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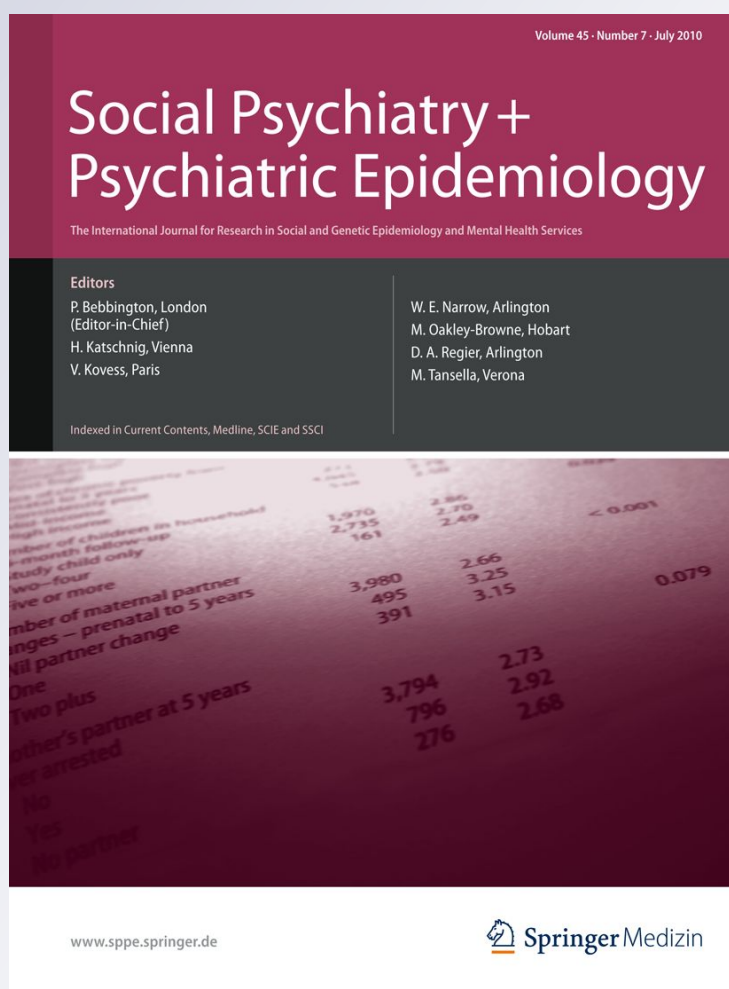
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Predicting outcome of assertive outreach across England

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Abstract

Background Assertive community treatment for the severely mentally ill is being implemented increasingly internationally. It is unclear whether recommended characteristics of assertive outreach (AO) teams influence care and outcomes. We hypothesised that recommended characteristics of AO teams such as joint health and social care management would predict reduced hospitalisation in the first year of an AO client programme and related outcomes throughout England.

Methods A two-stage design was used: a stratified sample of 100 of the 186 'stand-alone' AO teams in England and a systematic sample of clients from each team with stratification for black and ethnic minority patients. Team characteristics, treatment and outcomes were collected from teams. Analyses took account of patients' histories, clustering and ethnic minority over-sampling.

Results Under AO the proportion of time spent in hospital following admission decreased. Only 3/1,096 patients went

missing in 9 months. Although patient' histories significantly predicted outcomes almost no team characteristics predicted re-admission or other patient outcomes after 1 and 3 years. Ethnic minority clients were more likely to be on compulsory orders only on jointly managed teams ($P = 0.030$). Multidisciplinary teams and teams not working out of hours significantly predicted that patients received psychological interventions, but only 17% of sampled patients received such treatments.

Conclusions Characteristics of AO teams do not explain long-term patient outcomes. Since recommended team characteristics are not effective new models of care should be developed and the process of care tested. Managing teams to implement evidence-based psychological interventions might improve outcomes.

Keywords Community · Treatment · Process of care · Multidisciplinary

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Background

Evidence of the effectiveness of the high cost components of services for chronic complex health outcomes such as severe and long-term mental illness is vital for policy makers throughout the world. Experience of intensive case management (ICM) in the USA has suggested substantial benefits in hospital use, social stability and patient experience [2, 18, 21], but UK studies of ICM [3, 23] and of assertive outreach (AO) [13, 14], made possible by lower caseloads and greater specialisation, have not replicated such positive results. This could be due to disparate models of service organisation [15, 16] and improvements in standard community care that can compete successfully with formal assertive approaches [24]. More recent

literature syntheses have pointed to local contextual explanations such as variations in the availability of admission beds [4]. It has also been argued that unless variations in the process of care are considered only substantial effects of inputs on chronic health outcomes will be apparent [1]. Evaluation of intensive versus standard case management for severe mental illness [3] concluded that more attention should be paid to the influence on outcome of the nature and organisation of care.

Following publication in England of a National Service Framework for Mental illness [9] AO teams were rapidly implemented throughout England [13], to care for severely mentally ill individuals with multiple needs not easily served by generic mental health teams [19]. Two linked national evaluative studies were also commissioned. A 'Team Service Organisation' (TSO) study aimed to examine the operational features of AO Services (the model of service, staffing, therapies offered, partnership with other local services, etc.), and to provide a descriptive analysis of team variation across England [27]. The results of this first study demonstrated a very wide variety of compliance with, or interpretations of AO guidelines, with a consequential variety of staffing, mode of practice, and care offered to clients and families. Such variation should provide scope for testing effects on patient outcomes. Teams showed high model fidelity. For example all teams rated the highest level of specialisation (3) on the modality of "establishing and maintaining relationships", including importantly home visits [6] on a regular basis. But teams were able to offer only limited levels of expertise in therapeutic interventions [27]. The purpose of the second, present, study was to investigate which AO team characteristics might best explain outcomes, represented primarily by reduced time of in-patient care, defined as nights spent in hospital by individual patients (clients).

Aims and hypotheses

The work described was designed to identify predictors of success in implementation. Such findings could be used to guide services in achieving the aims of a published policy, as for example detailed in the AO specification in The Mental Health Policy Implementation Guide (PIG) [10], which may also be of interest to policy makers elsewhere. From the published observational literature the most likely feature of AO teams to be related positively to reduction of hospital in-patient care appeared to be the joint management of health and social service elements of community care [5]. Therefore, we hypothesised that AO teams with joint management, defined as requiring a common budget and at least one social worker and at least one health worker in the team, would be associated with reduced nights of hospital in-patient care in the first year of an AO

programme, than teams without joint management. We also predicted reduced use of hospital care due to recommended policy for England [10]: multidisciplinary team working; out of hours working; the presence in the team of a psychiatrist; a wide range of specialist intervention skills available within the team; lower average caseloads per team member. We also examined effects on secondary outcomes: fewer nights in hospital on compulsory orders [formal Mental Health Act (MHA) admissions]; fewer clients lost to contact (established using prospective data); the number of clients receiving specialist psychological interventions (a key process variable, highlighted in the TSO study [27]); and fewer nights in hospital in the third year of the client AO programme (to test possible longer term more gradual rehabilitation effects). We aimed to ensure validity of our findings for black and ethnic minority patients who are over represented in these services [27]; and we examined the effect of longer periods of AO on hospital use [1]. Information was also obtained on detention under the MHA, and rates of loss of contact with AO services. The focus of this paper is upon 'stand-alone' teams, that is, those not integrated into Community Mental Health Teams; integrated teams were subject to later study.

Methods

In order to facilitate data collection, a two-stage design was used. A sample was taken of 100 of the 186 'stand-alone' AO teams in England functioning for at least 6 months—using stratification so as to be representative of all 'stand-alone' teams in England, for whether the team had been functioning for at least 2 years, whether the client list was at least 1% rural, and for the eight geographical regions. This was achieved by systematic sampling [17] from a list in which the teams had been sorted by stratum, using sampling intervals that allowed for the estimated caseloads and proportions of black and ethnic minority patients. Each selected team then furnished a list of all its current AO patients. A systematic sample of 12 clients was then selected from each such list with stratification for black and ethnic minority patients—incorporating a designed over-sampling ratio of 2.5 in order to increase the validity of secondary analyses that examined black and ethnic minority patients and compared ethnic groups.

The study sample size was estimated on the basis of comparing between two types of AO team and the proportions of patients receiving any hospitalisation since admission to AO, since this was the only reliable AO patient outcome measure available to us at the design stage. The proportion of patients hospitalised was in the region of 50% with an intra-cluster correlation coefficient (ICC) of 0.085 yielding a design effect of 1.93. Based on comparing

the teams with and without a responsible medical officer (RMO) present, the study would have 80% power at the 5% significance level to detect a difference between underlying proportions hospitalised of 45 and 56%.

Team data were drawn from the linked TSO study [27]. Assessments for dedicated AO teams were made by interview with the team leader as well as scrutiny of other data sources, e.g. team policy documents during 2002/2003. The interview used a Team Organisation Questionnaire (TOQ—previously developed and operationalised for PLAO [26]); the Dartmouth assertive community treatment scale (DACTS) [22]—a measure of conformity to the ACT model based on expert opinion in the USA, with three supplementary human resource items for the UK (clinically active team leader, and identified substance abuse and vocational workers); and the International Classification of Mental Health Care (ICMHC) [8]—describing the team's ability to provide a range of interventions across ten modalities of care; and their level of expertise in these. Integrated teams were assessed by an adapted version of the TOQ, which was extended to include several items from the DACTS, together with the ICMHC.

Following ethical and administrative approval, each team was re-visited during 2004 and current data on team characteristics were elicited. Retrospective data on clients and their treatment (medication and psychological interventions) were collected from case files and medical records. Prospective data on hospital admissions were collected over 9 months following patient sampling. Characteristics of those lost in the prospective study were noted from the retrospective data.

Statistical analysis

Linear regression modelling was used to analyse the proportion of time spent in hospital and other continuous outcome measures; unconditional logistic regression was used for the proportion of specialist psychological interventions and other dichotomous secondary outcomes. STATA [20] survey facilities were used to reflect the stratification and over-sampling inherent in the sampling design, and adjustment was made for the following potential confounding factors: age at acceptance into AO, gender, ethnicity, living situation, accommodation, diagnostic grouping, number of hospital admissions in the 10 years prior to AO, and histories of homelessness, violence and drugs/alcohol abuse. Results for hospitalisation are presented as the 'effect size' for the relevant team characteristic, being the estimated mean difference in hospitalisation between those patients in teams with the characteristic and those without, after adjustment. Results are presented with *P* value and 95% confidence interval calculated using the bootstrap method [12] due to highly

positively skewed distributions observed for some outcome variables. For interpretation the bootstrap CI is given priority if it is found not to be fully consistent with the corresponding *P* value [12]. Statistical significance is assessed at the 5% level.

Analysis proceeded according to an agreed prior plan: descriptive analysis of team, client and event data; analyses relating predictors to outcomes; and comparative analyses for ethnic groups and eligibility groups. We described client characteristics that could influence the primary outcome as confounders of the main analyses as possible predictors. The primary outcome, percentage of nights spent in hospital in the first year after acceptance into AO, but excluding the first 6 weeks after acceptance in order to avoid the possibility of overlapping hospitalisation during acceptance onto AO. Allowance was made 'pro rata' for the expected reduced hospital use of those clients who did not last a full year in the programme.

Results

The number of clients selected in the final sample from the stand-alone teams, and how the final sample was reached are shown in Fig. 1.

Client characteristics

Records of employment status showed that 3% of patients were in full or part time employment and 90% were unemployed. The distributions of 12 client characteristics considered as possibly influencing the primary outcome as confounders of the main analyses, are described in Table 1 (the 13th characteristic, 'proportion of hospitalisation in the 2 years prior to acceptance into AO', is appended to Fig. 2).

About two-thirds of clients were male; about two-thirds were 'white British'; about two-thirds were living alone, very few with a child; 80% were in independent housing, very few in secure accommodation or on the street. All ages were accepted into AO, the median being 35 years. Over 90% had a diagnosis of 'psychosis'; rather less than half had a history of drug abuse (including alcohol); rather less than half had a history of violence. 9% had no hospital admissions in the previous 10 years; others had a wide range of hospital experience.

Time spent in hospital before and after acceptance into AO is shown in Fig. 2. After acceptance into AO more patients do not spend any time in hospital, and there is a reduction of time in hospital in all other time bands compared to that before acceptance.

Missed appointments were relatively common. Percentages have been adjusted to reflect the population

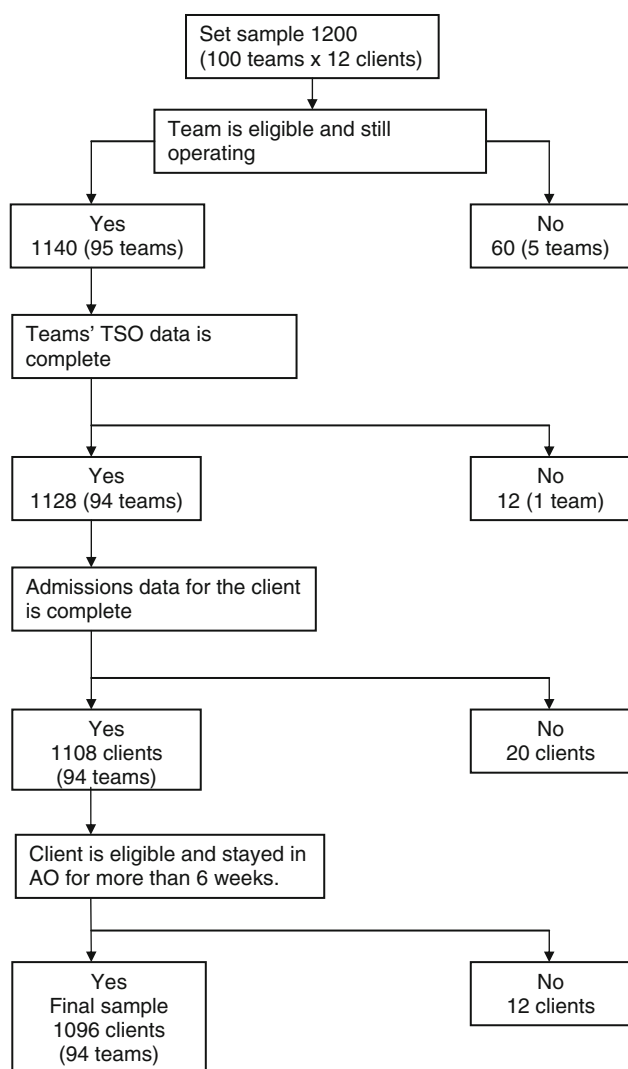


Fig. 1 Sampling process and eventual sample achieved

sampled. Of 1,096 clients from 94 teams, 70 (6%) did not have weekly booked visits, 143 (14%) were in either hospital or prison, and 32 (3%) were unknown. Of 851 clients (78%) with regular, booked, weekly visits, 279 (35%) missed at least one appointment during the 4 weeks before the date of team data collection.

Team characteristics

Table 2 describes the distributions of team characteristics. Compared with the total of 186 teams, the sample contained more old teams (>36 months) and less younger teams; more urban and less rural teams; were larger; had mean caseloads almost twice as great, and did not include any teams with very low caseloads.

Reflecting over-sampling, sampled teams were more likely to have over 5% of clients from a particular black and ethnic minority group than those not sampled. Of 11

ethnic minority groups (other than white British, Table 1), Caribbean was most commonly over 5% of team clients (38 of sampled teams). Small numbers in many categories make the overall analysis difficult to interpret but in every instance of teams having over 5% of clients from a particular ethnic group, less than half of these teams had over 5% of staff from the same ethnic group; of those 38 teams with over 5% of Caribbean clients, only 17 (45%) had over 5% of Caribbean staff.

Comparative analysis of client characteristics

The 13 client characteristics described above were included because they were possible confounders in the main analyses of the study. However, they were also possible predictors, so were analysed as such in respect of the primary and six secondary outcomes to test their validity as confounders. Three had no statistically significant effect on any of the seven outcomes: 'History of homelessness in the 2 years prior to AO', 'Living with a child' and 'Living alone'. We report only results significant when all other confounders were included.

Primary outcome nights in hospital in the first year of AO was positively associated with nights in hospital in the 2 years before AO and progressively with the total admissions in the previous 10 years.

Secondary outcomes hospital admissions commencing in the first year of AO were progressively associated with the total admissions in the 10 years before AO; there were 23% more admissions in the first year of AO in clients with a history of violence than those without; there were 19% fewer admissions of black and ethnic minority clients in the first year of AO than 'white British' clients.

Nights in hospital on compulsory order in the first year of AO were positively associated with the proportion of nights in hospital in the 2 years before AO.

Nights in hospital as voluntary in-patients in the first year of AO were positively associated with the proportion of nights in hospital in the 2 years before AO, and progressively associated with the total admissions to hospital in the ten years before AO. Female clients spent 3% more nights as a voluntary in-patient in the first year of AO than male clients. Clients living on the street or in secure accommodation had 4% fewer nights as a voluntary in-patient than those living in other accommodation.

Nights in hospital in the third year of AO (about half of all clients remained in AO this long) were positively associated with the proportion of nights in hospital in the 2 years before AO, and diminished progressively (0.3%/year) with increasing age.

The number of clients receiving specialist psychological interventions diminished with increasing age at acceptance into AO.

Table 1 Client characteristics

Gender				Diagnostic grouping			
Male		Female		Psychosis ^a		Other	
721 (66%)		375 (34%)		996 (91%)		94 (9%)	
Ethnicity				History of drugs/alcohol abuse			
White British		Other ^b		Yes		No	
713 (82%)		383 (18%)		461 (44%)		614 (56%)	
History of homelessness				History of violence			
Yes		No		Yes		No	
174 (16%)		918 (84%)		490 (43%)		606 (57%)	
Age at acceptance into AO (in years)				Total number of admissions in the 10 years prior to AO			
16–19		25 (2%)		None		118 (9%)	
20–29		293 (27%)		One or two		294 (26%)	
30–39		404 (37%)		Three or four		269 (24%)	
40–49		233 (21%)		Five or six		168 (16%)	
50–59		113 (10%)		Seven or eight		88 (8%)	
60+		28 (3%)		Nine or above		159 (17%)	
Mean	SD	Min	Max	Mean	SD	Min	Max
36.4	10.7	16	69	4.6	4.5	0	39
Living situation				Living with a child			
Living alone		No		Yes		No	
Yes		402 (37%)		48 (3%)		1,043 (97%)	
689 (63%)							
Accommodation				Street/prison/secure unit			
Independent housing		No		Yes		No	
Yes		214 (20%)		39 (4%)		1,052 (96%)	
877 (80%)							

Client characteristics from patient records in each AO team: total clients in the analysis, 1,096; missing values for some confounders affect some totals. History of violence, homelessness, living situation, accommodation, drug abuse including alcohol refer to the 2-year period before acceptance into AO

A number of missing values were present in the data: diagnostic grouping (6), living situation (5), history of homelessness (4), history of drugs and/or alcohol abuse (21), accommodation (5). Rounding may affect totals. Independent housing = owned or rented accommodation. Percentages have been adjusted to reflect the general population

^a Psychosis included: schizophrenia, unipolar and bipolar disorder

^b Ethnic minority groups in the other category include: White Other, Black African, Black Caribbean, Black Other, Indian, Pakistani, Bangladeshi, Oriental/Chinese, Mixed and Other

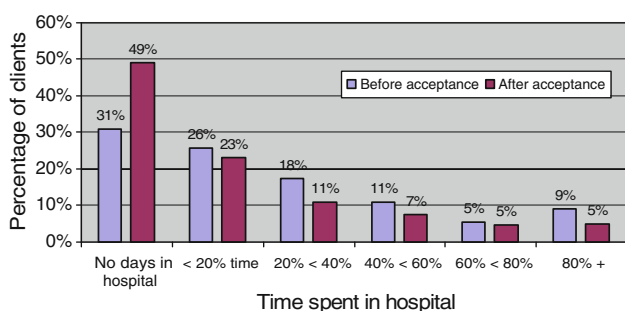


Fig. 2 Comparison of the proportion of time spent in hospital in the year before and the year after acceptance into assertive outreach. The corresponding proportions of time in hospital in the 2 years before acceptance into AO were 24% (no days); 37, 21, 9, 4, 5% (more than 80% of days). Percentages have been adjusted to reflect the general population

Nights in hospital in the first year after the TSO data collection interview were positively associated with the proportion of nights in hospital in the 2 years before AO.

Predictors of outcome

Table 3 shows the results of the main analysis for the primary outcome (nights in hospital in the first year after acceptance into AO) with the primary predictor (joint health and social care management), for the full sample and black and ethnic minority only sample, and for clients on compulsory orders and voluntary admissions separately. For each outcome, the effect of the interaction between ethnicity and joint management is shown for the full sample. Apart from the interaction between ethnicity and

Table 2 Descriptive analysis of team characteristics from the ‘Team Service Organisation’ (TSO) data

Measure	Teams in the TSO sample N = 186 (100%)	Sampled teams N = 97 ^a (52%)	Not sampled N = 89 ^b (48%)
Months in operation (since assertive outreach team established)			
0–12	29 (16%)	14 (14%)	15 (17%)
13–24	60 (32%)	27 (28%)	33 (37%)
25–36	39 (21%)	20 (21%)	19 (21%)
>36	58 (31%)	36 (37%)	22 (25%)
Urbanicity (where majority of teams’ time is spent serving patients from)			
Rural	21 (11%)	5 (5%)	16 (18%)
Suburban	122 (66%)	60 (62%)	62 (70%)
Urban	43 (23%)	32 (33%)	11 (12%)
Staffing (mean team size as total staff WTEs ^c)			
Mean	8.8	10.4	7.0
SD	4.1	4.2	3.3
Range	2.0–23.0	2.0–23.0	2.0–17.5
Caseloads (mean caseload per team)			
Mean	40.5	50.2	29.9
SD	22.2	22.1	16.8
Range	7–137	14–135	7–137

^a The sampled teams’ column includes three which are not included in any further analyses. Two were ineligible and one had been shut down

^b Numbers may not agree exactly; three teams sampled were not in the TSO sample of 186 ‘stand-alone’ teams, and turned out to be ‘integrated’ teams. The number of teams not sampled is thus 89, not 86

^c Whole time equivalents

Table 3 The effect of joint health and social care management on nights in hospital in the first year of AO, with adjustment for potential confounders

Primary outcome (nights in hospital in first year of AO) with primary predictor (joint management)	Sample	Effect size (%)	Bootstrap 95% CI	P value
All clients (mean group difference)	Full	−0.9	−5.1 to 3.5	0.738
	Black and ethnic minority only	5.2	−0.8 to 12.0	0.180
<i>Interaction between ethnicity and joint management</i>	Full	8.1	−0.2 to 16.3	0.102
Clients on compulsory orders (mean group difference)	Full*	−3.4	−7.3 to 0.6	0.140
	Black and ethnic minority only	4.4	−1.1 to 9.8	0.206
<i>Interaction between ethnicity and joint management</i>	Full	9.6	2.7 to 16.5	0.030
Clients on voluntary admission (mean group difference)	Full	0.9	−1.3 to 2.9	0.363
	Black and ethnic minority only	1.3	−2.0 to 4.8	0.483
<i>Interaction between ethnicity and joint management</i>	Full	0.6	−3.4 to 4.5	0.764

The effect size is the mean group difference in hospitalisation. All results shown are for adjusted models (see Table 1 client characteristics, for the factors that we adjusted for)

* The unadjusted model is significant at the 5% level

joint management for clients on compulsory orders, no result was statistically significant at the 5% level. This shows that black and ethnic minority clients are more likely to be on compulsory orders only on jointly managed teams ($P = 0.030$).

The relationships of the primary outcome with other team characteristics were examined, including: high proportion of support workers, multidisciplinary team working, out of hours working, a psychiatrist on the team, a

range of specialist skills available, specialist psychological interventions, and high caseload per team member.

After adjustment for all confounders, the only (marginally) significant predictor of the primary outcome, was a high proportion of support workers. For the full sample, clients in teams with a high proportion of support workers experienced 3.1% (95% bootstrap CI 0.1–6.3%) more nights in hospital in the year following acceptance into AO, 6.2% for the ethnic sub-sample (95% bootstrap CI

0.2–13.0%). The interaction between ethnicity and high proportion of support workers was not significant.

We also combined these eight binary predictors into a total conformity score and divided the conformity score at the median score (6): 45% (495) of clients were on teams scoring 6 or greater. Neither the conformity score nor the binary form predicted the primary outcome.

Team characteristics and other outcomes

The main analysis was re-run for the outcome nights in hospital in the year following the TSO data collection interview, because it was more closely related in time to the data on team characteristics than the year after acceptance into AO. However, joint management was not a significant predictor either for the full sample or the black and ethnic minority sub-sample, nor was the interaction between joint management and ethnic status significant. The same was true for two other alternative (secondary) outcomes—number of hospital admissions in the year after

acceptance into AO, and nights in hospital in the third year after acceptance into AO.

When other team characteristics were considered in relation to the year following the TSO interview, clients of teams offering specialist skills had marginally significantly fewer nights in hospital. For the black and ethnic minority sub-sample, the only significant finding was 20% fewer nights in hospital in teams offering out of hours working.

Loss of contact could not be examined in analysis because there were very few lost clients; for those few clients, data were very sparse.

However, there were some team characteristics that influenced the provision of the process variable, specialist psychological interventions (Table 4).

For the full sample, both multidisciplinary team working and out of hours working, were significant predictors of whether an individual client receives one of the interventions. Results suggest that a client was more than twice as likely to receive an intervention if the team was multidisciplinary, but a client was half as likely to receive an

Table 4 Predictors of use of specialist psychological interventions, with adjustment for potential confounders

Secondary outcome (client receives a specialist psychological intervention) with secondary team characteristics	Sample	Odds ratio	Bootstrap 95% CI	P value
Joint management (odds ratio)	Full	0.880	0.531–1.384	0.710
	Black and ethnic minority only	0.725	0.359–1.506	0.444
<i>Interaction between ethnicity and joint management</i>	Full	0.795	0.332–2.010	0.687
High proportion of support workers (odds ratio)	Full	1.212	0.789–1.706	0.417
	Black and ethnic minority only	1.638	0.793–3.170	0.233
<i>Interaction between ethnicity and high support</i>	Full	1.512	0.709–3.225	0.383
Multidisciplinary team working (odds ratio)	Full*	2.051	1.222–3.625	0.037
	Black and ethnic minority only	2.064	0.776–7.864	0.153
<i>Interaction between ethnicity and Multidisciplinary</i>	Full	0.914	0.286–4.569	0.892
Out of hours working (odds ratio)	Full*	0.508	0.364–0.828	0.006
	Black and ethnic minority only*	0.431	0.221–0.836	0.017
<i>Interaction between ethnicity and out of hours working</i>	Full	0.853	0.400–1.935	0.722
Psychiatrist on the team (odds ratio)	Full	1.059	0.674–1.558	0.796
	Black and ethnic minority only	1.146	0.569–2.388	0.696
<i>Interaction between ethnicity and a psychiatrist on the team</i>	Full	1.039	0.490–2.372	0.928
Range of specialist skills available (odds ratio)	Full	1.318	0.885–2.084	0.295
	Black and ethnic minority only	1.470	0.680–3.079	0.359
<i>Interaction between ethnicity and a range of specialist skills</i>	Full	1.220	0.538–2.940	0.701
High caseload per team member (odds ratio)	Full*	0.707	0.488–1.049	0.139
	Black and ethnic minority only*	0.493	0.275–1.103	0.048
<i>Interaction between ethnicity and high caseload</i>	Full	0.738	0.339–1.638	0.490

Specialist psychological interventions included CBT, help for substance misuse, family therapy and anger management

* The unadjusted model is significant at the 5% level

intervention if the team employed out of hours working. For the ethnic sample also, clients were less than half as likely to receive an intervention if the team had out of hours working; this is also true for teams with a high caseload per team member.

Out of 94 sampled teams, 69 (73%) offered specialist psychological interventions on a regular, planned basis. These teams served 817 (75%) of the total 1,096 clients. However, only 186 (23%; 17% of the total sample) of those 817 clients were actually receiving any intervention. Cognitive behaviour therapy (CBT) was the most commonly available specialist therapy (59% of the 69 teams offering any intervention); family therapy (45%), family intervention (32%); substance misuse programme (26%) and anger management (16%) were also available. But in the 41 teams offering CBT, only 73 (39%) of the 186 clients receiving any intervention, are receiving CBT; of clients in teams offering specialist psychological interventions, barely 9% (73/817) were receiving CBT; of the whole study sample, barely 7% (73/1,096) of clients were receiving CBT.

Discussion

This prospective national evaluation of AO based on observational data calls into question a clearly recommended model of care for the severely mentally ill in the community in England. The results of the principal analyses of team characteristics were largely neutral; that is, most associations with hospitalisation were non-significant when adjusted for confounders. When all eight team characteristic predictors were combined into a total policy conformity score there was still no association with the primary outcome. The only significant relationship between joint management and nights in hospital in the first year of AO was for black and ethnic minority clients admitted under compulsory orders. Joint management would appear, therefore, to have no effect on in-patient care of white British clients, but to increase in-patient care on compulsory orders by 12% for clients from ethnic minorities. However, several team characteristics were significant predictors of the provision of specialist psychological interventions, which is an important process of care objective of such teams. Importantly, hardly any patients were lost to teams and there was an overall trend for time in hospital to fall following acceptance into AO throughout England.

Reduction of hospital in-patient care is not the only desired outcome of AO services, but was a pragmatic, measurable outcome in all locations. Nor is it evidence of effective performance: the study was not designed to determine whether AO reduces use of hospital care; furthermore, there was a trend for reduced bed usage over the

same time period in England [13]. The literature had suggested that joint working between health and social care services, both likely in any case to be involved for most clients, was a key feature of AO teams tending to improve their effectiveness [5]. Joint working was, therefore our primary predictor of reduced in-patient care and this national study found no evidence for its influence on outcome. But even when taken together with seven other characteristics of services that indicate conformity to recommended service models no effect on our main outcome was found.

Such operational research is difficult; definitions are often ambiguous, loosely applied, and variable; records cannot be controlled and are often lacking; both clients and staff are not easily stereotyped into research categories. Our research design and implementation were as rigorous as service conditions permitted. The sample was a large proportion of both teams and clients throughout England; data on many possible confounding variables were collected; the analysis was carefully specified beforehand, though additional analyses were added later. Our findings are in line with those of a meta-regression analysis of the wide heterogeneity found in the results of randomised controlled trials of ICM, which showed that team characteristics (size, caseload, range of staff) did not predict hospitalisation [4]. However, the present study is the largest detailed examination based on observational data of a wide range of team characteristic predictors of hospitalisation in routine clinical practice in a high income country in which the policy of AO has been widely funded and implemented.

Methodological research comparing observational and experimental effectiveness studies has demonstrated the importance of observational research in identifying effects that are restricted to a particular duration of outcome that RCTs may fail to detect [25]. The measurement of 'nights in hospital' appears robust, but perhaps it takes longer than 1 year to affect in-patient care in these, by definition, challenging long-term clients. However, analysis of the third year after acceptance into AO, data being available for about half the total sample, showed no reduction related to joint management of teams. Such longer term effects have never before been examined.

Perhaps joint management is too ill-defined, too varied and too variable in its function to serve as an indicator of effective working. And compared to the US context, in England, traditions of collaborative working have often been strong even where there is no joint management, so there might be little contrast. On the other hand, other team characteristics did not fare much better in predicting in-patient care.

What has been clear from the earlier TSO study and this present work, is that there is very variable adherence

to the specified model of AO teams promulgated by the Department of Health. In the light of this we created an operational definition of 'eligibility' for AO based on that specification and found only 66% of clients fitted it. Since earlier hospital care was part of that definition, it was not surprising that 'eligible' clients experienced more hospital care later, but the degree to which the vast majority of in-patient care in the first year after AO was for 'eligible' clients was noteworthy (details available on request).

This eligibility analysis, though claiming no precision, points clearly to loosely applied criteria for inclusion in AO, and variable adherence to the 'official' model. On the other hand, the intended prospectively conducted examination of clients 'lost to contact' was impossible largely because there were hardly any of them, though also because those few had even fewer data available. AO teams in England do seem to retain contact with clients very effectively now.

Research in this field should also consider the influence on outcome of the nature and organisation of care, examining separately inputs, processes and outcomes [1] according to Donabedian [11]. Several team characteristics were significant predictors of the provision of specialist psychological interventions, surely a fundamental process objective of any mental health team. For the full sample, multidisciplinary team working increased the chance of receiving such an intervention, which is not surprising. The finding that the policy of engaging in out of hours working reduced the chance of receiving such an intervention cannot be explained using our data but may indicate that such policies have unwanted costs. For the black and ethnic minority sub-sample both out of hours working and a high caseload per team member reduced the chance of receiving such an intervention. However, the overall provision of specialist therapies was small, involving only 17% of the total sample, and only 23% of the clients of the 75% of teams which did have them available. Only 41 teams offered CBT, and only 7% of the total sample were receiving it. This is, perhaps, a salutary finding; the apparent availability of specialist therapies in teams or services, does not mean that many clients receive them. And one of the theoretical benefits of AO teams is that they can provide such interventions in the community. This low rate of application cannot easily be dismissed as lack of time or resource. It is possible therefore that focusing attention on this aspect of the design and management of teams could increase the delivery of evidence-based psychological interventions with possible health benefits. Understanding why skills that are much sought by mental health professionals appear to be so difficult to deliver in routine clinical care, albeit to a long-term mentally ill population, might be needed to enable such an endeavour.

Various explanations have been given for the failure of ACT and AO models to show better outcomes than conventional community care [1, 3, 4, 13–16, 23, 24]. Our findings call into question the model itself because its recommended components did not predict outcome in a uniquely large national evaluation although patient level data do predict outcomes as expected. If there is doubt about this unexpected conclusion it should be possible to test the supposed key components using constructive and dismantling experimental designs to isolate effects of intervention components on targeted mediators and outcomes [7]. We would certainly advocate that any redesign of service and care models for this key client group should be evaluated rigorously. A feasible and relatively low cost design for incorporating constructive and dismantling designs is the cluster randomised controlled trial in which teams (clusters) are randomised to develop and maintain contrasting models of care permitting both service and patient level outcomes to be compared. With the exception of the need to focus on delivering evidence-based psychological interventions, unfortunately, our data offer few insights into potential other redesign components that should be tested.

Conclusions

The team characteristics of AO services in England do not predict subsequent individual use of inpatient care but do predict a key process variable individual use of psychological interventions. Services are almost totally effective in preventing loss of contact with patients but disappointingly few patients are in receipt of structured psychological interventions such as CBT. Researchers, policy makers and mental health service managers should reconsider the relevance of previously recommended service characteristics. More attention to the process of care that is being delivered is needed.

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