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Comparison of the Effectiveness of Family-Focused Therapy and Social Cognition and Interaction Training in Preventing Relapse in Bipolar Disorder and Enhancing Patients' Social Functioning and Interpersonal Relationships

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Abstract

Background: Bipolar disorder type I (BD-I) is marked by periodic mood swings, including episodes of mania and depression. Factors such as family stress and cognitive impairments are crucial in the relapse of this disorder.

Objectives: This study aims to evaluate the effectiveness of family-focused therapy (FFT) and social cognition and interaction training (SCIT) in preventing relapses of BD-I and enhancing patients' interpersonal relationships and social functioning.

Methods: This experimental study featured a controlled, pretest-posttest design with a three-month follow-up, conducted from 2019 to 2020. Sixty primary caregivers of patients with BD-I in Zahedan, Iran, were purposively selected and randomly assigned to three groups. The SCIT group (only patients) and the FFT group (patients with primary caregivers) each underwent 15 sessions of group interventions. Research tools were administered before and after the intervention, as well as in the follow-up. Baseline differences in outcomes were assessed using independent samples *t*-tests for completers vs. non-completers and analysis of variance (ANOVA) for the three intervention groups.

Results: Results indicate that both SCIT and FFT significantly improved relapse prevention and enhanced social functioning, except in the domain of interpersonal relationships. Here, SCIT proved more effective than FFT in post-tests ($\beta = 3$, $P = 0.034$) and follow-up ($\beta = 5.043$, $P = 0.001$).

Conclusions: Given that FFT is an evidence-based treatment for BD-I, integrating SCIT can further enhance intervention effectiveness, particularly in improving interpersonal relationships and social functioning by addressing environmental factors and social cognitive deficits.

Keywords: Bipolar Disorder Type I, Family-Focused Therapy, Social Cognitive and Interaction Training, Relapse Prevention, Social Functioning, Interpersonal Relationship

1. Background

Bipolar disorder type I (BD-I) is characterized by periodic mood swings, including mania and depression (1, 2). It affects approximately 1% of the general population, with a 12-month prevalence of 0.6% in the United States. Typically, the first manic episode occurs around the age of 18, and about 90% of those who experience one manic episode are likely to have subsequent episodes (3). Research indicates that 30% of these individuals suffer significant declines in occupational and functional areas. Within six months of onset, one-third of individuals with BD-I are unable to work, and only two-fifths function as expected (2, 4).

Mania often involves loss of concentration, restlessness, and impaired judgment, leading to

difficulties in social functioning. This not only causes distress but also negatively impacts family stability and marital relationships, imposing substantial costs on healthcare systems and insurers and diminishing the patient's quality of life and economic productivity (5-7). The social stigma associated with BD-I diagnosis leads to frustration among patients and their families, often resulting in social isolation and increased environmental stress, along with symptoms of depression and anxiety (3).

Therapeutically, emotional swings may affect cognitive accessibility and insight in bipolar patients (BPs), leading to frequent medication non-adherence; statistics show that 60% of individuals with this disorder either do not follow their prescribed therapies or do so poorly. Consequently, rapid relapse due to medication discontinuation poses a significant challenge in treatment (8). Additional factors contributing to relapse include environmental stress, family conflicts, lack of social support, and socio-economic factors such as celibacy, divorce, and separation (2, 4).

One important social factor influencing the relapse of bipolar disorder (BD) is the role and functioning of the family. Although general findings suggest a relationship between mental health and family and interpersonal relationships (9), more specific studies indicate that family attitudes and interactions can affect the course of BD and, in turn, family functioning. When close relatives lack adequate information, support, and training in adaptive coping strategies, the patient's symptoms may worsen, increasing the risk of relapse (10). Several studies have identified a negative family emotional climate post-discharge as a significant predictor of complications in individuals with BD. Severe negative emotional expressions, criticism, hostility, and conflicts disrupt family dynamics and heighten the likelihood of relapse. Additionally, these disturbed interactions adversely affect the mental and physical health of caregivers and other family members (11, 12). Neglecting the dynamic role of the family can delay functional improvement relative to other components (11). Considering the high relapse rate of BD, it is crucial to assist patients and their families in identifying relapse risk factors and initiating necessary therapeutic interventions promptly upon symptom emergence (13). Given the reciprocal relationship between this disorder and family functioning, interventions that include both the patient and the family are essential for BPs.

For decades, various types of psychotherapy have been central to BD treatment. Interventions such as psychoeducation, cognitive behavioral therapy (CBT), and interpersonal and social rhythm therapy (IPSRT) are recognized as effective treatments (1, 14). Family-focused therapy (FFT) is another evidence-based treatment that concentrates on the present and enhances trust between the patient and family members. The primary components of FFT include psychoeducation (to increase knowledge about BD) and training in communication and problem-solving skills for both patients and their families. This treatment significantly improves BD outcomes by reducing the disorder's burden, preventing relapse, diminishing suicidal ideations, enhancing medication adherence, improving family cohesion, reducing isolation and depression, decreasing hospitalization rates, enhancing daily functioning, and improving quality of life (4, 12, 15, 16). Additionally, a study comparing the effectiveness of FFT with psychoeducation reported enhanced quality of life and reduced symptom severity in patients who received FFT (17).

In another study, the likelihood of BD relapse was estimated at 12% in patients treated with FFT versus 66% in the control group (4). However, one major limitation of this treatment is the lack of attention to the patients' cognitive defects; thus, authors of this treatment protocol have recommended cognitive interventions to enhance recovery post-disease (18). Since cognitive defects are identified as risk factors for BD and can precede the onset of the disorder, disrupting the patient's daily life and social functioning, they should be targeted in therapeutic interventions. Although FFT does not address these defects directly, the need for more specific interventions is evident, as enhancing patients' cognitive skills, coupled with family education, can significantly impact the outcomes of BD (19, 20).

Research over the past 15 years has shown that cognitive dysfunction is a prevalent characteristic of BD, affecting a significant percentage of patients (1). These cognitive defects not only increase the risk of relapse but also cause substantial issues in occupational settings and interpersonal relationships (21). Among these, defects in social cognition are particularly significant. Social cognition involves the mental operations that underpin social interactions (22, 23), including the ability to perceive others' intentions and emotional states. It encompasses a range of capabilities such as theory of mind, social perception, social

knowledge, attribution bias, and the perception and processing of emotions (24, 25).

Studies have demonstrated that social cognition acts as a moderating factor for cognitive defects and social functioning (26) and significantly influences the outcomes of this disorder and the patient's response to treatment. Deficits in social cognition impair a patient's ability to perform daily activities, solve problems, maintain interpersonal relationships, perform occupation-related tasks, and improve their quality of life (27-29). Patients with these deficits may struggle with recognizing facial expressions, empathizing with others, and may incorrectly attribute negative events to the intentions of others, leading to improper social interactions. Additionally, these deficits can result in aggressive behavior, social withdrawal, and anxious behavior (28, 29). Some studies suggest that impaired social cognition can be more persistent in patients with BD than in those with schizophrenia (30).

Limited studies have compared the social-cognitive functioning of BPs with and without psychotic symptoms; results suggest that BPs with psychotic symptoms exhibit social functioning similar to that of schizophrenia patients (31). These findings underscore the importance of addressing key determinants of poor social functioning to improve functional deficits. One such intervention is social cognition and interaction training (SCIT), an evidence-based treatment designed to enhance various aspects of social cognition. Initially developed for schizophrenia, SCIT is also applicable to other disorders that impair social cognition. This treatment comprises three core components: Theory of mind, enhancement of emotional perception, and attributional style, all rooted in a conceptual model that links social cognition disorders with social ineffectiveness (29, 32).

Few studies have assessed the effectiveness of social cognition interventions for BPs. One such study demonstrated significant improvements in social cognition and functioning in the experimental group compared to a control group. However, this study was limited by sample homogeneity and the absence of follow-up (33). Despite the critical role of social cognition in BPs, research on social cognition training for these patients remains sparse. By focusing solely on the social functioning of BPs and neglecting their cognitive deficits, there is a risk of exacerbating the disorder and increasing relapse rates.

2. Objectives

The current study seeks to address this gap in the research.

3. Methods

3.1. Study Design

This experimental study employed a controlled, pretest-posttest design with a three-month follow-up, involving three groups: One control group and two experimental groups. Group therapy was the treatment method for the patients. The follow-up period, set at three months post-intervention, aligns with current literature trends and was limited by time constraints. Bipolar disorder relapse prevention was assessed by monitoring the patients during the intervention and follow-up periods, with a Young Mania Rating Scale (YMRS) score above 12 indicating a relapse. Additionally, the Social Functioning Scale (SFS) was used to evaluate social functioning and interpersonal relationships.

3.2. Study Population

The study population consisted of BD-I patients hospitalized at a psychiatric hospital in XXX and their primary caregivers. Therapeutic interventions commenced during hospitalization and continued on an outpatient basis after discharge.

3.3. Sample Size, Sampling Method, and Procedure

The sample size was determined using G*POWER 3.1, based on an effect size of 0.44 (from a pilot study), a 5% type I error rate, and 80% power, resulting in 54 participants. To account for a potential 10% attrition rate, the final sample size was set at 60 individuals, divided evenly across the three groups.

Purposeful sampling was used at baseline, and random sampling was employed during the intervention phase. This study was conducted with three groups, recruiting patients hospitalized in the psychiatric ward of a hospital in Baharan since October 2020, who met the inclusion criteria. A sample size of 60 people was calculated, and the sample size of primary caregivers was 20 in the FFT group. Overall, 20 patients were assigned to the control group (only taking medications), 20 patients together with their primary caregivers were assigned to the FFT group, and 20 patients were assigned to the SCIT group. In the FFT experimental group, family members were also involved in the sessions per the protocol. However, data were

collected solely from the patients across all groups, with primary caregiver information not considered.

The inclusion criteria for the patient group included a BD-I diagnosis based on a psychiatrist's evaluation, experiencing no more than three relapse episodes, having an educational level above secondary school, and being aged 18 - 45 years. The exclusion criteria for patients were a history of alcohol or drug abuse, any mental disorder other than BD-I, a severe personality disorder diagnosed by the treating psychiatrist, and receiving concurrent psychological treatment from other clinics. Patients who missed more than three sessions, had changes in their drug therapy, or withdrew consent were also excluded.

For the caregiver group, inclusion criteria were a willingness to participate, being a family member and primary caregiver (spending 7 - 8 hours a day with the patient), aged 25 - 50 years, and having an education level above secondary school. Exclusion criteria included a severe mental disorder, a history of substance abuse, or brain damage. Primary caregivers who withdrew from the intervention or missed more than three sessions were removed from the study.

After confirming eligibility and randomly assigning the participants, all patients completed the study instruments prior to starting treatment. Participants were recruited from BD-I patients hospitalized at Baharan of Zahedan, Iran. A semi-structured clinical interview based on the structured clinical interview for the diagnostic and statistical manual of mental disorders (SCID-5) was conducted by a clinical psychologist. The cognitive complaints in bipolar disorder rating assessment (COBRA) was administered to ensure comparability in cognitive defects, and patients were also matched based on medication use, primarily sodium valproate and carbamazepine. Patients diagnosed with delusions of persecution were excluded from the study; however, delusions of grandeur were reported in 30% of the participants. Participation was voluntary. Ethical considerations were addressed by explaining the study's objectives to participants and their primary caregivers and informing them that their data would be analyzed anonymously.

After conducting interviews and recording baseline data, participants were randomly assigned to three groups. A research associate generated the random allocation sequence, enrolled participants, and assigned them to interventions. The random allocation rule, a simple restricted randomization method, was used. This method ensures a balanced number of individuals in each group at the study's conclusion. After calculating the total sample size, participants were randomly assigned to groups A, B, and C.

Due to COVID-19 restrictions, a lottery container was used for the random assignment. Three balls each were placed in the container for experimental groups 1 and 2, and for the control group. The balls, each bearing a participant's number, were mixed and drawn without replacement. The sequence of numbers was recorded, with the first number drawn assigned to group 1, the second to group 2, and the third to the control group. This process was repeated until all participants were assigned.

The study comprised one control group and two experimental groups. The control group (n = 20) included only patients taking medications. Group 1 (FFT, n = 20) consisted of BPs undergoing FFT along with their primary caregivers. Group 2 (SCIT, n = 20) consisted of BPs receiving SCIT. Interventions began after patients reached clinical stability in the hospital and continued post-discharge. All groups were maintained on medication.

Given the large sample size and the need for social distancing, treatments were conducted in small groups of three. Before sessions, masks and disinfectants were provided to all participants. The treatment protocols were administered by a clinical psychologist. In Group 1, two patients and two family members withdrew from the study. In Group 2, one patient discontinued participation, and in the control group, one participant failed to complete follow-up questionnaires and was excluded from the analysis.

3.4. Interventions for the Groups

The control group received no interventions and continued with their prescribed medications only. In group 1, the pretest was followed by FFT sessions for both patients and their primary caregivers, adhering to the established treatment protocol (9). Subsequently, a posttest and a three-month follow-up were conducted. In group 2, following the pretest, patients participated in group SCIT, as outlined by Roberts et al. (32), followed by a posttest and follow-up.

3.5. Treatment Monitoring and Ethical Considerations

All study procedures were conducted under the supervision of a guiding supervisor. Every two months, progress reports were submitted to all supervisors and advisors for review and implementation of their recommendations. The study adhered to the declaration of Helsinki principles. Upon completion of the study, interventions were also offered to the control group, adhering to ethical standards. Participants were informed about the study's principles such as confidentiality, commitment to the intervention, and the importance of regular attendance at group sessions, as well as the general processes of interventions and training sessions. The interventions lasted six months, from October 2020 to April 2021, with a follow-up conducted in August 2021.

3.6. Research Tools

The following questionnaires were employed to assess demographic and clinical characteristics.

3.6.1. Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID5)

The SCID5 is a semi-structured interview based on DSM-5 diagnostic criteria. The semi-structured nature of SCID5 requires the interviewer to exercise clinical judgment regarding the interviewee's responses. Therefore, interviewers must possess clinical knowledge and experience in psychopathology. In domestic studies, the diagnostic agreement for the current diagnosis of BD-I was 87.3%, with a kappa coefficient of 0.54. For lifetime diagnoses of this disorder, the overall agreement was 84.6%, with a kappa coefficient of 0.58. In international studies, its reliability was above 0.70, as determined by the test-retest method (9).

3.6.2. Cognitive Complaints in Bipolar Disorder Rating Assessment (COBRA)

Developed by Rosa et al. in 2013, the COBRA is a 16-item self-report tool designed to identify subjective cognitive deficits, including executive functioning, processing speed, working memory, verbal learning and memory, and attention/concentration. Responses are scored on a four-point Likert Scale ranging from 0 (never) to 3 (always). The scale items relate to everyday cognitive functions, with a maximum possible score of 48; higher scores indicate greater levels of subjective complaints. This questionnaire was utilized in this study to match patients based on cognitive deficits. Internationally, the COBRA exhibits a robust factor structure, high internal consistency with a Cronbach's alpha of 0.91. Its validity and reliability were assessed by Momeni et al. in Iran in 2018, with results pending publication.

3.6.3. Social Functioning Scale (SFS)

The SFS assesses social skills and functioning in psychiatric patients, differentiating between a lack of skills (incompetence) and a failure to utilize available skills (impaired functioning). This self-administered questionnaire comprises 76 items with varied response formats, including two-part questions, items rated on three- or five-point Likert Scales, and most on a four-point frequency or ability scale. Higher scores denote better social competencies. The SFS includes seven subscales: Social conflict/isolation, interpersonal behaviors, social behaviors, recreation, independence/competence, independence/functioning, and employment/occupation. The reliability of this tool was measured at 0.81 (34).

3.6.4. Young Mania Rating Scale (YMRS)

The YMRS consists of 11 items used to assess the severity of manic symptoms, rated by a clinical specialist or nurse based on patient observations. Scores range from 0 to 60. The reliability of this scale was in the range of 0.41 - 0.85, and its validity was equal to 0.88 (35). The YMRS is noted for its high internal consistency (alpha = 0.82) within the specified population. Factor analysis identified three factors correlating with DSM-5 criteria: Increased activity, risky behaviors, and prognosis. The optimal clinical cutoff point is 7.5, providing 62.5% sensitivity and 89% specificity in distinguishing patients with unipolar disorder from those with BD (36).

3.7. Statistical Analyses

All analyses were performed using IBM SPSS Statistics 24 (IBM Corp, Armonk, NY, USA). The demographic characteristics of completers and non-completers were compared using the chi-square test for categorical data and independent samples *t*-tests for continuous data. Baseline differences in outcomes were evaluated using independent samples *t*-tests for completers vs. non-completers and analysis of variance (ANOVA) for the three intervention groups. Due to missing data, linear mixed models with restricted maximum likelihood

estimation (REML) and unstructured covariance were employed. Comparisons between intervention groups and the control group were made at baseline, post-intervention, and follow-up.

4. Results

This study assessed 60 patients with BD-I, aged 18 - 44 years (M = 31.88, SD = 7.46). The majority of participants were male (n = 44, 73.4%), married (n = 28, 46.6%), and self-employed (n = 33, 55%), with most holding a high school diploma (n = 31, 51.7%). Fifty-six participants completed all assessments up to follow-up (93.3%), resulting in a 6.7% attrition rate.

There were no significant differences between completers and non-completers at baseline in terms of functioning ($t_{(58)} = -1.56$, P = 0.123), social conflict ($t_{(58)} = -1.19$, P = 0.238), interpersonal relationships ($t_{(58)} = -1.62$, P = 0.110), social behaviors ($t_{(58)} = 0.12$, P = 0.908), recreation ($t_{(58)} = -1.43$, P = 0.118), competence in functioning ($t_{(58)} = 1.36$, P = 0.179), independence in functioning ($t_{(58)} = -1.61$, P = 0.111), employment ($t_{(58)} = 0.41$, P = 0.687), and relapse prevention ($t_{(58)} = -0.34$, P = 0.733). There were also no significant differences in gender ($\chi^2_{(2, N = 60)} = 1.19$, P = 0.551), marital status ($\chi^2_{(2, N = 60)} = 0.95$, P = 0.622), occupation ($\chi^2_{(2, N = 60)} = 2.19$, P = 0.334), education ($\chi^2_{(2, N = 60)} = 1.74$, P = 0.420), or age ($F_{(2,57)} = 0.69$, P = 0.505).

Furthermore, there were no significant baseline differences among the three groups in terms of functioning ($F_{(2,57)} = 0.63$, P = 0.532), social conflict ($F_{(2,57)} = 0.38$, P = 0.689), interpersonal relationships ($F_{(2,57)} = 0.15$, P = 0.861), social behaviors ($F_{(2,57)} = 1.98$, P = 0.147), recreation ($F_{(2,57)} = 0.07$, P = 0.936), competence in functioning ($F_{(2,57)} = 0.99$, P = 0.379), independence in functioning ($F_{(2,57)} = 1.87$, P = 0.164), employment ($F_{(2,57)} = 0.15$, P = 0.866), and relapse prevention ($F_{(2,57)} = 0.88$, P = 0.419). The mean and standard deviations of the research variables for the intervention and control groups are presented in Table 1.

For the linear mixed-effects model to be valid, it is crucial that the covariance among repeated measures is properly modeled. Four common covariance structures were evaluated: Compound symmetric (CS), first-order autoregressive [AR(1)], unstructured (UN), and Toeplitz (TOEP). The model with the lowest Akaike information criterion (AIC) and Bayesian information criterion (BIC) values was selected, which was the unstructured (UN) covariance structure, as it showed the smallest AIC and BIC values compared to other structures (1) (Table 2).

Table 3 illustrates significant interaction effects between time and group on relapse prevention, social functioning, and its components in patients with BD-I (P < 0.001). The results of the Bonferroni correction test, displayed in Table 4, indicate that SCIT was effective in improving relapse prevention, social functioning, and its components during the post-test and follow-up phases (P < 0.001). Specifically, SCIT had a significant impact on social functioning ($\eta^2 = 0.792$), social conflict ($\eta^2 = 0.572$), interpersonal relationships ($\eta^2 = 0.581$), social behaviors ($\eta 2 = 0.580$), recreation ($\eta^2 = 0.381$), functioning competence ($\eta^2 = 0.479$), functioning independence ($\eta^2 = 0.498$), employment ($\eta^2 = 0.356$), and relapse prevention ($\eta^2 = 0.501$) at the posttest. Additionally, in the follow-up, SCIT's effects remained significant across all measures.

Similarly, FFT was also effective in enhancing relapse prevention, social functioning, and its components, as indicated by the Bonferroni correction test in Table 4 (P < 0.001). In the posttest, FFT significantly affected social functioning ($\eta^2 = 0.811$), social conflict ($\eta^2 = 0.585$), interpersonal relationships ($\eta^2 = 0.408$), social behavior ($\eta^2 = 0.494$), recreation ($\eta^2 = 0.242$), functioning competence ($\eta^2 = 0.467$), functioning independence ($\eta^2 = 0.407$), employment ($\eta^2 = 0.341$), and relapse prevention ($\eta^2 = 0.613$). These effects were maintained or improved in the follow-up, with significant impacts on social functioning ($\eta^2 = 0.894$), social conflict ($\eta^2 = 0.645$), interpersonal relationships ($\eta^2 = 0.369$), social behaviors ($\eta^2 = 0.625$), recreation ($\eta^2 = 0.491$), functioning competence ($\eta^2 = 0.567$), functioning independence ($\eta^2 = 0.644$), employment ($\eta^2 = 0.447$), and relapse prevention ($\eta^2 = 0.320$). Overall, the main effects of group and time on the variables of relapse prevention, social functioning, and its components were found to be significant (Table 3).

Social cognition and interaction training was more effective than FFT in improving the component of interpersonal relationships at the post-test ($\beta = 3$, P =

Table 1. Mean Value of Research Variables

Variables and Groups	Pretest		Posttest		Follow-up	
	Mean ± SD	No.	Mean ± SD	No.	Mean ± SD	No.
Social functioning						
SCIT	173.60 ± 12.48	20	240.10 ± 10.63	20	253.26 ± 10.06	19
FFT	170.50 ± 9.85	20	243.95 ± 13.79	20	254.47 ± 10.32	19
Control	175.05 ± 16.12	20	176.70 ± 15.89	20	174.77 ± 13.80	18
Social conflict						
SCIT	18.10 ± 3.94	20	28.35 ± 3.31	20	30.10 ± 3.57	19
FFT	17.30 ± 3.61	20	28.60 ± 3.43	20	30.36 ± 3.32	19
Control	18.25 ± 3.61	20	18.75 ± 3.86	20	18.72 ± 3.96	18
Interpersonal relationships						
SCIT	17.80 ± 2.60	20	28.85 ± 3.36	20	30.78 ± 3.70	19
FFT	18 ± 2.90	20	25.85 ± 3.43	20	26.10 ± 3.92	19
Control	18.35 ± 3.97	20	18.65 ± 4.05	20	18.77 ± 4.37	18
Social behaviors						
SCIT	27.50 ± 4.45	20	40.50 ± 3.73	20	42.10 ± 3.79	19
FFT	27.35 ± 5.65	20	38.90 ± 3.29	20	41 ± 3.10	19
Control	29.95 ± 3.57	20	30.50 ± 3.64	20	29.94 ± 3.79	18
Recreation						
SCIT	31.75 ± 4.21	20	42.65 ± 5.82	20	41.89 ± 3.52	19
FFT	31.65 ± 5.13	20	39.40 ± 3.84	20	40.31 ± 3.33	19
Control	31.10 ± 8.17	20	31.05 ± 8.14	20	29.55 ± 6.35	18
Functioning competence						
SCIT	27.70 ± 5.42	20	37.75 ± 4.32	20	41.84 ± 3.86	19
FFT	27.25 ± 5.47	20	37.45 ± 5.16	20	40.15 ± 5.09	19
Control	25.30 ± 6.28	20	25.45 ± 6.41	20	25.88 ± 6.43	18
Functioning independence						
SCIT	31.30 ± 3.86	20	42.80 ± 3.51	20	44.36 ± 3.05	19
FFT	30.05 ± 3.31	20	41.05 ± 4.47	20	42.84 ± 3.56	19
Control	32.55 ± 4.92	20	32.45 ± 4.93	20	31.55 ± 3.86	18
Employment						
SCIT	19.45 ± 4.17	20	26.05 ± 3.72	20	28.05 ± 3.86	19
FFT	18.90 ± 4.10	20	25.85 ± 2.60	20	27.78 ± 2.46	19
Control	19.55 ± 4.07	20	19.85 ± 4.01	20	20.33 ± 3.89	18
Relapse prevention						
SCIT	6.55 ± 1.27	20	4.15 ± 1.18	20	4.31 ± 1.63	19
FFT	6.95 ± 0.99	20	3.45 ± 1.22	20	4.26 ± 1.14	19
Control	6.95 ± 0.99	20	6.90 ± 1.02	20	6.50 ± 1.24	18

Abbreviations: SCIT, social cognition and interaction training; FFT, family-focused therapy.

0.034) and follow-up (β = 5.043, P = 0.001), showing differences of three and 5.043 points between the SCIT and FFT groups at these stages, respectively. However, SCIT and FFT were equally effective in enhancing social functioning and its components (except for interpersonal relationships) and in reducing relapse rates in BPs during both the post-test and follow-up periods (Table 5).

5. Discussion

The results of this study indicate that SCIT and FFT are similarly effective in improving social functioning and preventing relapse in BPs, with these effects persisting through the follow-up. Notably, SCIT demonstrated greater efficacy than FFT in enhancing interpersonal relationships, highlighting the importance of addressing both environmental and cognitive factors in treating patients with BD-I. These findings align with

Table 2. Comparison of Covariance Structures for the Linear Mixed-Effects Model

Variables and Covariance Structure	-2 Res. log-Likelihood	AIC	BIC
Social functioning			
UN	1261.210	1273.210	1291.918
CS	1292.862	1296.862	1303.098
AR(1)	1289.511	1293.511	1299.747
TOEP	1289.045	1295.045	1304.399
Social conflict			
UN	780.140	782.140	789.848
CS	785.911	789.911	796.147
AR(1)	784.875	788.875	795.111
TOEP	782.097	788.097	797.451
Interpersonal relationships			
UN	829.706	841.706	860.414
CS	874.706	878.706	884.942
AR(1)	861.110	865.110	871.346
TOEP	860.028	866.028	875.382
Social behaviors			
UN	802.769	814.769	833.477
CS	858.980	862.980	869.216
AR(1)	853.049	857.049	863.285
TOEP	852.017	858.017	867.371
Recreation			
UN	965.659	977.659	982.367
CS	975.483	979.483	985.719
AR(1)	989.623	993.623	999.859
TOEP	974.983	980.983	990.337
Functioning competence			
UN	887.061	890.061	898.769
CS	909.124	913.124	919.360
AR(1)	890.272	894.272	900.508
TOEP	899.790	895.790	905.144
Functioning independence			
UN	859.864	871.864	880.572
CS	872.957	876.957	883.193
AR(1)	877.483	881.483	887.719
TOEP	872.253	878.253	888.607
Employment			
UN	702.583	714.583	733.291
CS	767.147	771.147	777.383
AR(1)	760.647	764.647	770.883
TOEP	759.339	765.339	774.693
Relapse prevention			
UN	543.933	550.933	556.641
CS	548.547	552.547	558.783
AR(1)	547.361	551.361	557.597
TOEP	546.879	552.879	562.233

Abbreviations: CS, compound symmetric structure; UN, unstructured; AR(1), first-order autoregressive structure; TOEP, toeplitz structure.

previous research that identifies FFT as an evidence-based treatment (10, 37, 38).

The effectiveness of FFT can be attributed to various factors associated with the high risk of relapse in BD.

Table 3. The Main Effects of Group, Time, and Group-by-Time Interactions for the Variables

Variables	Groups		Time		Group-by-Time	
	F	P-Value	F	P-Value	F	P-Value
Social functioning	109.327	< 0.001	574.418	< 0.001	136.009	< 0.001
Social conflict	27.456	< 0.001	456.098	< 0.001	99.120	< 0.001
Interpersonal relationship	28.132	< 0.001	100.576	< 0.001	27.651	< 0.001
Social behaviors	18.121	< 0.001	240.111	< 0.001	59.211	< 0.001
Recreation	11.270	< 0.001	889.944	< 0.001	25.014	< 0.001
Functioning competence	24.462	< 0.001	213.953	< 0.001	51.413	< 0.001
Functioning independence	19.016	< 0.001	231.051	< 0.001	59.405	< 0.001
Employment	11.365	< 0.001	282.589	< 0.001	64.561	< 0.001
Relapse prevention	28.402	< 0.001	75.752	< 0.001	18.846	< 0.001

Table 5. Comparison of the Two Methods of Social Cognition and Interaction Training (SCIT) and Family-Focused Therapy (FFT) in the Post-Test and Follow-Up Phases

Variables and Parameters	Estimate	Std. Error	df	P-Value	Cohen's d
Social functioning					
$Time_2$	-3.850	4.304	57	1	0.014
$Time_3$	0.605	4.016	51.236	1	0.002
Social conflict					
$Time_2$	-0.250	1.100	57	1	0.001
$Time_3$	-0.221	1.125	57.602	1	0.001
Interpersonal relationships					
$Time_2$	3	1.148	57	0.034	0.107
$Time_3$	5.043	1.262	56.800	0.001	0.197
Social behavior					
$Time_2$	1.600	1.127	57	0.483	0.034
$Time_3$	0.585	1.157	56.084	1	0.017
Recreation					
$Time_2$	3.250	1.958	57	0.307	0.046
$Time_3$	1.275	1.661	48.687	1	0.021
Functioning competence					
$Time_2$	0.300	1.698	57	1	0.001
$Time_3$	1.151	1.661	56.334	1	0.018
Functioning independence					
$Time_2$	1.750	1.376	57	0.626	0.028
$Time_3$	1.415	1.226	50.604	0.761	0.033
Employment					
$Time_2$	0.200	1.105	57	1	0.001
$Time_3$	0.212	1.107	56.772	1	0.001
Relapse prevention					
$Time_2$	0.700	0.363	57	0.177	0.061
$Time_3$	0.034	0.438	54.540	1	0.00

Abbreviations: $Time_2$, posttest; $Time_3$, follow-up.

Key contributors to relapse include non-adherence to medication due to lack of disease knowledge,

unfamiliarity with side effects, fears of drug dependence, alcohol and drug use, family and environmental stress, disturbed circadian rhythms, inadequate activity, and unrealistic expectations from others (11, 39, 40). Given these challenges, enhancing social functioning emerges as a critical need for BPs and their families, underscoring the relevance of interventions like FFT and SCIT (33).

Studies indicate that providing information to BPs and their families, maintaining regular habits, and early detection of relapse signs are crucial for reducing relapse (18, 41, 42). Previous research has highlighted the significant role of psychoeducation in decreasing BD relapse (43-45). A key component of FFT is psychoeducation, which addresses relapse triggers by educating individuals about the symptoms of the disease (both positive and negative), emphasizing the importance of a regular sleep-wake rhythm, explaining the role of stress in relapse, developing strategies for stress management, and encouraging patients to engage in daily and recreational activities. Moreover, adjusting family expectations through education and enhancing patient cooperation can also target relapse triggers (46).

Furthermore, the effectiveness of FFT in improving social functioning and interpersonal relationships can be attributed to its focus on communication skills training. This includes an effective communication model, active listening, encouraging assertive behavior, training in clarification techniques, instructions on how to express criticism constructively, and strategies for a balanced view of others' behaviors rather than impulsive reactions, evaluating their actions based on the consequences for their mental health and others. This component also emphasizes appropriate emotional expression and demand articulation to minimize tension. These exercises strengthen and regulate the emotions of patients, boost their self-esteem during vulnerable periods, and teach them relaxation techniques, self-awareness, and mindfulness in their behaviors and relationships (47). These aspects explain the effectiveness of this treatment in enhancing social functioning and relationships.

The findings of this study align with previous research, suggesting that SCIT significantly enhances the social functioning of patients with schizophrenia and BD (48, 49). Social cognition and interaction training comprises three components: Emotion perception, theory of mind, and attributional style improvement. Consistent with prior studies (50, 51), these components are predictors of social functioning. Moreover, SCIT addresses cognitive distortions and enhances cognitive flexibility by focusing on cognitive bias modification, which fosters empathy and a better understanding of others' perspectives. When individuals view social interaction as a protective factor against disorders, rather than dwelling on past negative thoughts, they are more likely to see social engagement as a goal, thereby enhancing the interpersonal relationships of BPs.

A key feature of SCIT is the continuous involvement of a training partner, which underscores the treatment's focus on bolstering communication skills. Given the influence of social cognition on social functioning, SCIT appears capable of amending the social cognitive deficits of BPs, thereby enhancing their social functioning (32). The theoretical foundation of SCIT posits that optimal social functioning is best developed through real-life social interactions. A significant benefit of SCIT is its ability to increase positive social interactions among patients in real-world settings (52).

In conclusion, the findings from this study demonstrate that SCIT, through its distinct mechanisms that enhance social cognition and reduce cognitive biases, is more effective than FFT in improving the interpersonal relationships of BPs.

This study has some limitations. The predominance of male participants suggests caution in generalizing the results to female populations. Furthermore, due to its experimental design, it cannot be asserted that all confounding factors were controlled. Future studies should employ experimental designs with more stringent controls to address this limitation.

Footnotes

Authors' Contribution: M.Y.T., participated in designing the study, preparing the manuscript, selecting the study, extracting and analyzing data, and synthesizing; F.M., selected the study and reviewed the manuscript; NM.B, selected the study and reviewed the manuscript; A.P, selected the study, designed the study, and reviewed the manuscript; O.R., selected the study and reviewed the manuscript; K.GH.B., extracted data and reviewed the manuscript. All authors read and endorsed the final version.

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Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to confidentiality of information.

Ethical Approval: The present study was approved by the Ethics Committee of the University of Rehabilitation Sciences and Social Health, Tehran, Iran under the ethical approval code of IR.USWR.REC.1398.195 and all methods were performed following the ethical principle and the national norms and standards for conducting Medical Research in Iran.

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Table 4. Estimation of Fixed-Effect Parameters of the Regression Model for the Research Variables

Parameters	Estimate	Std. Error	Df	*t*	P	η^2 [a]
Social functioning						
Time (pretest vs. follow-up)	-1.63	2.82	55.406	18.99	< 0.001	
Time (posttest vs. follow-up)	0.012	1.50	51.485	0.009	0.993	
$Time_1$ × group (SCIT vs. control)	-1.450	4.136	57	-0.351	0.727	0.002
$Time_2$ × group (SCIT vs. control)	63.400	4.304	57	14.729	< 0.001	0.792
$Time_3$ × group (SCIT vs. control)	77.110	4.029	51.735	20.787	< 0.001	0.891
$Time_1$ × group (FFT vs. control)	-4.550	4.136	57	-1.100	0.276	0.021
$Time_2$ × group (FFT vs. control)	67.250	4.304	57	15.623	< 0.001	0.811
$Time_3$ × group (FFT vs. control)	76.505	4.029	51.735	21.108	< 0.001	0.894
Social conflict						
Time (pretest vs. follow-up)	-0.608	0.543	56.051	-1.120	0.268	
Time (posttest vs. follow-up)	-0.108	0.420	54.080	-0.258	0.797	
$Time_1$ × group (SCIT vs. control)	-0.150	1.179	57	-0.127	1	0.00
$Time_2$ × group (SCIT vs. control)	9.600	1.100	57	8.731	< 0.001	0.572
$Time_3$ × group (SCIT vs. control)	11.274	1.129	58.169	9.551	< 0.001	0.633
$Time_1$ × group (FFT vs. control)	-0.950	1.179	57	-0.806	0.424	0.011
$Time_2$ × group (FFT vs. control)	9.850	1.100	57	8.958	< 0.001	0.585
$Time_3$ × group (FFT vs. control)	11.495	1.129	58.169	9.772	< 0.001	0.645
Interpersonal relationships						
Time (pretest vs. follow-up)	-0.467	0.896	56.886	-0.521	0.604	
Time (posttest vs. follow-up)	-0.167	0.421	53.025	-0.397	0.693	
$Time_1$ × group (SCIT vs. control)	-0.550	1.017	57	-0.541	0.591	0.005
$Time_2$ × group (SCIT vs. control)	10.200	1.148	57	8.882	< 0.001	0.581
$Time_3$ × group (SCIT vs. control)	12.085	1.266	57.313	9.119	< 0.001	0.611
$Time_1$ × group (FFT vs. control)	-0.350	1.017	57	-0.344	0.732	0.002
$Time_2$ × group (FFT vs. control)	7.200	1.148	57	6.270	< 0.001	0.408
$Time_3$ × group (FFT vs. control)	7.042	1.266	57.313	5.563	< 0.001	0.369
Social behaviors						
Time (pretest vs. follow-up)	-0.254	0.747	57.588	-0.340	0.735	
Time (posttest vs. follow-up)	0.295	0.297	53.098	0.995	0.324	
$Time_1$ × group (SCIT vs. control)	-2.450	1.467	57	-1.670	0.301	0.047
$Time_2$ × group (SCIT vs. control)	10	1.127	57	8.874	< 0.001	0.580
$Time_3$ × group (SCIT vs. control)	11.529	1.159	56.414	10.331	< 0.001	0.668
$Time_1$ × group (FFT vs. control)	-2.600	1.467	57	-1.772	0.245	0.052
$Time_2$ × group (FFT vs. control)	8.400	1.127	57	7.454	< 0.001	0.494
$Time_3$ × group (FFT vs. control)	10.944	1.159	56.414	9.392	< 0.001	0.625
Recreation						
Time (pretest vs. follow-up)	.218	0.829	55.730	0.263	0.793	
Time (posttest vs. follow-up)	0.168	0.790	53.345	0.213	0.832	
$Time_1$ × group (SCIT vs. control)	0.650	1.923	57	0.338	1	0.002
$Time_2$ × group (SCIT vs. control)	11.600	1.958	57	5.926	< 0.001	0.381
$Time_3$ × group (SCIT vs. control)	10.803	1.666	49.188	8.196	< 0.001	0.559
$Time_1$ × group (FFT vs. control)	0.550	1.923	57	0.286	1	0.001
$Time_2$ × group (FFT vs. control)	8.350	1.958	57	4.265	< 0.001	0.242
$Time_3$ × group (FFT vs. control)	9.528	1.666	49.188	7.147	< 0.001	0.491

Parameters	Estimate	Std. Error	Df	*t*	P	η^2 [a]
Functioning competence						
Time (pretest vs. follow-up)	-0.201	0.826	58.539	-0.244	0.808	
Time (posttest vs. follow-up)	-0.051	0.538	53.752	-0.096	0.924	
$Time_1$ × group (SCIT vs. control)	2.400	1.816	57	1.321	0.575	0.030
$Time_2$ × group (SCIT vs. control)	12.300	1.698	57	7.243	< 0.001	0.479
$Time_3$ × group (SCIT vs. control)	16.032	1.666	56.796	9.309	< 0.001	0.620
$Time_1$ × group (FFT vs. control)	1.950	1.816	57	1.074	0.862	0.020
$Time_2$ × group (FFT vs. control)	12	1.698	57	7.067	< 0.001	0.467
$Time_3$ × group (FFT vs. control)	14.878	1.666	56.796	8.326	< 0.001	0.567
Functioning independence						
Time (pretest vs. follow-up)	0.142	0.687	57.964	0.207	0.837	
Time (posttest vs. follow-up)	0.042	0.525	54.427	0.080	0.936	
$Time_1$ × group (SCIT vs. control)	-1.250	1.294	57	-0.966	1	0.016
$Time_2$ × group (SCIT vs. control)	10.350	1.376	57	7.522	< 0.001	0.498
$Time_3$ × group (SCIT vs. control)	11.703	1.230	51.135	11.112	< 0.001	0.700
$Time_1$ × group (FFT vs. control)	-2.500	1.294	57	-1.932	0.175	0.061
$Time_2$ × group (FFT vs. control)	8.600	1.376	57	6.250	< 0.001	0.407
$Time_3$ × group (FFT vs. control)	10.288	1.230	51.135	9.788	< 0.001	0.644
Employment						
Time (pretest vs. follow-up)	-0.309	0.488	58.038	-0.633	0.529	
Time (posttest vs. follow-up)	-0.009	0.181	53.739	-0.053	0.958	
$Time_1$ × group (SCIT vs. control)	-0.100	1.302	57	-0.077	1	0.00
$Time_2$ × group (SCIT vs. control)	6.200	1.105	57	5.611	< 0.001	0.356
$Time_3$ × group (SCIT vs. control)	8.299	1.108	56.916	6.774	< 0.001	0.464
$Time_1$ × group (FFT vs. control)	-0.650	1.302	57	-0.499	1	0.004
$Time_2$ × group (FFT vs. control)	6	1.105	57	5.430	< 0.001	0.341
$Time_3$ × group (FFT vs. control)	8.088	1.108	56.916	6.543	< 0.001	0.447
Relapse prevention						
Time (pretest vs. follow-up)	0.438	0.359	57.055	1.219	0.228	
Time (posttest vs. follow-up)	0.388	0.329	55.983	1.179	0.243	
$Time_1$ × group (SCIT vs. control)	-0.400	0.348	57	-1.151	0.764	0.023
$Time_2$ × group (SCIT vs. control)	-2.750	0.363	57	-7.566	< 0.001	0.501
$Time_3$ × group (SCIT vs. control)	-2.203	0.443	54.828	-4.876	< 0.001	0.310
$Time_1$ × group (FFT vs. control)	0.001	0.348	57	0.00	1	0.00
$Time_2$ × group (FFT vs. control)	-3.450	0.363	57	-9.492	< 0.001	0.613
$Time_3$ × group (FFT vs. control)	-2.237	0.443	54.828	-4.994	< 0.001	0.320

Abbreviations: $Time_1$, pretest; $Time_2$, posttest; $Time_3$, follow-up.

[a] Partial eta squared.