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Family-Based Intervention for Schizophrenic Patients in China
A Randomised Controlled Trial

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Background. We developed and evaluated a comprehensive, ongoing intervention for families of schizophrenic patients appropriate for China's complex family relationships and unique social environment.

Method. Sixty-three DSM-III-R schizophrenic patients living with family members were enrolled when admitted to hospital and randomly assigned to receive standard care or a family-based intervention that included monthly 45-minute counselling sessions focused on the management of social and occupational problems, medication management, family education, family group meetings, and crisis intervention.

Results. At 6, 12, and 18-month follow-ups by blind evaluators, the proportion of subjects rehospitalised was lower, the duration of rehospitalisation was shorter, and the duration of employment was longer in the experimental group than in the control group; these differences were statistically significant at the 12 and 18-month follow-ups and were not explained by differences in drug compliance. Family intervention was associated with significantly lower levels of family burden.

Conclusions. This intervention is less costly than standard treatment, is suitable for urban families of schizophrenic patients in China and feasible given the constraints of the Chinese mental health system.

Over 90% of the estimated 4.5 million schizophrenic individuals in China live with their families (Phillips, 1993), and virtually all out-patient visits for schizophrenic patients include patients' family members. It would, therefore, seem highly appropriate to use family-based interventions, but no indigenous Chinese family therapy techniques have evolved, largely because Chinese mental health clinicians have no training in the evaluation and management of family problems. The usefulness of family interventions for schizophrenia in the West (Lam, 1991; Kavanagh, 1992) may not be suitable for China, due to the complex family relationships in Chinese culture, the characteristics of the Chinese mental health system, and the unique social environment of the People's Republic of China.

Developing a family intervention appropriate for China

We worked intensively with 30 families of schizophrenic patients for over two years, testing and adapting a variety of approaches that have been used in the West. These included educational approaches (Abramowitz & Coursey, 1989), relatives' groups (Vaughan *et al*, 1992), family therapy (Leff *et al*, 1990), behavioural treatments (Falloon *et al*, 1985; Tarrier *et al*, 1989), and multi-component psychosocial treatment (Leff *et al*, 1985). It soon became evident that these approaches make assumptions that do not hold true in China: they assume patients and family members realise that counselling or 'talking therapy' is a legitimate method of treating mental disorders; that the primary social goal of the family is to change the dependent individual into an independently functioning member of society (Grinspoon, 1989); and that there is an overall mental health care system that will provide ongoing services to patients and families during and after the intervention. The circumstances are very different in China, so our intervention had to be modified accordingly.

Families' expectation of the clinical encounter

Most Chinese are unfamiliar with the concept of counselling or psychotherapy. Chinese families find it strange to talk with clinicians at length about the problems of having the patient in the home, as this contravenes the strongly held belief that family matters should not be discussed with outsiders, and it is not consonant with their expectations of the clinical encounter – a brief exchange with an authoritative physician who provides a prescription. Compared with Western interventions, in the early stages of family intervention in China much more effort needs to be placed on transforming family members' perception of the role of the physician

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from that of a pill-provider to that of an informed family advisor.

Goals of families of schizophrenic patients

The ultimate social goal of family members of mentally ill individuals in China is to develop a sustainable family-based support system for the dysfunctional individual. The cultural and legal obligations of parents towards disabled children continue until the child is married, when the responsibility is transferred to the patient's spouse. Disabled children who never marry are usually cared for by their parents until the parents die. Thus the major goals for these parents are (a) to obtain stable employment for their child (preferably with full medical and disability benefits) which ensures future livelihood and makes him or her more attractive as a potential spouse; (b) to find a spouse for the child – often by minimising the seriousness of the illness and offering a potential spouse (usually of lower social status) benefits such as housing, help in obtaining urban residence permits or urban employment, and financial assistance; (c) to encourage the young couple to have their own child as soon as possible as this both secures the marriage and provides someone to care for the patient in his or her old age; and (d) to prevent divorce, by giving financial and practical help to the spouse. Once the patient's acute symptoms are under control, these issues become the major focus of the counselling sessions; the therapist assists patients and family members in their dealings with work sites, helps them negotiate the hurdles of marriage, educates them about the potential problems of pregnancy, and trains the patient to adapt to the demands of marriage and parenthood.

Minimal services for the mentally ill

In most of mainland China there is no community-based mental health care system to which the family can be referred at the end of a time-limited family intervention (Phillips & Pearson, in press). Some of the major cities (Shanghai, Beijing, and a few others) have sheltered workshops for psychiatric patients, and a few have community-based mental health clinics and experimental programmes of supervision of patients by non-professionals (Zhang *et al*, in press). In the vast majority of urban areas the psychiatric hospital's out-patient department is the only form of professional support available. In most of these there is no system of regular appointments, so families of schizophrenic patients see different clinicians at each visit and are given a prescription for a neuroleptic after a cursory evaluation by someone who knows little of the patient's history. There are no voluntary organisations that provide services to the mentally ill, no halfway houses or alternative living facilities, no recreational centres for the mentally ill, no family support organisations, and – most importantly – no social workers (Pearson & Phillips, in press) or community psychiatric nurses (Bueber, 1993) who could provide home-based care.

The characteristics of the available mental health services dictated several of the parameters of our intervention.

(a) Intervention is provided by hospital-based physicians and nurses since these are the only mental health professionals available in China.

(b) The treating clinicians needed special training because psychiatrists and psychiatric nurses in China have no experience in the evaluation and management of the family and social problems faced by mentally ill patients.

(c) The intervention is ongoing rather than time-limited, because stopping it would mean the termination of any regular follow-up care.

(d) Medication supervision is included, for the best medication management available. Talking without providing medication is so at odds with families' expectations that it would not be tolerated long enough for them to engage in the treatment process.

(e) To change the erratic service utilisation pattern of participating families, regular appointments are made and reminder letters sent if necessary.

(f) The intervention includes, to the extent possible, support services that are typically provided by community social workers and community psychiatric nurses in the West.

Method

After more than two years of trial and error, the family-based intervention was sufficiently developed to merit formal evaluation. Starting in January 1990, patients and families were enrolled in the evaluation trial. As soon after admission to the Shashi Psychiatric Hospital as possible, an unselected sample of patients from Shashi or Jingzhou (adjacent 'medium-sized' Chinese cities with a total population of 450 000) who lived with at least one adult family member were assessed to determine if they met DSM–III–R criteria for schizophrenia (American Psychiatric Association, 1987). If so, a detailed history was obtained from the patient and family members; if they gave written consent to participate, they were randomly assigned to the family intervention (experimental) or the standard care (control) group.

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Family intervention

The intervention has three phases: a 2–3 month introduction, 1–2 years of treatment, and ongoing maintenance. At enrolment, families are provided with information booklets about schizophrenia. Family members are seen two or three times during the patient's hospitalisation (which usually lasts 2 to 3 months); if the patient's clinical condition is stable he or she also attends these 45-minute sessions. For the first few months after discharge the family (including the patient) are seen every two to three weeks. The main objectives during this introductory phase are to establish a trusting, empathic relationship with the family, to educate them about the illness, to develop an effective method of medication management, and to introduce this unusual talking therapy.

Once the family has adapted to interacting with clinicians, the treatment phase begins. Monthly, 45-minute counselling sessions in the out-patient clinic with the patient and co-resident family members are combined with a monthly 90-minute family group. These are supplemented by individual sessions with patients and family members, home visits, interviews with leaders of the patient's work unit, and with potential spouses and important members of the extended family. Frequency of contact with the family often increases at times of crisis. The issues addressed in the sessions, the people participating, and the primary therapy (education, behavioural training, problem-solving, counselling, etc.) will change over time in parallel with changes in the patient's clinical and social status and in the family's attitudes. During the family group sessions the therapists lead discussions on common problems such as medication usage, detecting relapse, controlling violence, marriage, dealing with stigma, and mental health laws. Records of these group discussions are typed and sent to each family every month along with information about forthcoming topics.

Once the patient's social functioning has improved and the family has developed an effective coping strategy, the maintenance phase can begin. Families are seen every two to three months for drug supervision and ongoing monitoring of symptoms, and are also expected to attend the monthly group meetings. The goal is to reduce the medication to the lowest effective dose and to have an ongoing relationship with the family, to ensure they will contact the therapist in the event of a crisis or exacerbation of the patient's symptoms.

Smooth progress is not always made. Some patients adamantly refuse to take medication or participate in any form of treatment; some have mild symptoms or have no serious effect on the family members, who refuse to participate in post-hospitalisation follow-up; not all families can adapt to this style of treatment; some refuse to accept that their family member has a mental illness; some drop out during treatment when they realise that the 'final cure' they are desperate for will not be provided; and some are so apathetic or over-involved that any form of outside intervention is impossible. As far as possible we try to accommodate varying needs by applying different methods such as making regular home visits, seeing the patient without family members (quite uncommon in China), individually counselling disturbed family members, and assisting in the rehospitalisation of relapsed patients. The aim is to maintain contact, so that families are willing to ask for assistance in a crisis and, at some later point, re-engage in treatment.

Standard care

Standard post-hospitalisation care for schizophrenic patients in our hospital is similar to that provided in most other urban centres in China. At discharge the family is given a prescription for two to three months of medication and told to have the patient take a specified dose to completion. Some in-patient clinicians advise the family to go to the psychiatric hospital's out-patient department for follow-up, but those who do seek follow-up care prefer to get prescriptions from the patient's in-patient clinician (if willing to see them). No appointments are made in the out-patient department, so very few patients make regular visits; in many cases family members make sporadic visits for prescription renewal and only bring the patient to the clinic when an exacerbation of symptoms requires rehospitalisation.

Evaluation of outcome

The clinical status of enrolled patients at admission and discharge was evaluated using Chinese versions of the Scale for Assessment of Positive Symptoms (SAPS), the Scale for Assessment of Negative Symptoms (SANS), and the Brief Psychiatric Rating Scale (BPRS), all of which have excellent reliability and validity in China (Phillips *et al*, 1990, 1991; Zhang, 1983). At six-month intervals after discharge two experienced clinical researchers who were blind to patients' treatment status conducted home interviews with patients and family members to assess patients' clinical and social functioning over the previous six months. SAPS, SANS, and BPRS were used to assess the severity of clinical symptoms; the overall level of functioning was assessed using the Global Assessment

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of Functioning scale (GAF) (American Psychiatric Association, 1987) and the Social Disability Screening Schedule (SDSS), a simplified Chinese version of the World Health Organization's Disability Assessment Schedule (WHO, 1988) that has satisfactory psychometric properties (Phillips *et al*, 1990). The SDSS assesses 10 different aspects of social functioning, providing an overall percentage dysfunction score. Patients' medication usage and time engaged in their normal occupation (as reported by family members) over each six-month evaluation period were also recorded. The effect of the patient's illness on the family's economic, emotional, and social functioning over each follow-up period was assessed by family respondents on scales that are coded 0 to 3 (none to severe); previous work (Phillips *et al*, 1990) has shown that this simple measure of family burden can discriminate between different types of families. The number and duration of hospitalisations after the index discharge was determined with information from the family and hospital charts.

Outcome variables include the level of clinical and social functioning, the number and duration of rehospitalisations, relapse, duration of employment, duration of drug compliance (i.e. time for which the patient took over 50% of the dosage recommended at the time of last contact with a psychiatrist), and the effect of the illness on the family.

A relapse occurred if the patient was hospitalised, or made a serious suicide attempt; or if a patient who had previously recovered subsequently deteriorated and met any one of the following conditions:

(a) the global rating on any of the four positive symptom groups assessed by SAPS (hallucinations, delusions, formal thought disorder, and bizarre behaviour) was rated as 'marked' or 'severe';
(b) the global rating on two or more of the five negative symptoms assessed by SANS (affective flattening, poverty of thought, decreased motivation, decreased interests, and attention deficit) was rated as 'marked' or 'severe';
(c) one or more of the five psychotic symptoms assessed by BPRS (items 4, 7, 11, 12 and 15) was rated as 6 (severe) or 7 (very severe), or two or more of the psychotic symptoms were rated as 5 (moderately severe);
(d) the overall functioning as assessed by GAF was markedly impaired (score of 40 or less);
(e) there was a severe degree of psychosocial dysfunction as assessed by SDSS (greater than 80% disability).

Results

Characteristics of the sample

Of the 77 families who met the enrolment criteria, 14 (18%) refused to participate. The remaining 63 were randomly assigned to the experimental group ($n=34$) or the control group ($n=29$).

The characteristics of the 63 patients and their households were as follows: 43 (68%) were male; mean (s.d.) age at index admission was 31 (10) years (range 17 to 54); mean years of schooling was 9 (2); 24 (38%) had never married, 35 (56%) were currently married, and 5 (6%) were separated, divorced, or widowed; 50 (79%) had health insurance that covered the cost of hospitalisation while 13 (21%) paid for the hospitalisation themselves; 25 (40%) lived in their own marital households and 38 (60%) lived in their parents' households; the mean number of persons living in the households was 3.8 (1.0) (range 2 to 6); and their mean per capita family income was US $20.20 per month.

The characteristics of their illness and of the treatment they received were: the mean age of onset was 24 (7) years (range 11 to 42); mean duration of illness was 7.5 (6.8) years (range 0.5 to 26); mean number of hospitalisations was 4.0 (5.1) times (range 1 to 36); mean total duration of prior hospitalisations was 9.3 (15.6) months; the index admission lasted for a mean of 77 (56) days; for the 57 patients with greater than one year of illness, the mean duration of medication usage over the year prior to the index admission was 5.2 (4.9) months and the mean time employed was 4.1 (5.0) months.

In contrast to the cosmological and traditional Chinese medical explanations of mental illness (e.g. spirit possession, disturbances of the *Yin–Yang* balance) frequently reported by rural subjects (Li & Phillips, 1990), most of these urban families attributed their family members' illness to social stress: 36 (57%) identified conflict at work, difficulty finding a spouse, social disturbances (e.g. the Cultural Revolution), family conflict, or problems in school as the primary cause of the first episode of illness; 11 (17%) thought personality factors were responsible; 7 (11%) reported organic or hereditary factors; 2 (3%) considered the excessive practice of *Qi gong* (a popular Chinese therapeutic practice similar to Yoga) the precipitating factor; and 7 (11%) reported other causes.

None of these parameters differed significantly between the experimental and control groups. The severity of symptoms (as assessed by SAPS, SANS, BPRS, and GAF) at the time of the index admission and discharge did not differ significantly between the

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experimental and control groups. The subjectively reported level of family burden at the time of admission was also similar between the two groups. The only significant difference between the 14 patients whose family members refused to participate in the study and the 63 participating patients was that non-participating patients had significantly shorter index admissions (40 (24) days v. 77 (55) days; $F = 5.90$, d.f. $= 1.75$; $P = 0.0175$). (All reported P-values are for two-tail tests.)

Compliance with treatment

At the time of this interim analysis, the families had been followed for a mean of 25 (5) months after the index discharge (range 10 to 34). The 34 experimental group families had made a mean of 14 (10) visits to the clinic (range 0 to 35) and received a mean of 2.7 (2.5) home visits (range 0 to 10). This represents an average of 8.1 contacts with each family for each year of follow-up (not including attendance at the monthly family group meetings).

Despite agreeing to participate in the study and to have visits by an independent evaluator every six months, compliance with the family-based intervention varied considerably. Families and patients were separately classified as 'actively compliant' (the patient or family members regularly attended appointments in the out-patient clinic), 'passively compliant' (the patient or family members would come to the clinic only if reminded by a letter or readily accepted home visits), and 'non-compliant' (the patient or family members never came to the clinic and resisted or completely refused home visits). According to these criteria 56% (19/34) of the experimental group patients were actively compliant, 21% (7/34) were passively compliant, and 23% (8/34) were non-compliant. Among family members, 41% (14/34) were actively compliant, 32% (11/34) were passively compliant, and 27% (9/34) were non-compliant. There were three families in which family members participated but the patient was non-compliant, four families in which the patient participated but the family members were non-compliant, and five families in which both the patient and family were non-compliant. Despite regular letters and encouragement from the treating clinicians, 32% (11/34) of the families never attended the monthly family group meetings, mainly because of fear of exposure of the 'family secret'. Members of about half of the 23 families that participated in the group meetings attended in any one month. All of these families – compliant and non-compliant – are included in the subsequent analysis.

The primary focus of standard treatment is to maintain patients on medication, so control group patients were classified as compliant if they were compliant with medication (see definition above) for at least 75% of the non-hospitalised follow-up period. According to this standard, 59% (17/29) of the control group patients were compliant and 41% (12/29) were non-compliant.

Table 1
Proportions of schizophrenic patients who experienced rehospitalisation and relapse

	Family intervention group		Control group		χ^2	P
	n/N	%	*n/N*	%		
Rehospitalisation						
6 months	1/34	2.9	4/29	13.8	-	0.1714*
12 months	4/33	12.1	10/28	35.7	4.77	0.0290
18 months	4/32	12.5	10/28	35.7	4.50	0.0339
Relapse						
6 months	8/34	23.5	10/29	34.5	0.92	0.3375
12 months	11/33	33.3	17/28	60.7	4.57	0.0325
18 months	14/32	43.8	18/28	64.3	2.29	0.1300

*Two-tail Fisher's exact test.

Outcome

One patient in the experimental group committed suicide 10 months after the index discharge (he hanged himself during an acute anxiety episode that occurred four days after a first dose of long-acting haloperidol), and one patient in the control group committed suicide by poisoning 10 months after the index discharge. Another experimental group patient died from the complications of inadequately treated diabetes 20 months after the index discharge. These deaths were treated as relapses in the analysis. Suicide and premature death from inadequately treated medical conditions is fairly common among schizophrenic patients in China; there was also one suicide by poisoning among the 14 patients who refused to participate in the study.

The main results for the study are shown in Tables 1, 2, and 3. The numbers of patients in the groups at different time periods varies because the length of follow-up after hospitalisation differed. More of the control group patients than experimental group patients had experienced a rehospitalisation at the end of each of the time periods, and the mean duration of rehospitalisation was much longer in the control group; these differences were statistically significant at the 12-month and 18-month follow-ups. Overall, the experimental group subjects were

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Table 2
Duration of rehospitalisation, medication usage, and employment at 6, 12, and 18 months following discharge

	Family intervention group				Control group				Mann–Whitney Z-value	Two-tailed P value
	Total	Mean	s.d.	N	Total	Mean	s.d.	N		
Days of rehospitalisation										
6 months	22	0.6	3.7	34	158	5.4	16.5	29	1.60	0.1089
12 months	259	7.9	22.4	33	681	24.3	43.6	28	2.12	0.0339
18 months	305	9.5	34.8	32	1203	43.0	67.7	28	2.24	0.0252
Months of employment										
6 months	74	2.18	2.62	34	43	1.48	2.47	29	1.52	0.1282
12 months	183	5.55	5.04	33	91	3.14	5.05	29	1.95	0.0511
18 months	285	9.50	7.83	30	130	4.64	7.39	28	2.31	0.0207
Months used medication*										
6 months	193	5.68	1.17	34	155	5.34	1.65	29	1.27	0.2044
12 months	353	10.7	2.77	33	278	9.58	3.59	29	1.73	0.0845
18 months	469	15.1	4.70	31	365	13.5	5.76	27	0.78	0.4365

*Compliance as defined in text.

hospitalised for 6.8 days per follow-up year compared to 31.6 days in the control group, a 4.5-fold difference.

At each stage of the follow-up more control group subjects experienced a relapse than experimental group subjects, but the difference is only statistically significant at the 12-month follow-up. At the 6, 12, and 18-month post-hospitalisation evaluations the mean scores for the five clinical and social functioning scales (i.e. SAPS, SANS, BPRS, GAF, and SDSS) all indicated less severe pathology in the experimental group than in the control group; but these differences only reached statistical significance for the BPRS, GAF, and SDSS scores at 12 months and the SAPS, BPRS, GAF, and SDSS scores at 18 months. The mean level of social dysfunction over the entire follow-up period (i.e. the group mean of each subject's average six-monthly SDSS scores) was 39% in the experimental group and 49% in the control group (Mann–Whitney $Z = 2.64$, $P = 0.0068$).

The other goals of the intervention were to increase the occupational functioning and medication compliance of patients and to decrease the family burden. Table 2 shows that experimental group patients worked for a greater proportion of the follow-up period than control group patients; this difference was statistically significant at the 18-month follow-up. Overall, experimental group subjects worked for 46.2% of the follow-up period while control group subjects only worked for 24.4% of the follow-up period.

Table 2 also shows that experimental group patients complied with psychiatrists' recommendations regarding medication for a greater proportion of the

Table 3
Family members' subjective assessment of the effect of the patient's illness on various aspects of family functioning over the follow-up period*

Type of effect	Family intervention group (n = 34)		Control group (n = 28)		Mann–Whitney Z-value	Two-tailed P-value
	Mean	s.d.	Mean	s.d.		
Family finances	1.19	0.93	1.87	0.85	8.89	0.0058
Non-ill family members' work function	0.63	0.73	0.93	0.76	2.46	0.1001
Non-ill family members' emotional well-being	1.70	0.78	2.14	0.70	5.42	0.0152
Interpersonal relationships in the family household	0.42	0.65	0.84	0.77	5.48	0.0083
Non-ill family members' social activities	0.73	0.69	0.81	0.57	0.19	0.4462
Overall burden	1.38	0.74	1.82	0.47	7.61	0.0130

*Assessed on a four-point scale (0 = none, 1 = mild, 2 = moderate, 3 = severe) at six-monthly intervals; values are averaged over the entire follow-up period.

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Table 4
Rehospitalisation and relapse rates, and duration of rehospitalisation, medication usage and employment over the entire follow-up period, for compliant and non-compliant schizophrenic patients, and the overall burden experienced by their families during the follow-up

	Family intervention group		Control group		χ^2	d.f.	P
	Actively compliant ($n=19$)	Passively compliant or non-compliant ($n=15$)	Compliant ($n=17$)	Non-compliant ($n=12$)			
Rehospitalisation							
n	2	6	6	5	5.13	3	0.1623
%	10.5	40.0	35.3	41.7			
Relapse							
n	7	11	12	11	11.67	3	0.0113
%	36.8	73.3	70.6	91.7			
Days of hospitalisation							
mean	3.8	27.4	61.6	77.3	6.17**	3	0.1033
s.d.	11.4	50.3	134.4	113.1			
Proportion of time as out-patient complying with medication*							
mean	96.0	65.3	95.8	38.5	29.79**	3	0.0000
s.d.	4.4	32.8	6.7	22.6			
Months at work							
mean	10.0	10.5	6.5	4.0	4.68**	3	0.1967
s.d.	9.7	9.5	10.4	6.7			
Overall burden on the family							
mean	1.32	1.47	1.56	2.08	8.35**	3	0.0393
s.d.	0.75	0.74	0.63	0.67			

*See text for definitions of terms.
**χ^2 from Kruskal–Wallis one-way analysis of variance.

follow-up period than control group patients, but these differences were not statistically significant. Overall, experimental group patients used over 50% of the recommended antipsychotic dosage for 86.3% of the follow-up period compared with 73.8% for control group patients.

Table 3 indicates significant differences in the level of burden experienced by the experimental and control families. The lower rate and shorter duration of hospitalisations and the longer time in gainful employment of the experimental group patients probably reduces the economic burden experienced by their families. The effect of the patient on non-ill family members' interpersonal relationships and emotional well-being in experimental group families was significantly less severe compared with control group families.

Table 4 compares the results for compliant and non-compliant patients in the experimental and control groups. In all cases the outcomes are best for compliant experimental group patients and worst for non-compliant control group patients, but several of the results were not statistically significant. Despite having almost identical levels of drug utilisation, the actively compliant experimental group patients had much better outcomes than the compliant control group patients. Experimental group patients from families with passively compliant or non-compliant family members or with family members who did not attend the monthly family group meetings have poorer outcomes than patients with actively compliant family members and family members who attended the family group, but in most cases these differences were not statistically significant.

Discussion

Economic assessment

Compared with control group patients, each patient in the family intervention group was hospitalised 24.8 days less per year and worked for 2.6 months more per year. Given the mean cost of psychiatric hospitalisation in our setting of US $111 per month and the mean urban worker's income of $36.50 per month (State Statistical Bureau, 1992), the result is a gain of $185 per year per treated patient. The average yearly cost of drugs, blood tests, clinic visits, home visits (not including clinician salaries that are

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paid by the state), travel to the clinic, and lost income for time off work for clinic visits was \$41 in the experimental group and \$26 in the control group. Thus the intervention resulted in a net saving of \$170 (\$185 – \$15) per patient per year, which is 58% of the per capita yearly income (\$291) of urban residents (State Statistical Bureau, 1992). The proportion of this saving that benefits the family and the work unit varies depending on whether or not the patient has medical insurance and receives work disability payment.

Our experience shows that after approximately six months of apprentice-type training one psychiatrist and one psychiatric nurse can provide this family-based intervention for 60 families. Assuming a generous monthly income for nurses of \$45 per month and for doctors of \$60 per month, the salary outlay for treating 60 patients is \$1260 per year (after an initial investment of \$630 for training). Thus one physician–nurse team can save \$8940 per year (60 families × \$170 per family – \$1260 in salaries) or \$149 per family treated. This is an underestimate of the savings because it does not consider the salary outlay for standard out-patient treatment or the productivity losses of patients' work units.

Limitations of the study

There are several limitations to this study.

(a) The relatively small sample size is the probable reason that many of the trends observed did not reach statistical significance, but virtually all the trends suggested the superiority of the family-based intervention, so this problem is unlikely to have affected the overall results.

(b) The treatment method we developed is an ongoing treatment, but we have only presented the results for the first 18 months after discharge because the number of subjects followed for longer periods is not yet sufficient to make meaningful inferences. The long-term efficacy of this approach will be reported in subsequent papers.

(c) As in all family intervention studies, there was some difficulty in maintaining blinding since some families spontaneously state that they received treatment during the follow-up evaluations. This problem was minimised by instructing the families not to state who had provided treatment and by ensuring that the evaluators were unaware of the purpose of the study.

(d) The reliability of the rehospitalisation data was excellent because (according to the family respondents) none of the patients was hospitalised in out-of-area hospitals. There was, however, some problem in determining a clinical relapse without rehospitalisation if the patient refused a follow-up evaluation or was so ill that it was impossible to complete SAPS, SANS, and BPRS. This problem was minimised by including scales that rely on evaluators' and family members' assessments (GAF and SDSS) to determine relapse. Very brief relapses that occurred in the intervals between the six-monthly evaluations were not captured unless the patient required rehospitalisation; it is likely that the few cases for whom this occurred were evenly distributed between the two groups.

(e) Virtually all Chinese patients take less medication than prescribed and so we felt that defining 'drug compliance' as full compliance with the last prescribed dosage would not reveal any differences between the groups. But our definition of the duration of drug compliance as the time the patient took more than 50% of the last prescribed dosage proved too lax, as it resulted in unrealistically high levels of compliance. Moreover, the determination of drug usage was based on family members' reports; pill counts would have provided more accurate information, but as many patients received multiple prescriptions over the six-month follow-up periods this was not practical.

(f) The measure of work function employed – the time on the job – was fairly easy to determine accurately from family members, but it does not reveal the quality of the work performed. To make qualitative assessments, however, would require much more detailed information.

(g) The 18% refusal rate is only slightly higher than the 13% median refusal rate in Western studies (Kavanagh, 1992) and the non-attendance rate in the family support group of 32% is similar to the 45% rate reported by Leff *et al* (1990), but the rates of non-compliance with the individual family sessions in patients and family members of 23% and 27%, respectively, are much higher than the reported 7% median dropout rate in Western studies (Kavanagh, 1992). Non-compliance does not, however, confound the results because all subjects are included in the analysis. The intervention will, nonetheless, need to be modified to make this 'talking therapy' more acceptable to Chinese patients and their family members.

Generalisability of the results

We believe that the above limitations do not seriously bias the results. Given the randomised design we are confident in the validity of the overall findings of the study – that this family-based intervention results in less rehospitalisation and better social functioning of Chinese schizophrenic patients and a decreased burden for their families. Our sample was an unselected group of urban schizophrenic patients living with family members who were willing to participate in the study. Since over 90% of Chinese schizophrenic patients live with family members, since 82% (63/77) of eligible families agreed to participate, and since the urban schizophrenic patients admitted to our hospital

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are similar to those elsewhere in China (Phillips, 1993), these results can be generalised to at least three-quarters of urban schizophrenic patients. The prevalence of schizophrenia in China's 238 million urban residents 15 years of age or older is 6.07 per 1000 (Coordinating Epidemiological Group for Twelve Regions, 1986); thus these results apply to at least 1.06 million of the 1.44 million urban schizophrenic patients in China.

This treatment method is suitable for China and for other countries with limited mental health resources because there are minimal staff requirements, it can be provided in existing institutions (i.e. out-patient departments of psychiatric hospitals), and it is significantly less expensive than standard care. Given the estimated US $149 saving per treated family, the widespread use of this intervention could result in savings of US $158 million per year – equivalent to 1.44% of China's estimated total health sector expenditures for 1991 (Anonymous, 1992). Moreover, the rapidly increasing cost of hospitalisation (from 1984 to 1992 the mean per day cost in our hospital rose more than fivefold) will increase the economic superiority of the family intervention.

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