

Joint crisis plans for people with psychosis: economic evaluation of a randomised controlled trial

Chris Flood, Sarah Byford, Claire Henderson, Morven Leese, Graham Thornicroft, Kim Sutherby, George Szmukler

Abstract

Objective To investigate the cost effectiveness of joint crisis plans, a form of advance agreement for people with severe mental illness.

Design Single blind randomised controlled trial.

Setting Eight community mental health teams in southern England.

Participants 160 people with a diagnosis of psychotic illness or non-psychotic bipolar disorder who had been admitted to hospital at least once within the previous two years.

Intervention Joint crisis plan formulated by the patient, care coordinator, psychiatrist, and project worker containing contact information, details of illnesses, treatments, relapse indicators, and advance statements of preferences for care for future relapses. Control group was standardised service information.

Main outcome measures Admission to hospital; service use over 15 months.

Results Use of a joint crisis plan was associated with less service use and lower costs on average than in the standardised service information group, but differences were not significant. Total costs during follow-up were £7264 (€10 616, \$13 560) for each participant with a joint crisis plan and £8359 (€12 217, \$15 609) for each participant with standardised service information (mean difference £1095; 95% confidence interval –2814 to 5004). Cost effectiveness acceptability curves, used to explore uncertainty in estimates of costs and effects, suggest there is a greater than 78% probability that joint crisis plans are more cost effective than standardised service information in reducing the proportion of patients admitted to hospital.

Conclusion Joint crisis plans produced a non-significant decrease in admissions and total costs. Though the cost estimates had wide confidence intervals, the associated uncertainty suggests there is a relatively high probability of the plans being more cost effective than standardised service information for people with psychotic disorders.

Introduction

Many people with a diagnosis of a psychotic disorder have high rates of relapse, which may result in numerous admissions to inpatient psychiatric units. This can be distressing for the individuals concerned as well as costly for society. In 1998 Patel and Knapp calculated the annual cost to the UK National Health Service (NHS) of inpatient and residential provision for schizophrenia and other non-organic psychoses as £946m (€1382m, \$1766m).¹ Morris et al and Rice and Miller showed that 79% of direct costs are incurred by only 10% of patients.^{2 3}

Joint crisis plans aim to mitigate some of the negative consequences of relapse, including admission to hospital, use of coercion in the form of the Mental Health Act, and associated costs.^{4 5} The plan establishes the preferences for treatment of those who use the service at a point when they are relatively well, to be applied in any subsequent crisis when the individual may be too unwell to indicate their preferences. The aim is to reach agreement between the service user and clinical team through negotiation and consensus building, facilitated by a third party.

A randomised controlled trial comparing joint crisis plans with a control intervention in which patients were supplied with information leaflets relevant to their mental health care (standardised service information) showed fewer admissions at a borderline level of significance and significantly reduced use of the Mental Health Act in the joint crisis plan group.⁴ We are reporting the results of the economic evaluation for this trial.

Methods

The methods of the trial have been reported elsewhere.⁴ Participants were recruited from seven different community mental health teams across London and one in Kent. Eligible patients had a clinical diagnosis of psychotic illness, were not currently receiving inpatient care, and had experienced an admission in the previous two years.

Interventions

A facilitator, an experienced mental health professional external to the teams participating in the trial and not involved in the participants' care, coordinated the development of a joint crisis plan. At an introductory meeting the facilitator explained the procedure to the participating service user and care coordinator and discussed possible contents of the plan. The facilitator finalised the contents at a second meeting with the service user, care coordinator, and psychiatrist and included contact information, details of mental and physical illness and their treatment, early indicators of relapse, and advance statements of preferences for care in the event of relapse. People specified by the service user, typically key local services and named friends and family members, received a copy of the plan.

Members of the standardised service information control group received information leaflets on different types of mental illness and medication, local services, the Mental Health Act, complaints procedures, and access to case records, in addition to receiving treatment as usual.

Department of Mental Health and Learning Disability, City University, London E1 2EA
Chris Flood
lecturer in mental health

Centre for the Economics of Mental Health, Institute of Psychiatry, King's College, London SE5 8AF

Sarah Byford
senior lecturer in health economics

Section of Community Psychiatry, Health Service Research Department, Institute of Psychiatry, King's College, London
Claire Henderson
MRC training fellow in health services research

Health Service Research Department, Institute of Psychiatry, King's College, London
Morven Leese
medical statistician

Graham Thornicroft
professor of community psychiatry
Croydon CR0 1XT
South London and Maudsley NHS Trust
consultant psychiatrist

Institute of Psychiatry, King's College, London
George Szmukler
dean

Correspondence to: S Byford s.byford@iop.kcl.ac.uk

BMJ 2006;333:729–32



This is the abridged version of an article that was posted on bmj.com on 16 August 2006: <http://bmj.com/cgi/doi/10.1136/bmj.38929.653704.55>

Table 1 Mean (SD) use of resources over the 15 month follow-up period

Service	Joint crisis plan (n=80)	Standardised service information (n=80)
Mental health services		
Psychiatric inpatient days	32.0 (73.0)	36.0 (69.0)
Psychiatric outpatient attendances	1.5 (2.0)	1.6 (2.0)
Community psychiatric nursing contacts	185.0 (292.0)	170.0 (292.0)
Psychiatric day service contacts	1.0 (9.0)	1.5 (12.0)
Other community day centre contacts	5.0 (25.0)	13.0 (38.0)
Mental health act assessments	0.1 (0.4)	0.3 (0.4)
Other health services		
Non-psychiatric inpatient days	18.0 (26.0)	2.5 (2.0)
Non-psychiatric outpatient attendances	18.0 (47.0)	33.0 (89.0)
Accident and emergency contacts (non-psychiatric)	0.1 (0.2)	0.2 (1.0)
Accident and emergency contacts (psychiatric)	0.1 (0.4)	0.2 (0.5)
General practitioner contacts	1.9 (4.0)	1.3 (2.0)
No of different medications prescribed	1.9 (1.8)	1.7 (1.4)
Social services		
Social work hours	32.0 (74.0)	138.0 (217.0)
Specialised accommodation weeks	0.3 (0.4)	0.2 (0.4)
Criminal justice		
Arrests	0.1 (0.4)	0.2 (0.9)
Contacts with lawyer	0.3 (1.3)	0.3 (1.6)
Court appearances	0.0 (0.2)	0.1 (0.7)
Contacts with probation officer	0	0
Contacts with police officer	0.5 (1.2)	0.7 (1.5)
Nights in police cell	0.1 (0.3)	0.1 (0.4)
Nights in prison	0.2 (1.4)	6.8 (46.0)

Outcomes

We assessed outcomes at 15 months after trial entry. These included admission to hospital, length of time spent in hospital (primary outcome measures⁴), and objective coercion (compulsory treatment under the Mental Health Act 1983).

Costs

We assessed costs from the perspective of service providers, including the NHS, social services, and the criminal justice system. We also considered the perspectives of the user and carer in terms of out of pocket expenses. We collected data on use of services from interviews with patients using a modified version of the client service receipt inventory.⁶ This was supplemented by data on hospital admission, bed days, and use of the Mental Health Act from computerised hospital clinical activity systems and Mental Health Act office records.

We costed the joint crisis plan on the basis of the time spent by the facilitator and clinical team in producing the crisis plans, plus relevant administrative, managerial, and capital overheads. The cost of the control group intervention was calculated on the basis of the actual purchase cost of the information leaflets with the cost of the facilitator's time in distributing them.

We derived unit costs from published cost templates⁷ to cost the administration of the Mental Health Act, including initial assessment, managers' hearings and tribunal hearings, report preparation, legal aid provision, and administration. We costed secondary healthcare services using NHS reference costs⁸ and information provided by the South London and Maudsley NHS Trust finance department. Published unit costs were applied to community health and social services,⁹ prison stays,¹⁰ medications,¹¹ and criminal justice resources (contact with lawyers, probation and police officers, arrests, court appearances, and nights in police cells).⁷

As most people with psychotic disorders are unemployed, changes in productivity are unlikely to be relevant so we did not measure losses of productivity as a result of time off work due to illness.

Statistical analyses

Statistical analyses were carried out on an intention to treat basis. Unit costs were applied to individual service use data and aggregated. Despite the skewed nature of cost data, we analysed differences in costs between the two groups using the standard *t* test and confirmed the validity of results using bootstrapping.¹² We have not reported the bootstrapped results as the confidence intervals were similar to *t* test results in all tests. We assessed cost effectiveness by calculating incremental cost effectiveness ratios.¹³ In the primary analysis we explored cost effectiveness in terms of admissions, the primary outcome of the clinical trial. In secondary analyses we explored cost effectiveness in terms of use of the Mental Health Act, and the results did not differ from the primary analyses (data available from authors).

We used repeat re-sampling from the costs and effectiveness data using non-parametric bootstrapping to generate a distribution of mean costs and effects for the two treatments.¹² These distributions were used to plot cost effectiveness acceptability curves, which illustrate the uncertainty associated with the estimate of costs and effects as a result of sampling variation.¹⁴ We performed several one way sensitivity analyses to ascertain thresholds for cost effectiveness and to explore the robustness of results to changes in the cost data.

Results

Patients

We assessed 466 patients for eligibility. Twenty three did not meet the criteria for inclusion. Of the

remainder, 283 patients were either not contacted or declined to take part. The 160 patients remaining were individually randomised to each arm, and we collected the economic data over a period of 15 months.

Outcomes

There were also fewer admissions to hospital in the joint crisis plan group, but this difference was not significant (30% *v* 44%; ratio 0.69, 0.45 to 1.04, $P=0.07$). Use of the Mental Health Act was significantly reduced in the joint crisis plan group, with compulsory admission experienced by 13% compared with 27% in the standardised service information group (risk ratio 0.48, 95% confidence interval 0.24 to 0.95, $P=0.03$).

Service use

Table 1 shows the mean number of contacts that patients had with each service over the 15 month follow-up. Patients with joint crisis plans had fewer psychiatric admissions and outpatient and accident and emergency attendances, Mental Health Act episodes, attendances at a day centre, contacts with social workers and criminal justice contacts. The control group had fewer non-psychiatric admissions to hospital, fewer contacts with general practitioners and community psychiatric nurses, and used less specialised accommodation. There were no differences in the receipt of social security benefits or out of pocket expenses between the two groups.

Costs

The mean total cost per patient over the 15 month study period was lower in the joint crisis plan group than in the control group (£7264 (€10 616, \$13 560) *v* £8359 (€12 217, \$15 609), respectively), but this difference was not significant (mean difference £1095; 95% confidence interval -2814 to 5004; $P=0.57$) (table 2). Nor were there any significant differences in cost by providing sector.

Sensitivity analysis

Threshold analysis revealed that, on average, an additional reduction of 14 days in hospital per patient in the joint crisis plan group would be required before the difference in mean total cost per patient between the two groups became significant (mean difference £3381, 95% confidence interval 27 to 6735, $P=0.05$).

Cost effectiveness analysis

The incremental cost effectiveness ratio for admissions over the 15 month follow-up period was -£131 per 1% reduction in the proportion of patients admitted to hospital. Observed differences show that the joint crisis plan was cheaper and more effective on average than standardised service information. The cost effectiveness acceptability curve (figure) shows that there is at least a 78% probability that the joint crisis plan is more cost effective than standardised service information in preventing admissions (range 78% to 94%).

Discussion

Crisis planning interventions seem to be a cost effective method of preventing admissions and compulsory treatment for people with psychotic disorders. In this study there were fewer compulsory admissions in the joint crisis plan group than the

Table 2 Mean (SD) total cost (£) per patient over the 15 month follow-up period, 2000-1 prices

Service	Joint crisis plan (n=80)	Standardised service information (n=80)	Mean difference (95% CI)
Mental health services:			
Total cost	6064 (12 638)	6912 (12 022)	875 (-2948 to 4698)
JCP/SSI	44 (28)	18 (3)	-26 (-32 to -20)
Other health services	1016 (1343)	1033 (1006)	17 (-350 to 385)
Social services	116 (187)	110 (229)	-6 (-71 to 59)
Criminal justice sector	37 (138)	274 (1666)	238 (-129 to 604)
Out of pocket expenses:			
Patient	14 (36)	7 (20)	-6 (-15 to 3)
Carer	18 (61)	22 (99)	4 (-22 to 29)
Total costs	7264 (13 045)	8359 (12 168)	1095 (-2814 to 5004)*

JCP=joint crisis plan; SSI=standardised service information.

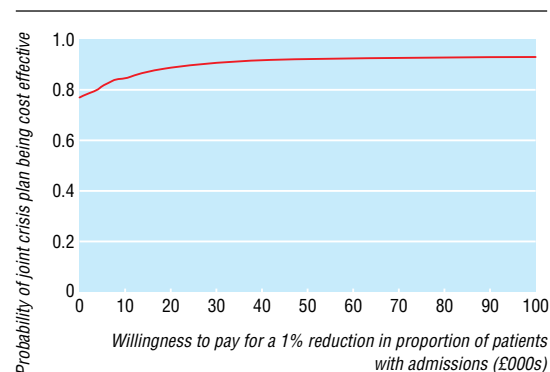
* $P=0.58$.

standardised service information group. Numbers of total admissions and total costs were also lower in the plan group, but these differences were not significant. Exploration of the uncertainty surrounding the estimates of costs and effects suggests that there is at least a 78% probability that joint crisis plans are a more cost effective strategy than standardised service information for reducing the probability of admissions, irrespective of the amount a decision maker may be willing to pay for such reductions. Attempts to bias against the intervention in sensitivity analysis reduced this probability somewhat, but there was still a minimum probability in favour of joint crisis plans of 67%.

In the long term, joint crisis plans are not particularly resource intensive; the marginal cost of facilitating an additional joint crisis plan is relatively small. In the short term, however, the provision of facilitated plans may involve investment in the salaries of the facilitators. Whether this is affordable must be considered with evidence of the probable cost effectiveness of joint crisis plans and any savings made by reducing admissions.

One limitation of the current study was the lack of a measure of change from the patients' perspective. It is reasonable to assume, however, that fewer admissions, particularly compulsory admissions, would have a positive impact on quality of life. Such perspectives should be explored in future research of advance statements.

Our findings are of interest with respect to a new or amended Mental Health Act in England. A



Cost effectiveness acceptability curve for admissions over 15 month follow-up period

What is already known on this topic

Joint crisis plans, formulated jointly by a mental health service user, a clinician, and a facilitator, are highly acceptable to service users

Such plans have been shown to approximately halve the use of compulsion during psychiatric hospital admission for people with psychotic disorders

People with psychotic disorders who create and use plans may also have modestly reduced hospital admission rates

What this study adds

Over 15 months total costs were £7264 for each person with a joint crisis plan and £8359 for each person with standardised service information

Cost effectiveness acceptability curves suggest there is a greater than 78% probability that joint crisis plans are more cost effective than standardised service information in reducing the proportion of patients admitted to hospital

parliamentary committee has commented that measures proposed by the government could erode civil liberties and be too heavily focused on compulsion.¹⁵ Advance statements in the form of joint crisis plans may have the potential to reduce both compulsion and costs.

Contributors: See bmj.com.

Funding: CH was funded by a Medical Research Council health service research training fellowship, and CF was funded by Bethlem and Maudsley research and development support.

Competing interests: None declared.

Ethical approval: Ethics committees of the South London and Maudsley NHS Trust, Lewisham University Hospital, South West London and St George's NHS Trust, and Thames Gateway NHS Trust.

- 1 Patel A, Knapp M. Costs of mental illness in England. *Mental Health Res Rev* 1998;5:4-10.
- 2 Morris S, Hogan T, McGuire A. The cost-effectiveness of clozapine. A survey of the literature. *Clin Pharmacoeconomics* 1998;15:137-52.
- 3 Rice D, Miller L. The economic burden of schizophrenia: conceptual and methodological issues, and cost estimates. In: Moscarelli M, Rupp A, Sartorius N, eds. *Handbook of mental health economics and health policy*. Vol 1. *Schizophrenia*. Chichester: John Wiley, 1996.
- 4 Henderson C, Flood C, Leese M, Thornicroft G, Sutherby K, Szmukler G. Effect of joint crisis plans on use of compulsory treatment in psychiatry: single blind randomised controlled trial. *BMJ* 2004;329:136-8.
- 5 Sutherby K, Szmukler GI, Halpern A, Alexander M, Thornicroft G, Johnson C, et al. A study of "crisis cards" in a community psychiatric service. *Acta Psychiatr Scand* 1999;100:56-61.
- 6 Beecham J, Knapp M. Costing psychiatric interventions. In: Thornicroft G, ed. *Measuring mental health needs*. London: Royal College of Physicians/Gaskell, 2001:200-24.
- 7 Knapp M, Chisholm D, McCrone P, Almond S, Amponsah S. *The resource implications of the Mental Health Act*. London: London School of Economics and Institute of Psychiatry, Kings College London, 1999.
- 8 Department of Health. *NHS reference costs*. London: DoH, 2001.
- 9 Netten A, Curtis L. *Unit costs of health and social care*. Canterbury: Personal Social Services Research Unit, University of Kent, 2000.
- 10 Prison Service. *Prison service annual report and accounts*. London: Stationery Office, 2000.
- 11 British Medical Association, Royal Pharmaceutical Society of Great Britain. *British national formulary*. London: BMA, RPS, 2001. (No 42.)
- 12 Efron B, Tibshirani R. *An introduction to the bootstrap*. New York: Chapman and Hall, 1993.
- 13 Van Hout B, Al M, Gordon G. Costs, effects and c/e-ratios alongside a clinical trial. *Health Econ* 1994;3:309-19.
- 14 Fenwick E, Claxton K, Sculpher M. Representing uncertainty: the role of cost-effectiveness acceptability curves. *Health Econ* 2001;10:779-87.
- 15 House of Lords House of Commons Joint Committee. *Draft Mental Health Bill*. Vol 1. London: Stationery Office, 2005. (HL Paper 79-1 HH.)

(Accepted 19 July 2006)

doi 10.1136/bmj.38929.653704.55

You can never have too much medical kit

Buying a car for less than £100 and then driving it across the Sahara was never going to be straightforward. We prepared our 1981 Renault 18 for every eventuality—a rack of spares, extensive toolkit, and some aluminium sand ladders for when we inevitably got stuck. My medical kit was small but, I thought, comprehensive. I was armed with every known defence against malaria as well as a raft of dressings in case we crashed. I imagined myself plucking people from the jaws of death from such things as an anaphylactic reaction to the bite of the tsetse fly, leaving the "car" stuff to the males in our group.

In southern Morocco our "road" consisted of a powdery dirt track snaking through valleys of red stone dotted with kasbahs. We were driving along the edge of a six metre drop when the car went into a skid. The dust churned upwards as if someone had shaken a huge tin of face powder into the air. The brakes chose this moment to fail. It transpired that we could get them to work only by repeatedly pumping the pedal to raise the pressure within the system. We crept along for the next 12 km of track, the brakes hissing at each hairpin bend.

At the main road, we stopped to have a look. The brakes still had plenty of fluid, and so we concluded there must be air in the system—but we had nothing to

drain it with. I relinquished my only set for giving intravenous fluids, which provided just the required gauge of tubing to release the air. The transparency of the tubing allowed us to monitor the bubbles coming through.

Apart from this, my kit found use off the shores of Mauritania with a fishing hook improvised from an orange needle (we didn't catch anything). Also, a strip of paracetamol (acetaminophen) lifted the spirits of even the most unsmiling Senegalese policemen, who would then wave us on our way. We never got to use our sand ladders—apart from the night we cooked a goat, when they made ideal campfire grills.

Claire Davies *general practitioner flexible careers scheme, London Fields Medical Centre, Stoke Newington, London* (caldavies2001@yahoo.co.uk)

We welcome articles up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. Please submit the article on <http://submit.bmj.com> Permission is needed from the patient or a relative if an identifiable patient is referred to. We also welcome contributions for "Endpieces," consisting of quotations of up to 80 words (but most are considerably shorter) from any source, ancient or modern, which have appealed to the reader.