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Alternatives to standard acute in-patient care in England: readmissions, service use and cost after discharge

Sarah Byford, Jessica Sharac, Brynmor Lloyd-Evans, Helen Gilburt, David P. J. Osborn, Morven Leese, Sonia Johnson and Mike Slade

Background

Residential alternatives to standard psychiatric admissions are associated with shorter lengths of stay, but little is known about the impact on readmissions.

Aims

To explore readmissions, use of community mental health services and costs after discharge from alternative and standard services.

Method

Data on use of hospital and community mental health services were collected from clinical records for participants in six alternative and six standard services for 12 months from the date of index admission.

Results

After discharge, the mean number and length of readmissions, use of community mental health services and costs did not differ significantly between standard and alternative services. Cost of index admission and total 12-month cost per participant were significantly higher for standard services.

Conclusions

Shorter lengths of stay in residential alternatives are not associated with greater frequency or length of readmissions or greater use of community mental health services after discharge.

Declaration of interest

None.

Cost-effectiveness analysis of residential alternatives to standard hospital-based mental health services for patients in crisis found alternatives to be associated with shorter lengths of stay and significantly lower costs but poorer staff-rated clinical outcomes than standard acute psychiatric wards.¹ However, these findings refer only to the period between admission and discharge from the initial admitting service. It is important to determine whether shorter average lengths of stay in residential alternatives have an adverse impact on subsequent admissions or use of community mental health services after discharge. In addition, knowledge of patient and service variables significantly associated with subsequent use of services, and thus cost, would help to predict which people are likely to be intensive service users and to assess the appropriateness of this intensity. In the absence of resource constraints and systemic inefficiencies, the quantity of services received by people with mental health problems would be determined by need alone. In reality, however, a number of factors may influence resource use and thus the total cost of care. This paper explores medium-term use of hospital and community mental health services by participants admitted to six alternative and six standard services. The aims were to test first for differences in the number, length of stay and cost of admissions and the total cost of hospital and community mental health services over 12 months from date of index admission, and second for patient and service characteristics significantly associated with 12-month costs of care.

Method

Our observational cohort study involved 12 services, six providing a residential alternative to standard psychiatric in-patient services and six comparison standard acute wards accepting patients from similar catchment areas and where possible served by the same community mental health services. The characteristics of the six services are reported in detail elsewhere;² they include a hospital

unit implementing an innovative model intended to increase quantity and quality of contact between staff and patients, a short-stay ward intended to prevent longer-term admissions, community services integrated within crisis or community mental health teams, and non-clinical services managed by voluntary sector organisations. The study aimed to recruit 35–40 consecutively admitted patients at each site. Exclusion criteria were opting out of the study, being admitted for non-crisis purposes (e.g. planned respite care) and being transferred from another acute ward for non-clinical reasons. All participants received information through posters displayed on the unit and information sheets received at admission and at discharge, and were given the opportunity to opt out of the study.

Measures

Data on psychiatric admissions and use of all other hospital and community mental health services were collected from computerised patient activity records at each service, covering the 12-month period from date of index admission to the service. All unit costs were calculated for the financial year 2006–7. The manager of each alternative service provided budget data for the service to calculate cost per bed-day. National average unit costs were applied to standard admissions and all other mental health services.^{3,4} Outcome measures assessed at baseline in the original observational study and used in the current analyses included the Health of the Nation Outcome Scales (HoNOS) measure of social disability,⁵ the Global Assessment of Functioning (GAF) measure of symptoms and social functioning,⁶ and the Threshold Assessment Grid (TAG) measure of severity of mental health problems across the domains of need, safety and risk.⁷

Statistical analysis

Service use data are reported descriptively. Despite skewed cost distributions, differences in the cost of standard and alternative

services were tested using standard parametric tests and the validity and robustness of the results confirmed using non-parametric bootstrap techniques,⁸ as recommended by Thompson & Barber.⁹ Analyses were adjusted for area (six areas associated with the six paired comparison sites) and for possible confounding factors identified as predictors of being admitted to an alternative rather than a standard service.² These included age, gender, ethnic group (White, Black or 'other'), born in the UK (yes/no), patient initiated help-seeking (yes/no), previously known to services (yes/no), baseline behaviour problems as determined by the HoNOS (behaviour subscale score ≥ 5), baseline risk of harm to others as determined by the TAG (item 4 score \geq moderate risk), baseline GAF symptoms score and the cost of psychiatric admissions in the 12 months prior to study entry. Single imputation using multiple regression was used for missing items (approximately 6% of the data). Results from complete case analyses did not differ significantly and so are not reported here.

Univariate associations between baseline characteristics and total costs over the 12-month follow-up period were investigated. Results for continuous variables are presented in two groups split at the median value, but analyses were carried out on the continuous data. Multiple regression was used to reduce the variable list to those independently associated with follow-up costs, using a process outlined in previous research.¹⁰ This involved, in the first instance, fitting a multiple regression model which included all variables that had important univariate associations with costs and then discarding from this model all variables that ceased to be important. Second, each variable that did not have a univariate association with costs was added, one at a time, and retained if it added significantly to the model or otherwise discarded. The model finally arrived at was checked to ensure that none of the terms currently excluded would add significantly to it. In carrying out this procedure a significance level of 10% was used.

Results

A total of 433 participants entered the study (between 34 and 40 per service). Detailed baseline characteristics are presented elsewhere,^{1,2} and on the whole the alternative services were seen as accepting a clinical population overlapping with but not identical to hospital services. One alternative service was found to closely resemble standard in-patient services in terms of patient profile, content of care, length of stay and outcomes,^{2,11} and thus was excluded from the current analyses, reducing the number of participants to 398. Basic demographic details are presented in Table 1. Data on use of mental health services were available for all 398 participants from six standard services ($n=222$) and five alternative services ($n=176$).

Mental health service use and cost

Contacts with mental health services in the 12 months before and after the date of index admission are reported in Table 2. In the year before index admission those admitted to standard services spent 22 days on average in hospital for psychiatric reasons, compared with 27 days for those admitted to an alternative service (mean difference 5 days). In the 12 months following the date of index admission the mean number of psychiatric in-patient days was much greater (standard service 70 days, alternative service 57 days; mean difference 13 days). Observed differences between groups were evident for the mean duration of the index admission (standard service 44 days, alternative service 29 days; mean difference 15 days) but not for subsequent admissions (standard service 26 days, alternative service 28 days;

Table 1 Sociodemographic characteristics

	Standard service (n = 222)	Alternative service (n = 176)
Male gender, n (%)	120 (54)	86 (49)
Age, years: mean (s.d.) ^a	39 (13)	42 (13)
Marital status, n (%) ^a		
Unmarried	113 (54)	101 (61)
Married/cohabiting	64 (30)	27 (16)
Separated/divorced/widowed	33 (16)	38 (23)
Ethnicity, n (%)		
White British	159 (72)	120 (68)
Black Caribbean	8 (4)	23 (13)
Black African	8 (4)	12 (7)
Born in UK, n (%) ^a	170 (81)	149 (85)
Time since first contact with mental health services, n (%) ^a		
Less than 2 years	86 (42)	52 (31)
2–5 years	37 (18)	30 (18)
More than 5 years	83 (40)	84 (51)
Contact with mental health services in 3 months preceding admission, n (%)	128 (58)	125 (71)
Patient initiated help-seeking, n (%) ^a	36 (17)	53 (31)

a. Some missing data.

mean difference 2 days). Participants admitted to alternative services had slightly more contact with community mental health teams, early intervention services and crisis teams, whereas participants admitted to standard services were seen to have more contact with assertive outreach teams.

Total costs per participant are reported in Table 3. There was no significant difference in mean costs between standard and alternative services for psychiatric admissions in the 12 months prior to index admission (mean UK£5685 standard, £6560 alternative; mean difference £875, $P=0.5$) or total use of mental health services subsequent to the index admission (mean £8228 standard, £8719 alternative; mean difference £491, $P=0.7$). However, large differences in the mean costs of the index

Table 2 Mental health service use before and after index admission

	Standard service (n = 222)	Alternative service (n = 176)
Year preceding date of index admission		
Psychiatric in-patient stay, days	22 (50)	27 (56)
Year following date of index admission		
Number of psychiatric admissions		
including index admission	2 (1)	2 (1)
Index admission days ^a	44 (58)	29 (55)
Post-index admission psychiatric in-patient days	26 (52)	28 (58)
Total psychiatric in-patient days	70 (77)	57 (79)
Psychiatric out-patient attendances	3 (4)	2 (2)
Psychiatric day hospital attendances	3 (10)	5 (16)
CMHT contacts	9 (16)	14 (19)
Assertive outreach team contacts	5 (23)	3 (11)
Early intervention service contacts	0 (1)	2 (15)
Community rehabilitation team contacts	1 (5)	1 (5)
Crisis resolution team contacts	7 (14)	9 (17)
A&E/liaison psychiatry contacts	0 (1)	0 (1)

A&E, accident and emergency; CMHT, community mental health team.

a. Index admissions include transfers from the initial admitting service to other facilities, not previously reported by Slade *et al.*¹

Table 3 Costs per participant before and after index admission

	Cost per participant, UK£				
	Standard service (n = 222) Mean (s.d.)	Alternative service (n = 176) Mean (s.d.)	Mean difference (95% CI)	P	Adjusted P ^a
Year preceding study entry					
Psychiatric admissions	5685 (12 868)	6560 (13 687)	-875 (-3502 to 1751)	0.513	
Year following study entry					
Index admission	11 060 (15 033)	6233 (13 267)	4827 (2034 to 7620)	0.001	0.005
Subsequent psychiatric admissions	6525 (13 311)	6477 (13 041)	47 (-2570 to 2665)	0.972	0.878
Psychiatric out-patient attendances	382 (494)	283 (298)	100 (21 to 178)	0.013	0.002
Psychiatric day hospital attendances	237 (965)	471 (1522)	-234 (-493 to 25)	0.077	0.054
CMHT contacts	638 (1148)	1006 (1349)	-368 (-619 to -117)	0.004	0.017
Assertive outreach team contacts	185 (924)	100 (446)	85 (-64 to 234)	0.264	0.179
Early intervention service contacts	3 (22)	65 (424)	-62 (-125 to 1)	0.053	0.027
Community rehabilitation team contacts	44 (339)	57 (372)	-12 (-83 to 58)	0.728	0.910
Crisis resolution team contacts	186 (354)	234 (442)	-49 (-127 to 30)	0.224	0.238
A&E/liaison psychiatry contacts	28 (111)	26 (68)	2 (-16 to 21)	0.815	0.949
Total cost subsequent to index admission	8228 (13 590)	8719 (13 603)	-491 (-3189 to 2206)	0.721	0.847
Total 12-month cost including index admission	19 288 (20 044)	14 952 (19 026)	4336 (447 to 8225)	0.029	0.049

A&E, accident and emergency; CMHT, community mental health team.

a. Adjusted for area, age, gender, ethnic group, born in UK, self-referred, known to services, baseline behaviour problems (Health of the Nation Outcome Scales), baseline risk of harm to others (Threshold Assessment Grid), baseline Global Assessment of Functioning symptoms and pre-index admission costs.

admission were evident (£11 060 standard, £6233 alternative) resulting in statistically significant differences in total cost per participant over the full 12-month follow-up period (mean £19 288 standard, £14 952 alternative; mean difference £43356, $P = 0.03$). Adjusted analyses did not alter the significance of these findings. Across all services participants cost just over £17 000 per annum on average, with psychiatric in-patient admissions accounting for 89%.

Index admissions, including length of stay in the initial admitting service and subsequent moves as part of the index admission, were found to vary considerably in terms of mean length of stay (range 25–64 days standard, 16–61 days alternative) and index admission cost per participant (range £6311–16 442 standard, £3293–12 336 alternative) (Table 4). Non-clinical and crisis team bed alternatives were found to have the shortest index admission duration on average (mean 17 days), whereas the clinical crisis house had the second longest index admission of all services (mean 61 days). Despite having the shortest duration of stay in the initial admitting service (mean 1.2 days), the short-stay psychiatric ward fell in between these two extremes (mean 35 days index admission) as a result of having the longest

stays in subsequent index admission services. This contrasts with a mean index admission duration of 44 days in the standard services. The pattern for costs was the same, with the non-clinical and crisis team bed alternatives being associated with the lowest index admission and total 12-month costs of all services, the clinical crisis house being the most expensive in terms of total 12-month costs and the third most expensive in terms of index admission costs, and the short-stay ward being located between the two.

Factors associated with costs

Univariate associations with total 12-month costs are reported in Table 5. In addition to allocation to standard *v.* alternative services, higher total costs per participant were significantly associated with older age, being previously known to services, help-seeking not initiated by the patient, risk of harm to others and higher cost of psychiatric admissions in the 12 months prior to index admission.

Table 6 details the final multiple regression model, which found the same associations to be significant as in the univariate

Table 4 Duration and cost of index admission

Type of service ^a	Description of alternative service	Length of stay, days (mean)			Total length of index admission ^b	Cost, UK£ (mean)			Total cost of index admission	Total 12-month costs
		First service	Second service	Third service		First service	Second service	Third service		
Alternative	Crisis team beds	7.1	8.3	0.3	15.7	1386	2130	67	3 583	10 669
Alternative	Non-clinical 1	16.4	0.5	0.0	16.9	3 187	105	0	3 293	8 660
Alternative	Non-clinical 2	15.6	1.6	0.0	17.2	3 032	405	0	3 437	11 244
Standard		23.5	1.3	0.0	24.8	6 060	251	0	6 311	14 067
Standard		32.5	0.1	0.0	32.7	8 395	33	0	8 428	15 080
Alternative	Short-stay ward	1.2	33.4	0.0	34.6	238	8604	0	8 842	18 859
Standard		43.1	0.6	0.0	43.7	11 116	122	0	11 238	19 232
Standard		44.3	1.4	0.0	45.7	11 431	159	0	11 591	23 602
Standard		36.4	8.6	5.5	50.4	9 379	1979	1409	12 766	21 064
Alternative	Clinical crisis house	53.9	7.3	0.0	61.2	10 464	1873	0	12 336	26 040
Standard		50.4	13.3	0.0	63.7	13 011	3432	0	16 442	22 870

a. In order of total index admission length.

b. Totals are not exact because of rounding.

analyses. Total 12-month follow-up costs were found to increase by £180 for every additional year of age and by £0.45 for every additional £1 spent on psychiatric in-patient services in the 12 months before entry to the study. Participants known to services cost almost £7000 more than participants not known to services, on average. Participants assessed by the TAG as at risk of harm to others cost almost £5500 more than participants not at risk of harm to others. Participants who initiated help-seeking were found to cost £4000 less on average than participants who did not initiate help-seeking, although this relationship was weak. The model was able to explain around 20% of the variation in total follow-up costs (adjusted $R^2 = 0.19$).

Discussion

Index admissions to alternative services were on average shorter and thus cheaper than index admissions to standard services.

Table 5 Univariate associations with total 12-month costs

	n	Cost per participant, £ Mean (s.d.)	P
Service			
Standard	222	19 288 (20 044)	
Alternative	176	14 952 (19 026)	0.029
Age ^a			
≤40 years	206	16 532 (19 382)	
>40 years	187	18 362 (20 181)	0.030
Gender			
Male	206	17 688 (20 044)	
Female	192	17 031 (19 358)	0.740
Ethnicity			
White	310	17 969 (20 170)	
Black	53	16 258 (18 257)	
Other	35	13 757 (17 408)	0.443
Born in the UK			
Yes	319	17 613 (20 067)	
No	64	16 581 (18 493)	0.704
Known to services			
Yes	253	20 208 (21 040)	
No	145	12 421 (15 994)	<0.001
Self-referral			
Yes	89	11 924 (15 944)	
No	293	18 698 (20 138)	0.004
GAF symptom score ^a			
≤52	202	18 648 (21 104)	
>52	193	16 199 (18 189)	0.238
TAG risk of harm to others			
Yes	93	22 181 (23 627)	
No	305	15 904 (18 120)	0.007
HoNOS behaviour problems			
Yes	98	18 657 (23 360)	
No	300	16 951 (18 364)	0.457
Cost of admissions in previous year ^a			
0	220	14 189 (16 461)	
>0	178	21 303 (22 507)	<0.0001
Area			
1	70	15 238 (17 268)	
2	68	23 332 (20 775)	
3	70	16 769 (22 149)	
4	39	15 080 (12 281)	
5	77	16 556 (21 672)	
6	74	16 535 (18 924)	0.470

GAF, Global Assessment of Functioning; HoNOS, Health of the Nation Outcome Scales; TAG, Threshold Assessment Grid.

a. Summarised as two groups split at the median, but P values relate to analysis on a continuous scale.

The use and cost of subsequent admissions and other hospital and community mental health services differed little between the two groups, resulting in significantly lower 12-month total costs for patients in the alternative services. These findings suggest that shorter lengths of stay in alternative services are not associated with a greater need for subsequent admissions or for support from other hospital or community mental health services. There was some evidence to suggest that participants admitted to alternative services made more use of community-based services, in particular community mental health teams, early intervention services and crisis teams, but these differences were not large or significant and may be due to the longer length of time spent in the community over the 12-month period of follow-up.

The overall service use and cost results mask substantial variation between the services, with non-clinical alternatives and crisis team beds being associated with the shortest lengths of stay and lowest costs, whereas the clinical crisis house was found to be one of the most expensive services. This suggests a trend for clinical services, irrespective of type, to involve longer duration of stay and greater costs than non-clinical services, with even the short-stay psychiatric ward involving much greater lengths of stay and costs than the cheaper non-clinical alternative services. However, there is also evidence to suggest that participants admitted to clinical alternatives differed very little from patients in the comparison standard service, in contrast to participants admitted to non-clinical alternatives who were significantly more likely to be known to services, to be self-referred and to cooperate with assessment, and were significantly less likely to have psychotic symptoms, to be admitted through accident and emergency departments or the police and criminal justice system, to have behaviour problems and to be perceived as posing a risk of harm to others.² Thus the shorter lengths of stay and lower costs observed in the non-clinical alternatives may be explained to a large extent by the fact that they appear to be admitting a less severely affected group of patients.

There is little existing evidence with which to compare these results. A pilot patient-preference evaluation of women's crisis houses compared with standard psychiatric admission found similar results in terms of service use,¹² reporting mean index admission lengths of 33 days per participant compared with 37 in the study reported here. More detailed comparisons of service use and cost beyond the index admission were not possible because of the different periods over which the two studies collected service use data. However, Howard *et al* over a 3-month period found psychiatric in-patient admissions accounted for 85% of total costs, compared with 89% in our study, again supporting the conclusion that they recruited a similar population.¹²

Factors associated with high cost

Analysis of factors associated with follow-up costs suggest that patients not initiating help-seeking, those at risk of harm to others, those with admissions in the recent past and those who

Table 6 Multiple regression for total 12-month follow-up costs

	Coefficient (95% CI)	P
Service – standard v. alternative	4147 (400 to 7893)	0.030
Age	180 (42 to 318)	0.011
Known to services – yes v. no	6844 (3011 to 10677)	0.001
Patient initiated help-seeking – yes v. no	-3914 (-8211 to 383)	0.074
Risk of harm to others – yes v. no	5456 (1148 to 9764)	0.013
Pre-index cost of psychiatric admissions	0.45 (0.31 to 0.58)	0.000

are older are likely to be high-cost service users and to require relatively long admissions on average. Being at risk of harm to others and not initiating help-seeking were found to be significantly associated with admission to a standard service,² which is in turn associated with longer lengths of stay and thus higher costs. In contrast, being previously known to services was found to be significantly associated with admission to an alternative service,² which in turn is associated with lower costs on average. In the current analysis, however, this group was in fact found to be more expensive than those not previously known to services. Exploration of the data suggests this is due to longer duration of index admission on average (mean 32 days for those known to services, 18 days for those not known to services).

Limitations

This study was limited by the use of an observational design. Participants were not randomly allocated between the two service types, and differences between the two groups at baseline were evident on a number of measures, with participants in standard services being more likely to experience psychotic symptoms, to be perceived as a risk to others, to be compulsorily detained and to be admitted through the accident and emergency department or the police and criminal justice system, and less likely to have referred themselves for help in the current crisis.² However, there were substantial similarities between the two groups, and adjustment for baseline differences, including symptoms, risk of harm to others, behaviour problems and self-referral, did not have an impact on the results reported.

An important limitation of the analyses presented was the lack of an assessment of patient outcomes at the 12-month follow-up point, which meant that a full economic evaluation was not possible. In a separate paper we present short-term evidence of the relative cost-effectiveness of admission to alternatives compared with standard services, which used data on costs and outcomes covering the period between admission and discharge from the initial admitting service.¹ The results suggest a trade-off between the two service types, with standard services demonstrating better staff-rated clinical outcomes, but for greater cost as a result of longer periods of stay. However, it is possible that greater improvement in outcome for the standard services was partly or wholly due for some patients to the longer duration of stay associated with admission to a standard service, so these short-term findings are inconclusive, and a key question raised by these results is what happens to costs and outcomes following discharge. Although patient interviews after discharge from the initial admitting service were not feasible within the scope of this study, using readmissions as a proxy for outcome over the medium term suggests that although the cost advantage of the alternative services remains, the outcome advantage for standard services is diminished.

Reliance on psychiatric admission and other hospital and community mental health service data available from patient activity systems resulted in a cost perspective that was necessarily narrow, excluding hospital services for reasons other than mental health, primary healthcare services, social services, criminal justice system costs and productivity losses as a result of time off work due to illness. However, previous research suggests that hospital and community mental health services contribute the greatest proportion of the total costs of caring for people with severe mental health problems,^{13,14} so a broader perspective is unlikely to have a substantial impact on the reported results.

The generalisability of the results is also uncertain. Although the alternative services included in the analysis were selected to be representative of the main types of alternatives identified in

England,¹⁵ clear differences between alternative service types were evident, in particular between clinical and non-clinical alternatives, making interpretation of the overall findings difficult. Although clinical alternatives tended to be similar to standard services in terms of patient characteristics, service use and costs, non-clinical services appear to admit a somewhat different group of patients and were found to be associated with much shorter lengths of stay and total costs than standard services or clinical alternatives.

The absence of a clear-cut cost-effectiveness advantage for either type of service suggests that commissioners may need to take other factors into account when considering the development of services for this population. Such factors include the experience and satisfaction of service users, with both quantitative and qualitative evidence to support an overall preference for residential alternatives as a result of greater levels of freedom, safety and autonomy and lower levels of coercion and negative experiences,^{16,17} and evidence of improvements in outcome for patients in both standard and alternative services.¹ These factors must be considered alongside concerns regarding the risk of harm to others and the need for compulsory admission, both of which may be criteria for exclusion from alternative services.

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