

Family Support in Assertive Community Treatment:  
To support family members who care for clients or  
to support clients instead of family members

包括型地域生活支援における家族支援

—利用者を支える家族を支えるか、家族に代わって利用者を支えるか—

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## Background

The rehabilitation of psychiatric patients is difficult in closed hospital settings—institutionalization often worsens patients' motivation and living skills<sup>1</sup>. Therefore, a humane alternative to institutionalization should be provided in minimally restrictive environments, ideally incorporated into the community.

Psychiatric rehabilitation in Japan has not yet seen deinstitutionalization<sup>2, 3</sup>. Nevertheless, in the wake of rapid economic growth, private psychiatric hospitals—which account for approximately 90% of all psychiatric beds in Japan—have built new wards, and as a result Japan has the highest ratio of beds to psychiatric patients in the world (2.8 beds per 1,000 persons in 2006)<sup>4, 5</sup>.

The Ministry of Health, Labour and Welfare of Japan recently announced a policy promoting the discharge of 72,000 inpatients—if the discharged individuals could receive community support. Using this policy as a starting point, this paper explores effective ways to enrich community care for persons with severe mental illnesses.

To this end, we considered the assertive community treatment (ACT) model suitable because it has

been well-documented and is based on evidence<sup>6</sup>. The ACT model is an outreach-based psychosocial case management model that has been implemented in the United States for the past 30 years. ACT has been shown to effectively increase social functioning and decrease length of hospital stay for persons with severe mental illnesses<sup>7-10</sup>.

ACT is a highly intensive and integrated approach for the delivery of mental health services to communities. ACT programs serve people with severe functional difficulties that interfere with their ability to achieve personally meaningful recovery goals in several major areas of life: working, having friends, living independently, and so forth.

Characteristics of ACT include:

- a clear focus on clients who require the most help;
- an explicit mission to promote clients' independence, rehabilitation, and recovery while also preventing homelessness and unnecessary hospitalization;
- a primary emphasis on home visits and other in vivo (out-of-the-office) interventions, eliminating the need to transfer learned behaviors from an artificial rehabilitation or treatment setting to the "real world";
- a clients-to-staff ratio low enough to allow the ACT "core services team" to perform

virtually all of the necessary rehabilitation, treatment, and community support tasks themselves in a coordinated and efficient manner—unlike traditional case managers, who broker or “farm out” most of the work to other professionals;

- a “total team approach” in which all of the staff members work with all of the clients;
- an interdisciplinary assessment and service planning process that typically involves a psychiatrist and one or more nurses, social workers, substance abuse specialists, vocational rehabilitation counselors, and peer recovery specialists (individuals who have had personal, successful experience with the recovery process);
- a willingness on the part of the team to take ultimate professional responsibility for the clients’ well-being in all areas of community functioning, especially including the “nitty-gritty” aspects of everyday life;
- a conscious effort to help people avoid crisis situations in the first place; however, if that proves impossible, to resolve their crises without going back to the hospital; and
- a promise to work with people on a time-unlimited basis, as long as they demonstrate a continuing need for a highly intensive level of professional help<sup>11-14</sup>.

ACT was first developed during the early 1970s<sup>15</sup>. During this time—the heyday of deinstitutionalization—large numbers of patients were discharged from state-operated psychiatric

hospitals in the United States to underdeveloped and poorly integrated community services.

The founders of the ACT approach were Leonard I. Stein, M.D.<sup>7, 16-18</sup>, Mary Ann Test, Ph.D.<sup>12, 19</sup>, Arnold J. Marx, M.D.<sup>20</sup>, Deborah J. Allness<sup>21</sup>, M.S.W., and their colleagues<sup>22, 23</sup> at the Mendota Mental Health Institute, a state hospital in Madison, Wisconsin, USA. Also known in the literature as the Training in Community Living (TCL) project, the Program of Assertive Community Treatment (PACT), or simply the “Madison model,” this innovation seemed radical at the time but has since evolved into one of the most influential service delivery approaches in the history of community mental health. The original Madison project received the American Psychiatric Association’s prestigious Gold Award in 1974<sup>24</sup>. The ACT approach has long track record of success with high-priority service recipients in a wide variety of geographical and organizational settings, as demonstrated by a large and growing body of rigorous outcome evaluation studies<sup>25-27</sup>.

In May 2003, the first experimental adoption of ACT in Japan (the ACT-J project) was initiated at the National Center of Neurology and Psychiatry in Chiba, Japan. Before May 2003, we spent a considerable amount of time preparing to start up an ACT team because this was the first trial of ACT in Japan. A team of researchers and practitioners was formed to develop research studies addressing issues related to implementation of an ACT team. During 2001 and 2002, the team

gathered information on ACT through written documents and site visits to US-based ACT programs in Chicago, Philadelphia, Indianapolis, Portland and Baltimore. In addition, we invited research and practice consultants from the US to further clarify the US model. Specifically, we discussed differences between the history and current status of mental health systems in the US and Japan, as well as ways to effectively use the ACT model to promote deinstitutionalization in Japan. Furthermore, individuals appointed to become ACT team members reviewed the literature on ACT. After the ACT-J project was officially funded in 2002, a draft of the ACT-Japan standard was developed, which clarified the structure and content of ACT services for implementation in Japan. Guidelines for risk management and dealing with legal issues were also developed.

Consideration of Japanese cultural concepts is important in order to disseminate ACT in a social context different from Western countries. Reflecting these cultural adaptations, one of the essential components of ACT in Japan is family support—historically, family members have played an important role in the community care of people with severe mental illnesses in Japan<sup>28</sup>.

Family members of ACT-J clients expressed anxiety about the future, when they fear it may become difficult for them to provide care themselves, and hoped that ACT could provide care similar to that currently being provided by the family. When family members are able to provide care for clients,

current ACT needs are relatively low and future needs are high. Furthermore, family members who can provide care for clients themselves often do not need ACT services, especially in regard to ACT service components such as assistance with daily living tasks, financial management, or housing services<sup>29, 30</sup>.

Services provided by ACT were associated with a decrease in care burdens on family members. Direct services provided by ACT, such as assistance with daily living tasks, were associated with high satisfaction rates of the clients' families. That ACT alleviated part of the care burden on family members is evidenced by a decrease in care behaviors exhibited by family members. On the other hand, family support provided by ACT was associated with a decrease in family members' self-esteem regarding their care-giving abilities, suggesting that professional care causes family members to lose self-confidence. ACT practitioners may therefore need to pay more attention to the autonomy and empowerment of clients' family members<sup>31</sup>.

Few studies have focused on family support provided by ACT, and there has been a lack of research on the effects of family support on client outcome. In order to resolve these issues, this study addresses three questions. First, how much and what kind of services were provided to the clients by ACT-J? Second, what is the difference between services provided to clients living with family and

without family? Third, which is more effective for client outcome: to support family members who provide care to clients or to support clients themselves instead of family members?

## Methods

### Settings

The ACT-J program is operated jointly with Kohnodai Hospital, National Center of Neurology and Psychiatry, Japan, which is an acute-care hospital located in a suburban area near Tokyo. The program's catchment areas are the three adjacent cities, with a total population of about 1,500,000.

At the start of the program, the multi-disciplinary team was composed of 12 case managers, including nurses, psychiatric social workers, psychologists, and a full-time psychiatrist.

The services provided by the ACT-J team include self-care, medical care, illness management assistance, vocational support, assistance with housing and shopping, social skills training, and assistance in various other life domains, and family support. Family support includes information transfer (symptoms, causes, treatment concepts etc.), counseling, consultation, family psychoeducation, and assistance with daily living tasks. The program operates seven days per week: 12 hours per day on weekdays and eight hours per day on weekends. Staff members are on call after hours. On a typical weekday, staff members have morning meetings, visit several clients at home or

in the community, and return to the office before 5 pm, where they have a closing meeting and record a daily service log. In addition, they take part in case conferences and team administrative meetings once a week.

The ACT-J program's fidelity to the original ACT model was measured by the Dartmouth Assertive Community Treatment Scale (DACTS). Fidelity scales are used to evaluate the degree of implementation of programs or faithfulness to program standards. DACTS is widely used to monitor the fidelity of ACT programs<sup>32-35</sup>. DACTS consists of 28 items, each scored from 1 to 5, with higher scores indicating higher fidelity. The average score of the research period for ACT-J was 3.8. When excluding three items related to dual diagnosis—which is uncommon in Japan, almost always resulting in the low item rating of 1—the average score was 4.3. Thus, ACT-J appears to be a well-implemented ACT program in line with international standards.

This study was approved by the Research Ethics Board of the University of Tokyo Graduate School of Medicine and the Faculty of Medicine, and also by the Research Ethics Board of the National Center of Neurology and Psychiatry.

## **Subjects**

Of the 2,860 patients newly admitted to psychiatric wards at Kohnodai Hospital between May 1, 2003 and October 31, 2007, 257 met the entry criteria of the program, and 161 gave informed consent to the research contents and ethical considerations, including their privacy rights. From May 1, 2003 to April 30, 2004, a pilot study of the ACT-J was conducted and 43 clients were participated in this period. On May 1, 2004, we began a randomized controlled trial. 119 clients were randomized; 59 clients were assigned to the intervention group and 59 clients assigned to the controlled group who had hospital-based psychiatric and psychosocial rehabilitation services and were excluded from the analysis in this study. That is to say, the ACT-J team provided services to 102 clients who were participated during the pilot study and assigned to the intervention group of the randomized controlled trial. The data presented here are those for 99 clients (3 clients, who had not yet been discharged or for whom one year had not passed since discharge, were excluded). The flow chart is presented in Figure 1.

The entry criteria were as follows:

1. Age 18 - 59
2. Resident of one of the three cities in the ACT program's catchment area
3. Primary diagnosis of either schizophrenia (F2x), mood disorder (F3x), or neurotic disorder (F4x) defined by ICD-10<sup>36</sup> excluding those who have primary diagnosis of mental

retardation, dementia, substance/ alcohol abuses, personality disorders

4. High psychiatric service utilization in last two years (2 or more hospitalizations, 100 or more inpatient days, 3 or more psychiatric emergency room uses, or 3 months or more no-show to outpatient clinics)
5. Low level of social functioning in the previous year (less than 50 of GAF) score at best

Clients with schizophrenia or mood disorder must meet criteria either 4 or 5; clients with other disorders must meet criteria both 4 and 5.

## **Procedures**

The schedule of data collection was as follows:

- $T_0$ : Date of discharge of the index admission, or the day when we obtained informed consent (if informed consent was obtained after discharge of the index admission). We conducted interview surveys with clients and administered self-report questionnaires to both clients and family members.
- $T_1$ : 12 months after  $T_0$ . We administered the same survey as  $T_0$ .

We obtained daily service log and socio-demographic data from  $T_0$  to  $T_1$  on a continuous basis (Figure 2).

## **Variables**

Variables were classified broadly into three categories: scale assessing needs, processes, and outcomes. Outcome scales were subclassified into client outcomes and family functioning.

### Scale assessing needs

Care needs scale: We assessed clients' care needs using a scale developed by the Committee on Case Management Guidelines for People with Mental Disabilities in Japan<sup>37</sup>. The scale consists of 24 items (scored on a six-point scale), covering the following eight dimensions of care needs: personal care, safety management, health management, use of social resources, interpersonal relationships, social role and daytime activities, crisis intervention, and social behavior requiring supervision. A summary score for total care needs (1 - 5 points) can be calculated using this scale, with a higher score indicating greater care needs. The reliability and validity of this scale have been established<sup>38</sup>.

In this study, care needs were assessed by research staff through interviews with clients and ACT-J staff.

### Processes

Daily service log: ACT-J staff used a computerized daily service log system to record and share clinical service information (Appendix 1). The log data contain the date, time, duration, place, client,

staff, and service codes of each contact. Service codes include 14 codes selected based on expert opinions, literature about ACT, and existing scales. The daily service log system was constructed using LAMP (Linux, a computer operating system; Apache, a web server; MySQL, a relational database management system; and PHP, a computer scripting language). All LAMP components are free and open source. Data of services provided between T<sub>0</sub> and T<sub>1</sub> were used for each case. Only data of direct (face-to-face) contact were used; contact through telephone, fax, or email was excluded.

#### Scales assessing outcome

Reliability and validity of Japanese version of all outcome scales used in this study were established unless otherwise noted.

#### Client Outcomes

The Brief Psychiatric Rating Scale (BPRS)<sup>39, 40</sup>: BPRS is one of the most frequently used instruments for evaluating psychopathology in patients with mental illnesses. The BPRS is a 18-item scale with positive symptom, negative symptom, depression, mania, and hypochondria subscales. Completed by a trained rater, each item is scored on a seven-point severity scale (the higher the number, the more severe the symptom), resulting in a range of possible scores from 16 to 112. A

Japanese translation of BPRS was provided and validated by Kitamura et al<sup>41</sup>.

Quality of Life Interview (QOLI)<sup>42</sup>: QOLI is a comprehensive questionnaire developed by Lehman to assess subjects' objective living situations and subjective life satisfaction. The Japanese translated version of QOLI has been validated by Oka et al. (unpublished). The scale has eight subscales (housing, leisure activities, family relationships, social relationships, finances, safety, health, and global well-being), with higher scores indicating higher QOL.

Global Assessment of Functioning (GAF)<sup>43</sup>: The Global Assessment of Functioning (GAF) is a numeric scale (0 through 100; higher score indicating high functioning) used to rate the social, occupational and psychological functioning of adults. The scale is presented and described in the DSM-IV-TR<sup>44</sup>. GAF was translated into Japanese by Takahashi et al<sup>45</sup>.

Drug Attitude Inventory-10 (DAI-10)<sup>46</sup>: To evaluate compliance with drug treatment, we used the DAI-10 developed by Hogan et al. This scale includes 10 items designed to be self-reported. The reliability and validity of the Japanese translation have been previously established<sup>47</sup>. Each item describes an attitude or experience involving a psychoactive drug. Items are scored +1 for positive answers or -1 for negative answers. The sum of these scores ranges -10 from +10, with a higher

score indicating the client's positive attitude towards or subjective satisfaction with a psychoactive drug.

Self-Efficacy for Community Living (SECL): SECL is self-report questionnaire designed to measure the self-efficacy of people with mental illnesses regarding life in their communities. The scale has 18 items divided into five domains (daily life, activity related to treatment, coping behavior with symptoms, social life, and interpersonal relationships). Each item is rated on an 11-point scale ranging from 0 ("I have no confidence at all") to 10 ("I am absolutely confident"). The sum of these scores is defined as SECL. The reliability and validity of this scale was established previously by Okawa et al<sup>48</sup>.

Mastery Scale<sup>49</sup>: To evaluate clients' feelings of mastery of life skills, we used the mastery scale, which is a part of the EBP tool kit developed by SAMHSA. This scale is a self-report questionnaire including five items such as "I can change many of the important things in my life". Subjects choose one of four responses ranging from "1: Strongly Disagree" to "4: Strongly Agree". The sum of these points is converted to 100 points and then defined as the mastery score. A higher score indicates stronger feelings of mastery of life skills. Cronbach's alpha in this study at T<sub>0</sub> was 0.89 though the reliability and validity of this scale in Japanese was not sufficiently established.

Empowerment Scale<sup>49</sup>: To measure clients' feelings of empowerment, we used the empowerment scale, which is also a part of the EBP tool kit developed by SAMHSA. This scale is a self-report questionnaire including five items such as "I feel I have the right to approve all services I receive". Subjects choose one of four alternatives ranging from "1: Strongly Disagree" to "4: Strongly Agree". The sum of these points is converted to 100 points and then defined as the empowerment score. A higher score indicates stronger feelings of empowerment. Cronbach's alpha in this study at T<sub>0</sub> was 0.88 though the reliability and validity of this scale in Japanese was not sufficiently established.

Client Satisfaction Questionnaire-8 (CSQ-8)<sup>50</sup>: CSQ-8 is a scale to assess client satisfaction with treatment. The CSQ-8 is easily scored by summing the individual item scores to produce a range of 8 to 32, with higher scores indicating greater satisfaction. The CSQ-8 has been extensively studied, and while it is not necessarily an accurate measure of clients' perceptions of treatment or outcome, it does elicit clients' perspectives on the value of services received. The reliability and validity of the Japanese version of CSQ-8 was established previously by Tachimori et al<sup>51</sup>. In the present study, this scale was used only at T<sub>1</sub>.

Family functioning

Supportive behaviors scale<sup>52</sup>: To evaluate supportive behaviors of clients' family members, we used the Oshima supportive behaviors scale. The scale is composed of 17 items rated on a three-point scale (2, usually provided; 1, sometimes provided; and 0, not provided). The sum of these scores was defined as the number of supportive behaviors.

Family life difficulty scale<sup>52</sup>: The family life difficulty scale was used to measure the difficulty and adversity that caregivers experience in trying to manage social and family life, finances, and their personal lives while caring for a family member with a mental illness. The scale has 15 items such as "I have no time for myself". Items were scored from 0 to 2; the sum was the family life difficulty score. Scores on this scale ranged from 0 to 30, with higher scores indicating more difficulty.

Family rejection scale<sup>53</sup>: To evaluate family members' feelings about accepting the problems and responsibilities associated with caring for a family member with a mental illness, we used Kreisman's family rejection scale. The scale has 11 items rated on a three-point scale (2, I agree very much; 1, I agree; and 0, I disagree). The reliability and validity of the Japanese version of this scale was established previously by Nojima<sup>54</sup>.

Self-esteem scale<sup>55</sup>: The self-esteem scale was used to evaluate family members' level of confidence

regarding care-giving. The scale has 19 items such as “I can cope with the psychotic symptoms of a family member with a mental illness”. Scores ranged from 0 to 190, with higher scores indicating a higher level of self-esteem.

## **Analysis**

Outcome measures at  $T_0$  and  $T_1$  were compared using a paired t-test. Relationships between care needs and the amount of services provided were analyzed using Pearson’s correlation coefficient.

Relationships among outcome variables were also analyzed using Pearson’s correlation coefficient.

To compare the services provided between clients living with family and without family, Analysis of Covariance (ANCOVA) of the amount of services provided was used, controlling for statistically significant differences in age between the groups as a covariate.

To identify effective ways to support family members, clients living with family were divided into two groups: the backup and replacement groups. In this study, “family support” includes not only the direct services performed for family members by ACT-J, but also the assumption by ACT-J of a family caregiver role. In other words, “backup” means to support family members who continue to care for clients, while “replacement” means to support clients instead of family members. Using

daily service log data, clients were divided into two groups as follows: the Z score of the amount of care usually provided by family (assistance with daily living tasks, finances, housing, and communications and coordination) was defined as  $Z_{\text{replacement}}$  and the Z score of the amount of care provided to the family by ACT-J was defined as  $Z_{\text{backup}}$ . If  $Z_{\text{replacement}} < Z_{\text{backup}}$ , clients were assigned to the backup group; if  $Z_{\text{backup}} < Z_{\text{replacement}}$ , they were assigned to the replacement group. To compare the outcome at  $T_1$  between the replacement and backup groups, ANCOVA was used again. The scores of each outcome scale at  $T_0$  were controlled as a covariance.

Statistic calculations were performed by the SPSS (Statistical Package for Social Sciences) version 11.5J (Tokyo, Japan).

## Results

### **Client characteristics and outcome**

Table 1 shows the basic clients characteristics. Average age was 39.4 years old and average age of onset of mental illness was 24.0 years old; 76.8% of clients were living with their family. The majority of clients (73.7%) were diagnosed with schizophrenia or related disorders.

Table 2 shows changes in client outcome. According to paired t-tests, pre-post scores did not exhibit

any significant differences in terms of DAI-10, mastery, empowerment, self-efficacy for community living, or QOLI (Global well-being). However, GAF ( $t = -3.96, p < 0.01$ ) and positive symptom score of BPRS ( $t = -2.04, p = 0.05$ ) were significantly increased, while significant decreases were observed in negative symptom score of BPRS ( $t = 2.26, p = 0.03$ ), care needs for crisis intervention ( $t = 2.39, p = 0.02$ ), and care needs for social behavior requiring supervision ( $t = 2.33, p = 0.03$ ).

Table 3 shows correlations among outcome variables at  $T_0$ . Family functioning such as the family life difficulty ( $r = -0.45, p < 0.001$ ) and family rejection ( $r = -0.36, p < 0.01$ ), and self-esteem about care-giving ( $r = 0.37, p < 0.01$ ) had relatively strong correlations with GAF. On the other hand, no significant correlation was found between family functioning and BPRS or QOLI.

### **Provided services**

The most frequently provided service component was medical support for psychiatric symptoms (56.7 times 53.2 hours per year per client). Assistance with social life (28.8 times 33.5 hours) and family support (15.2 times 19.5 hours) were provided more than other services (see Table 4).

The total score of care needs had a significant positive correlation with the total amount of provided services ( $r = 0.47, p < 0.001$ ). Service components such as family support ( $r = 0.52, p < 0.001$ ),

medical support for psychiatric symptoms ( $r = 0.50, p < 0.001$ ), care management ( $r = 0.45, p < 0.001$ ), and communications and coordination ( $r = 0.42, p < 0.001$ ) had relatively strong positive correlations with the total score of care needs. On the other hand, vocational and educational support had a significantly negative correlation with total score of care needs ( $r = -0.23, p = 0.039$ ). The amount of family support and medical support for psychiatric symptoms had significant correlations with all dimensions of care needs (see Table 5).

### **Services provided to clients living with vs. without family**

Taking client age as the covariate, ANCOVA was performed on the services provided to clients living with family and without family (Table 6). Assistance with daily living tasks ( $F(1, 98) = 10.06, p < 0.01$ ), finances ( $F(1, 98) = 16.41, p < 0.01$ ), housing ( $F(1, 98) = 7.09, p = 0.01$ ), and communications and coordination ( $F(1, 98) = 6.16, p = 0.02$ ) were more frequently provided to clients without family than to clients living with family. Family support ( $F(1, 98) = 10.10, p < 0.01$ ) was provided more frequently to clients living with family.

### **Replacement vs. backup groups**

Table 7 shows differences in clients' basic characteristics at  $T_0$ , provided services, and outcome measures at  $T_0$  between the replacement and backup groups. No significant difference was found

between the two groups except GAF, which had a significantly higher score in the replacement group ( $t = 3.66, p < 0.01$ ).

Table 8 shows the result of ANCOVA on the scores of outcome scales at  $T_1$  between the replacement and backup groups, taking each outcome scale score at  $T_0$  and GAF at  $T_0$  as the covariate. The total score of BPRS ( $F(1, 38) = 10.67, p < 0.01$ ), positive symptom score of BPRS ( $F(1, 38) = 6.64, p = 0.01$ ), depression score of BPRS ( $F(1, 38) = 9.67, p < 0.01$ ), and hypochondria score of BPRS ( $F(1, 38) = 4.85, p = 0.03$ ) in the replacement group were significantly lower than in the backup group. On the other hand, GAF ( $F(1, 39) = 7.68, p = 0.01$ ) and self-efficacy for community living ( $F(1, 33) = 4.72, p = 0.04$ ) scores were significantly larger in the replacement group than in the backup group. According to the result of the t-test, the replacement group had a higher CSQ-8 score than the backup group ( $t = 2.45, p = 0.02$ ).

The scores at  $T_0$  for family life difficulty ( $t = -2.27, p = 0.03$ ) and supportive behaviors ( $t = -3.00, p < 0.01$ ) of the replacement group were higher than backup group. At  $T_1$ , supportive behaviors ( $t = -2.13, p = 0.04$ ) in the replacement group were still significantly higher than in the backup group (see Table 9).

## Discussion

ACT-J provided a broad range of services, including medical support for psychiatric symptoms, assistance with daily living tasks, social life, and finances, and family support. It is difficult to compare the quantity of provided services with preceding ACT programs in foreign countries due to the lack of publications based on daily service logs; however, there is research about the critical ingredients of ACT based on the perspectives of ACT clinicians<sup>56</sup>, and all of the service components rated “beneficial” by ACT clinicians, such as medication management, provision of adequate housing, provision of social support, and money management, were provided in ACT-J. While interactions with clients’ families were given relatively low priority in that research, support for clients’ families was one of the most frequently provided services in ACT-J, suggesting the importance of family support in Japan.

The significant correlations between care needs and the amount of services provided indicate that the amount and components of services seem to be decided in response to the needs of the client. Support for psychiatric symptoms and family support had significant correlations with all dimensions of care needs. Independent of care needs, these elements might be essential service components of ACT. Because ACT is a program targeted at people with severe mental illnesses, it is expected that support for psychiatric symptoms was provided to clients with various needs. On the

other hand, it is notable that family support was provided to clients with various needs. This result is consistent with past research and indicates the importance of the role of family members in the community care of people with mental illnesses<sup>29, 30</sup>.

Assistance with daily living tasks, finances, and housing were provided more frequently for clients without family than for clients with family. There were no significant differences in the basic characteristics of clients with and without family except average age—the higher average age of clients without family may be due to the higher rates of death of their parents due to old age. Additionally, no significant differences in psychiatric symptoms, social functioning, or care needs were found between the two groups; that is to say, the provided services were affected only by the presence or absence of family members in the client's home. Furthermore, clients with family were provided less ACT assistance related to daily living, as their families were usually able to take care of these tasks. Families and the ACT team, then, shared responsibility for client care.

Comparison of client outcome between the replacement and backup groups revealed that direct support of clients rather than family members is more effective for improving psychiatric symptoms, social functioning, and self-efficacy of clients, and results in a higher level of client and family satisfaction with provided services.

Better outcome was observed in the group in which clients directly received more services related to daily living tasks. Clients were able to have a variety of experiences with ACT staff in the world outside the home or hospital, resulting in increased self-efficacy and social functioning. These experiences may have contributed to the reduction of psychiatric symptoms observed in this group.

In preceding research about the families of people with mental illnesses, it has been pointed out that families' supportive behaviors intensify the burden on family members and increase the difficulty of family life<sup>52</sup>. Family life difficulty increases EE (Expressed Emotion), which is an important psycho-social factor for predicting the prognosis of clients with schizophrenia or other mental illness. Providing support to the families of people with mental illnesses not only reduces family life difficulty but also improves client prognosis<sup>57, 58</sup>.

At baseline, family life difficulty and supportive behaviors in the backup group were higher than in the replacement group. Family members of clients in the backup group might have been exhausted and under excess amounts of stress—a high-EE state. For this reason, family support was provided preferentially to family members of backup group clients, whereas ACT services were directed at clients in the replacement group because the exhaustion and support needs of their family members

were relatively low. If ACT were to continue providing support to family members, family life difficulty and other factors affecting family functioning would improve, possibly allowing the prognosis of clients to improve as well. Future studies should include longer follow-up and analysis of other factors that might affect the outcome of ACT clients.

These results are not inconsistent with that providing support to family members have contributed to the client outcome. As mentioned above, the amount and family support seem to be decided in response to the needs of the clients and the family members. "Backup group" and "replacement group" could be considered as "exhausted family group" and "not exhausted family group", respectively. That is to say, in the clients whose family members are not so exhausted or have low need for family supports, the services provided by ACT can easily be directed to the clients themselves. It is possible to consider these aspects of family members as a cause of better outcomes observed in the replacement group. The important thing is to do an assessment of needs for family supports to make supports oriented to the clients themselves. When family members are exhausted and have high needs, to reduce the responsibility of family and to undertake responsibility for the care of clients would be important.

Careful interpretation of the results is necessary, as subjects were not randomly assigned into

replacement and backup groups. However, no significant differences in baseline measures, except GAF, were found between the two groups. The baseline GAF was controlled statistically, giving this discussion a certain level of validity.

Because subjects were limited to ACT-J clients, generalization of the findings of this study is limited. However, ACT programs share a common structure or services regardless of country, region, or culture because they are usually based on internationally disseminated standards, choose clients based on operational entry criteria, and monitor the program using a fidelity scale. Thus, it is possible to apply the findings of this study not only to other ACT programs in Japan, such as those in Kyoto and Okayama, but also to ACT programs located in communities worldwide where families play a large role as caregivers.

The low response rate, especially at T<sub>1</sub>, is another important limitation of this work. At T<sub>1</sub>, the response rates were 50.5% and 47.5% for clients and family survey, respectively. Despite this limitation, the responders who were followed at T<sub>1</sub> did not differ from the non-responders in age, sex, the total amount of provided services, and any outcome variables at T<sub>0</sub>. The low response rate is therefore unlikely to have affected the results.

In light of current trends in the deinstitutionalization of people with mental illnesses, construction of a community support system is an urgent issue. The shape of the average family is also rapidly changing—focusing, for example, on the nuclear rather than extended family—and the capacity of family members to care for persons with disabilities has been weakened. Inevitably, family caregivers will find it difficult to continue to play a large role in community care. To provide community-level support to people with mental illnesses, comprehensive and community-rooted outreach services will play increasingly crucial roles.

However there are many challenges in implementing ACT in Japan. One of key issues in operating the ACT in Japan is financial. Currently, there is no existing mechanism to finance ACT teams. We need to make the proposal of the regulations that make ACT financially sustainable on the one hand, but at the same time to find the way to operate financially sustainable ACT teams with flexible application of the current regulations. Another key issue is communication among different professionals. The structure for psychiatric treatment in Japan was a hierarchical one with the psychiatrist on the top of the hierarchy. The ACT-J aimed to establish an equal relationship between the clients, psychiatrist, and co-medical staff that strove for the recovery of the consumers. In order for different professionals to cooperate in such a manner, considerable training and supervision is necessary.

In addition, effective family support during home visits is critical in Japan as the majority of clients discharged from hospitals live with their family. As a result of home visits, we found that conflicts between family members and clients were greater than we expected. Family members tend to devote their lives to caring for a relative, who suffers from a mental illness and become enmeshed in the relationship with their loved one. In fact, family members were as isolated as clients. The findings in this research indicate that the ACT team needs to not only provide practical supports, such as psychoeducation and individual consultation, to family members but also reduce the responsibility of family and undertake responsibility for the care of people with mental illness.

## Conclusion

This is the first systematic evaluation study focusing on the family support activities of ACT. The results showed that families and the ACT team shared responsibility for care of clients. Providing support directly to clients instead of family members was found to be more effective in improving psychiatric symptoms, social functioning, and self-efficacy, resulting in higher levels of client and family satisfaction with the services provided. The findings of the present study indicate that to reduce the responsibility of family and to undertake responsibility for the care of people with mental illness as a society are important and effective in improving the outcome of people with mental

illnesses.

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## References

1. Wing JK. Institutionalism in mental hospitals. *The British journal of social and clinical psychology*. 1962;1:38-51.
2. Oshima I, Mino Y, Inomata Y. Institutionalisation and schizophrenia in Japan: social environments and negative symptoms: Nationwide survey of in-patients. *The British Journal of Psychiatry*. 2003;183:50-56.
3. Horiuchi K, Nisihio M, Oshima I, Ito J, Matsuoka H, Tsukada K. The quality of life among

- persons with severe mental illness enrolled in an assertive community treatment program in Japan: 1-year follow-up and analyses. *Clinical Practice and Epidemiology in Mental Health*. 2006;2:18.
4. Currier GW. Psychiatric bed reductions and mortality among persons with mental disorders. *Psychiatric services*. 2000;51(7):851.
  5. OECD. OECD Health Data 2008: Statistics and Indicators for 30 Countries. 2008.
  6. Dixon L. Assertive community treatment: twenty-five years of gold. *Psychiatric services*. 2000;51(6):759-765.
  7. Stein LI, Test MA. Alternative to mental hospital treatment. I. Conceptual model, treatment program, and clinical evaluation. *Archives of general psychiatry*. 1980;37(4):392-397.
  8. Weisbrod BA, Test MA, Stein LI. Alternative to mental hospital treatment. II. Economic benefit-cost analysis. *Archives of general psychiatry*. 1980;37(4):400-405.
  9. Test MA, Stein LI. Alternative to mental hospital treatment. III. Social cost. *Archives of general psychiatry*. 1980;37(4):409-412.
  10. Marshall M, Lockwood A. Assertive community treatment for people with severe mental disorders. *Cochrane database of systematic reviews* (Online). 2000(2):CD001089.
  11. Assertive community treatment - Wikipedia, the free encyclopedia. Available at: [http://en.wikipedia.org/wiki/Assertive\\_Community\\_Treatment](http://en.wikipedia.org/wiki/Assertive_Community_Treatment). Accessed Oct 2, 2008.

12. Test MA, Stein LI. Practical guidelines for the community treatment of markedly impaired patients. *Community mental health journal*. 1976;12(1):72-82.
13. Allness DJ, Knoedler WH. A manual for ACT start-up: Based on the PACT model of community treatment for persons with severe and persistent mental illnesses. Arlington, VA: National Alliance on Mental Illness; 2003.
14. McGrew JH, Bond GR. Critical ingredients of assertive community treatment: judgments of the experts. *Journal of mental health administration*. 1995;22(2):113-125.
15. Test MA. ACT History and Origins. November 2001. Available at: <http://www.actassociation.org/origins/>. Accessed Oct 2, 2008.
16. Stein LI, Test MA. Retraining hospital staff for work in a community program in Wisconsin. *Hospital & community psychiatry*. 1976;27(4):266-268.
17. Stein LI, Test MA. The evolution of the training in community living model. *New directions for mental health services*. 1985(26):7-16.
18. Stein LI, Test MA, Marx AJ. Alternative to the hospital: a controlled study. *The American journal of psychiatry*. 1975;132(5):517-522.
19. Test MA, Stein LI. Training in community living: a follow-up look at a Gold-Award program. *Hospital & community psychiatry*. 1976;27(3):193-194.
20. Marx AJ, Test MA, Stein LI. Extrahospital management of severe mental illness. Feasibility

- and effects of social functioning. *Archives of general psychiatry*. 1973;29(4):505-511.
21. Allness DJ, Knoedler WH, Test MA. The dissemination and impact of a model program in process, 1972-1984. *New directions for mental health services*. 1985(26):41-48.
  22. Brekke JS, Wolkon GH. Monitoring program implementation in community mental health settings. *Evaluation & the health professions*. 1988;11(4):425-440.
  23. Cohen LJ, Test MA, Brown RL. Suicide and schizophrenia: data from a prospective community treatment study. *The American journal of psychiatry*. 1990;147(5):602-607.
  24. The 1974 APA achievement award winners. Gold award: A community treatment program. Mendota Mental Health Institute, Madison, Wisconsin. *Hospital & community psychiatry*. 1974;25(10):669-672.
  25. Mueser KT, Torrey WC, Lynde D, Singer P, Drake RE. Implementing evidence-based practices for people with severe mental illness. *Behavior modification*. 2003;27(3):387-411.
  26. Olfson M. Assertive community treatment: an evaluation of the experimental evidence. *Hospital & community psychiatry*. 1990;41(6):634-641; discussion 649-651.
  27. Ziguras SJ, Stuart GW. A meta-analysis of the effectiveness of mental health case management over 20 years. *Psychiatric services*. 2000;51(11):1410-1421.
  28. Oshima I, Ito J. Care management for people with schizophrenia: Focusing on ACT. *Japanese Journal of Biological Psychiatry*. 2003;14:29-34.

29. Sono T, Oshima I, Ito J. Needs for assertive community treatment of families of people with severe mental illness and their structure. *Japanese Bulletin of Social Psychiatry*. 2007;16:29-37.
30. Sono T, Oshima I, Ito J. Family needs and related factors in caring for a family member with mental illness: Adopting assertive community treatment in Japan where family caregivers play a large role in community care. *Psychiatry and Clinical Neurosciences*. 2008;62:584-590.
31. Sono T, Nishio M, Suzuki Y, Oshima I, Fukaya H, Horiuchi K, Ogawa H, Hisanaga F, Niekawa N, Ito J. Effects of assertive community treatment on families of people with severe mental illness in Japan – An analysis of self-report questionnaire using a quasi-experimental method. *Australian and New Zealand Journal of Psychiatry*. 2007;41(S2):A359-A432.
32. McGrew JH, Bond GR, Dietzen L, Salyers M. Measuring the fidelity of implementation of a mental health program model. *Journal of consulting and clinical psychology*. 1994;62(4):670-678.
33. Teague GB, Bond GR, Drake RE. Program fidelity in assertive community treatment: development and use of a measure. *The American journal of orthopsychiatry*. 1998;68(2):216-232.

34. Salyers MP, Bond GR, Teague GB, Cox JF, Smith ME, Hicks ML, Koop JI. Is it ACT yet? Real-world examples of evaluating the degree of implementation for assertive community treatment. *The journal of behavioral health services & research*. 2003;30(3):304-320.
35. Bond GR, Salyers MP. Prediction of outcome from the Dartmouth assertive community treatment fidelity scale. *CNS spectrums*. 2004;9(12):937-942.
36. Committee of Case Management Guidelines for People with Mental Disabilities. Case Management Guidelines for People with Mental Disabilities. Tokyo: Japan Ministry of Health, Labor and Welfare; 1998.
37. Phelan M, Wykes T, Goldman H. Global function scales. *Social psychiatry and psychiatric epidemiology*. 1994;29(5):205-211. WHO. The International Classification of Diseases and Health Related Problems Tenth Revision. Geneva; 1992.
38. Oshima I, Cho N, Anzai N, Takahashi K. The development of care assessment schedule in the Case Management Guideline for the People with Mental Disabilities in Japan: Reliability and validity of the needs for care scale and handicaps scale. *Seishin Igaku*. 2000;42(8):809-817.
39. Overall JE, Gorham DR. The Brief Psychiatric Rating Scale. *Psychological Reports*. 1962;10:790-812.
40. Kolakowska T. Brief Psychiatric Rating Scale. Glossaries and rating instructions. Oxford:

Oxford University; 1976.

41. Kitamura T, Yuzuriha T, Morita M, Ito J, Suga R, Nakagawa Y. Oxford version of BPRS: development and validation of subscales. *Archives of Psychiatric Diagnostics and Clinical Evaluation*. 1990;1(1):101-107.
42. Lehman A. A quality of life interview for the chronically mentally ill. *Evaluation and Program Planning*. 1988;11(1):51-62.
43. Phelan M, Wykes T, Goldman H. Global function scales. *Social psychiatry and psychiatric epidemiology*. 1994;29(5):205-211.
44. American Psychiatric Association APA, American Psychiatric Association Task Force on DSM-IV. Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR: American Psychiatric Association; 2000.
45. American Psychiatric Association translated by S Takahashi, Y Ohno, T Someya. Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR. Tokyo: Igaku Syoin; 2002.
46. Hogan TP, Awad AG, Eastwood R. A self-report scale predictive of drug compliance in schizophrenics: reliability and discriminative validity. *Psychological medicine*. 1983;13(1):177-183.
47. Watanabe K. Drug Compliance in Outpatients with Schizophrenia as Affected by Their Drug Attitude and Insight. *Journal of the Keio Medical Society*. 2000;77(6):309-317.

48. Okawa N, Oshima I, Cho N, Makino H, Oka I, Ikebuchi E, Ito J. Development of 'Self-Efficacy for Community Life Scale' for People with Schizophrenia: Its Reliability and Validity. *Seishin Igaku*. 2001;43(7):727-735.
49. SAMHSA's National Mental Health Information Center. CMHS Programs: Community Support - Measuring Psychosocial Rehabilitation Outcomes. SAMHSA. Oct. 9, 2008. Available at: <http://tinyurl.com/3ppd7s>.
50. Larsen DL, Attkisson CC, Hargreaves WA, Nguyen TD. Assessment of client/patient satisfaction: development of a general scale. *Evaluation and Program Planning*. 1979;2(3):197-207.
51. Tachimori H, Ito H. Reliability and validity of Japanese version of Client Satisfaction Questionnaire-8. *Seishin Igaku*. 1999;41(7):711-717.
52. Oshima I. A study on the family support system for the mentally disabled from the perspective of its function and resources. *Psychiatria et Neurologia Japonica*. 1987;89:204-241.
53. Kreisman DE, Joy VD. Family response to the illness of a relative: A review of the literature. *Schizophrenia Bulletin*. 1974;10:34-57.
54. Nojima S. Chronicity and family/patient interaction in a Japanese schizophrenic patient population. San Francisco: Unpublished Doctor of Nursing Science Dissertation. University

of California San Francisco; 1989.

55. Oshima I. Nation-wide survey about needs assessment and outcome evaluation of psycho-social support program - research design and development / evaluation of scales. Annual Report of the Research on Nervous and Mental Disorders (10A-2), Japan Ministry of Health, Labor and Welfare; 2000:20-23.
56. McGrew JH, Pescosolido B, Wright E. Case managers' perspectives on critical ingredients of assertive community treatment and on its implementation. *Psychiatric services*. 2003;54(3):370-376.
57. Jackson HJ, Smith N, McGorry P. Relationship between expressed emotion and family burden in psychotic disorders: An exploratory study. *Acta Psychiatrica Scandinavica*. 1990;82:243-249.
58. Vaughn CE, Leff JP. The influence of family and social factors on the course of psychiatric illness. *The British Journal of Psychiatry*. 1976;129:125-137.

Age (Mean, SD)	39.4	10.3
Sex		
Male	44	44.4%
Female	55	55.6%
Psychiatric diagnosis		
Schizophrenia and related disorders	73	73.7%
Mood disorders and related disorders	19	19.2%
Others	7	7.1%
Age of onset (Mean, SD)	24.0	0.1
Living status		
Living with family	76	76.8%
Living without family	23	23.2%

Variable	N	T <sub>0</sub>		T <sub>1</sub>		t	p
		Mean	SD	Mean	SD		
GAF	57	47.4	9.2	51.9	9.3	-3.96	0.00 **
DAI-10	46	6.0	2.5	6.4	2.4	-1.29	0.20
Mastery	46	47.7	18.4	46.0	15.6	0.61	0.54
Empowerment	46	64.2	20.3	61.6	22.6	0.88	0.38
Self-Efficacy for Community Living	47	61.4	15.2	61.4	17.9	0.01	0.99
BPRS total	56	16.8	7.1	16.8	8.4	0.02	0.98
Positive symptom	56	5.4	4.1	6.4	4.4	-2.04	0.05 *
Negative symptom	56	3.4	3.0	2.6	2.9	2.26	0.03 *
Depression	56	5.2	2.6	4.9	2.5	0.69	0.49
Mania	56	0.5	1.3	0.5	0.9	0.09	0.93
Hypochondria	56	2.3	1.4	2.3	1.6	-0.19	0.85
QOLI (Global well-being)	55	4.0	1.5	4.1	1.5	-0.55	0.58
Needs of care	35	2.1	0.8	2.0	0.7	0.89	0.38
Personal care	35	2.3	1.1	2.2	0.9	0.43	0.67
Safety management	35	1.5	1.1	1.6	1.1	-0.42	0.67
Health management	35	2.2	1.2	2.1	1.0	0.38	0.70
Use of social resources	35	1.7	1.1	1.6	1.2	0.84	0.40
Interpersonal relationships	35	2.0	1.0	2.2	1.3	-1.25	0.22
Social role and daytime activities	35	2.9	1.2	2.7	1.0	0.75	0.46
Crisis intervention	35	2.8	1.2	2.3	0.9	2.39	0.02 *
Social behavior requiring supervision	35	1.9	0.9	1.6	0.7	2.33	0.03 *

Paired t-test. \*\* p < 0.01, \* p < 0.05

Table 3 Correlations among outcome variables at T<sub>0</sub>

	N	Clients outcome						Family functioning				
		DAI-10	Mastery	Empowerment	SECL	BPRS total	QOLI (Global well-being)	Needs of care	The family life difficulty	Supportive behaviors	Family rejection	Self-esteem about care-giving
<b>Clients outcome</b>												
GAF	82	0.15	0.08	0.17	0.30 *	0.06	-0.68	-0.50 **	-0.45 **	0.05	-0.36 **	0.37 **
DAI-10	70		0.07	0.12	0.21	0.11	-0.18	-0.06	-0.03	-0.07	-0.01	0.10
Mastery	68			-0.16	0.58	0.36 **	-0.27 *	-0.20	0.10	0.37 **	-0.17	0.36 *
Empowerment	68				-0.12	-0.06	-0.07	-0.15	-0.10	-0.20	0.14	0.08
SECL	70					0.41 **	-0.29 *	-0.27	-0.20	0.08	-0.29 *	0.35 *
BPRS total	82						-0.19	0.37 **	0.23	-0.11	0.23	-0.27
QOLI (Global well-being)	84							0.22	-0.07	0.19	-0.10	0.10
Needs of care	61								0.52 **	-0.02	0.34 *	-0.33 *
<b>Family functioning</b>												
The family life difficulty	58									0.35 **	0.51 **	-0.29 **
Supportive behaviors	57										-0.12	0.37 **
Family rejection	57											-0.52 **

Pearson's correlation coefficient, \*\* p < 0.01, \* p < 0.05

	Numbers of provided services		Time of provided services (hours)	
	Mean	SD	Mean	SD
Care management	0.8	6.9	1.0	8.6
Medical support for psychiatric symptoms	56.7	53.0	53.2	60.0
Crisis intervention	3.0	6.5	4.6	10.2
Support for physical health	9.2	11.7	9.1	13.3
Assistance with daily living tasks	15.3	32.9	18.9	47.9
Financial support	5.0	11.6	5.2	11.1
Social life support	28.8	38.6	33.5	48.0
Vocational and educational support	3.9	13.6	5.4	22.2
Housing services	3.9	9.5	4.8	12.1
Family support	15.2	20.3	19.5	26.4
Psycho-social intervention programs	1.1	4.2	1.5	5.8
Other direct services	9.1	8.8	7.2	8.7
Communications and coordination	2.1	7.5	1.4	5.8
Conference / supervision	0.6	1.9	0.5	1.6
Total	204.6	152.2	212.1	193.4

Table 5 Correlations between care needs and amount of services provided

Needs of care	Sub scales of needs of care							
	Personal care	Safety management	Health management	Use of social resources	Interpersonal relationships	Social role and daytime activities	Crisis intervention	Social behavior requiring supervision
Total	0.47 **	0.29 **	0.36 **	0.34 **	0.26 *	0.36 **	0.23 *	0.50 **
Family support	0.52 **	0.23 *	0.42 **	0.52 **	0.33 **	0.26 *	0.29 **	0.58 **
Medical support for psychiatric symptoms	0.50 **	0.36 **	0.40 **	0.38 **	0.32 **	0.33 **	0.31 **	0.52 **
Care management	0.45 **	0.33 **	0.39 **	0.28 *	0.21	0.34 **	0.22	0.51 **
Communications and coordination	0.42 **	0.34 **	0.39 **	0.13	0.15	0.27 *	0.20	0.45 **
Conference / supervision	0.42 **	0.18	0.36 **	0.18	0.25 *	0.30 **	0.39 **	0.44 **
Crisis intervention	0.41 **	0.28 *	0.41 **	0.24 *	0.20	0.26 *	0.30 **	0.51 **
Social life support	0.36 **	0.23 *	0.25 *	0.31 **	0.17	0.29 **	0.15	0.42 **
Physical health support	0.30 **	0.13	0.18	0.30 **	0.17	0.36 **	0.20	0.19
Assistance with daily living tasks	0.18	0.07	0.12	0.09	0.04	0.30 **	0.05	0.14
Housing services	0.14	0.17	0.01	0.04	0.16	0.00	-0.04	0.22 *
Financial support	0.14	-0.02	0.05	0.04	0.14	0.19	-0.06	0.09
Other direct services	0.13	0.09	0.10	0.05	0.00	0.08	-0.08	0.12
Psycho-social intervention programs	0.07	-0.01	0.09	0.07	0.06	-0.09	-0.02	-0.04
Vocational and educational support	-0.23 *	-0.16	-0.22 *	-0.24 *	-0.13	-0.19	-0.16	-0.19

Pearson's correlation coefficient (n = 83), \*\* p < 0.01, \* p < 0.05

Table 6 ANCOVA of amount of services provided for clients living with and without family

	Living with family (n = 76)		Living without family (n = 23)		F	p
	mean	SD	mean	SD		
Total	195.3	184.4	267.8	215.5	1.42	0.24
Care management	1.3	9.9	0.0	0.0	0.43	0.51
Medical support for psychiatric symptoms	50.4	63.2	62.5	47.8	0.06	0.81
Crisis intervention	4.4	11.0	5.2	7.1	0.27	0.61
Physical health support	7.4	11.8	14.6	16.7	1.16	0.28
Assistance with daily living tasks	8.9	15.0	52.0	89.2	10.06	0.00 **
Financial support	2.9	6.1	12.8	18.6	16.41	0.00 **
Social life support	32.2	50.2	37.7	40.6	0.23	0.63
Vocational and educational support	4.8	15.6	7.7	36.7	0.80	0.37
Housing services	2.6	7.5	12.1	19.7	7.09	0.01 **
Family support	24.2	28.2	4.0	7.9	10.09	0.00 **
Psycho-social intervention programs	1.9	6.6	0.2	1.0	0.16	0.69
Other direct services	6.9	8.6	8.4	9.3	0.00	0.96
Communications and coordination	0.6	3.0	4.2	10.4	6.16	0.01 *
Conference / supervision	0.5	1.7	0.3	1.1	0.01	0.93

ANCOVA analysis of covariance, controlling for age as a covariate, degree of freedom = 98,  
 \*\* p < 0.01, \* p < 0.05

Table 7 Comparison of basic characteristics, provided services, and outcome measures at T<sub>0</sub> for the two groups

	Replacement		Backup		χ <sup>2</sup> /t	p
	Mean/N	SD/%	Mean/N	SD/%		
Age	38.0	8.8	35.8	10.6	1.33	0.19
Sex					0.13	0.16
Male	17	38.6%	18	56.3%		
Female	27	61.4%	14	43.8%		
Psychiatric diagnosis					1.86	0.40
Schizophrenia and related disorders	31	70.5%	26	81.3%		
Mood disorders and related disorders	11	25.0%	4	12.5%		
Others	2	4.5%	2	6.3%		
Length of hospital stay between T <sub>0</sub> and T <sub>2</sub>	21.5	52.8	34.6	59.9	-0.98	0.33
Total number of provided services	162.7	123.1	228.3	172.7	-1.83	0.07
Client outcome scales						
GAF	50.7	8.8	42.3	8.9	3.66	0.00 **
BPRS	16.3	6.0	19.8	8.7	-1.76	0.09
QOLI (Global well-being)	3.7	1.3	4.4	1.4	-1.83	0.07
DAI-10	6.4	2.3	6.1	2.6	0.44	0.66
Mastery	47.1	17.5	47.0	15.4	0.44	0.66
Empowerment	70.5	12.8	70.1	19.3	0.08	0.93
Self-Efficacy for Community Living	65.2	11.1	61.1	14.4	1.09	0.28
Age of family members	62.1	12.5	59.8	11.4	0.64	0.52
Sex of family members					0.34	0.77
Male	11	36.7%	7	29.2%		
Female	19	63.3%	17	70.8%		
Relation					3.04	0.39
father	3.0	10.3%	4.0	16.7%		
mother	15.0	51.7%	16.0	66.7%		
Other	11.0	37.9%	4.0	16.7%		

Compared using the t-tests or binomial tests as appropriate, \*\* p < 0.01

Table 8 ANCOVA of outcome measures at T<sub>1</sub> for the two groups

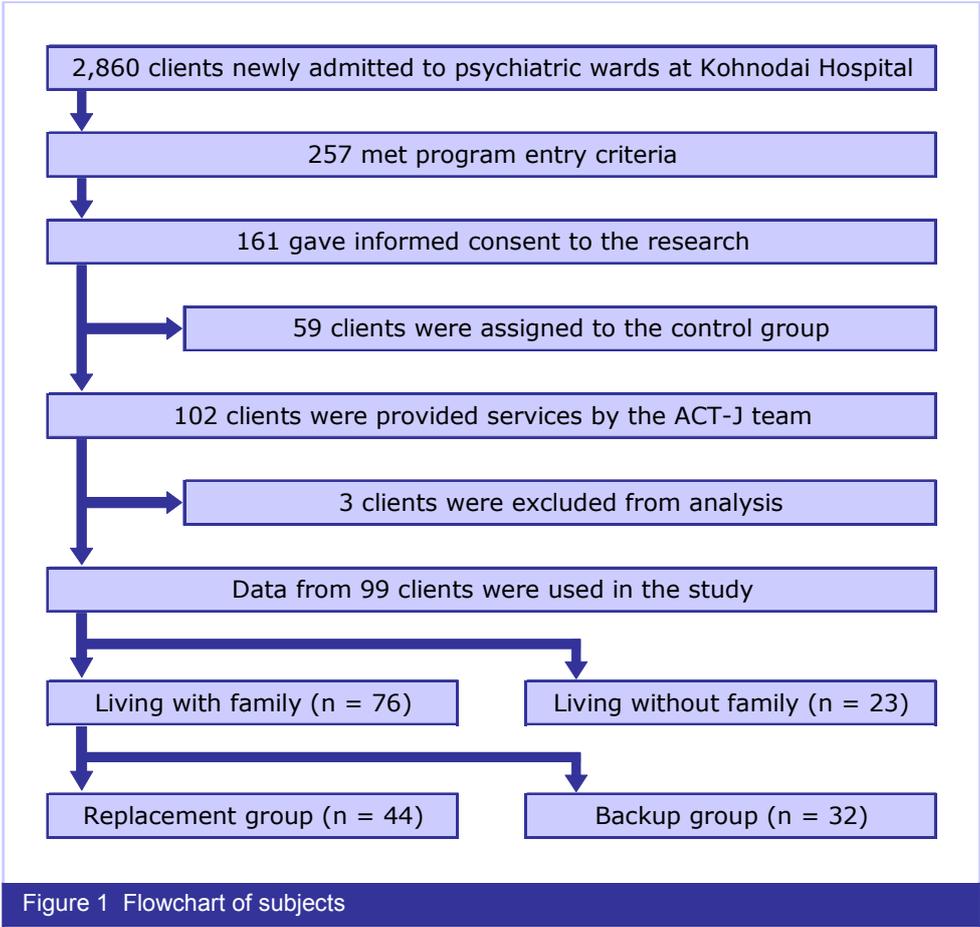
	Replacement		Backup		df	F	p
	Mean	SD	Mean	SD			
Length of hospital stay between T <sub>0</sub> and T <sub>2</sub>	21.46	52.80	34.59	59.92	58	0.68	0.41
BPRS total	13.60	7.46	24.43	8.48	38	10.67	0.00 **
Positive symptom	4.96	3.88	10.00	4.77	38	6.64	0.01 *
Negative symptom	1.72	2.34	4.71	3.02	38	1.25	0.27
Depression	4.52	1.94	6.14	2.88	38	9.67	0.00 **
Mania	0.40	0.65	0.79	1.42	38	1.28	0.27
Hypochondria	2.00	1.29	2.79	2.33	38	4.85	0.03 *
GAF	56.36	9.50	44.87	7.60	39	7.68	0.01 **
QOLI (Global well-being)	4.30	1.38	3.79	1.89	37	2.53	0.12
DAI-10	6.21	2.47	6.21	2.46	33	0.17	0.68
Mastery	47.08	11.89	45.24	18.89	32	0.05	0.83
Empowerment	69.17	13.87	56.67	28.13	33	2.81	0.10
Self-Efficacy for Community Living	67.19	13.81	53.97	20.15	33	4.72	0.04 *
CSQ-8 <sup>†</sup>	26.40	3.48	23.23	4.32	36	2.45	0.02 *

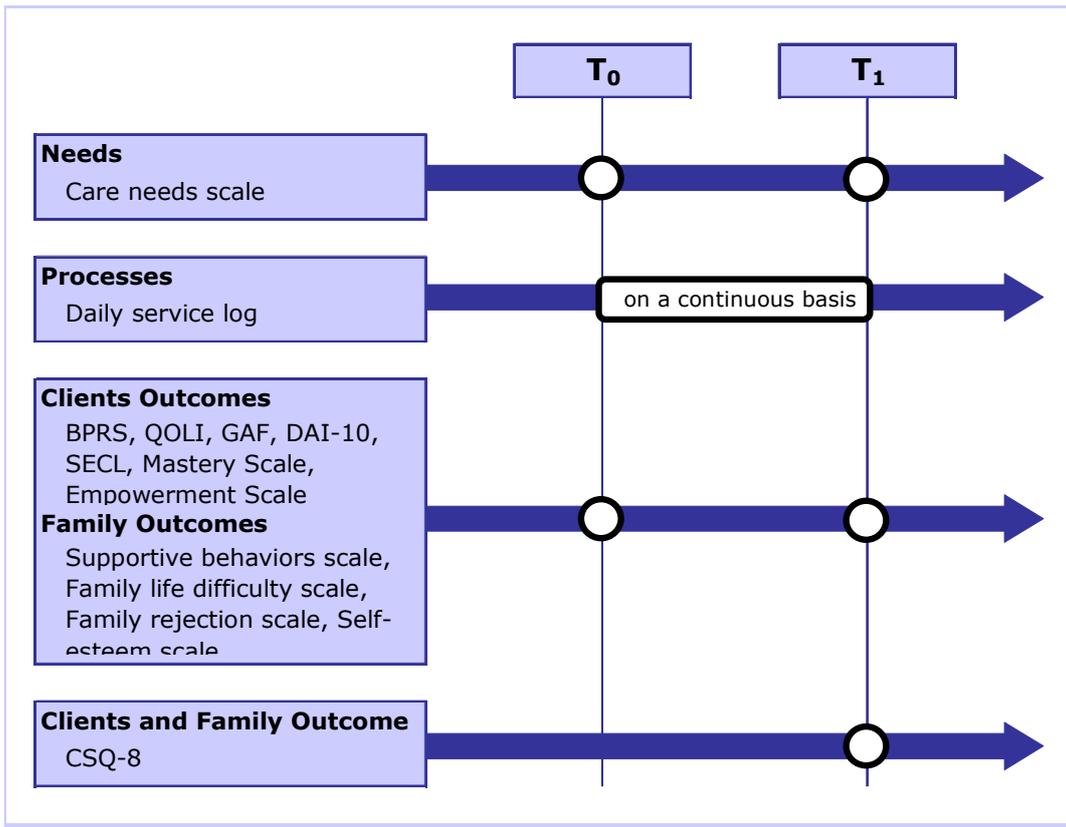
ANCOVA analysis of covariance, controlling for GAF at T<sub>0</sub> and T<sub>0</sub> scores of each scale as covariates.  
<sup>†</sup> t-test, df degree of freedom, \*\* p < 0.01, \* p < 0.05

Table 9 Comparison of family functioning at T<sub>0</sub> and T<sub>1</sub> for the two groups

	T <sub>0</sub>						T <sub>1</sub>									
	Replacement			Backup			Replacement			Backup						
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	t	p		
The family life difficulty	30	9.53	6.39	22	13.22	4.81	27	9.65	1.46	17	12.55	1.40	-2.27	0.03 *	-1.35	0.18
Supportive behaviors	29	15.78	5.50	22	20.02	4.27	27	14.64	1.16	17	18.29	1.13	-3.00	0.00 **	-2.13	0.04 *
Family rejection	30	6.82	4.39	22	8.58	3.48	26	7.93	1.02	17	9.91	1.10	-1.55	0.13	-1.28	0.21
Self-esteem about care-giving	30	63.96	16.88	21	60.91	13.34	25	59.68	3.80	17	60.40	3.11	0.69	0.49	-0.14	0.89
CSQ-8	-	-	-	-	-	-	26	27.09	0.97	16	23.75	0.81	-	-	2.40	0.02 *

t-test. \*\* p < 0.01, \* p < 0.05





$T_0$ : Date of discharge of the index admission, or the day when we obtained informed consent (if informed consent was obtained after discharge of the index admission).  
 $T_1$ : 12 months after  $T_0$ .

Figure 2 The schedule of data collecting

