Modelling the population cost-effectiveness of current and evidence-based optimal treatment for anxiety disorders

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
The health interventions examined were current care and a hypothetical regime of evidence-based optimal treatment for anxiety disorders in Australia. More specifically, panic disorder and/or agoraphobia, social phobia, generalised anxiety disorder (GAD), post-traumatic stress disorder (PTSD) and obsessive-compulsive disorder. Further details of the two interventions were not reported.

Type of intervention
Treatment.

Economic study type
Cost-utility analysis.

Study population
The study population comprised patients currently in contact with the health services who met the ICD-10 criteria for one of four anxiety disorders (panic disorder with and without agoraphobia, social phobia, GAD, PTSD).

Setting
The setting was not explicitly reported, but it was likely to have been secondary care and the community. The study was conducted in Australia.

Dates to which data relate
The dates of the effectiveness evidence ranged from 1993 to 2002. The epidemiological and resource use data for the current care group were collected between mid 1997 and mid 1998. The resource use data for the optimal care group were published between 1993 and 2002. The price year was 1997/1998.

Source of effectiveness data
The estimates of effectiveness were derived from a review or synthesis of published studies and authors’ assumptions.

Modelling
The authors stated that a modelling method was developed to translate changes in symptoms and disability, which were summarised as an effect size (ES), into changes in health state preference values (HSPVs). This model was described in detail in another publication (Sanderson et al., see Other Publications of Related Interest).

Outcomes assessed in the review
The outcome assessed was the burden averted by both the specific and non-specific effects of treatment. The outcome
was measured as the change in years lived with disability (YLD). The YLDs were estimated from changes in disability weights.

**Study designs and other criteria for inclusion in the review**
Although some details of the papers used to provide the data were reported, the inclusion criteria by which the papers were included or excluded were not specified. The efficacy of the interventions was defined from literature on randomised controlled trials (RCTs). Summaries of the benefits of individual interventions were obtained from published meta-analyses.

**Sources searched to identify primary studies**
Not reported.

**Criteria used to ensure the validity of primary studies**
Not reported.

**Methods used to judge relevance and validity, and for extracting data**
The authors stated that the meta-analyses were selected on the basis of their recentness and methodological rigour. No other details were reported.

**Number of primary studies included**
Four meta-analyses provided the ES data for the different treatments for the four anxiety disorders.

**Methods of combining primary studies**
A single meta-analysis was chosen for each of the four anxiety disorders.

**Investigation of differences between primary studies**
Not reported.

**Results of the review**
The population outcomes of current and optimal care were presented in full in the paper. The ESs for the treatments used for the anxiety disorders were as follows:

for panic with and without agoraphobia, the ES was 0.56 with selective serotonin reuptake inhibitor or tricyclic antidepressant (SSRI/TCA), 0.90 with cognitive-behavioural therapy (CBT) and 0.90 with CBT plus SSRI/TCA;

for social phobia, the ES was 1.58 with SSRI/TCA, 1.28 with CBT and 1.58 with CBT plus SSRI/TCA;

for GAD, the ES was 1.54 with SSRI/TCA, 1.89 with CBT and 1.89 with CBT plus SSRI/TCA; and

for PTSD, the ES was 0.81 with SSRI/TCA, 0.99 with CBT and 0.99 with CBT plus SSRI/TCA.

For combined treatment, the highest ES was applied on the assumption that combined treatment was at least as good, but not better than the most effective intervention alone.

The disability weight changes for current and optimal treatment of all four anxiety disorders were:

for current treatment, 0.0616 for panic/agoraphobia, 0.0967 for social phobia, 0.1197 for GAD and 0.0776 for PTSD;
for optimal treatment (mild), 0.1107 for panic/agoraphobia, 0.0805 for social phobia, 0.2415 for GAD and 0.1247 for PTSD; and

for optimal treatment (moderate or severe), 0.1093 for panic/agoraphobia, 0.1876 for social phobia, 0.2436 for GAD and 0.1278 for PTSD.

The authors reported an increased efficacy of optimal care, which also reflected particular changes in treatment patterns for each disorder. For panic disorder, GAD and PTSD, the increased efficacy was produced by a shift from pharmacological to psychological treatment. Across all four disorders, evidence-based care would result in a 1.5- to 2-fold increase in efficacy compared with treatment under current care.

Methods used to derive estimates of effectiveness
The assumptions used in the analysis were based on authors’ estimates.

Estimates of effectiveness and key assumptions
The authors assumed that the degree of change resulting from treatment in ES units in clinical trials indicated the degree of change in disability weights used in the YLD calculations. It was also assumed that the ES captured both changes in severity and duration of illness that were used in YLD calculations. The authors assumed that efficacy reflected effectiveness when the RCTs included dropouts and non-compliance if an intention to treat analysis was used. Treatment resistance was modelled for a proportion of cases (10%).

Measure of benefits used in the economic analysis
The summary measure of benefit adopted was the YLD averted (the disability component of the disability-adjusted life-year, DALY). YLDs were calculated as the product of prevalence and disability. The outcomes were based on a 12-month prevalence, which was adjusted for time spent symptomatic. The details of the methods used to derive the time spent symptomatic were unclear.

Disability was defined by an HSPV called the disability weight. The HSPVs were derived from a convenience sample of general practitioners (GPs) with knowledge of mental disorders, using the rating scale and time trade-off methods. Changes in YLDs were estimated from changes in disability weights. A modelling method was used to translate the ESs reported in the literature into disability weights.

Direct costs
The resource quantities and the costs were measured separately. The cost of current and evidence-based optimal mental health-related treatment for a 12-month period for the four anxiety disorders was reported. The total mental health sector costs, total general health sector costs, pharmaceutical costs and costs per treated case were presented. The mental health sector costs covered inpatient stay, consultations with psychiatrists, psychologists and the mental health team. The general health sector costs covered GP visits, GP referred self-help and medical specialist consultations.

The resource use data for current care were obtained from the Australian National Survey of Mental Health and Well-being (NSMHWB) (1997 - 1998). The resource use data for the optimal care package were derived from treatment recommendations, guidelines and meta-analyses. Specific information on medication class, type and dosage was not collected. Therefore, current medications were costed against the medication type and dose recommended under optimal care. These costs were varied in a univariate sensitivity analysis.

All the unit costs were obtained from published sources (Commonwealth Department of Health and Aged Care, 1999; Buckingham et al. 1998). The costs and quantities were estimated from actual data and some assumptions were made. For example, information on the length or nature of the consultations was not reported in the NSMHWB data, and unit costs for the most common consultation length and type were applied in the analysis. A one-year time horizon was used, thus it was not necessary to carry out any discounting. Details of the costs of each type of care for 12 months, as well as the total cost and cost per treated case of all services and treatments, were presented. The costs were converted to

**Statistical analysis of costs**
A Monte Carlo simulation approach was used to provide 95% confidence intervals (CIs) around the estimated total costs of treatment.

**Indirect Costs**
The indirect costs were not included in the analysis.

**Currency**
Australian dollars (Aus$).

**Sensitivity analysis**
A sensitivity analysis of the costs and benefits was carried out. The authors stated that every point estimate in the analysis was included in the sensitivity analysis. Variance around the estimates of resource use for patients under current care was obtained from the NSMHWB data. Variance around the estimates of resource use under optimal care was derived from investigator-modelled ranges around the rates, types and number of contacts. No further details were provided. Variance around the unit costs was obtained from the Buckingham et al. (1998) study. The method and rationale for determining the range of values for the estimates of benefits were not mentioned in the paper. A probabilistic sensitivity analysis, using a Monte Carlo simulation approach, was employed to provide 95% CIs for estimates of costs and benefits. A multivariate, stepwise, linear regression was conducted to determine the strongest predictors in variance around the cost-effectiveness estimate. One-way sensitivity analyses were conducted on variables that were estimated from treatment guidelines and expert reviews.

**Estimated benefits used in the economic analysis**
The benefits were reported as YLDs averted.

In the panic/agoraphobia sub-group, the YLDs averted were 2,375 (95% CI: 1,762 - 3,063) for current treatment and 3,304 (95% CI: 1,988 - 5,002) for optimal treatment.

In the social phobia sub-group, the YLDs averted were 2,530 (95% CI: 1,988 - 3,159) for current treatment and 3,885 (95% CI: 2,260 - 3,531) for optimal treatment.

In the GAD sub-group, the YLDs averted were 14,469 (95% CI: 11,891 - 17,297) for current treatment and 23,424 (95% CI: 18,142 - 29,091) for optimal treatment.

In the PTSD sub-group, the YLDs averted were 6,687 (95% CI: 4,323 - 8,973) for current treatment and 9,489 (95% CI: 6,919 - 12,334) for optimal treatment.

A one-year timeframe was used for the study. The length of follow-up was not extrapolated beyond the timeframe of the study.

**Cost results**
The total costs of treatment (presented as million Aus$) for 12 months were:

for the panic/agoraphobia sub-group, Aus$81.7 (95% CI: 54.1 - 101.1) for current treatment and Aus$65.4 (95% CI: 37.9 - 89.4) for optimal treatment;

for the social phobia sub-group, Aus$43.6 (95% CI: 28.0 - 61.4) for current treatment and Aus$33.1 (95% CI: 18.9 - 50.8) for optimal treatment;
for the GAD sub-group, Aus$112.3 (95% CI: 83.8 - 140.0) for current treatment and Aus$118.2 (95% CI: 94.2 - 141.0) for optimal treatment; and

for the PTSD sub-group, Aus$158.2 (95% CI: 136.3 - 212.4) for current treatment and Aus$149.2 (95% CI: 140.7 - 194.1) for optimal treatment.

The costs of adverse effects of treatment do not appear to have been included in the study.

**Synthesis of costs and benefits**

The results were presented as a cost-effectiveness ratio (the cost per YLD averted).

An incremental analysis was not performed.

The estimates of cost-effectiveness were:

for the panic/agoraphobia sub-group, Aus$34,389 (95% CI: 20,998 - 49,854) per YLD averted for current treatment and Aus$19,820 (95% CI: 13,221 - 28,087) per YLD averted for optimal treatment;

for the social phobia sub-group, Aus$17,218 (95% CI: 10,136 - 26,038) per YLD averted for current treatment and Aus$8,531 (95% CI: 5,980 - 12,253) per YLD averted for optimal treatment;

for the GAD sub-group, Aus$7,761 (95% CI: 5,531 - 10,488) per YLD averted for current treatment and Aus$5,048 (95% CI: 4,105 - 6,116) per YLD averted for optimal treatment; and

for the PTSD sub-group, Aus$23,656 (95% CI: 17,148 - 41,932) per YLD averted for current treatment and Aus$15,728 (95% CI: 12,550 - 24,311) per YLD averted for optimal treatment.

The results showed that the increase in efficacy for optimal evidence-based care compared with current care was achieved at a similar, or lower, overall cost for each disorder. However, the 95% CIs for current and optimal care overlapped for all four anxiety disorders.

For the cost-effectiveness of current treatment, intervention ESs and unit costs associated with medication usage were important predictors of variance for all four disorders. Estimates of bed day usage contributed significantly to the final cost-effectiveness estimates for GAD, social phobia and PTSD. The pattern of predictors was similar for the cost-effectiveness of optimal treatment, with the addition of the transformation factor used to translate the effect size into a disability weight change.

The one-way sensitivity analysis indicated that using the upper and lower plausible limits on a number of investigator-modelled estimates generally produced a less than 10% change either side of the reported estimates. Two parameters were an exception to this. These were doubling the proportion of people estimated as treatment resistant (from 10 to 20%), and modelling different classes of medication for each disorder.

**Authors' conclusions**

Evidence-based care for anxiety disorders would produce greater population health gain at a similar cost to that of current care, and would result in a substantial increase in the cost-effectiveness of treatment.

**CRD COMMENTARY - Selection of comparators**

The rationale for the choice of the comparator was clear. The scenario of no treatment was used as the comparator for both current care and optimal care. The comparator was justified on the grounds that it, essentially, represents the natural history of a disorder and is consistent with the methods used by the WHO for assessing the cost-effectiveness of different interventions. You should decide if this is appropriate for your own setting.

Validity of estimate of measure of effectiveness
The analysis was based on data from RCTs, meta-analyses and a modelling method that was used to translate changes in symptoms and disability into changes in HSPVs. The HSPV was derived using a novel method, the full details of which were published elsewhere (Sanderson et al., see Other Publications of Related Interest). Further investigation of the robustness of this approach is required.

The authors determined the ES of the four anxiety disorders from RCTs and meta-analyses, but did not state whether a systematic review of the literature was undertaken. In addition, the authors did not specify the criteria used in selecting and assessing the validity of these studies.

The ESs were derived from the clinical trial setting and are likely to reflect efficacy rather than "real world" effectiveness. The inclusion of nonresponders, which was based on assumption, might have adjusted for this, but the sensitivity analysis found that the results were sensitive to this parameter.

Validity of estimate of measure of benefit
The YLDs averted were selected as a benefit measure. The authors acknowledged that the YLDs averted were estimated on the assumption that the ES, which measures symptoms, can be used to predict disability.

Validity of estimate of costs
The resource use data were presented as percentages. For costing purposes, mean values would be more informative. The resource use data for optimal care were derived from treatment recommendations, guidelines and meta-analyses. The method of searching for the studies and the criteria for inclusion were not specified in detail. The 95% CIs for the estimates of costs, for both current and optimal treatment, overlapped for all four anxiety disorders. Therefore, no statistically significant difference in the costs of current and optimal care was demonstrated. Current medications were costed against the medication type and dose recommended under optimal care. This does not reflect reality, and one-way sensitivity analysis demonstrated that the estimate of cost-effectiveness was sensitive to this parameter. The collection of more robust drug utilisation data is recommended.

Other issues
The authors mentioned a number of limitations in their study. For example, the analysis did not include estimates of indirect costs, but the economic burden to society is considerable and extends beyond the direct costs of treatment. Therefore, the benefits of treatment were likely to be underestimated. The study did not account for the additional costs of implementing the optimal-based care approach in terms of recruitment, education and training. This is particularly relevant given the increased requirement for psychological treatment under optimal care. The generalisability of the results to other settings was not discussed.

Implications of the study
The authors concluded that a package of evidence-based care for anxiety disorders would produce greater population health gain at a similar cost to that of current care, resulting in an increase in the cost-effectiveness of treatment. However, there is substantial uncertainty in these estimates of costs and benefits and, although most of the data were derived from the "best available" evidence, the authors acknowledged that there is room for improvement in the robustness of the data. The study highlighted that treatment under an optimal regime of care would require an increase in the numbers of people receiving psychological treatments for all four anxiety disorders.

Source of funding
None stated.

Bibliographic details
Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Anti-Anxiety Agents /economics /therapeutic use; Anxiety Disorders /classification /economics /therapy; Australia; Cognitive Therapy /economics; Cost of Illness; Cost-Benefit Analysis; Evidence-Based Medicine /economics; Health Care Costs; Humans; Mental Health Services /classification /economics; Models, Econometric; Monte Carlo Method; Quality-Adjusted Life Years

AccessionNumber
22004000369

Date bibliographic record published
31/12/2004

Date abstract record published
31/12/2004