Cost-effectiveness of selective serotonin reuptake inhibitors and routine specialist care with and without cognitive–behavioural therapy in adolescents with major depression

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Background Major depression is an important and costly problem among adolescents, yet evidence to support the provision of cost-effective treatments is lacking.

Aims To assess the short-term cost-effectiveness of combined selective serotonin reuptake inhibitors (SSRIs) and cognitive–behavioural therapy (CBT) together with clinical care compared with SSRIs and clinical care alone in adolescents with major depression.

Method Pragmatic randomised controlled trial in the UK. Outcomes and costs were assessed at baseline, 12 and 28 weeks.

Results The trial comprised 208 adolescents, aged 11–17 years, with major or probable major depression who had not responded to a brief initial psychosocial intervention. There were no significant differences in outcome between the groups with and without CBT. Costs were higher in the group with CBT, although not significantly so ($P=0.057$). Cost-effectiveness analysis and exploration of the associated uncertainty suggest there is less than a 30% probability that CBT plus SSRIs is more cost-effective than SSRIs alone.

Conclusions A combination of CBT plus SSRIs is not more cost-effective in the short-term than SSRIs alone for treating adolescents with major depression in receipt of routine specialist clinical care.

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Major depression among adolescents is an important and costly problem but evidence to support cost-effective treatments is lacking (Romeo *et al*, 2005). This paper reports an economic evaluation of cognitive–behavioural therapy (CBT) plus selective serotonin reuptake inhibitors (SSRIs) compared with SSRIs alone within a randomised controlled superiority trial – the Adolescent Depression Antidepressant and Psychotherapy Trial (ADAPT; Goodyer *et al*, 2007). It is currently unclear whether combination therapy is more effective than monotherapy, as studies from the USA are conflicting (Clarke *et al*, 2005; Melvin *et al*, 2006), and there have been no UK trials in a typical National Health Service (NHS) population. The provision of combination therapy, should it prove effective, would necessitate a shift in resources that could be used elsewhere. Consequently, the cost-effectiveness of CBT plus SSRIs should be determined.

METHOD

Hypothesis

The aim of the ADAPT trial was to determine, in a routine sample of adolescents with depression referred to child and adolescent mental health services, whether combination therapy (CBT plus SSRIs) was more effective and more cost-effective than SSRIs alone when provided in addition to routine specialist clinical care. We hypothesised that the additional costs of CBT would be offset by improvements in patient outcomes and/or savings in the use of other services, compared with SSRI treatment alone. Given the focus on patient outcomes, we considered a cost-effectiveness analysis to be the most appropriate method of economic evaluation.

Trial design

Adolescents aged 11–17 years meeting DSM–IV criteria (American Psychiatric Association, 1994) for major or probable major depression were recruited to this multicentre randomised controlled trial in Manchester and Cambridge, UK between June 2000 and November 2004. A brief psychosocial intervention was undertaken pre-randomisation to exclude participnats with depression that remit rapidly. Randomisation was carried out by a remote independent statistical centre. Stochastic minimisation was used to ensure balance on severity, centre, gender, comorbid behavioural disorder and age. More detailed information on the brief initial intervention and all other aspects of the design of this trial are provided by Goodyer *et al* (2007).

Interventions

Fluoxetine was chosen as the primary SSRI as it was the only SSRI with evidence for efficacy from a randomised controlled trial at the start of the study (Emslie *et al*, 1997). If fluoxetine was ineffective or causing problematic side effects, other SSRIs were considered. All participants were seen regularly by a study psychiatrist for general case management and monitoring of medication. Participants receiving SSRIs only were offered nine out-patient sessions over 28 weeks; this could be increased depending on clinical need. Participants in the combined therapy group were also offered weekly CBT for 12 weeks, followed by six maintenance sessions every 2 weeks and a final session at 28 weeks. CBT was provided by psychiatrists (who also undertook case management and monitoring of medication) or CBT therapists (in which case separate sessions with a study psychiatrist were provided for case management and monitoring of medication). All therapists had reached pre-agreed competence criteria and supervision was provided by fully accredited CBT supervisors.

Outcome measures

Research assessors, masked to treatment allocation, carried out assessments at baseline, 6, 12 and 28 weeks after trial entry. Diagnoses were determined by the Kiddie Schedule for Affective Disorders and Schizophrenia, present and lifetime version (K–SADS–PL; Kaufman *et al*, 1997). The *a priori* primary outcome measure was the Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA; Gowers *et al*, 1999), a global measure of mental health impairment scored in the

range 0–52 (with higher scores indicating worse outcomes). Secondary analyses explored cost-effectiveness in terms of quality-adjusted life-years (QALYs), calculated using the EQ–5D measure of health-related quality of life (Williams, 1995; Brooks, 1996). This method of economic evaluation is known as cost–utility analysis. The EQ–5D consists of a five-item questionnaire in the domains of mobility, self-care, usual activities, pain/discomfort and anxiety/depression, which classifies individuals into one of 243 health states, each associated with a score that can be used to calculate QALYs. In addition, it contains a visual analogue scale (VAS) on which patients rate their own health between 0 (worst imaginable health state) and 100 (best imaginable health state). The measure has been used extensively and its psychometric properties are adequate (Brooks, 1996).

Cost

The economic evaluation took a broad service-providing perspective, including that of the health, social services, education, voluntary and private sectors. Travel costs to intervention sessions and productivity losses of the primary carer resulting from their child's illness were also recorded. Economic information was collected by interview at baseline, 12 and 28 weeks using the Child and Adolescent Service Use Schedule (CA–SUS), developed by the authors in previous studies and adapted for this study (Byford et al, 1999; Harrington et al, 2000; Barrett et al, 2006). At baseline, information covered the previous 6 months. At follow-up, service use since the previous interview was recorded. Data on the trial interventions, CBT and case management/monitoring of medication were collected from clinical records to avoid patients revealing their treatment group to the research assessors. All unit costs were for the financial year 2003–04, the most recent financial year over which the trial data were collected, and are reported in UK pounds sterling. Discounting was not necessary owing to the short-term nature of the trial.

Intervention sessions were costed on the basis of the salary of the professional involved. Costs included relevant on-costs (employers' national insurance and superannuation contributions) and overheads (administrative, managerial and capital; Curtis & Netten, 2004). Intervention sessions lasted approximately 55 min for the CBT plus SSRIs group and 30 min for the

SSRIs group. Indirect time was included using information provided by the trial therapists on the ratio of direct face-to-face contact to all other activities. Although the time the therapists spent in supervision is included in these calculations, supervisor costs were excluded owing to difficulties in accurately separating supervision for the two trial groups. Supervisor costs were estimated and explored in sensitivity analysis. Intervention costs were calculated on the basis of the number of sessions attended; the inclusion of the cost of non-attendance was explored in sensitivity analysis. The cost of the initial clinical assessment and brief pre-randomisation intervention were not included, as these activities took place before randomisation.

Costs of SSRIs and other psychotropic medication were taken from the British National Formulary (British Medical Association & Royal Pharmaceutical Society, 2004). Hospital contacts were costed using NHS Reference Costs (Department of Health, 2004). Unit costs of community health and social services were taken from national publications (Curtis & Netten, 2004). The costs of schooling came from Ofsted reports (the UK inspectorate and regulatory body for schools in England; http://www.ofsted.gov.uk) and published documents (Berridge et al, 2003; Independent Schools Council, 2005). Productivity losses of the primary carer were calculated using the human capital approach, which involves multiplying days off work owing to illness by the individual's salary.

Statistical methods

Analyses were carried out on an intention-to-treat basis using a statistical analysis plan drawn up prior to data analysis. The analyses were conducted as for a superiority trial with CBT plus SSRIs as the default (superior). Although costs were not normally distributed, analyses compared mean costs using standard parametric t-tests with the validity of results confirmed using bootstrapping (Efron & Tibshirani, 1993; Barber & Thompson, 1998). The primary analysis was of total cost per young person over 28 weeks. Multiple regression was used to adjust for the following pre-specified baseline characteristics: gender, age, centre, HoNOSCA score, severity of illness (Children's Global Assessment Scale; Shaffer et al, 1983), comorbid behavioural disorder (K–SADS–PL) and costs, in all tests of differences in costs and outcomes. The impact of drop-out was assessed by

comparing baseline characteristics of participants with and without full economic data. Subgroup analyses by centre and severity of illness were performed using tests of interaction.

Cost-effectiveness was explored through the calculation of incremental cost-effectiveness ratios (ICER), defined as the difference in mean costs divided by difference in mean effects (Van Hout et al, 1994). Non-parametric bootstrapping (repeat re-sampling) from the costs and effectiveness data was used to generate a joint distribution of incremental mean costs and effects for the two treatments (Efron & Tibshirani, 1993). This was then used to calculate the probability that each of the treatments is the optimal choice, subject to a range of possible maximum values (ceiling ratio) that a decision-maker might be willing to pay for a unit improvement in outcome. Cost-effectiveness acceptability curves are presented by plotting these probabilities for a range of possible values of the ceiling ratio (Fenwick et al, 2001). These curves incorporate the uncertainty that exists around the estimates of expected costs and expected effects associated with the two interventions (Fenwick & Byford, 2005).

RESULTS

Participants

In total 208 adolescents were randomised to CBT plus SSRIs ($n=105$) or SSRIs alone ($n=103$). Full economic data were available for 188 participants (90%), 96 in the CBT plus SSRIs group and 92 in the SSRIs group. Comparison of baseline characteristics revealed a significant centre difference between those included in the economic evaluation and those who were missing, with 95% of missing data coming from Manchester ($P=0.015$). No other significant differences were found and there was no difference in missing data between the two treatment groups. Although final follow-up was planned to take place 28 weeks after trial entry, this was not always achieved. Attempts were made to include all participants, so earlier and longer follow-ups were allowed. For this reason, length of follow-up varied greatly (range 21–51 weeks); however, there was no significant difference between the two treatment groups (mean 29 weeks in both groups). In addition, there were no significant differences in baseline characteristics between the two treatment groups (Table 1).

Outcomes

Results for the HoNOSCA and EQ–5D at the 28-week follow-up are reported in Table 2. The two groups did not differ significantly on either measure, nor were any differences found at the 12-week follow-up (Goodyer *et al*, 2007). EQ–5D utilities and self-rated health status from the visual analogue scale show improvements in health status over time in both groups, but there was little difference between the two groups at final follow-up.

Resource use

Table 3 details the mean number of contacts participants had with all services over the 28-week follow-up. Resource use differed little between the two groups except for intervention sessions and in-patient services, with the CBT plus SSRIs group attending more intervention sessions and spending more time in hospital than the SSRIs group.

Costs

The mean cost of intervention sessions for the CBT plus SSRIs group was estimated to be £67 (range £41–£216 depending on profession and seniority of therapist), compared with £36 for the SSRIs group (range £22–£118). Assuming full attendance, the cost of a full course of CBT plus SSRIs was estimated to be £1273 (range £779–£4104). The actual cost per study participant was £750 since few completed the full course of treatment owing to non-attendance or a clinical decision to discharge the participant.

Table 4 details the total costs over the 28-week follow-up. Results from the non-parametric bootstrap replications did not differ substantially from the parametric results and are not reported here. Total costs per participant in the CBT plus SSRIs group were £6940, which was £2300 more than in the SSRIs group. This difference was not statistically significant but came close ($P=0.057$). The CBT plus SSRIs group incurred significantly greater costs than the SSRIs group in terms of intervention sessions and secondary healthcare services. The difference for intervention sessions was due to the greater length of these sessions and higher attendance rates in the CBT plus SSRIs group. The latter difference was owing primarily to two participants in the CBT plus SSRIs group who were admitted to hospital for a significant proportion of their time in the trial

(65% and 92%, respectively). Differences between the two groups were almost entirely due to differences in the cost of admissions. To take into consideration the variable length of follow-up costs per week are also reported but this made no difference to the results ($P=0.059$). In subgroup analyses, there were no statistically significant differences in the estimated effect of CBT plus SSRIs on total cost by centre (test of interaction $P=0.412$) or severity of illness ($P=0.971$).

Sensitivity analysis

A number of one-way sensitivity analyses were undertaken.

(a) The cost of intervention sessions was based on the salaries of the professionals involved. Since the seniority of

the therapists may have been influenced by the research, these costs were re-calculated to reflect likely clinical practice using the following professionals: specialist registrar, clinical psychologist grade A and mental health nurse grade F/G.

(b) The main analysis excluded sessions where the participant did not attend, which assumes the therapist was able to use the time for alternative productive work. This assumption was removed and the full cost of participants not attending was included (equivalent to the cost of an attended session).

(c) Estimates of the cost of supervisors' time was added on the basis of the following assumptions: supervision provided by a consultant psychiatrist;

Table 1 Baseline characteristics of the sample

	CBT plus SSRIs (n=96)	SSRIs (n=92)
Female gender, n (%)	70 (73)	66 (72)
Age, years: median (range)	14 (11–17)	14 (11–17)
Study centre, n (%)		
Manchester	67 (70)	63 (68)
Cambridge	29 (30)	29 (32)
Behavioural disorder, n (%)	29 (30)	24 (26)
HoNOSCA score: mean (s.d.)	25 (6)	26 (6)
Six-month costs, £: mean (s.d.)	2984 (2176)	3141 (2195)

CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors; HoNOSCA, Health of the Nation Outcome Scale for Children and Adolescents.

Table 2 Outcome according to treatment group

	CBT plus SSRIs Mean (s.d.)	SSRIs Mean (s.d.)	Difference (95% CI)[1]	P[1]
EQ–5D VAS				
Baseline	55 (21)	59 (21)	−4 (−10 to 2)	
12 weeks	65 (18)	67 (21)	−3 (−9 to 3)	
28 weeks	72 (19)	72 (22)	0 (−6 to 6)	
EQ–5D utilities				
Baseline	0.49 (0.30)	0.50 (0.29)	−0.02 (−0.10 to 0.06)	
12 weeks	0.68 (0.30)	0.73 (0.25)	−0.07 (−0.14 to 0.01)	
28 weeks	0.74 (0.30)	0.78 (0.26)	−0.04 (−0.12 to 0.04)	
QALYs				
28 weeks	0.36 (0.15)	0.38 (0.14)	−0.02 (−0.07 to 0.05)	0.137
HoNOSCA				
28 weeks	15.39 (8.58)	14.52 (8.26)	1.24 (−1.05 to 3.52)	0.287

VAS, visual analogue scale; QALYs, quality-adjusted life-years; HoNOSCA, Health of the Nation Outcome Scale for Children and Adolescents; CGAS, Children's Global Assessment Scale; CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors.
1. Adjusted for gender, age, centre and baseline HoNOSCA, CGAS, comorbid behaviour disorder and EQ–5D.

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Table 3 Use of resources by young people during the 28-week follow-up period

Service	CBT plus SSRIs (n=96)	SSRIs (n=92)	Using service, %
Intervention sessions	11.3 (5.8)	7.0 (4.0)	98
Hospital services for all reasons			
In-patient days	5.8 (24.0)	0.6 (2.7)	13
Out-patient contacts	2.1 (4.6)	1.7 (3.3)	38
Day patient contacts	0.1 (0.3)	0.0 (0.2)	3
Accident and emergency contacts	0.5 (1.0)	0.4 (0.8)	31
Community health services			
General practitioner contacts	2.9 (4.6)	2.6 (5.7)	91
Practice nurse contacts	0.3 (0.7)	0.5 (1.7)	30
Counsellor contacts	0.1 (0.5)	0.4 (1.9)	9
District nurse contacts	0.0 (0.1)	0.1 (0.3)	3
Community psychiatric nurse contacts	0.3 (1.6)	0.2 (1.6)	3
Community psychologist contacts	0.1 (0.4)	0.1 (0.7)	2
Group therapy contacts	0.0 (0.0)	0.2 (1.4)	2
Education			
Mainstream school weeks	16.4 (12.4)	15.2 (12.2)	74
Hospital school weeks	2.1 (5.8)	1.7 (5.4)	12
Classroom support weeks	0.6 (2.8)	1.2 (4.4)	11
Home tuition weeks	1.1 (4.4)	1.3 (4.0)	12
Exclusion service weeks	0.4 (3.0)	0.3 (2.1)	2
Education welfare officer contacts	0.1 (0.6)	0.1 (0.6)	3
Education psychologist contacts	0.0 (0.0)	0.2 (1.3)	3
School doctor contacts	0.1 (0.3)	0.0 (0.2)	2
School nurse contacts	0.7 (3.4)	0.4 (1.4)	15
Social services			
Social worker contacts	0.2 (1.0)	0.6 (2.6)	16
Family support worker contacts	0.1 (1.2)	0.0 (0.1)	1
Youth worker contacts	0.2 (1.5)	0.0 (0.0)	1
Voluntary sector services	0.2 (1.1)	0.5 (2.2)	8
Private sector services	0.2 (1.7)	0.0 (0.1)	1

CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors.

mean of ten intervention sessions per week; mean of 60 min of supervision per week; mean of 6 min of supervision per session per week.

(d) The impact on cost of the two participants who spent the majority of the trial in hospital was explored by excluding these from the analysis.

(e) Travel and productivity losses borne by parents were added to provide a broader cost perspective.

(f) Local costs were changed to national unit costs (Curtis & Netten, 2004) to assess generalisability to the wider UK population.

The majority of these analyses did not alter the finding of no significant difference in cost between the two groups (Table 5).

Inclusion of the full cost of a participant not attending and supervisors' time increased the difference in cost between the two groups to the extent that the CBT plus SSRIs group became significantly more expensive than the SSRIs group (P=0.049 in both analyses). The removal of the participants who spent most of the trial in hospital greatly reduced the difference in cost (P=0.202).

Cost-effectiveness analysis

Using the bootstrapped means, the CBT plus SSRIs group cost £2327 more than the SSRIs group and HoNOSCA scores were 0.81 points worse over 28 weeks, giving an ICER of £2873 per unit increase in HoNOSCA score, where higher scores

indicate worse outcomes. Figure 1 presents a scatterplot of the bootstrapped replications for incremental cost and incremental HoNOSCA score on the cost-effectiveness plane. Because poorer outcomes on the HoNOSCA are associated with higher scores, moving from left to right on the x-axis means a worsening in the incremental effectiveness for the CBT plus SSRIs group compared with the SSRIs group. The standard cost-effectiveness plane is therefore reversed. In the north-west quadrant, the experimental intervention is more costly and more effective, whereas in the northeast quadrant the experimental intervention is more costly and less effective. The scatterplot demonstrates that CBT plus SSRIs is more expensive than SSRIs for almost all replications (points above the x-axis) and is associated with poorer outcomes for a large proportion of replications (points to the left of the y-axis). Figure 2 illustrates the associated uncertainty. At a ceiling ratio of £50 000, the highest value shown, there is a 25% chance of CBT plus SSRIs being more cost-effective than SSRIs alone. Tests beyond this value (up to a ceiling ratio of £150 000) found that the probability of CBT plus SSRIs being more cost-effective than SSRIs alone did not rise above 26%.

The relationship was similar for QALYs, with the CBT plus SSRIs group having higher costs and lower effects than the SSRIs group (bootstrapped incremental mean costs £2364; bootstrapped incremental mean effects −0.023), with an ICER of −£102 965, where higher scores indicate better outcomes. The cost-effectiveness acceptability curve showing the probability of CBT plus SSRIs being more cost-effective than SSRIs alone did not rise above 4%.

DISCUSSION

Outcomes

The combination of CBT with SSRIs did not result in significant clinical benefits for adolescents with major depression compared with SSRIs alone over 28 weeks. Health-related quality of life showed consistent improvements over time in both groups, but there were no between-group differences. Although improvements were evident in the group as a whole (mean baseline EQ–5D self-rated health status score 57, increasing to 72 at 28 weeks), these participants were still reporting scores lower than the UK population norm for

Table 4 Total service cost per participant over the 28-week follow-up period (£)

	CBT plus SSRIs (n=96) Mean (s.d.)	SSRIs (n=92) Mean (s.d.)	Mean difference (95% CI)[1]	P[1]
Health services	3512 (9425)	919 (1150)	2511 (568 to 4453)	
Intervention sessions	752 (683)	262 (196)	491 (344 to 639)	
Hospital services	2652 (9388)	551 (1109)	2017 (83 to 3950)	
Community health services	68 (96)	74 (126)	−9 (−41 to 22)	
Medication	40 (50)	32 (47)	9 (−5 to 23)	
Education	3400 (3556)	3575 (4089)	−55 (−1104 to 994)	
Social services	16 (70)	133 (1154)	−112 (−349 to 125)	
Voluntary sector services	6 (33)	14 (69)	−10 (−24 to 4)	
Private sector services	7 (55)	0 (3)	7 (−4 to 19)	
Total costs	6940 (11122)	4640 (4516)	2340 (−91 to 4772)	0.059
Total costs per week	244 (403)	161 (155)	85 (−3 to 173)	0.057

CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors; HoNOSCA, Health of the Nation Outcome Scale for Children and Adolescents; CGAS, Children's Global Assessment Scale.
1. Adjusted for gender, age, centre and baseline HoNOSCA, CGAS, comorbid behaviour disorder and costs.

young people under 25 years of age (mean 86.49; Kind *et al*, 1999).

Costs and cost-effectiveness

The CBT plus SSRIs group was more expensive over the 28-week follow-up than the SSRIs group, but not significantly so. However, the addition of the cost of participants failing to attend sessions and the cost of supervisors' time increased this cost difference to the extent that the CBT plus SSRIs group became significantly more expensive in both analyses. Since the cost of supervisors' time is a realistic cost to include, these results strongly suggest that CBT plus SSRIs is significantly more expensive than SSRIs alone.

Cost-effectiveness analysis further emphasised the lack of evidence in favour of CBT plus SSRIs. Irrespective of the measure of outcome chosen, there was no evidence to support the hypothesis that CBT plus SSRIs is a more cost-effective strategy than SSRIs alone for adolescents with major depression in receipt of routine care. Cost-effectiveness acceptability curves suggest that there is at best a 26% probability that CBT plus SSRIs is more cost-effective than SSRIs alone in terms of the HoNOSCA and only a 4% probability in terms of QALYs. Even when the two participants receiving CBT plus SSRIs who spent most of the trial in hospital were excluded in an attempt to bias the results in favour of CBT plus SSRIs, the probability of being cost-effective remained less than 50%. Thus, the sensitivity of the cost results to changes in the assumptions upon which the costs are based did not alter the overall findings.

Limitations

Analysis of participants excluded owing to missing economic data found a significant centre difference, with a higher proportion of missing data in Manchester than Cambridge. However, follow-up rates were relatively high overall (90%) and there is no evidence to suggest the comparison of the two groups was biased as a result of missing data. Despite intensive efforts to maintain therapeutic contact, mean attendance rates for CBT were low (11 out of 19 sessions), which may have reduced the response. However, this was a pragmatic trial and these rates reflect the clinical reality of attendance in this population of young people. The results are unable to provide evidence of the relative cost-effectiveness of CBT only; however, it was not considered appropriate to deny SSRIs to a population with such severe illness, given the existence of evidence to support their effectiveness, particularly for fluoxetine (Emslie *et al*, 1997; Whittington *et al*, 2004). The results presented here are short-term, covering only the 28-week treatment period. The longer-term impact of the interventions is unknown.

Other evidence

Despite these limitations, this study presents the only evidence of the cost-effectiveness of combination therapy for a pragmatic sample of adolescents with major depression. One similar study carried out in the USA explored the use of health services (Clarke *et al*, 2005), providing some indication of resource implications. The study evaluated a collaborative care, CBT programme for adolescents with major depressive disorder as an addition to treatment as usual

Table 5 Sensitivity analysis of 28-week cost per participant (£)

	CBT plus SSRIs (n=96) Mean (s.d.)	SSRIs (n=92) Mean (s.d.)	Mean difference (95% CI)[1]	P[1]
Main analysis	6940 (11 122)	4640 (4516)	2340 (−91 to 4772)	0.059
Varying grade/profession of therapist	6614 (11 074)	4531 (4499)	2126 (−294 to 4546)	0.085
Including full cost of missed appointments	7131 (11 089)	4736 (4516)	2436 (10 to 4862)	0.049
Including cost of supervisors' time	7200 (11 119)	4799 (4525)	2444 (14 to 4874)	0.049
Excluding high-cost individuals[2]	5531 (5180)	4640 (4516)	890 (−517 to 2297)	0.202
Including travel costs and parental productivity losses	7129 (11 347)	4836 (5171)	2357 (−178 to 4892)	0.068
Applying national unit costs	6981 (11 198)	4630 (4502)	2376 (−63 to 4815)	0.056

CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors; HoNOSCA, Health of the Nation Outcome Scale for Children and Adolescents; CGAS, Children's Global Assessment Scale.
1. Adjusted for gender, age, centre and baseline HoNOSCA, CGAS, comorbid behaviour disorder and costs.
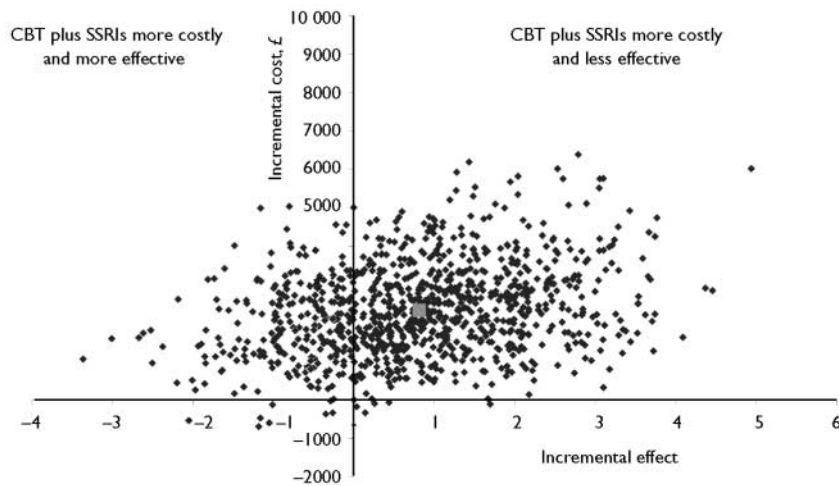2. Two young people receiving CBT plus SSRIs who spent most of the trial in hospital.

Fig. 1 Cost-effectiveness plane showing the bootstrapped mean differences in costs and effects using the Health of the Nation Outcome Scale for Children and Adolescents (HoNOSCA). CBT, cognitive–behavioural therapy; SSRIs, selective serotonin reuptake inhibitors.

(consisting primarily of SSRIs) and found significantly fewer out-patient visits and a lower use of medications in the CBT group compared with treatment as usual. However, since service use was not costed, it is not possible to determine whether these resource use differences would have translated into significant cost differences.

Only one cost-effectiveness analysis of individual treatments was located (Haby *et al*, 2004). Haby *et al*, undertook a modelling exercise to explore the cost-effectiveness of CBT and SSRIs, both compared with current practice. They concluded that CBT provided by a public psychologist was the most cost-effective option for the first-line treatment of major depressive disorders. However, this study was based on many assumptions and data

from sources of varying quality, including expert opinion. The sample was much broader than that of the current study, including both children and adolescents, and the economic perspective was much narrower, including only the cost of the interventions. Although providing the only other evidence of cost-effectiveness of treatments for depression in young people, the relevance of this Australian modelling study to UK clinical populations is uncertain.

Policy implications

Guidance for the treatment of depression in children and adolescents in the UK states that antidepressant medication should not be offered to children or young people with moderate or severe major depression except
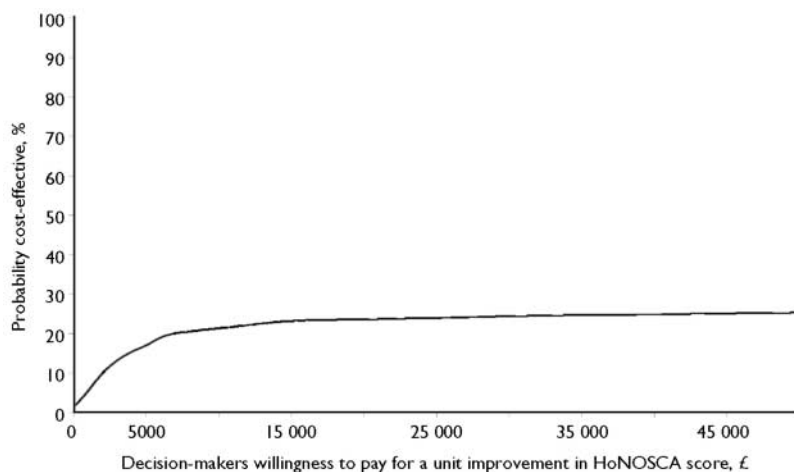
in combination with a concurrent psychological therapy (National Collaborating Centre for Mental Health, 2005). For adolescents in receipt of routine specialist clinical care, the results of the ADAPT trial do not support the combination of CBT and antidepressants over antidepressants alone, either in terms of effectiveness or cost-effectiveness, over the short to medium term. The findings suggest that the provision of SSRIs in addition to routine care has a higher probability of improving outcomes in a cost-effective manner over the first 6 months of treatment. This finding was robust to changes in the underlying cost assumptions and, given the pragmatic nature of the trial, is generalisable to clinical samples of adolescents with major depression in the UK.

ACKNOWLEDGEMENTS

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Fig. 2 Cost-effectiveness acceptability curve for Health of the Nation Outcome Score for Children and Adolescents (HoNOSCA) showing the probability that selective serotonin reuptake inhibitors (SSRIs) plus cognitive–behavioural therapy (CBT) is more cost-effective than SSRIs alone.

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