British Journal of Psychiatry (1988), **153**, 532–542

The Community Management of Schizophrenia

A Controlled Trial of a Behavioural Intervention with Families to Reduce Relapse

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Schizophrenic patients were recruited into a trial of a prophylactic behavioural intervention with families. Families with at least one high Expressed Emotion (EE) relative were randomly allocated to one of four intervention groups: Behavioural Intervention Enactive; Behavioural Intervention Symbolic; Education Only; Routine Treatment. Patients from low-EE families were randomly allocated to two groups: Education Only or Routine Treatment. Relapse rates over nine months after discharge were significantly lower for patients in the two Behavioural Intervention, compared with Education Only and Routine Treatment groups. There was little difference between the two low-EE groups. Patients returning to high-EE relatives showed significantly higher relapse rates than those returning to low-EE relatives, in groups not receiving active intervention. Changes from high to low EE occurred in the Behavioural Intervention groups, and similar although less extensive changes occurred in the Education Only and Routine Treatment groups. Changes in criticism and marked emotional over-involvement (EOI) occurred generally in high-EE groups but were larger in magnitude in the Enactive and Symbolic groups. Reduction of hostility only occurred in the Behavioural Intervention groups. These results give partial support for the causal role of EE in relapse. There were no significant differences between the groups with respect to contact with the psychiatric services or medication.

The development of vulnerability–stress models of schizophrenia (e.g. Zubin & Spring, 1977; Nuechterlein & Dawson, 1984) has had important implications for the management of the disorder, especially within the broad policy of care of the mentally ill in the community. The model incorporates an interaction between an enduring and inherent vulnerability on the one hand, and a set of stressful environmental stimuli on the other, which can result in increasing episodes of the illness. In terms of management, the important factor is that it may be possible to identify and modify such sets of stimuli, and hence reduce or at least delay relapse.

Following the advent of neuroleptic medication and the move away from institutional care, a series of studies that investigated the relationship between social factors and the recurrence of positive schizophrenic symptoms identified a measure of the relative's level of Expressed Emotion (EE) as an important predictive variable (Brown *et al*, 1962; 1972; Vaughn & Leff, 1976*a*; Vaughn *et al*, 1984; *see* Leff & Vaughn, 1985; Koenigsberg & Handley, 1986, for reviews); they were particularly important because they identified a quantifiable measure of environmental stress that was shown empirically to be associated with relapse. Patients returning to live with a relative who had been rated as high-EE had much higher relapse rates than those who returned to live with a low-EE relative (Leff & Vaughn, 1985). However, patients who lived with a high-EE relative would receive some degree of protection both through maintenance neuroleptic medication, and having low face-to-face contact (less than 35 h a week) with their relative (Vaughn & Leff, 1976*a*).

The identification of this familial factor – high-EE – as being related to and possibly causative of relapse, formed the basis of a number of intervention studies. These utilised psychosocial intervention to alleviate stress within the home environment, thus reducing the EE level of the relative, and hence the rate of relapse. Intervention studies provide an opportunity both to assess the efficacy of the clinical techniques in altering the family environment (i.e. modifying the stimulus sets) and to determine whether such modifications influence the course of the illness (Koenigsberg & Handley, 1986). These intervention studies have been reviewed at length elsewhere (Barrowclough & Tarrier, 1984; Leff, 1985; Koenigsberg & Handley, 1986; Strachan, 1986; Tarrier, 1988).

Such studies provide strong evidence for the consistent efficacy of community-based family-management programmes in reducing the rate of relapse with positive symptoms, as well as at least partial support for the causative role of EE in relapse. However, such studies are expensive, and are beset with both practical and methodological difficulties, including several potentially mediating variables. Firstly, the role of neuroleptic medication; to demonstrate the effectiveness of family interventions and to support the concept of the stress-reduction model, it is necessary to show that any treatment-group differences are not due purely to medication compliance or drug dosages. Secondly, it has been suggested that the success of intervention, at least in British studies, has been due to improved liaison with the established psychiatric services, especially as involving rehabilitation (G. Shepherd, pers. comm.), so that it must be demonstrated that families in treatment groups do not have differing amounts and kinds of contact with the established services.

This study examined: (1) the relapse rates between patients from both high- and low-EE households who were not receiving effective intervention; (2) the efficacy of 9-month behavioural intervention and short-term educational intervention with families, compared with routine psychiatric treatment given to a control group in patients from high-EE households; (3) the effects of two different levels of behavioural intervention – symbolic and enactive; (4) the effects of short-term educational intervention compared with routine treatment on a low-EE group; (5) changes in EE status and the salient EE constituent dimensions, in relation to treatment and outcome; and (6) the use of medication and contact with the psychiatric services as alternative explanations of any treatment effect. The viability of family intervention as part of a normal district psychology service, in liaison with other psychiatric services, in producing benefits over and above existing community-care provision for schizophrenic patients was also considered.

Method

Subjects

All patients admitted to the four acute case wards in Salford Health Authority (three at the psychiatric hospital and one at the general hospital) were screened, and patients fulfilling the following four criteria recruited into the study: (1) a diagnosis of schizophrenia elicited by the Present State Examination (PSE) (Wing *et al*, 1974); (2) between the ages of 16 and 64; (3) not suffering from any organic condition that could explain their psychopathology; (4) having lived with their relative(s) for 3 months before admission and intending to return to the household.

Patients were divided into 'high risk', i.e. those who had a high-EE relative in their household, and 'low risk' – those who did not. Ninety-two families were identified as suitable for inclusion; of these, the relatives of nine patients refused to be interviewed or continually failed to attend for appointments for the Camberwell Family Interview (CFI) (Vaughn & Leff, 1976*b*); 83 families were so assessed, of which 64 patients were from high-EE households.

There was a total of 83 subjects, average age 35.3 (s.d. 12.8) years; 54 (65%) were female. In terms of marital status, 45 (54%) were single, 29 (35%) married or co-habiting, and 9 (11%) separated or divorced; 17 (21%) were employed, one in full-time education, one retired, and 64 (77%) unemployed – the average interval since last employment was 5 (s.d. 5.5) years. Educational levels were: no qualification, 57 (68%); extra schooling or technical training, 21 (25%); tertiary education, 5 (6%). The households in which patients were living were: parental, 42 (51%); marital, 29 (35%); with siblings, 4; with children, 3; other, 5. Sixty-three patients were living with one interviewed relative only.

The clinical characteristics of the patients were: first episodes, 25 (30%); mean number of admissions, 2.8 (s.d. 3.6); mean duration of illness, 6.3 (s.d. 7.4) years; mean time since last admission, 1.6 (s.d. 3.1) years; mean days in hospital prior to index admission, 91 (s.d. 148.7) days; mean days in hospital (index admission) 35.5 (s.d. 25) days; admitted compulsorily, 23%. Of the relatives, the mean age was 53 (s.d. 15.2) years, and 53% were female; 20 households contained two relatives, 11 had two high-EE relatives, four had two low-EE relatives, and five households had both a high-EE and a low-EE relative. The relationship of the relative to the patient was: mother, 42%; father, 24%; husband, 18%; wife, 6%; other, 10%. Of the relatives, 48% were employed, 20% unemployed, 25% retired, and 7% had other occupational status. Relatives' educational status was: no formal qualifications, 79%; further schooling or technical qualifications, 13%; tertiary education, 8%. There was a history of psychotic illness in 5% of the relatives.

Patients from high-EE families were considered at high risk of relapse and were randomly allocated in a stratified manner to one of four groups (with first or multiple episodes and presence or absence of residual symptoms as factors), while the patients from low-EE families who were considered as low risk were allocated to one of two groups. Ten families could take no further part (non-participators); the relatives of four patients refused to participate; two patients went to live in hostels; two left home; and two were transferred to a rehabilitation ward. A total of 73 patients and their families entered the trial.

Treatment drop-outs were defined as those families that entered the trial and received at least one treatment session, but then refused to continue. In those groups not receiving the 9-month intervention (i.e. Education Only and Routine Treatment), the equivalent group were those who refused follow-up assessments (see Table I), although every effort was made to persuade families to continue in treatment or to complete the assessments. All treatment or assessment drop-outs were included in the analyses, even though they may not have received the complete intervention; this may

TABLE I
Clinical outcome in terms of relapses

	High-EE group					*Low-EE group*	
	Nine-month Behavioural Intervention			*Education only*	*Routine treatment*	*Education only*	*Routine treatment*
	Combined groups (BIF)	*Enactive*	*Symbolic*				
Allocation	32	16	16	16	16	9	10
Non-participators	7	3	4	2	1	0	0
Participators	25	13[1]	12	14	15	9	10
Treatment/assessment drop-outs	3	1	2	2	1	0	1
Relapsing patients	3 (12%)	2 (17%)	1 (8%)	6 (43%)	8 (53%)	2 (22%)	2 (20%)

1. One patient died after 7 months and was excluded from the analysis.

produce more conservative results, but was thought necessary in evaluating a clinical service.

Medication

All the patients were treated with neuroleptic medication during admission and prophylactically after discharge. Ten patients were discharged with oral medication only, and of the 63 patients who were discharged on depot injection, 24 also received oral neuroleptics; 6 (11%) patients from high-EE and 5 (26%) from low-EE households received oral medication only. Compliance with medication was assessed by: (a) asking patients and relatives about this on a monthly basis; (b) verifying attendance at drug clinics and appointments with the community psychiatric nurses (CPNs) for depot injections; and (c) randomly selecting patients who received 'oral medication only' for blood tests. Details of all patients' medication over the 9-month trial period were compiled and compliance rated on a four-point scale: 0 = complete compliance; 1 = medication missed for 1 month and/or occasionally missed oral medication or injections not resulting in the patient being without medication for 1 month; 2 = medication missed for more than 1 and up to 4 months; 3 = medication missed for more than 4 months. Each patient's medication was calculated in neuroleptic equivalents (Suy *et al*, 1982) for each month, which gave an equivalent in terms of a monthly dose of haloperidol decanoate (mg). These monthly equivalents were then summed over the 9-month period to produce a total neuroleptic dosage over the intervention period.

Contacts with the psychiatric services

All contacts with the psychiatric services were recorded for all patients. (a) Frequency and compliance with psychiatric out-patient appointments were rated on a 5-point scale: 5, good, no appointments missed; 4, fair, no more than two missed appointments; 3, poor, more than two missed appointments, but over 50% attendance; 2, very poor, less than 50% attendance; 1, extremely poor, or virtually no attendance. (b) Injection-clinic attendance was rated on a 3-point scale: 1, regular; 2, irregular; 3, no or virtually no attendance. (c) Contact with CPNs was recorded. (d) Day-care attendance was rated on two scales: attendance for 3 or more days each week or for less than that; and attendance for 50% or more of the 9 months, or for less than 50%. (e) Contacts with social workers of both the patient and the family were recorded.

Assessments

Expressed emotion

The relatives' EE was assessed from the CFI – an audiotaped, semi-structured interview, from which five EE scales are rated (Vaughn & Leff, 1976*b*). These scales are: critical comments (a frequency count); hostility (a 4-point scale, 0–3); emotional overinvolvement (EOI) (a 6-point scale, 0–5); warmth (a 6-point scale, 0–5) and positive remarks (a frequency count). A relative is classified as high-EE if he or she rates as 6 or more on 'critical comments' or 1–3 on 'hostility', or 3–5 on EOI (Leff & Vaughn, 1985). The CFI was administered at admission. Patients with a high-EE relative were then allocated to the high-EE group, while patients without such a relative were allocated to the low-EE group. Every attempt was made to interview all relatives in the household over the age of 16; all parents or spouses were interviewed, with two exceptions – in one case, the mother was too ill and subsequently died of breast cancer during the follow-up period, while in the other, the mother had a long-standing psychotic illness. Siblings and grown-up children were also interviewed, where possible. In seven households, this was not possible, but in all cases, these were not the key relatives, and their contact with the patient was minimal.

The CFI was again administered 4.5 and 9 months after discharge. Ratings of EE at the follow-up assessments (rated by CV and KP) were completed blind to the treatment group to which the patient had been allocated. The interrater reliability of EE between CV and the two other raters (KP and SW) was calculated. The phi coefficients for agreement on EE ratings were: CV and KP (9 interviews) = 1.0, and CV and SW (12 interviews) = 0.84. There was disagreement

between CV and SW on the classification of one relative (*see* Results).

Clinical state of the patient

Initial diagnoses were made using the PSE interview and CATEGO program. The PSE was further administered 1 month after discharge (to assess the presence of any continuing psychotic symptoms), at 9 months after discharge, and at any time that there was any indication of a relapse or a worsening of the patient's condition. All patients were assessed on a monthly basis, using the PAS (Krawiecka *et al*, 1977) to monitor their clinical state. Follow-up PSEs were completed by a psychiatrist who was blind to the treatment group to which the patient had been allocated. Relapses were defined by either a reoccurrence of psychotic symptoms in a patient who was symptom-free at post-discharge assessment, or a worsening of psychotic symptoms in a patient who had residual symptoms as elicited by the PSE, of at least 1 week's duration. Assessment of relapse was performed blind to treatment-group allocation.

Assessment battery

At index admission and at 4.5 and 9 months after discharge, assessments were made of the patient's social functioning (Birchwood, 1983) and psychophysiological reaction to their relative (Tarrier *et al*, 1988). Also, the relative's level of personal distress was assessed using the General Health Questionnaire (Goldberg, 1972) and the Symptom Rating Scale (Kellner & Sheffield, 1973), and perception of the patient's problem behaviour using the Family Questionnaire (Tarrier & Barrowclough, 1984).

Treatment groups

Routine treatment (RT)

All patients were under the care of a multidisciplinary clinical team during their admission and after discharge, and were reviewed at out-patient clinics. The research team maintained contact with these families for assessment purposes, and acted as a link with the clinical team where necessary, but no specialist intervention was offered.

Education only (Ed)

Families allocated to this group received a standardised, two-session educational programme, designed to give the patient and relatives extensive individualised information about schizophrenia and how to manage it in the home environment; it has been described in detail elsewhere (Barrowclough *et al*, 1987).

Behavioural intervention (BIF)

These were two 9-month interventions of similar content but different levels (Enactive and Symbolic). Initially, families allocated to one of these groups received the Education programme of two sessions followed by a Stress Management programme of three sessions, conducted with the relatives. This programme was designed to teach the relatives to monitor sources of stress and their reactions to it, and then to learn more appropriate methods of coping. Finally, there was an 8-session programme of Goal Setting, in which patient and relatives were taught to identify areas of change or need, to set goals to meet these needs and to establish procedures to achieve the goals using a constructional approach (Goldiamond, 1974). These treatment programmes have been described in detail elsewhere (Barrowclough & Tarrier, 1987) and the methodological advantages of using enactive and symbolic levels of behavioural intervention discussed (Barrowclough & Tarrier, 1984). The difference between the Enactive and Symbolic groups is in level of intervention, and not in content; both interventions are didactic, in that families are taught skills with which to manage schizophrenia. The difference between the two is in how these skills are taught – either through symbolic representation such as discussion and instruction, or through an enactive method that requires such participation as role-playing, guided practice, record-keeping, and corroborated active participation in the programme. For example, a relative would be advised to relax more when under stress and be instructed verbally how to do this (Symbolic), or would be actively taught relaxation and supplied with taped exercises to practice, as well as being expected to monitor and record the success of the practice and its implementation to counter stressful situations (Enactive). The first aim of the intervention was to identify components of high-EE (e.g. criticism, intrusiveness, overprotection, or poor coping reactions), and to eliminate these by either changing the relatives' behaviour or the patient's behaviour that elicited the original negative response. It was hypothesised that in so reducing the EE of the relative, the risk of relapse would also be reduced. The second aim was to encourage an increase in the patient's level of functioning, through a systematic identification of needs and planning of goals to meet these needs.

Results

Outcome relapse

For the majority of analyses, the high-EE Symbolic and Enactive groups were combined into one group – Behavioural Intervention with Families (BIF). The number of relapses which occurred within each group is presented in Table I. Because of the subject numbers, comparisons of the number of relapses within the 9-month follow-up period between three or more groups were carried out using the chi-squared test, and between two groups using the Fisher exact probability test. A comparison of the number of relapses within 9 months between the five groups (low-EE–Routine Treatment; low-EE–Education; high-EE–Routine Treatment; high-EE–Education; high-EE-BIF) proved significant ($\chi^2 = 9.35$, d.f. = 4, $P < 0.05$).

1. To examine the question of whether patients returning to high-EE and to low-EE relatives had different relapse rates, a comparison was made between the combined low-EE group (since there was a minimal difference between the relapse rates in the low-EE–Routine Treatment and low-EE–Education groups, it was thought justifiable

https://doi.org/10.1192/bjp.153.4.532 Published online by Cambridge University Press

to combine these groups) and the high-EE–Routine Treatment group; this was significant ($P=0.025$). There was a significant difference ($P=0.02$) between the combined low-EE groups and the combined high-EE–Routine Treatment and high-EE–Education group. Table I indicates that these results are due to the higher relapse rates in the high-EE–Routine Treatment and high-EE–Education groups.

To examine the efficacy of the behavioural intervention, a comparison was made between the high-EE–BIF group and the high-EE–Routine Treatment group, which proved significant ($P<0.02$). A chi-squared test between the two low-EE groups (low-EE–Routine Treatment, low-EE–Education) and high-EE–BIF was not significant, nor was a comparison between the high-EE–BIF and combined low-EE groups. To examine the efficacy of the educational intervention, comparisons were made between: the high-EE–Education and high-EE–Routine Treatment (not significant), high-EE–Education and high-EE–BIF (which approached significance, $P<0.08$), and the combined low-EE groups and high-EE–Education (which approached significance, $P<0.09$). Table I indicates that these results are due to the lower relapse rates in the high-EE–BIF, low-EE–Education, and low-EE–Routine Treatment groups, compared with the high-EE–Routine Treatment and high-EE–Education groups.

3. To examine any differences between the two behavioural interventions, a comparison was made between the high-EE–Enactive and high-EE–Symbolic groups; this was not significant.
4. A comparison between the two low-EE groups was not significant, indicating the absence of any significant benefit in terms of relapse rates, of the Education programme in the low-EE sample.

During the reliability checks on EE ratings, one relative who was initially rated high-EE and allocated to the high-EE–Routine Treatment group was rated low-EE. The third rater, rating the interview blind, also rated the relative low-EE and as this was the sole relative, there was a potential misclassification at allocation; disagreement was on the number of critical comments. However, since the relative was rated high-EE at 4.5 and 9 months, on the basis of criticism, hostility, and EOI, it was thought justified to keep the original allocation. The patient remained well during the 9-month follow-up period, so that reclassification would have resulted in the following relapse rates: high-EE–Routine Treatment, 75%; low-EE–Routine Treatment, 19%. Keeping the original allocation makes the results more conservative.

Outcome: expressed emotion (analyses of separate groups)

The EE of the relatives was assessed during index admission and at 4.5 and 9 months. Changes in EE status (high or low) were examined by means of the McNemar test (Siegel, 1956): EE dimensions (frequency of critical comments, hostility, EOI, warmth, and frequency of positive comments) and contact time were compared using a Wilcoxon matched-pairs signed-rank test, within each treatment group between assessments. The relatives of patients who relapsed during the 9-month follow-up period were excluded from the analyses. This allowed a comparison of the effect of the different treatments on the relatives' EE that was free of any reactive effect due to the patients' relapse, which would have differentially contaminated the high-EE–Routine Treatment and high-EE–Education groups.

TABLE II
Number of high-EE relatives in each of the four high-EE groups over 9 months

	Routine treatment	*Education only*	*Symbolic*	*Enactive*
Admission	8/9	8/8	13/14	14/15
4.5 months	4/9	3/8	1/13	7/14
9 months	5/8	4/8	2/12	4/14

EE status

The number and percentage of high-EE relatives in each group are presented in Table II.

Admission–4.5 months. The high-EE–Symbolic group showed a significant ($P<0.01$) change from high- to low-EE, and the high-EE–Enactive group showed similar change, that approached significance ($P=0.06$). No other treatment group showed any significant changes.

4.5–9 months. There were no significant changes in any of the treatment groups during this period.

Admission–9 months. Both the high-EE–Symbolic ($P<0.05$) and high-EE–Enactive ($P<0.01$) groups showed significant changes from high- to low-EE. No significant changes were shown in any other group.

EE dimensions

Analyses of changes in the magnitude of each dimension (not changes in EE status).

Admission–4.5 months. The high-EE–Routine Treatment ($z=-2.35$, $P<0.05$), high-EE–Symbolic ($z=-2.67$, $P<0.01$), and high-EE–Enactive ($z=-2.82$, $P=0.005$) groups all showed significant decreases in the number of critical comments. Similarly, the high-EE–Routine Treatment ($z=-2.2$, $P<0.05$), high-EE–Symbolic ($z=-2.03$, $P<0.05$), and high-EE–Enactive ($z=-2.45$, $P<0.01$) groups all showed significant decreases in ratings of EOI. The high-EE–Enactive group showed a significant ($z=-2.1$, $P<0.05$) decrease in warmth, and the high-EE–Routine Treatment group a significant ($z=-2.43$, $P<0.02$) increase in contact time. No other changes were significant.

4.5–9 months. None of the treatment groups showed any significant changes during this period.

Admission–9 months. The high-EE–Enactive and high-EE–Symbolic groups showed the same significant effects

https://doi.org/10.1192/bjp.153.4.532 Published online by Cambridge University Press

TABLE III
Changes in relatives' EE status over 9 months

	High-EE-BIF	*High-EE (Ed + RT)*	*Low-EE*
Admission			
Number of high-EE relatives	27/29	16/17	0/18
4.5 months			
Number of high-EE relatives	8/27	7/17	2/15
9 months			
Number of high-EE relatives	6/26	9/16	1/18

Relatives of patients who relapsed are excluded.
For definitions of abbreviations, see text.

on criticism, EOI, and warmth at 9 months as at 4.5 months (Criticism: Enactive, $z = -2.9$, $P < 0.005$; Symbolic, $z = -2.17$, $P < 0.05$. EOI: Enactive, $z = -2.4$, $P < 0.02$; Symbolic, $z = -2.2$, $P < 0.05$. Warmth: Enactive, $z = -2.22$, $P < 0.05$). However, the high-EE–Routine Treatment group showed no significant differences over 9 months in EOI and contact time (the effect at 4.5 months disappears), but the decrease in the number of critical comments was still significant ($z = -2.52$, $P = 0.01$). No other changes were significant.

Outcome: EE (analyses of combined groups)

Since subject numbers are low, analyses of changes in EE within the six separate groups may fail to reveal important trends. Because of this, further analyses were completed, combining groups of equivalent relapse rates. Hence the Behavioural Intervention with families group was formed combining Enactive and Symbolic interventions. A second group, high-EE–(Ed + RT) was made up of the high-EE–Education-only and Routine Treatment groups, and a third group of the two low-EE groups. The EE status and dimension data of these three groups at the three assessment periods are presented in Tables II and IV. (Similarly analyses and data excludes subjects who relapse.)

EE status (see Table III)

Admission–4.5 months. Both the high-EE–BIF group ($z = -3.72$, $P < 0.0001$) and high-EE–(Ed + RT) group ($z = -2.5$, $P < 0.01$) showed a significant change from high- to low-EE.

4.5–9 months. There were no significant changes in any groups.

Admission–9 months. Both the high-EE–BIF group ($z = -3.31$, $P < 0.001$) and the high-EE–(Ed + RT) group ($z = -2.2$, $P < 0.03$) showed significant reductions in EE.

TABLE IV
Changes in EE dimensions over 9 months

	Criticism	*Hostility*	*EOI*	*Warmth*
High EE–BIF				
Admission				
Median	8.4	0.2	3	3.7
Range	0–28	0–3	0–5	2–4
Percentage rated as high-EE	79%	31%	66%	86%[1]
4.5 months				
Median	2.3	0.06	1.8	2.8
Range	0–14	0–3	0–5	0–5
Percentage rated as high-EE	11%	11%	19%	63%
9 months				
Median	1.2	0.07	1.4	2.8
Range	0–12	0.3	0–4	1–5
Percentage rated as high-EE	15%	12%	15%	65%
High-EE (Ed + RT)				
Admission				
Median	9	0.4	2.6	2.8
Range	3–31	0–3	0–4	0–5
Percentage rated as high-EE	82%	47%	53%	59%
4.5 months				
Median	0.4	0.2	1.4	3.0
Range	0–12	0–3	0–3	0–5
Percentage rated as high-EE	34%	34%	29%	71%
9 months				
Median	2.5	0.2	2.0	2.8
Range	0–10	0–3	0–4	1–5
Percentage rated as high-EE	31%	25%	44%	62%
Low-EE (Ed + RT)				
Admission				
Median	2.2	0.0	1.0	3.5
Range	0–4	0	0–2	1–4
Percentage rated as high-EE	0%	0%	0%	72%
4.5 months				
Median	0.3	0.0	0.6	2.3
Range	0–12	0	0–2	0–5
Percentage rated as high-EE	13%	0%	0%	47%
9 months				
Median	0.3	0.03	0.9	2.4
Range	0–11	0–1	0–2	0–5
Percentage rated as high-EE	6%	6%	0%	44%

1. Warmth is not used in classification of EE, but the percentage of relatives who score 3 or more is included for interest.

https://doi.org/10.1192/bjp.153.4.532 Published online by Cambridge University Press

EE dimensions (see Table IV)

Admission–4.5 months. The high-EE–BIF group showed a significant decrease in criticism ($z = -3.51$, $P<0.0001$), hostility ($z = -2.21$, $P<0.04$): EOI ($z = -3.5$, $P<0.001$) and warmth ($z = -2.81$, $P<0.005$). The high-EE–(Ed + RT) group showed a significant decrease in criticism ($z = -2.69$, $P<0.007$) and EOI ($z = -2.67$, $P<0.003$). The low-EE groups showed a significant decrease in warmth ($z = -2.04$, $P<0.04$).

4.5–9 months. There were no significant changes in any groups.

Admission–9 months. The high-EE–BIF group showed a significant decrease in criticism ($z = -3.97$, $P<0.0001$), EOI ($z = -3.51$, $P<0.0001$) and warmth ($z = -2.5$, $P<0.01$) and a trend towards a significant decrease in hostility ($z = -1.7$, $P<0.08$). The high-EE–(Ed + RT) group showed a significant decrease in criticism ($z = -3.01$, $P<0.003$), and a trend towards a significant decrease in EOI ($z = -1.7$, $P<0.09$). The low-EE groups showed a significant increase in criticism ($z = -2.56$, $P<0.01$).

Comparison of combined groups at different assessments

A further comparison of EE status and dimensions was completed between high-EE–BIF and high-EE (Ed + RT) groups at the different assessment points.

Admission

The high-EE (Ed + RT) group had a significantly higher rating of warmth ($z = 2.24$, $P<0.02$). No other analyses were significant.

4.5 months. No analyses were significant.

9 months. The high-EE–BIF group had a significantly lower number of high-EE relatives ($z = -2.15$, $P<0.03$) and lower ratings of criticism ($z = -2.01$, $P<0.04$) than the high-EE (Ed + RT) groups. No other comparisons were significant.

Medication

Complete medication compliance was achieved by 50 (68%) of all patients, 8 (11%) missed their medication occasionally or for up to 1 month, 10 (14%) missed medication for at least 1 and up to 4 months, and 5 (7%) missed for more than 5 months. In a sample of patients ($n = 5$) who indicated they were taking oral medication, blood tests substantiated their verbal report. Differences between the treatment groups in terms of medication were assessed in the following ways: chi-squared test for compliance, for number of months without medication and for whether the patient was on depot injection or oral medication; and a Kruskal–Wallis one-way analysis of variance of the total dosage of medication in neuroleptic equivalents. No significant differences between the groups were found.

Contact with the psychiatric services

Out-patient appointments with a psychiatrist were attended by 69 (95%) of all patients; the median number of appointments during the 9-month follow-up period was 5.6, with a range of 0–30. In terms of compliance, 45 (62%) of patients attended all their appointments; 13 (18%) missed less than two, and only 4 (4%) missed all or virtually all. Sixty-three (86%) were referred to an injection clinic or received a depot injection from a CPN, and 52 (83%) of these patients complied on a regular basis; however, only 6 (9%) patients had contact with CPNs for any other reason, and in only two cases were the family seen for formal consultation. The Day-care facility was attended by 28 (38%), of which 23 (81%) attended for more than 3 days per week and 22 (77%) for 50% or more of the 9 months; 45 (62%) had no contact with a social worker after discharge, while 13 (18%) had five or more appointments, but in only 14 (19%) of cases were the relatives seen formally, either with the patient or alone, while 7 (9%) were seen five or more times. Chi-squared analyses indicated that there were no significant differences between the treatment groups on any of the measures relating to the patients' or relatives' contact with the psychiatric services.

Summary of results

1. For patients of families not receiving effective interventions (i.e. high-EE Education and Routine Treatment), returning to live in a high-EE household is associated with higher relapse rates for patients than is returning to a low-EE household.
2. The two behavioural interventions, Symbolic and Enactive, significantly reduced relapse rates in high-EE patients.
3. Education alone, as an intervention with relatives, had no effect on relapse in high-EE patients.
4. Significant changes from high- to low-EE were found to occur generally in the high-EE groups, but greater changes in the Behavioural Intervention groups. The Behavioural Intervention groups had significantly less high-EE relatives at 9 months than the high-EE Education and Routine Treatment Groups.
5. Significant decreases in criticism and EOI were found generally in high-EE groups, but greater changes in the Behavioural Intervention groups. Significant decreases in hostility were only found in the Behavioural Intervention groups. The Behavioural Intervention groups had significantly less critical comments than the Education and Routine Treatment group at 9 months.
6. There were no significant differences between the treatment groups in terms of medication or contact with the psychiatric services.

Discussion

This study principally examined the efficacy of two 9-month behavioural interventions and a two-session educational intervention (the behavioural interventions also included the educational programme), for

https://doi.org/10.1192/bjp.153.4.532 Published online by Cambridge University Press

patients living with high-EE relatives compared with a control group receiving routine psychiatric treatment and after-care from the multidisciplinary psychiatric services. The results clearly demonstrate the superiority of the 9-month behavioural interventions over routine treatment, and also suggest that the educational programme alone is ineffective in reducing relapse rates, although it may have other benefits. The combined Behavioural Intervention group (BIF) showed relapse rates which were lower, although not significantly different from the low-EE groups, while the high-EE–Routine treatment and high-EE–Education groups showed relapse rates similar to those found in control groups of other studies (i.e. approximately 50%). Similarly, the relapse rates in the Symbolic and Enactive Intervention groups are equivalent to those in intervention groups of other studies (e.g. Falloon *et al*, 1982, 1985; Leff *et al*, 1982, 1985; Hogarty *et al*, 1986), except the Hamburg study (Kottgen *et al*, 1984), and the very successful combined family-management and social skills-training group in Hogarty's study (Hogarty *et al*, 1986), which had no relapses.

Of the three patients in the Behavioural Intervention groups who relapsed, two were 'treatment drop-outs'; in one of these families, the patient and her daughter attended only one intervention session, while in the other, the patient's husband was very uncooperative and although ten sessions were held, he failed to attend four of these and only two were completed to the required criteria. This patient later had six readmissions within 2 years of discharge from the index admission. The third relapse in this group was also anomalous, in that it occurred soon after the midterm assessments, when the patient's sister, her only relative, had been rated as low-EE, although this relapse occurred soon after a reduction in medication.

The two alternative hypotheses for the treatment effect were that medication (either in terms of dosage or compliance), or contact with the psychiatric services (especially aftercare), would be significantly different between treatment groups. These hypotheses were not supported, and did not explain the lower relapse rates in family intervention groups. The data from those who refused treatment and those who dropped out indicated that there was a small but not insignificant group of patients and their relatives who were at high risk of frequent relapse, but who were very difficult to engage in treatment. How to engage this group in treatment is an important issue for further research.

The combined intervention group (BIF) included the two intervention groups – the Symbolic and Enactive; the content of these two interventions is identical, but the level of intervention differs. Barrowclough & Tarrier (1984) described the inadequacies of the concept of the placebo control group in trials of psychosocial interventions; to avoid these problems in controlled trials, it was suggested that if the intervention was didactic, then lessons could be drawn from the research into skills training. Bruner (1966) described different modes of instruction, e.g. one where a skill is taught through verbal instruction, discussion, persuasion, or written material, in which actual behaviour change is represented in a symbolic manner, and another mode where skill is taught through enactment or participation, such as rehearsal or role-playing. It is a consistent finding in skill-training that greater success is achieved through enactive instruction, rather than through purely symbolic teaching. It was hypothesised, therefore, that as the intervention was aimed at teaching relatives the skills needed to manage the patient, and as the goal was to change behaviour associated with the high-EE ratings, then the enactive mode of instruction would be more effective than the symbolic. However, in terms of relapse rates, there appears to be little significant difference between the groups, although these rates were so low that a ceiling effect for improvement probably operated.

There is some evidence that the systematic and operationalised approach of the Enactive programme could be more effective: firstly, some individual cases demonstrated great benefits that would not have been achieved without the behavioural prompting performed by the therapist (Barrowclough & Tarrier, 1987). Secondly, there is some evidence that the Enactive programme was more effective with relatives who had extreme ratings of EOI. Clinically, it has always been thought very difficult to change very high levels of EOI: in this study there were three relatives rated 5 on EOI at admission, and all were in the Enactive group. At 4.5 months, only one relative was still rated as 5, while at 9 months, none received that rating; indeed, two of these relatives were rated low-EE on EOI, although one was still high-EE on critical comments. Thirdly, changes in EE and its dimensions were frequently of greater statistical significance in the Enactive group.

The second major aim of the study was to investigate the role of EE in relapse. It is possible to analyse this in two ways: firstly, through the association between the EE status of the relative and schizophrenic relapse, and secondly, by examining relapse rates within each treatment group and any associated changes in the relatives' EE status. The first issue is the association between the EE status of the relative and schizophrenic relapse in those groups who received no or empirically ineffective

interventions. As the relapse rates between the two low-EE groups (those who received routine treatment and those who received the education programme) were very similar, it was thought justified to combine these into one group, which was then compared with the high-EE group that received routine treatment; the results indicate that significantly higher relapse rates are associated with returning to live with a high-EE relative. Similarly, it was thought justified to combine the high-EE group that received the education programme with the one that received routine treatment. In this way, groups of larger sample sizes were compared, and the significant association between EE and relapse was evident. These results are in agreement with those of the previous larger studies of Brown *et al* (1972) and Vaughn & Leff (1976*a*) and Vaughn *et al* (1984), and with a smaller American study (Moline *et al*, 1985). A study principally investigating the prophylactic value of neuroleptic medication with first episodes (MacMillan *et al*, 1986) found that higher relapse rates were associated with high-EE relatives, but this was related to the estimated duration of illness prior to admission. Using the data presented here, it is not possible to comment on this latter relationship, other than to say that the CFI includes questions on the duration of illness prior to admission, so that these two measures are unlikely to be independent. Our results differ from those of the German study (Dulz & Hand, 1986), which found higher relapse rates in low-EE (65%), compared with a high-EE sample (48%), but it also found no effect on relapse rates of neuroleptic medication, which is contrary to a large number of controlled drug trials (see Davis, 1975, for a review). However, both these latter studies include young, first- or second-episode patients, and it is reasonable to hypothesise a relationship between high-EE, relapse, and chronicity, which may explain any contradiction in results. This is another issue which needs further investigation.

The second line of enquiry was to examine the changes in EE and its constituent dimensions, and their relationship with relapse within each treatment group. It can be hypothesised that if a change from high- to low-EE in the relatives is evident in the treatment groups that show low relapse rates, and not in those that have higher relapse rates, then there is support for the mediating influence of EE in relapse. However, it is necessary to look at changes only in the relatives of patients who remain well, or else the influence of the intervention on the relative is confounded with the patient's clinical state.

The results to support this hypothesis are more problematic. There are significant changes from high- to low-EE in the relatives in the long-term behavioural-intervention groups, but also evidence of similar changes in the other two high-EE groups when analysed together, although not when analysed separately. Although the education received by some relatives could have influenced this trend, this latter result would not be expected if EE is a stable dimension with a simple causal role in relapse. Similarly, Brown *et al* (1972) and Dulz & Hand (1986) found that between 30 and 50% of high-EE relatives changed to low-EE naturally over time. There is evidence to suggest that EE changes are greater in the BIF groups in that there were a significantly lower number of high-EE relatives at 9 months in these groups compared with Education Only and Routine Treatment groups. Furthermore, evidence from other studies, e.g. Leff *et al* (1982) and especially Hogarty *et al* (1986), who found no relapses occurred in families in which relatives changed from high- to low-EE, also support the causal role of EE. The data presented here should be interpreted with caution in this respect, and the relationships between intervention, EE, and relapse are probably complex, although there is some suggestion that EE changes are greater in the behavioural-intervention groups, and hence associated with decreased relapse rates.

Similarly, significant decreases in criticism and EOI are evident in the BIF groups, and are also found, but to a lesser extent, in the high-EE Education Only and Routine Treatment groups. The dramatic reduction in the median of critical comments in the combined high-EE Education and Routine Treatment groups could be explained by the skewness of the distribution of scores within each group (BIF = 0.3; Ed + RT = 1.58) at admission, where 38% of the BIF group score 20 or more critical comments, compared with 6% of the Education Only and Routine Treatment groups. Similarly, 31% of the relatives in the BIF group score 4 or 5 on EOI, compared with 18% of the Education Only and Routine Treatment groups. Hence, it is possible that changes in the high-EE Education and Routine Treatment groups may occur because of the lower scores on the EE dimensions, and that these borderline cases may be more responsive to education or influences of the routine aftercare services. Significant decreases in hostility only occur in the BIF groups. Possibly, the family intervention produces changes in the more extreme-scoring high-EE relatives, thus enhancing the naturally occurring trend in EE reduction (see Tables II, III and IV). In all groups, changes in EE and its dimensions occur principally in the first 4.5 months after discharge.

There is considerable, although not significant, change from low- to high-EE in the low-EE group

who received routine treatment, which is not evident in the low-EE group who received the educational intervention. When the two groups are combined, there is a significant increase in the number of critical comments. This highlights the danger of perceiving low-EE families as problem-free; if they do not receive any specialist intervention, these relatives may well develop critical and hostile attitudes. The fact that no relatives changed from low- to high-EE in the low-EE–Education group indicates that a short educational intervention may suffice.

The final issue to be considered is the viability of a routine clinical service to patients and their relatives that would be aimed at reducing the levels of stress in the family environment. A behavioural approach is most likely to be applied by clinical psychologists, although this is not necessarily exclusively so, as this approach is derived from psychological theory and data bases. The data presented here on contacts with routine psychiatric services highlight the deficits in formal contacts with families of schizophrenic patients. Patients had very few contacts with CPNs other than for injections, and this is in accordance with a recent survey in the same health district (Wooff *et al*, 1988), which showed that, on average, much less time is spent with the psychotic than with the depressed or anxious patient. Although social workers saw over one-third of patients and just under one-fifth of relatives, and some families were seen quite regularly, contact with relatives did not appear to be standard practice. Furthermore, these are records purely of contact, without any analysis of content.

In 1982, Leff *et al* called for systematic training of professional staff in psychosocial intervention techniques, but little seems to have occurred. Lack of clarification of the goals of community care and the methods of achieving it has resulted in considerable ambiguity in the interpretation of this policy (Baldwin, 1987). Relatives have been largely ignored as service receivers, in terms of care, rehabilitation, and therapy. Since many sufferers of schizophrenia will return to live with relatives after an admission for an acute schizophrenic episode, the success of this intervention argues that the role of relatives should be taken into account, within community care, when planning multidisciplinary psychiatric services. Appropriate reallocation of resources and priorities to meet the needs of the chronically mentally ill and their families would be required, if such a policy is to be successful.

Acknowledgement

This research was supported by a grant (no 5062) from the North West Regional Health Authority.

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