

core ideas at research team meetings, and contributed to the paper. AP contributed to protocol design, undertook recruitment and conducted the debriefing intervention, participated in data collection and discussion of core ideas at research team meetings, coded all the questionnaires, and contributed to the paper. UW participated jointly in protocol design and discussion of core ideas at research team meetings, was the principal investigator for the study in its first two years, and contributed to the paper.

Funding: Research and development grants advisory committee of the Australian Commonwealth Department of Health, Housing, and Community Services.

Competing interests: None declared.

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(Accepted 12 June 2000)

Randomised comparison of the effectiveness and costs of community and hospital based mental health services for children with behavioural disorders

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Abstract

Objective To test the hypothesis that a community based intervention by secondary child and adolescent mental health services would be significantly more effective and less costly than a hospital based intervention.

Design Open study with two randomised parallel groups.

Setting Two health districts in the north of England.

Participants Parents of 3 to 10 year old children with behavioural disorder who had been referred to child and adolescent mental health services.

Intervention Parental education groups.

Main outcome measures Parents' and teachers' reports of the child's behaviour, parental depression, parental criticism of the child, impact of the child's behaviour on the family.

Results 141 subjects were randomised to community (n = 72) or hospital (n = 69) treatment. Primary outcome data were obtained on 115 (82%) cases a year later. Intention to treat analyses showed no significant differences between the community and hospital based groups on any of the outcome

measures, or on costs. Parental depression was common and predicted the child's outcome.

Conclusions Location of child mental health services may be less important than the range of services that they provide, which should include effective treatment for parents' mental health problems.

Introduction

Views about where to provide secondary mental health services for children and adolescents have changed repeatedly over the past 50 years. Child psychiatry started as a community discipline in child guidance clinics.¹ There were, however, many practical difficulties in the administration of these clinics,¹ and during the 1970s and '80s many clinics closed and were replaced by hospital based services.^{1,2} Over the past 15 years, however, hospital based services too have been criticised—on the grounds that they are inaccessible, stigmatising, expensive, poorly integrated with community services, and less likely to produce gains that generalise to other environments, such as school.^{3,4} Political pressure has also been applied to child mental health services to return to the community.²

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BMJ 2000;321:1047-50

bmj.com

The full version of this paper appears on the BMJ's website

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We conducted a randomised trial whose main hypothesis was that for children with behavioural disorders a community based intervention would be significantly more effective and less costly than a hospital based intervention.

Participants and methods

Participants

The study was based on the parents of children with behavioural disorders. Parents were eligible if they had children who were aged 3-10 years and had normal intelligence (clinical judgment). The study was conducted in two health districts in the north of England.

Interventions

During the study each district's child and adolescent mental health service provided the same intervention either in a children's hospital or in a community setting. As this was a pragmatic trial of the interventions used in the NHS, each service used its routine interventions for behavioural disorder for the age group being studied. In one of the districts, this was the videotape modelling parental group education programme.⁵ The other district used a programme of parental education groups with parallel child groups. In both districts the interventions were provided by various professionals, including community psychiatric nurses, psychologists, social workers, and psychiatrists.

Procedures for assignment and blinding

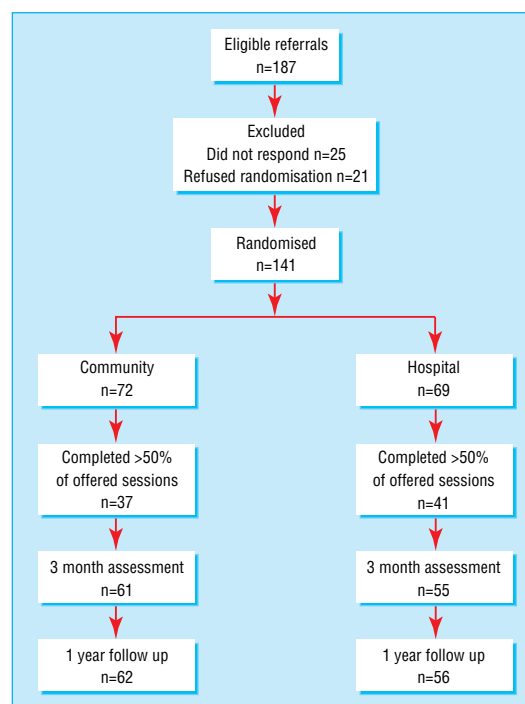
The unit of randomisation was the parent/index child pair. After written consent had been obtained, an independent statistician at a distant site randomly allocated participants to the community or hospital based interventions, stratified by health district. Group allocation was concealed from the outcome assessor.

Assessment of effectiveness

Measures were completed before treatment and at two follow up stages—three months after treatment started and at about one year. Because parental perception of a child's problems is one of the most important determinants of the use of services,⁶ the primary outcome was parental report of the child's behaviour.⁷ Secondary outcomes comprised the teacher's report of the child's behaviour,⁷ parental reports of the impact of the child's behaviour on the family,⁸ parental criticism of the child (assessed by counting the number of critical comments during a five minute speech sample⁹), and parental perception of parenting problems.¹⁰ Parental depression was assessed with the Beck questionnaire.¹¹ A score of 15 or more on the Beck scale was categorised as "high," indicating a high level of maternal depression.¹²

Assessment of costs

Information on the use of all services by both the children and their primary carer (usually the mother) during the trial was collected from the primary carer at the final follow up interview.¹³ The perspective of the trial was that of all service providers, including the NHS, social services departments, education departments, and voluntary and private sectors. In addition, the cost of travel to attend the sessions and the cost of the crèche facilities were recorded. Unit costs were for the financial year 1998-9 and were collected from local service providers or national published unit costs¹⁴⁻¹⁶ or



Trial profile of eligible participants

calculated directly from relevant salary scales. All future costs were discounted at an annual rate of 5%.

Statistical analysis

The health authority and the provider of the existing child and adolescent mental health service in one of the districts agreed that only a large difference (effect size of 0.8 for the mean difference in parental report of child behaviour between community and hospital treatment at the 3 month assessment) would lead to changes in the ways that services were delivered. Thirty four cases per group are needed for a 90% chance of detecting this difference with a two sided test at the conventional 5% significance level.¹⁷

Just one intention to treat analysis was conducted at the end of the study. Changes from baseline were calculated for the outcomes, and *t* tests for independent samples were used to compare the community and hospital groups.

Results

In all, 187 eligible patients were referred to the trial, with 141 of these randomly allocated to the two groups. The figure shows the trial profile.

Participants' and children's characteristics

The median age of the children was 6.9 (range 3-10) years, and 112 (79%) were boys. The primary carer, who completed the parental questionnaires, was the mother in 136 out of 141 cases. In 94 out of 141 (67%) cases the parents were receiving state benefits, and in 61 out of 141 (43%) cases the parents were single. Seventy three out of 134 (54%) parents who completed the Beck depression questionnaire at baseline had a "high" score. The groups did not differ significantly in respect of these characteristics.

The mean behaviour intensity score (possible range 36-252, where the higher the score, the greater

the intensity of behavioural problems)⁷ before treatment was 178.0 (95% confidence interval 172.8 to 183.1).

Effectiveness

The two groups did not differ significantly on any of the measures at baseline or at either of the two follow up assessments (table 1). There were no significant effects of location of treatment (community *v* hospital) on changes in any of the outcomes (table 2). A high proportion of children (89/116 (77%)) had a high score (≥ 127) on parental report of the intensity of behavioural problems at the three month assessment. The risk of children having a high score after treatment was greater (odds ratio 2.8; 1.3 to 6.1) for those whose primary carer had a high score on the Beck depression questionnaire at baseline (48/55) compared with those with a low score (≤ 14) (36/56). Confounding by social class or behavioural problems at baseline did not account for this association.

Costs

Altogether, 118 out of 141 (84%) parents (61 in the community group, 57 in the hospital group) completed the resource questionnaire at the final follow up interview; these responses were included in the economic evaluation. The mean length of follow up was similar in both groups (65.7 weeks in the community group, 65.0 in the hospital group). The total cost over the trial period was £4919 (standard deviation £7668) in the community group and £3403 (£4332) in the hospital group (difference £1515 (£ - 742 to £3772); $P=0.19$). Differences between the hospital and community groups in the mean overall cost per child (difference £904 (£ - 1254 to £3062); $P=0.41$), per primary carer (£611 (£ - 143 to £1365); $P=0.11$), or in terms of cost per week were also not significant. To assess the robustness and generalisability of the results, several univariate sensitivity analyses were carried out. These analyses did not affect the results.

Table 2 Difference in scores for primary and secondary outcomes at three month follow up and at one year follow up, compared with baseline scores

	Difference between community and hospital groups (95% confidence interval)	P value
Intensity of child's behavioural problems—parental report		
At 3 months	2.5 (-13.2 to 8.2)	0.64
At 1 year	-9.8 (-20.2 to 0.6)	0.06
Intensity of child's behaviour—teacher's report		
At 3 months	6.3 (-7.1 to 19.7)	0.30
At 1 year	1.8 (-12.9 to 16.6)	0.81
Parental depression		
At 3 months	1.6 (-1.3 to 4.6)	0.28
At 1 year	-1.7 (-4.7 to 1.3)	0.28
Impact of child's behaviour on family		
At 3 months	0.9 (-0.8 to 2.6)	0.30
At 1 year	-0.5 (-2.2 to 1.2)	0.57
Parental criticism of child		
At 3 months	0.2 (-0.7 to 1.1)	0.69
At 1 year	-0.2 (-1.1 to 0.7)	0.64
Parental report of parenting problems		
At 3 months	0.3 (0.0 to 0.6)	0.05
At 1 year	0.1 (-0.2 to 0.4)	0.38

For scoring systems see footnote to table 1.

Table 1 Mean scores and standard deviations for primary and secondary outcomes at baseline, three months' follow up, and follow up at one year

	Before treatment	3 months' follow up	1 year follow up
Intensity of child's behavioural problems—parental report*			
Community:			
No of cases	68	61	62
Mean (SD) score	175.9 (31.6)	156.5 (41.2)	160.2 (42.7)
Hospital:			
No of cases	67	55	56
Mean (SD) score	180.1 (29.4)	157.8 (43.0)	152.8 (40.7)
Intensity of child's behavioural problems—teacher's report*			
Community:			
No of cases	61	57	65
Mean (SD) score	123.1 (50.2)	114.0 (52.1)	110.5 (45.7)
Hospital:			
No of cases	62	49	61
Mean (SD) score	117.8 (47.5)	104.3 (46.2)	111.9 (43.7)
Parental depression†			
Community:			
No of cases	67	60	61
Mean (SD) score	16.9 (10.5)	10.3 (9.3)	12.1 (10.4)
Hospital:			
No of cases	67	53	56
Mean (SD) score	16.6 (9.4)	11.4 (10.3)	9.1 (9.2)
Impact of child's behaviour on family‡			
Community:			
No of cases	68	60	62
Mean (SD) score	11.5 (5.0)	8.8 (5.5)	9.1 (5.6)
Hospital:			
No of cases	66	55	56
Mean (SD) score	12.0 (4.7)	9.7 (5.9)	8.6 (5.8)
Parental criticism of child¶			
Community:			
No of cases	66	55	59
Mean (SD) No	2.4 (2.2)	2.0 (2.3)	1.8 (2.1)
Hospital:			
No of cases	60	52	53
Mean (SD) No	2.1 (2.2)	1.6 (2.4)	1.3 (2.5)
Parental report of parenting problems**			
Community:			
No of cases	59	61	62
Mean (SD) score	3.8 (0.8)	3.1 (0.9)	3.1 (0.9)
Hospital:			
No of cases	54	55	56
Mean (SD) score	3.7 (0.9)	3.3 (0.9)	3.2 (1.0)

SD=standard deviation.

The table includes all available data, regardless of whether data on a subject were missing at other time points.

*Minimum score 36, maximum 252; the higher the score the greater the intensity.

†Minimum score 0, maximum 63; the higher the score the greater the intensity.

‡Minimum score 0, maximum 22; the higher the score the greater the intensity.

¶Number of critical comments about the child during the five minute speech sample.

**Minimum score 1, maximum 7; the higher the score, the greater the perceived parenting problems.

Discussion

The present study did not find that community based treatment was more effective than hospital based treatment. This finding contrasts with that of Cunningham and colleagues⁴ in Canada, who reported that children with behavioural problems treated in the community had better outcomes than those referred to a specialised clinic. It is, however, difficult to interpret the results of that study because outcome data were obtained on less than a third of randomised subjects.

Methodological issues

Three issues should be borne in mind when interpreting the results of the present study. Firstly, the trial was powered on the basis of a significant difference in

What is already known on this topic

It is assumed that community based child mental health services lead to better outcomes than hospital based services, although this has not been tested in a randomised trial in the United Kingdom

What this study adds

Community based child mental health services are not necessarily more effective or cheaper than hospital based services

The outcomes of children's mental health problems are determined by many other factors, such as parental mental health

Child mental health services should provide effective treatment for parental mental health problems

The range of mental health services available is more important than where the service is given

clinical outcomes. The sample size may have been too small to detect a significant difference in costs. Indeed, the actual cost differences found between the two groups were large, with the hospital group costing 30% less overall than the community group. Secondly, there are several different models of community child and adolescent mental health services. This study modelled the common situation in which secondary services were located in just one or two community settings. Different results might have been obtained if we had studied primary care interventions, such as training health visitors in parental education methods,¹⁸ or interventions in which mental health professionals support community schemes such as befriending.¹⁹ These interventions have, however, seldom been evaluated in randomised trials in the United Kingdom. Thirdly, the results from this study may not apply to the treatment of other child psychiatric disorders or, indeed, to the treatment of behavioural problems using other methods.

Planning services for children with behavioural disorders

We conclude that in planning services for children with behavioural disorders, greater attention must be paid to factors other than the location. Our findings suggest, for example, that a service for children with behavioural problems must also be able to call not just on parental education groups but also on interventions such as effective treatments for parental depression. As a substantial proportion of the costs associated with behavioural disorders in children are borne by the educational services, there may also be scope for further developing the role of mental health workers in schools.

We thank Fiona Campbell and Daphne Kounali of the department of statistics at Hope Hospital, Salford, who conducted the randomisation, and the therapists who conducted the parental education groups; Chrissie Pickin of Salford and Trafford Health Authority; and Sibyl Zaden of the University of California, who rated the five minute speech samples.

Contributors: RH and JG had the idea for the study, obtained the grant, and managed the project. RH conducted the analyses and wrote up the study. SP and JW conducted the outcome assessments, contributed to the design, and revised the final manuscript. SB designed the economic evaluation and conducted the economic analysis. RMcG conducted many of the parental groups and revised the manuscript. RH will act as guarantor for the paper.

Funding: Research grant from the NHS Executive's Motherhood and Child Health initiative. Clinical costs were provided by Manchester Children's Hospital NHS Trust (funding for two of the therapists to train in the Webster-Stratton programme in Seattle, United States) and by Salford social services.

Competing interests: None declared.

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(Accepted 1 August 2000)

Endpiece

Food for thought

There is no wealth but life.

John Ruskin

Only when the last tree has died and the last river been poisoned and the last fish been caught will we realise we cannot eat money.

A Cree comment

To patent the polio vaccine would be "like patenting the sun."

Jonas Salk