Disease Management in Latinos With Schizophrenia: A Family-Assisted, Skills Training Approach

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Abstract

This study evaluated the effectiveness of a skills training program designed to teach disease management to Latinos with schizophrenia treated at a community mental health center. Ninety-two Latino outpatients with schizophrenia and their designated relatives were randomly assigned to 3 months of skills training (ST) versus customary outpatient care (CC) and followed for a total of 9 months. The skills training approach was culturally adapted mainly by including the active participation of key relatives to facilitate acquisition and generalization of disease management skills into the patients' natural environment. There was a significant advantage for the ST group over the CC group on several symptom measures, skill acquisition and generalization, level of functioning, and rates of rehospitalization. There were no significant differences between the groups on quality of life or caregiver burden. Skills training had a direct effect on skill acquisition and generalization, and utilization of disease management skills led to decreased rates of rehospitalization. Incorporating an intensive, culturally relevant generalization effort into skills training for Latinos with schizophrenia appeared to be effective in teaching disease management and viable in a community mental health center.

Keywords: Schizophrenia, skills training, behavior therapy, psychiatric rehabilitation, Latino, cultural, skill generalization.

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Despite recent advances in pharmacotherapy, the lives of many people with schizophrenia are adversely affected by relapses, hospitalizations, poor social adjustment, and an unsatisfactory quality of life. The suboptimal effects of current medications, even when combined with the customary array of psychosocial treatments, point to the need for developing new biobehavioral interventions (Liberman et al. 1998, 1999). Antipsychotic medications and psychosocial treatments that have a broader spectrum of efficacy and are better tolerated, safer, and more readily used by practitioners would improve the outcomes of persons with schizophrenia (Lehman and Steinwachs 1998; Cabana et al. 1999; Torrey et al. 2001).

The need for improved treatments is particularly urgent for Latinos with schizophrenia because the Latino population is rapidly increasing in many regions of the United States (U.S. Census Bureau 2001). Latinos with severe and persistent mental disorders have been shown to have lower accessibility to services, to wait until florid psychotic symptoms arise before seeking treatment, and to use inpatient services disproportionately (U.S. Department of Health and Human Services 2001). Designing, adapting, and delivering both pharmacological and psychosocial services for individuals from Hispanic ethnic groups will require cultural competence in professional caregivers (Lopez et al. 2001).

One of the newer, evidence-based approaches to psychosocial treatment of schizophrenia that holds promise for utility with Latino patients and their families is social skills training (Liberman et al. 1986, 1993; Heinssen et al. 2000). When made available in modules that are prescriptive and highly structured, as well as focused on teaching patients and their relatives how to manage medication and develop relapse-prevention plans, skills training offers the type of authoritative, biomedically based, and educationally oriented treatment that has been shown to successfully engage Latinos with schizophrenia and their families in a form of treatment that augments antipsychotic medication (Kopelowicz 1997).

While social skills training has been documented as effective in schizophrenia (Benton and Schroeder 1990; Dilk and Bond 1996; Heinssen et al. 2000), its efficacy with Latinos has not been formally tested and questions have been raised about its generalization to community adjustment (Bellack et al. 1984; Halford and Hayes 1991; Penn and Mueser 1996). For Latinos with schizophrenia, cultural adaptation, efficacy, and generalization might be promoted by involving family members in the skills training enterprise. It is well established that the vast majority of Latinos with schizophrenia continue to live with their families for many years after the onset of illness (Guarnaccia and Parra 1996) and Latino family members are ideally poised to provide the opportunities, encouragement, and reinforcement for using the disease management skills learned by patients in clinic-based sessions (Karno et al. 1987; Guarnaccia 1992; Jenkins et al. 1992; Kopelowicz et al. 2002).

In the current study, which was set in a community mental health center serving a largely Latino area of Los Angeles, we engaged family members to facilitate the acquisition and generalization of disease management skills into the patient's natural environment. The skills taught were from the Medication Management and Symptom Management Modules (Eckman et al. 1990, 1992; Liberman and Corrigan 1993; Marder et al. 1996), translated into Spanish. The primary aim of this randomized, controlled study was to evaluate the effectiveness of combining a culturally adapted, educational approach to disease management, involving patients and families in separate venues, with antipsychotic medication for Latino persons with schizophrenia. A control group received medication and treatment as usual only. Because the study was carried out in a typical community mental health center with broad inclusion criteria for patients and with customary staff providing the interventions, the results could be viewed as elucidating "effectiveness" rather than the more limited "efficacy."

We hypothesized that as compared to control subjects, subjects who received skills training would show (1) greater acquisition, maintenance, and utilization of illness self-management skills in their everyday life, (2) lower ratings of psychopathology, relapse, and rehospitalization after the training period, (3) higher levels of medication compliance, (4) higher psychosocial functioning, and (5) more realistic and accepting attitudes toward their illnesses. Moreover, we posited a path model in which skills training directly leads to skill learning and utilization, skill utilization directly leads to medication compliance, and medication compliance directly leads to decreased likelihood of relapse. We also hypothesized that as compared to family members of control patients, family members enrolled in skills training would (1) express increased optimism and hope with regard to clinical progress and

rehabilitation, (2) verbalize less negative statements of a high "expressed emotion" nature, and (3) express less burden and higher levels of tolerance for their ill relative's symptoms and problem behaviors.

Methods

Study Participants. A total of 92 patients with schizophrenia spectrum disorders who were receiving care at the San Fernando Mental Health Center, a Los Angeles County Department of Mental Health–operated community mental health center located in a predominantly Latino neighborhood of Los Angeles, were recruited into the study from among all current outpatients if they met inclusion criteria. The criteria for selection were age between 18 and 60 years, a primary *DSM–IV* chart diagnosis of schizophrenia or schizoaffective disorder, at least one episode of treatment in an inpatient facility of at least 1 week's duration in the previous 12 months, Spanish-speaking, and living with their family. Patients with other concurrent diagnoses (e.g., substance abuse, depression, personality disorder) were not excluded from the study.

Seventy-two participants (78.3%) were diagnosed as having schizophrenia and 20 participants (21.7%) schizoaffective disorder. Sixty-two participants (67.4%) were male. Fifty-five participants (59.8%) were Mexican-American, 29 (31.5%) were from other Central American countries (El Salvador, Nicaragua, Honduras), and eight (8.7%) were from the Caribbean (Cuba, Puerto Rico). Seventy-four (80.4%) had never been married, eight (8.7%) were divorced or separated, and ten (10.9%) were married. Average age was 38.4 years, and the average education was 8.8 years. Seventy-three (79.3%) lived with their parents, 13 (14.1%) lived with their spouses or ex-spouses, and six (6.5%) lived with a family member other than parents or spouses (e.g., sibling, offspring, cousin). Seventy-six (82.6%) were unemployed at study entry and 16 (17.4%) had part-time work.

The key relatives consisted of 61 mothers (66.3%), 12 fathers (13.0%), three siblings (3.3%), three offspring (3.3%), ten spouses (10.9%), and 3 ex-spouses (3.3%). The average age of the key relatives was 58.6 years, and their average education was 7.6 years. Nine (9.8%) of the relatives were born in the United States. Ten (10.9%) of the relatives were illiterate in English and Spanish. The characteristics of the sample ultimately selected for this study did not significantly differ on any clinical or demographic variables from the more than 500 Latinos with schizophrenia spectrum disorders who were served by the community mental health center.

Procedures. All procedures and informed consent documents for the study were reviewed and approved by the

Human Subjects Protection Committee of the University of California, Los Angeles (UCLA) School of Medicine's Office for Protection of Research Subjects and the Human Subjects Research Committee of the Los Angeles County Department of Mental Health. After patients and family members agreed to participate in the study and signed informed consent, patients were assessed with the Structured Clinical Interview for *DSM–IV* (SCID-IV; First et al. 1995) by a research psychologist trained and maintained to meet high standards of reliability by the UCLA Clinical Research Center for Schizophrenia and Psychiatric Rehabilitation. Patients were then administered a battery of instruments, described below, including scales measuring psychopathology, medication compliance, attitudes toward illness, quality of life, level of psychosocial functioning, and disease management skills. Family members completed scales measuring (1) level of expressed emotion, (2) caregiver burden, and (3) hope for the future. Patients and their key relatives were then randomly assigned to either continue treatment as usual (*n* = 47) or participate in skills training with generalization along with treatment as usual (*n* = 45).

Interventions

Experimental treatment. Patients were assigned to groups of six for their skills training based on successive referral from intake into the study. Skills training groups met for 90-minute sessions four times per week during 3 months; 2 days apiece were dedicated to each of the two modules, Medication Management and Symptom Management. Each module includes a Trainer's Manual, Participant's Workbook, and a videocassette with thoroughly specified psychoeducational material and training techniques to teach participants instrumental, social, and problem-solving skills. The Trainer's Manual specifies what is to be said and done to teach a module's skills; the Participant's Workbook includes written material, forms, and exercises to help participants learn the skills; and the videocassette illustrates the behaviors to be learned.

The Medication Management module is divided into four skill areas: (1) obtaining information about antipsychotic medication, (2) recognizing its side effects, (3) monitoring these side effects, and (4) negotiating medication issues with physicians and other caregivers. In the Symptom Management module, the skill areas include (1) how to identify the warning signs of relapse, (2) how to intervene early to prevent relapse once these signs appear, (3) how to cope with the persistent psychotic symptoms that continue despite medications, and (4) how to avoid alcohol and drugs of abuse.

The trainers, whose disciplines included nursing, psychology, and social work, used seven learning activities to teach patients the requisite skills: (1) explanation of the purpose of the skill to be learned, (2) demonstration of the skill using video-assisted modeling, (3) role-playing with the patients, (4) learning how to identify and obtain the resources needed to perform the skills in the real world, (5) solving outcome problems using a formal problem-solving method (D'Zurilla 1986), (6) conducting in vivo exercises with the trainer's assistance but outside the training session, and (7) providing homework assignments to be performed by the patients on their own in their natural environments with "evidence" that they had completed the assignments. More detailed descriptions of the modules and the seven learning activities can be obtained from other publications (Liberman and Corrigan 1993; Liberman et al. 1993).

To ascertain that the modules were being conducted systematically and correctly, a therapist fidelity evaluation form was used (Wallace et al. 1992). This form includes a general section assessing overall therapist competency as well as specific items that pertain to mastery of each individual module content area. Prior to starting the study, raters were trained to high levels of competency on this scale, demonstrating at least 90 percent of the key techniques required by the module procedures. They were monitored for maintenance of fidelity throughout the study and given feedback when diverging from the 90 percent level.

In the experimental condition, family members of patients were included in weekly "generalization sessions" aimed at utilizing relatives as generalization agents. These group sessions used the modules as focal points for educating relatives as coaches for their ill family member. Relatives were thoroughly informed about the skills the subject had been taught in each module as well as the problem-solving skills and homework exercises that were provided. The relative was then assisted in mapping these skills to the patient's environment by examining how the home environment could provide opportunities for skill use. For example, a place, such as a bulletin board or the refrigerator, was identified where a copy of the Side Effects Checklist could be displayed for convenient completion by the patient on a daily schedule as prescribed in the Medication Management Module. The prescribed steps to be followed by the relative on how to coach the patient in the use of the Checklist were also covered. In essence, relatives were trained to offer opportunities, encouragement, and reinforcement to their mentally ill relatives for applying the skills in everyday life. Equally essential to this training was that relatives would never take over the patients' responsibilities; for instance, they were instructed to not complete the Side Effects Checklist for the patient.

Another method used to help relatives increase patients' use of skills in the home environment, namely

monitoring and reinforcing the use of these skills, was instituted. The relatives were instructed to set aside time each week to discuss adherence to the module's skills and learning activities with the patient and resolve obstacles that impeded performance. Also, the relative was asked to use a checklist to verbally reinforce the patient for successful performance. Pictorial representations were used with illiterate relatives. The use of praise was thoroughly explained, modeled, and practiced using role-plays. In addition, two home visits were conducted during the followup period; the first one about 1 month after the skills training and the second 4 months later. The purpose of these visits was to review progress and help solve problems identified by the therapist, the family, or the patient in the process of transferring the skills to the home environment. Specific problem-solving exercises were conducted to address the identified difficulties. The therapist offered support and encouragement for continued use of the skills. Other than these two home visits, experimental subjects received the standard treatment at the San Fernando Mental Health Center (see below for a description) during the followup period.

The wording of items on the training materials, checklists, and monitoring sheets and in the training procedures were culturally adapted for use with the study population (Leslie and Leitch 1989). To create a culturally relevant translation, six bilingual mental health professionals were each assigned a section of the English-language version of the module to translate. They met weekly to review and modify the Spanish-language version. Adaptations that were made in translating the modules for the study population included using Spanish vocabulary at the elementary school level, careful consideration of the wide range of dialects and colloquialisms used by the variety of Latino subgroups, and the attempt to forge a "universal Spanish" that would be comprehensible to all. A bilingual, bicultural psychologist who worked at the mental health center conducted a back-translation for the Spanish-language version to ensure the accuracy of translation for the study population. Finally, four Mexican-American actors dubbed the translated videoscripts over the audio portion of the videotapes. This process is described in more detail in another paper (Kopelowicz 1997).

Additional cultural adaptations included the use of indigenous, bilingual, and bicultural staff of the community mental health center as skills trainers, the participation of family members (rather than clinicians) as "generalization aides," and the modification of the trainer's activities during the sessions. As an example of the third type of adaptation, skills trainers used an informal personal style with patients and relatives that included the sharing of food and encouragement of "small talk" before and after training sessions. These adaptations were made

to encourage warm interactions among skills trainers, patients, and relatives, thereby increasing retention in the study as well as enhancing the overall effectiveness of the intervention (Lopez et al. 2001).

Control treatment. The comparison group, as well as those in the skills training groups, continued to receive treatment as usual. The San Fernando Mental Health Center is a community agency that provides case management by social workers and monthly psychiatric visits for medication management using a multidisciplinary team approach. The clinically stable patient typically attends a 20-minute appointment with a psychiatrist once a month. As patients enrolled in this study needed other treatment or rehabilitation modalities, other members of the treatment team were consulted. For example, if a patient faced eviction, the social worker facilitated the patient's efforts to solve the problem or, depending on the level of functioning of the patient, resolved the situation for the patient. If a patient expressed a desire to seek employment, the rehabilitation counselor assessed, trained, and placed the patient in the appropriate vocational setting. Finally, if patients experienced an exacerbation of symptoms, contact with the psychiatrist and/or psychiatric nurse increased (either at the Center or in the "field") until the patient was stabilized. For the patients who were clinically decompensating too rapidly to be treated as an outpatient, liaison was made between the Center and the local county hospital for inpatient admission. These interventions are the standard of care in the mental health centers administered by the Los Angeles County Department of Mental Health.

Assessments. All measures were gathered at baseline, at the end of the 3-month active treatment phase, and after a 6-month followup period, unless otherwise stated below. Measures were appropriately translated and adapted for use with the Spanish-speaking Latino population by a work group chaired by the first author as described in another paper (Kopelowicz 1997). Scales that assess psychopathology are generally normed to white, middle-class, urban groups and must be appropriately adapted for sensitive use by Latino patients and their relatives (Lopez 1994).

Separate raters were used to assess patients and relatives. All of the raters were blind to the treatment condition of the patients and relatives. To ensure blindness, the raters were instructed to remind patient and relative subjects at each visit to not disclose what kinds of treatment they were receiving. In addition, the assessments were conducted in an area removed from the study's clinical activities to minimize the chances that the raters would have access to information that could break the blind.

Patient measures. Psychiatric symptoms were assessed with the Positive and Negative Syndrome Scale

(PANSS; Kay et al. 1987). The Los Angeles County Department of Mental Health's Management Information System (MIS) was used to collect information on rehospitalization rates. Medication adherence was assessed by monthly pill counts, patient reports, family reports, and monthly interviews with treating psychiatrists. The criterion for adequate adherence was set at having taken at least 80 percent of prescribed medication as determined by all four of these sources in the month preceding the postintervention assessment.

The measure of social functioning was the Independent Living Skills Survey (ILSS; Wallace et al. 2000), completed by the key relative. This survey includes 103 items that provide a functional assessment of patients' instrumental living skills in 12 areas of basic community living skills. The key relative rated the person's overall social adjustment (global score) on an 11-point scale in which a higher score reflects better social adjustment. Subjective satisfaction was assessed with the Quality of Life Interview (Lehman et al. 1982).

The patients' attributions of the reasons for their level of adherence to pharmacological treatment were assessed with the Rating of Medication Influences Scale (ROMI; Weiden et al. 1994). The 23-item ROMI assesses patients' estimates of the extent to which adherence to medication is influenced by their attitudes and beliefs rated on a three-point scale (no influence–mild influence–strong influence).

Knowledge and skills in medication and symptom management were assessed through interview and role-play exercises with the Medication Management Module (MMM) Test and the Symptom Management Module (SMM) Test, respectively. The MMM Test includes 32 items and the SMM Test includes 40 items scored on a two- or three-point scale wherein the maximum score is 34 and 43, respectively. Previous field trials indicated that the Modular Skills Training Test (MSTT) could be reliably administered and scored (3-month test-retest interval ranged from 0.64 to 0.87 and the interrater agreement ranged from 0.93 to 0.98), and was sensitive to changes achieved with module prescription (Wallace 1999). To evaluate generalization of medication and symptom self-management skills, the Medication Management and Symptom Management Skills Generalization Assessment was used (Liberman et al. 2002). This instrument discerns whether patients were using their recently learned skills in their natural environments (see appendix for text). The Medication Management Module Generalization Assessment includes 15 items with a maximum score of 39 points and the Symptom Management Module Generalization Assessment includes 10 items with a maximum score of 22 points. The MMM Test, the SMM Test, and the Generalization Assessments were used at the previously mentioned intervals.

Family measures. Patient's skill development was expected to kindle family members' optimism about their relative's clinical progress and rehabilitation. This was measured using a 20-item, five-point Likert-type Hope for the Patient's Future Scale in which a higher score indicates more hope. The Hope for the Patient's Future Scale was created for this study and adapted for the study population from the Miller Hope Scale (Miller and Powers 1988), an instrument that was originally developed for patients with medical illnesses.

The attitudes and feelings family members express about their mentally ill relative ("expressed emotion") was evaluated with the Five Minute Speech Sample (FMSS; Magaña et al. 1986). This brief method reasonably corresponds to the "gold standard" for expressed emotion, the Camberwell Family Interview (Vaughn and Leff 1976), and has been shown to have predictive validity in the course of mental disorders (Asarnow et al. 1993). All FMSS ratings were completed by a trained rater who was blind to the purposes of the study.

The family's ability to cope with their ill relative's disruptive behaviors was assessed with the Family Burden Interview Schedule (Pai and Kapur 1981). This semi-structured interview schedule consists of 24 items divided into six categories of burden: financial, effect on family routine, effect on family leisure, effect on family interaction, effect on physical health of other family members, and effect on mental health of other family members. Each item could be recorded as no burden (scored zero), moderate burden (scored 1), or severe burden (scored 2).

Statistical Analyses. Separate analyses of covariance (ANCOVAs) were performed on each outcome measure, using the baseline score as the covariate and treatment condition as the independent variable (skills training [ST] versus customary outpatient care [CC]). A separate ANCOVA was performed for each assessment point (post-training and 6-month followup). A post hoc path analysis was done to evaluate a mediating model of treatment effects on relapse risk. Because that analysis was post hoc and depended on the results of other analyses, methodological details of the analysis are presented below with the presentation of results. All analyses were performed using the SAS statistical library.

Results

Forty-five subjects were randomized to the skills training condition and 47 to the comparison group, treatment as usual. Of the 45 participants randomized to the skills training condition, 39 completed the study protocol and had data gathered at all three assessment points. Of the six noncompleters, two patients dropped out because they obtained full-time employment and were thus unable to

participate. Two others dropped out because the key relative was unable to attend the family sessions and was unwilling to schedule make-up sessions. The remaining two patients, as well as two noncompleters in the control group, withdrew informed consent after undergoing baseline assessments. Baseline comparisons were conducted with all 92 subjects who were randomized, but all subsequent analyses included only those subjects who were assessed at all three time points (skills training: $n = 39$; comparison: $n = 45$). The 39 subjects in the skills training group who were assessed at all three time points attended more than 90 percent of the skills training sessions. Regular attendance was facilitated by the provision of transportation for all study participants.

There were no statistically significant differences between treatment conditions on any of the demographic or clinical history variables (table 1) except for level of education, in which skills training participants had on average 2 more years of education than those receiving customary care ($t = 2.99$; $df = 1, 90$; $p = 0.003$). The inclusion of educational level as a covariate in the various ANCOVAs analyzing outcome variables yielded no appreciable changes in the results. Therefore, analyses were re-conducted that did not include level of education as a covariate.

All study participants were prescribed antipsychotic medication with few changes in type or dose of medication made during the study protocol. Approximately two-thirds of the subjects in both groups were taking one of the newer generation antipsychotic medications. There was no statistically significant difference between groups on the dose of antipsychotic medication prescribed (table 1). Regarding skills knowledge and generalization as well as all other outcome variables, the groups did not differ at baseline.

Psychopathology. There was a Group × Time effect on positive [$F = 7.25$, $df = 2, 159$, $p < 0.001$], negative [$F = 3.77$, $df = 2, 159$, $p < 0.05$], and total symptoms [$F = 10.78$, $df = 2, 159$, $p < 0.0001$] with ST subjects demonstrating significant decreases across all three symptom categories while CC subjects showed no difference from their baseline symptom levels at postintervention or 6-month followup. As shown in table 2, ST participants demonstrated significantly reduced positive, negative, and total symptoms immediately after the 3-month intervention period, and maintained lower levels of positive and total symptom scores at 6-month followup.

Skill acquisition and durability. There was a significant main effect for group on skill acquisition for both Medication Management skills [$F = 46.38$, $df = 1, 81, p < 0.0001$] and Symptom Management skills [$F = 41.3$, $df = 1, 79$, $p < 0.0001$]. As shown in table 3, ST subjects learned the material presented in the training sessions and retained their knowledge through the 9-month followup assessment while CC subjects showed no change from baseline on either variable.

Skill generalization. There was a significant main effect for group on skill generalization for both Medication Management skills [$F = 79.78$, $df = 1, 81, p < 0.0001$] and Symptom Management skills [$F = 56.44$, $df = 1, 73$, $p < 0.0001$]. As shown in table 4, ST subjects increased their generalization of skills and continued to use these skills in their everyday lives while CC subjects demonstrated no change from baseline on either variable.

Level of functioning. There was a significant within-group main effect on the global score of the ILSS [$F = 3.98$, $df = 1, 82, p < 0.05$]. As shown in table 5, ST subjects improved significantly from baseline to postintervention ($t = 3.33, p = 0.002$) and from baseline to followup ($t = 2.62, p = 0.013$), but CC subjects did not. Between-group comparisons showed an advantage for the ST group over the CC group at postintervention ($t = 1.98, p = 0.05$), but not at followup ($t = 1.33, p = 0.19$).

Quality of life. There were no significant main or interaction effects on the Lehman Quality of Life Interview. Within- and between-group comparisons revealed no significant differences at any assessment point, nor any improvements from baseline to postintervention or followup for either group.

Attitude toward medication. There were no significant main or interaction effects on the Rating of Medication Influences Scale. Within- and between-group comparisons revealed no significant differences at any assessment point on any of the 23 items, nor any improvements from baseline to postintervention or followup for either group.

Adherence to medication regimen. At postintervention, participants in the ST group (33/39; 84.6%) were not more likely than CC subjects (35/45; 77.8%) to have been adherent to their medication regimens. There were no statistically significant changes from baseline to postintervention or followup for either group.

Rehospitalization. There were significant differences between the groups on hospitalization rates during the study period (from baseline to followup). As shown in figure 1, while only 2 of the 39 (5.1%) individuals in the ST group were hospitalized, 10 of the 45 (22.2%) individuals in the CC group were hospitalized. During the subsequent 6 months (from followup to 15 months after the start of the intervention), data from the MIS of Los Angeles County revealed that three more subjects from each group were hospitalized. Upon discharge from the inpatient setting, each of the participants rejoined the study protocol.

Family measures. There were no significant main or interaction effects on the Hope for the Patient's Future Scale or the Family Burden Interview Schedule. Within- and between-group comparisons revealed no significant differences at any assessment point. Responses of family members in both the ST group and the CC group were consistent throughout the study period with low levels of

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Table 1. Demographics and clinical history variables of the sample (n = 92)

	Experimental group n = 45	Control group n = 47	p
Gender (% males)	67%	68%	0.93[1]
Marital status (% never married)	87%	75%	0.18[1]
Work (% unemployed)	84%	81%	0.31[1]
Age	37.6 (10.8)[2]	39.1 (12.3)[2]	0.36[3]
Age of illness onset	24.9 (8.8)[2]	24.2 (12.0)[2]	0.79[3]
Lifetime hospitalizations	3.4(2.6)[2]	3.1(2.8)[2]	0.81[3]
Antipsychotic dose[4] (mg/day)	316.2 (188.6)[2]	328.3 (167.5)[2]	0.86[3]
Education	9.9 (3.3)[2]	7.7 (4.0)[2]	0.003[3]

[1]chi-square
[2]t test
[3]Mean (standard deviation)
[4]Chlorpromazine equivalents

Table 2. Analyses of covariance each with one dependent variable (symptoms), one predictor (group), and one covariate (baseline value for the dependent variable)[1]

	Group M(SD)		Between Groups	Within Groups	
	Experimental n = 39	Control n = 45		Experimental n = 39	Control n = 45
			p	p	p
Positive Sx					
Baseline	14.0 (5.7)	12.4 (4.9)	0.16		
Post	10.9 (4.9)	13.3 (5.3)	0.002	0.0001	0.19
Followup	11.4 (5.8)	12.1 (5.7)	0.09	0.0009	0.75
Negative Sx					
Baseline	17.8 (5.5)	17.7 (5.4)	0.96		
Post	16.2 (6.4)	18.2 (6.7)	0.09	0.04	0.48
Followup	16.8 (5.6)	18.8 (6.9)	0.06	0.16	0.14
General Sx					
Baseline	30.3 (6.4)	26.3 (5.2)	0.004		
Post	24.8 (6.1)	26.6 (6.8)	0.005	0.0001	0.75
Followup	26.1 (5.6)	26.7 (7.1)	0.03	0.0001	0.68
Total Sx					
Baseline	62.1 (13.7)	56.4 (11.8)	0.07		
Post	51.9 (14.7)	58.2 (14.8)	0.0001	0.0001	0.31
Followup	54.3 (12.8)	57.6 (15.7)	0.003	0.0001	0.50

[1]Within groups t test

Table 3. Analyses of covariance each with one dependent variable (knowledge), one predictor (group), and one covariate (baseline value for the dependent variable)[1]

|	Group M(SD)		Between Groups	Within Groups	
	Experimental n = 39	Control n = 45		Experimental n = 39	Control n = 45
			p	p	p
Symptom Management Module (maximum score = 43)					
Baseline	24.9 (7.9)	24.2(7.6)	0.68		
Post	32.2 (8.6)	24.8(7.3)	0.0001	0.0001	0.95
Followup	31.9 (8.4)	25.5 (7.7)	0.0001	0.0001	0.53
Medication Management Module (maximum score = 34)					
Baseline	16.9 (6.2)	17.6 (6.2)	0.60		
Post	24.0 (6.6)	17.9 (6.0)	0.0001	0.0001	0.97
Followup	23.7 (6.6)	18.5 (6.8)	0.0001	0.0001	0.46

[1]Within groups *t* test

Table 4. Analyses of covariance each with one dependent variable (skill generalization), one predictor (group), and one covariate (baseline value for the dependent variable)[1]

	Group M(SD)		Between Groups	Within Groups	
	Experimental n = 39	Control n = 45		Experimental n = 39	Control n = 45
			p	p	p
Symptom Management Module (maximum score = 22)					
Baseline	5.6 (3.0)	5.5 (2.9)	0.80		
Post	12.2 (4.7)	6.0 (2.8)	0.0001	0.0001	0.44
Followup	11.4 (4.8)	5.9 (2.4)	0.0001	0.0001	0.17
Medication Management Module (maximum score = 39)					
Baseline	21.8 (4.2)	21.7 (4.9)	0.91		
Post	30.2 (6.1)	21.0 (3.9)	0.0001	0.0001	0.16
Followup	28.6 (5.5)	21.8 (4.9)	0.0001	0.0001	0.93

[1]Within groups *t* test

Table 5. Analyses of covariance each with one dependent variable (global score on independent living skills survey[1]), one predictor (group), and one covariate (baseline value for the dependent variable)

	Group M(SD)		Between Groups	Within Groups	
	Experimental n = 39	Control n = 45		Experimental n = 39	Control n = 45
			p	p	p
Baseline	5.28 (2.48)	6.04 (2.48)	0.33		
Post	6.49 (2.24)	6.02 (2.06)	0.05	0.002	0.94
Followup	6.41 (2.66)	6.06 (2.19)	0.19	0.013	0.95

[1]Range of scores = 1–11

Figure 1. Number of patients hospitalized: skills training (ST) versus control
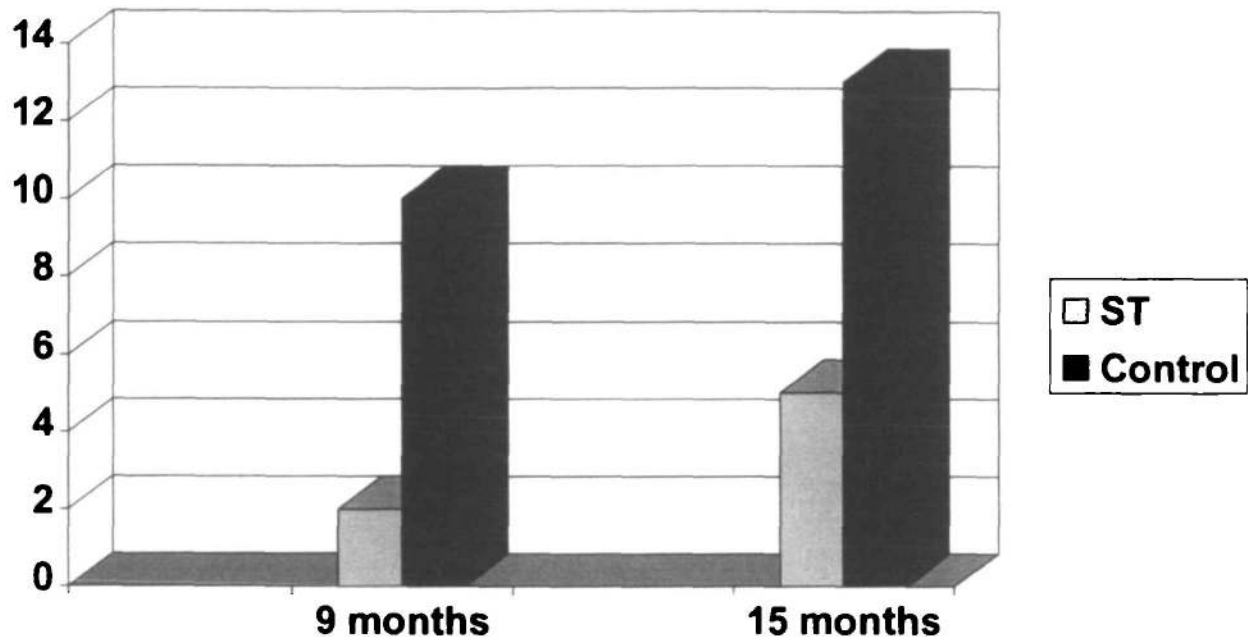
family burden (range of mean scores = 8.8–14.2 on a scale of 0–48) and high levels of hope for the future (range of mean scores = 70.2–76.1 on a scale of 20–100). There were no differences between groups at any of the time points on expressed emotion. Approximately 30 percent of the key relatives were rated as high in expressed emotion at each assessment.

Because the results confirmed that ST reduced relapse risk and resulted in increased skills and generalization, a post hoc path analysis was done to evaluate the hypothesis that treatment effects on relapse were mediated by acquisition and utilization of skills. Notably, the model does not include medication compliance. This is not to say that compliance is not related to relapse. However, since treatment did not affect compliance, it could not be a mediator of any treatment effects on relapse. We note that path analysis cannot "prove" a model. It can, however, indicate that a model is implausible (i.e., reject a model) and can yield evidence as to how well a given model "fits" the observed data. Models that fit well should have high indexes of goodness of fit and small chi squares which indicate that they cannot be rejected and are plausible.

The path analysis proceeded as follows. First, all linear influence of pretreatment levels of knowledge and generalization on these variables was removed by performing separate multiple regression analyses on each of them on baseline knowledge and generalization scores. The residuals from these analyses were entered into the subsequent path modeling. Use of these "baseline-adjusted" scores is

analogous to the use of baseline as a covariate in analysis of covariance. The path analysis was done with SAS CALIS (Covariance Analysis of Linear Structural Equations), a general structural modeling program, and the results are presented in figure 2. Standardized coefficients are reported below because they are more directly comparable with each other than unstandardized coefficients are. The model yielded a goodness of fit chi square with two degrees of freedom, which represent the two omitted paths: (a) from treatment directly to relapse and (b) from knowledge to relapse. Omission of a direct path from treatment to relapse tests the hypothesis of complete mediation (i.e., that treatment effects on relapse are entirely accounted for by its effects on skills acquisition and generalization). Also, the model posits that knowledge affects relapse only when it is used.

Discussion

The incorporation of relatives of Latino patients with schizophrenia spectrum disorders in a culturally relevant, disease management program based on skills training techniques seemed to produce favorable outcomes in key domains of psychopathology, relapse, rehospitalization, and social functioning. The robust differences between the groups not only demonstrated statistical significance but provided evidence of substantial clinical improvement. Moreover, these positive outcomes were seen for 6 months after the end of training and accrued in a group representa-

Figure 2. Path model of relationship among treatment, knowledge, generalization, and relapse
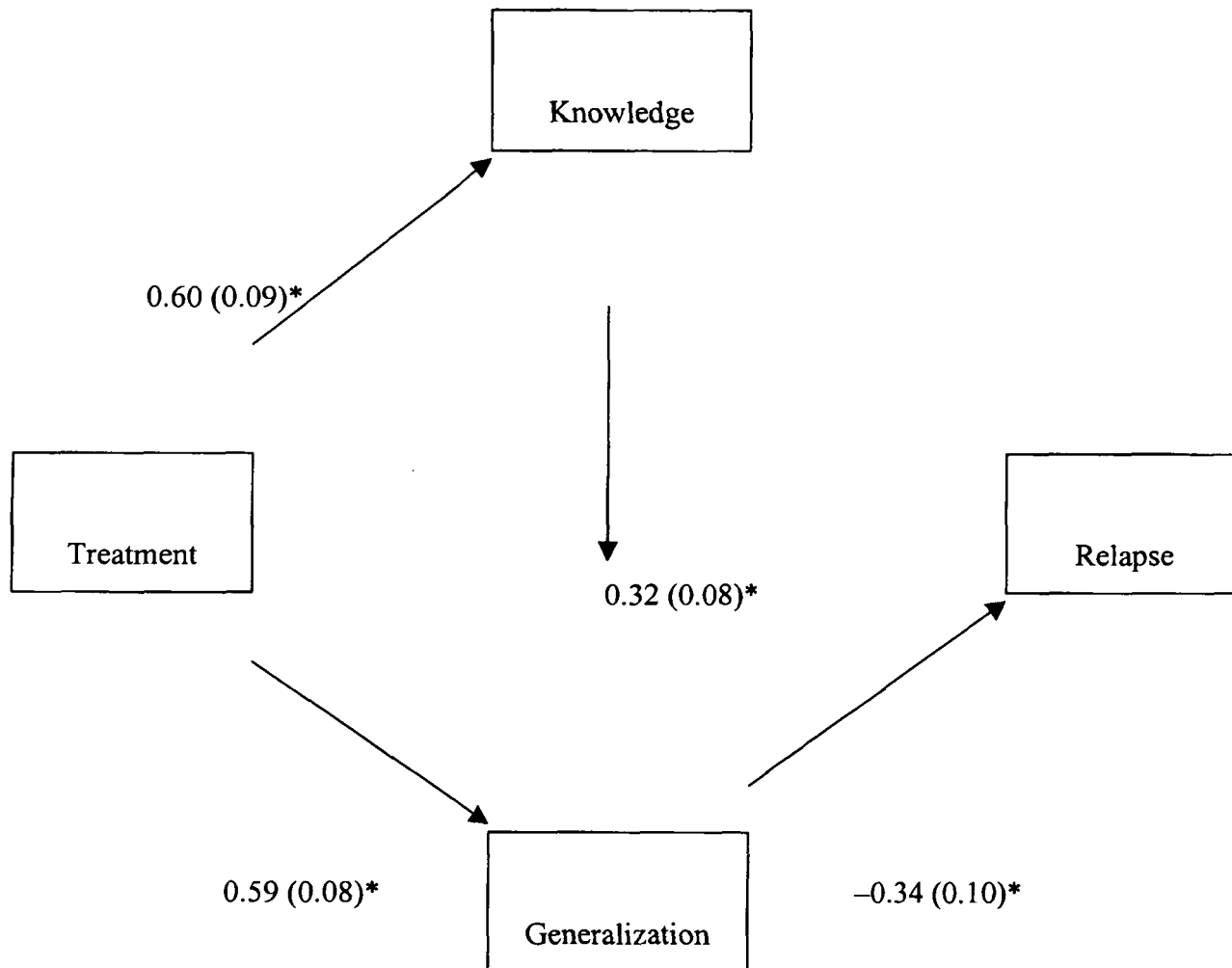
Note. — Standardized path coefficients appear on single-headed straight arrows; *t* values corresponding with starred (*) coefficients were greater than 3.00 ($p < 0.001$); $\Pi^2 = 0.24$, $df = 2$, $p = 0.89$, Goodness of Fit Index (GFI) = 0.999; and Adjusted GFI for degrees of freedom (AGFI) = 0.993.

tive of the full array of patients being served in a typical catchment area's mental health program and through services provided by line-level staff.

The present study replicates and extends into the cross-cultural arena the findings from three recent studies of social skills training in schizophrenia which suggested that generalization of skills training was facilitated through the use of trained clinicians (Liberman et al. 1998, 2001) and indigenous community supporters (Tauber et al. 2000; Glynn et al. 2002). Three factors may have played a role in the positive results on generalization that were reported by the investigators of these studies and which appear to contradict those researchers who have had less success in achieving transfer of effects of skills training in

patients' everyday lives: (1) use of a highly structured and prescriptive training technique that compensates for neurocognitive deficits and symptoms of schizophrenia; (2) employment of skills trainers whose quality of training is assured through the use of a fidelity scale; and (3) deployment of clinicians or natural supporters who are taught to promote opportunities, encouragement, and reinforcement for the naturalistic use of the skills learned in the clinic.

Each of the previous studies also utilized the modules from the UCLA Social and Independent Living Skills Program (Liberman et al. 1993; Kopelowicz and Liberman 1998). The procedures and format used for training the skills of each module were designed to compensate for the cognitive and symptomatic interferences with learning

commonly found in schizophrenia, thus allowing participants with "learning disabilities" to acquire and practice skills in the training sessions and in the "real world." The learning activities used in the modularized skills training integrated the following techniques which have been shown to be effective in compensating for the neurocognitive and symptomatic problems of persons with schizophrenia: social modeling, self-as model, video feedback, abundant positive reinforcement, prompting, coaching, presentation of knowledge and skill through multiple sensory channels, repetition, shaping, minimization of errors, and procedural or implicit learning (Liberman et al. 1982; Eckman et al. 1992; Liberman 2001).

A number of studies of psychosocial treatments of persons with schizophrenia and other severe and persistent mental illness have shown that naturalistic outcomes, such as employment in the competitive marketplace, are more likely to occur when the designated treatments are delivered with fidelity to the program's manual or protocol (McHugo et al. 1999; Bond et al. 2000; Becker et al. 2001). For skills training, critical elements that clinicians must adhere to in the training process include use of annotated modeling, guided practice of the skills with repetition until satisfactory role-plays are achieved, use of problem solving so that the inevitable obstacles to using the skills that occur in the community can be removed, and continuing with training until autonomous use of the skills in homework assignments has been demonstrated by the patient. When shortcuts are taken by trainers, such as deleting the role-playing and videotape feedback, desired outcomes may not occur (Wallace et al. 1992).

One reason for the frequent failure to demonstrate generalization of skills either to the natural setting or to global functioning is that generalization techniques are often not built into the skills training enterprise. Generalization techniques include providing support to the trainee as he/she attempts to adapt the newly learned skills to fit the living environment, encouragement to try the skills in that environment, and assistance if the attempt to use the skills is unsuccessful. Subjects paired with specially trained case managers, working together in their own environments to create personalized prompts and reinforcers in the community for skills that had been initially learned in the skills training session, demonstrate improved social adjustment in the community, better social functioning, lower relapse rates, and higher subjective quality of life (Liberman et al. 1998, 2001). Residential care staff members have also been utilized to facilitate generalization with salutary effects on interpersonal functioning (Tauber et al. 2000).

In addition to improvements in these domains, subjects who received skills training in the present study also manifested decreased symptoms at postintervention and at 6-month followup. This finding is noteworthy because a frequent criticism of skills training for individuals with schizophrenia is that the effect is lost after the training is completed. Although booster sessions are often required to maintain the effect of skills training over time, it appears that in this study the use of family members as generalization aides may have served to increase the durability of the effects of skills training. However, because the role of the family member was not controlled for (no subject received skills training without the participation of a key relative), we cannot assert that the family involvement itself caused the generalization. Moreover, because this study included only Latino subjects, we do not know if Latinos are any more likely than other cultural groups to benefit from the family approach used in this study. Several such studies are currently under way in Holland, Germany, Bulgaria, Peru, Japan, and Korea (Liberman 1998).

The present study also tested a mediational model to ascertain how skills training may improve outcome—in this case, relapse prevention. The results of the path analysis model suggest that the intervention directly enhanced skill learning and that skill utilization resulted directly from the increased skills learned as well as from the intervention itself. The acquisition and utilization of learned skills suggests that the benefits of the skills training were not just the result of higher frequency and intensity of contact experienced by the subjects in the experimental condition. Moreover, the finding that the intervention used in this study had direct effects on skill learning and utilization is plausible given that it included two separate but integrated components, that is, skills training for individuals with schizophrenia plus generalization training for their key relatives. However, because this study did not include a group receiving skills training or generalization training only, it is not possible to tease out the relative benefits of each of these treatment components.

An important result from the path model was that the utilization of skills, not their acquisition, was directly related to decreasing the risk of relapse. This finding has several implications for future work related to skills training for schizophrenia. First, it illustrates the need for studies on skills training to include measures of skill utilization, rather than just skill learning, as is most commonly done (Heinssen et al. 2000). Second, it highlights the critical role of skill utilization in affecting a variety of more distal outcomes such as symptom reduction, relapse prevention, and level of social functioning. Third, this finding supports the need to build a generalization strategy into the skills training enterprise; that is, patients should be afforded opportunities for using newly learned skills within their natural environments and skill performance should be prompted and reinforced by external agents.

While we initially hypothesized that the salutary effect of illness management training on relapse prevention

would be mediated by increased medication compliance, we found that the intervention reduced relapse risk independent of medication compliance. One explanation for this was the initially high level of medication compliance—a ceiling effect immune from any skills training effects. It is possible that the tendency for Latinos to be more compliant with their medication regimens (Hosch et al. 1995) and their involvement in a research study with periodic assessments of their medication use contributed to this ceiling effect. Another explanation for the reduction of relapse and rehospitalization in the experimental group was that the use of illness management techniques learned in the skills training groups served as a "protective factor" to buffer the effects of biopsychosocial stress and vulnerability. For example, subjects who learned and used symptom management skills may have been able to recognize their warning signs of relapse (Skill Area 2) and activate their emergency plan (Skill Area 3) to forestall a hospitalization. Such an explanation is consistent with the known benefits of the skills training modules (Wirshing et al. 1992).

The ST intervention did not produce differential benefits on quality of life. Failure to find improvements on quality of life is consistent with most studies of skills training for schizophrenia (Heinssen et al. 2000). Psychiatric rehabilitation techniques are generally viewed as domain specific, that is, the benefits are directly related to the targeted area of training. For example, antipsychotic medications improve symptoms of schizophrenia, vocational rehabilitation improves work outcomes, and assertive community treatment decreases rates of hospitalization. Similarly, the focus of the training in this study was to enable patients to acquire, maintain, and generalize disease management skills. Although the use of such skills may play a role in improving quality of life, other factors, such as depression, substance abuse, homelessness, poverty, and unemployment, are more germane to quality of life among individuals with schizophrenia (Lam and Rosenheck 2000).

Nor did the ST intervention produce any changes on patients' attitudes toward their medications. One possible explanation for this finding is that these attitudes were very positive at baseline, thus leaving little room for improvement. At all three assessments, patients strongly endorsed statements from the ROMI such as "My medication helps me feel better" and "My medication prevents relapse" and only weakly agreed with statements such as "I am embarrassed to take medications" and "The side effects of my medication bother me." This explanation is further supported by the high rates of medication adherence found across groups as adherence has been found to correlate with positive attitudes toward medications (Fenton et al. 1997). The results of the present study suggest that skills training in disease management can be effective for stable outpatients with schizophrenia across a variety

of outcomes without changing attitudes toward medication or increasing adherence to medication regimens. We are currently embarked on a followup study to determine whether schizophrenia patients with negative attitudes toward medication and poor adherence to their medication regimens would benefit similarly from a skills-based, disease management approach.

Contrary to expectations, why did we not find changes from baseline in family members' expressed emotion, hope for the future, and caregiver burden? One explanation for these findings is the floor and ceiling effect. The family members who participated in this study generally reported low levels of expressed emotion, positive expectations for the future, and low caregiver burden which is consistent with previous studies of Latino populations (Jenkins and Karno 1992). Another possible reason for the intervention's lack of impact on the family members' attitudes is that the relatives were not the object of the intervention, but rather served in this project as auxiliary clinicians; that is, the main aim of the sessions with relatives was to teach them how to help their ill relatives to learn and utilize disease management skills. Therefore, the domain specificity of the skills training may have mitigated any direct effect on the attitudes of the family member. The results of this study suggest that the acquisition and utilization of illness management skills can improve treatment outcomes without directly impacting the emotional environment of the family system.

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Acknowledgments

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Appendix. Medication Self-Management Module Generalization Form

<div align="center">

MEDICATION SELF-MANAGEMENT MODULE GENERALIZATION FORM

</div>

The purpose of this form is to record a) how often patients' utilize the skills they've learned in the medication management module, b) the reasons for the non-performance, c) your efforts to help the patient use the skills. These efforts may include reminding the patient to perform the skill, reviewing how to do it and even roleplaying it with coaching and reinforcement, convincing the patient that the skill is worthwhile to perform by reviewing its benefits, or liaising and consulting with natural caregivers to increase opportunities and encouragement to use the skill. The skills that patients are expected to use in the community are: a) continue to take medication exactly as prescribed, b) monitor their benfits and side effects and directly cope with them or report them to their caregivers and physicians for possible resolution; c) negotiate any other medication concerns with their physicians)

Patient Name:_____ Case Manager:_____

Date of contact:_______________ Type of contact (phone, etc.):_____

Ask the patient:
1) How many days in the last WEEK did you take less medication than prescribed or completely skip your medication? _____ (patients' answer, must be from 0 to 7)

     If the patient's answer is **0**, skip 2a, b, and c, and reinforce the patient for his effort. If other than 0, ask:
     2a) Did you take less but some, or take none at all? _____
     2b) Why did you decide to take (less or none at all)?

     2c) List all of the clinical techniques you used at this point to help motivate and prepare the patient to comply with his medication regimen.

     _____
     _____
     _____

Ask the patient:
3) Have you had any side effects from your medication? _____ (Y or N)
     What are they?_____

     If the patient's answer is **N**, skip 4a and b, and reinforce the patient for his effort. If **Y**, ask:
     4a) What did you do?

     _____

     4b) List all of the clinical techniques you used at this point to help motivate and prepare the patient to directly cope with side effects or discuss them with a caregiver, assuming that they should be resolved.

     _____
     _____
     _____

Ask the patient:
5) Have you had any concerns, like side effects, about your meds? _____ (Y or N)
     What are they?_____

     If the patient's answer is **N**, skip 6a and b, and reinforce the patient for his effort. If **Y**, ask:
     6a) What did you do?

     _____

     6b) List all of the clinical techniques you used at this point to help motivate and prepare the patient to discuss these concerns with his physician.

     _____
     _____
     _____

SYMPTOM SELF-MANAGEMENT MODULE GENERALIZATION FORM

The purpose of this form is to record a) how often patients' utilize the skills they've learned in the symptom management module, b) the reasons for the non-performance, c) your efforts to help the patient use the skills. These efforts may include reminding the patient to perform the skill, reviewing how to do it and even roleplaying it with coaching and reinforcement, convincing the patient that the skill is worthwhile to perform by reviewing its benefits, or liasing and consulting with natural caregivers to increase opportunities and encouragement to use the skill. The skills that patients are expected to use in the community are: a) monitor their warning signs and symptoms b) directly cope with them or report them to their caregivers and/or the individuals with who are the members of their emergency plan, c) cope with persistent symptoms, and d) avoid street drugs and alcohol.

Patient Name:_____ Case Manager:_____

Date of contact:_____ Type of contact (phone, etc.):_____

Ask the patient:

1) **What are your warning signs?** accurate?_____ (Y or N) If N, elicit or give correct information.
   In the last week, have you had any of them? _____ (Y or N) If N, go to #3. If Y, ask:
   Which ones? _____

   2a) What did you do? (should have implemented emergency plan or part of it)
   _____

   2b) List all of the clinical techniques you used at this point to help the patient decide to directly cope with warning signs or invoke the emergency plan, if applicable.
   _____
   _____
   _____
   _____

3) **What are your persistent symptoms?** accurate?_____ (Y or N) If N, elicit or give correct information.
   In the last week, have you had any of them? _____ (Y or N) If N, go to #5. If Y, ask:
   Which ones? _____

   4a) What did you do? _____

   4b) List all of the clinical techniques you used at this point to help the patient cope with persistent and intrusive symptoms.
   _____
   _____
   _____
   _____

5) **In the last week, have you had any alcohol or street drugs?** _____ (Y or N) If N, reinforce the patient for his abstinence. If Y, ask:
   6a) What did you use? _____

   6b) List all of the clinical techniques you used at this point to help the patient avoid using alcohol or street drugs during the next week or longer.
   _____
   _____
   _____
   _____

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