Cost-effectiveness of an intervention to prevent depression in at-risk teens


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
Teenagers at risk of depression were offered a 15-session group therapy (cognitive-behavioural therapy, CBT) prevention programme in addition to usual care. The comparator treatment was to offer usual care.

Type of intervention
Secondary prevention.

Economic study type
Cost-effectiveness analysis and cost-utility analysis.

Study population
The study population comprised teenagers aged between 13 and 18 years old. They had had at least two dispensations of an antidepressant medication and/or mental health visits within the previous year, and had parents who also had a diagnosis of depression or showed symptoms of depression. Their depression was classified according to the American Psychiatric Association's DSM-111-R diagnoses as being a subsyndromal group, and was not sufficiently severe to meet the criteria for a DSM-III-R affective disorder. (Center for Epidemiologic Studies Depression Scale score >/= 24).

Setting
The setting was a health maintenance organisation (HMO). The economic study was carried out in the USA.

Dates to which data relate
The dates of the effectiveness and resource evidence were not given. The price year was 2000.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The same patients provided both the effectiveness and the resource evidence. Some costing was carried out prospectively and some retrospectively.

Study sample
Power calculations were not reported. The study sample was selected by including all patients covered by the HMO who met the inclusion criteria and who consented to participate in the study. Of the 123 teenagers who met the inclusion criteria, 94 consented to participate in the study. Forty-nine patients were randomised to usual care and 45 to group therapy sessions with usual care.
**Study design**
This was a randomised controlled trial (RCT). The number of centres participating was not given. The patients were followed up for one year. Information on loss to follow-up was given in an earlier study (Clarke et al. 2001, see ‘Other Publications of Related Interest’ below for bibliographic details).

**Analysis of effectiveness**
The analysis was conducted on an intention to treat basis. The primary health outcome was the number of DFDs. A day that was not depression free occurred when either there were elevated symptoms (Center for Epidemiologic Studies Depression Scale score $\geq 21$) or when there was a major depression episode (as indicated by DSM-IV criteria). The two groups were similar at baseline in terms of current and past psychiatric disorder, but the intervention group had a significantly higher percentage of minority participants and a slightly higher baseline Child Behaviour Checklist depression score. The percentage of females was higher in the usual care group (65.3% versus 53.3%), but this was not statistically significant.

**Effectiveness results**
The mean number of DFDs was 248 (95% confidence interval, CI: 214 to 283) in the usual care group and 301 in the CBT group (95% CI: 279 to 320), ($p=0.001$).

**Clinical conclusions**
The authors concluded that the group therapy prevention programme had reduced the incidence of depression among the teenagers receiving it.

**Modelling**
Regressions were used to estimate depression-free days (DFDs) and cost-differences between the two groups to allow for baseline patient differences between the groups.

**Measure of benefits used in the economic analysis**
The measures of benefit used were the quality-adjusted life-years (QALY) gained and the number of DFDs gained during the year following the intervention. DFDs were transformed into QALYs using weights from "the literature" and 6 sources were referred to. The transition from fully symptomatic depression to full remission was taken to be 0.4 QALYs.

**Direct costs**
Discounting was not carried out as costs were incurred during less than 1 year. The quantities of medical service use per patient were given, but the quantities and the costs were not reported separately. The costs measured for the intervention were for teen group intervention sessions, parent group information sessions, group leader training, electronic identification of the patient population, chart review for parent depression status, HMO provider time and outreach and recruitment of parents and teens. The costs of the intervention were estimated using actual data obtained from the clinical trial records and study staff estimates. The costs of usual care were obtained from electronic HMO data, while participants were also given surveys to register any non-HMO resource use. The unit costs were obtained from other studies referred to in the study and local market unit costs. Family transportation costs were estimated from patient utilisation data and other information. The price year was 2000.

**Statistical analysis of costs**
CIs were obtained for the cost estimates using non-parametric bootstrapping methods.

**Indirect Costs**
Discounting was not carried out as the costs were incurred during less than 1 year. The amount of time taken by teenagers and parents was obtained from patient utilisation data and other study information. Time used by parents and teenagers was valued using national data on hourly wages for teens and parents in the same geographic region. The price year was 2000.

**Currency**

US dollars ($).

**Sensitivity analysis**

One-way sensitivity analyses were carried out on the cost and effectiveness variables using the bounds of the 95% CI for each variable. The effect of using a more conservative method to estimate DFDs, in which a DFD did not take place when symptoms were elevated but not severe enough to meet the full criteria for a depression diagnosis, was investigated. Also assessed were the effects of using 0.2 as a utility gain from moving to full remission from full depression, the exclusion of family costs and family time, the inclusion of HMO costs only, and the assumption that parents attend different percentages of the teen visits.

**Estimated benefits used in the economic analysis**

The mean QALYs were 0.869 (95% CI: 0.831 to 0.907) in the usual care group and 0.928 (95% CI: 0.903 to 0.949) in the intervention group, (p=0.001).

The average increase in QALYs in the intervention group was 0.059.

The average increase in DFDs in the intervention group was 53, (p=0.001).

The side effects of treatment were considered in the economic analysis.

**Cost results**

The mean costs were $2,715 (95% CI: 1,619 to 4,069) in the usual care group and $3,325 (95% CI: 2,861 to 3,830) in the CBT group, (p=0.81).

Knock-on costs were dealt with in the costing. The costs were calculated for 1 year.

**Synthesis of costs and benefits**

The incremental cost-effectiveness ratios (ICERs) were $10 per DFD gained (95% CI: -13 to 52) and $9,275 per QALY gained (95% CI: -12,148 to 45,641).

The one-way sensitivity analyses using the 95% CI boundaries showed that, at the low end of the intervention cost, the ICER would be negative (-$13 per DFD or $11,854 per QALY). At the high end of the cost estimate, the ICER would be $23 per DFD or $26,266 per QALY.

Although all the variables examined in the sensitivity analysis had an effect on the ICERs, the variables that had the largest effect on increasing the ICER were the assumption of a conservative clinical effect ($23 per DFD or $19,655 per QALY) and the inclusion of HMO costs only ($18 per DFD or $16,178 per QALY).

The other variable that had a strong effect on reducing the ICER was the assumption of a strong clinical effect ($10 per DFD or $3,279 per QALY).

Parents attending teen visits altered the range of the ICERs from $9 to $12 per DFD ($8,176 to $10,375 per QALY).

When family costs were excluded altogether, the ICER was $9 per DFD ($8,419 per QALY).
Authors' conclusions
The intervention increased the number of depression-free days (DFDs) for the subsyndromal teenagers in the study. The main result of $9,275 per quality-adjusted life-year (QALY) gained means that the provision of group cognitive-behavioural therapy (CBT) to teenagers achieved a benefit at a cost that is generally regarded as reasonable. The sensitivity analysis never showed an incremental cost-effectiveness ratio (ICER) of more than $35,000 and, when the authors drew up a cost-effectiveness acceptability curve, they found that if society were willing to pay $20 for an extra DFD, the probability of the intervention achieving this was 75%.

CRD COMMENTARY - Selection of comparators
The comparator was chosen to represent current practice in the authors' setting, but detailed information as to what constituted current practice was not given.

Validity of estimate of measure of effectiveness
The source of the effectiveness data was a single study. The study design, an RCT, was appropriate for the hypothesis. The study sample appears to have been representative of the study population, although the low percentage of eligible families who wanted to participate in the study suggests that they might not have been completely representative. The patient groups were shown not to be comparable in all respects at baseline. Indeed, the authors tried to take potential biases and confounding factors into account by carrying out a regression analysis.

Validity of estimate of measure of benefit
Two measures of benefit, DFDs and QALYs, were used in the economic analysis. The DFDs were taken directly from the effectiveness analysis, while the QALYs were arrived at using weights derived from the literature and applying them to the DFDs.

Validity of estimate of costs
Given the cost perspective adopted (i.e. that of society) all the relevant categories of cost were included in the analysis. The authors included measures of medical service use, although the costs were not reported separately from the quantities. A sensitivity analysis of the total costs was conducted, using ranges that appear to have been appropriate. The sources of the unit costs and resource use were reported. No statistical or sensitivity analysis of the prices or quantities was carried out. The price year was 2000.

Other issues
The authors made appropriate comparisons of their results with the findings from other studies. The issue of generalisability to other settings was discussed. The authors did not present their results selectively and their conclusions reflected the scope of the analysis.

The authors acknowledged several limitations of their study. First, they realised that their results would be more robust with a larger sample size. Second, they did not know if the results could be replicated with other health care systems and other geographical locations. Third, they were unable to take all their cost data from the trial and had to take some information from published literature. The authors pointed out that their method of recruiting patients was very expensive as it used paper records. They estimated that, in future, a similar programme using electronic records would be a lot cheaper. They also pointed out that the utility weights used to derive QALYs were taken from literature concerned with adults and, therefore, may not be applicable to teenagers. Similarly, the monetary value that one puts on a teenage QALY might be different from that of an adult QALY. The authors pointed out that, in this research study, the quality of care would probably be higher than in the "real world" and this might have resulted in an overestimation of the beneficial effects.

Implications of the study
The authors concluded that a study with a larger sample size and a more diverse population is needed to establish the
effectiveness and cost results in this study.

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**Bibliographic details**

**Other publications of related interest**
Because readers are likely to encounter and assess individual publications, NHS EED abstracts reflect the original publication as it is written, as a stand-alone paper. Where NHS EED abstractors are able to identify positively that a publication is significantly linked to or informed by other publications, these will be referenced in the text of the abstract and their bibliographic details recorded here for information.


**Indexing Status**
Subject indexing assigned by NLM

**MeSH**
Adolescent; Age Factors; Cognitive Therapy /economics /methods; Comparative Study; Cost-Benefit Analysis; Depressive Disorder /economics /prevention & control /therapy; Female; Health Care Costs; Health Maintenance Organizations /economics; Humans; Male; Research Support, N.I.H., Extramural; Research Support, U.S. Gov't, P.H.S.; Risk Factors; Treatment Outcome

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