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ORIGINAL ARTICLE

The association between social skills deficits and family history of mood disorder in bipolar I disorder

Francy B.F. Fernandes,[1,2] Cristiana C. Rocca,[1,2] Alexandre D. Gigante,[1] Paola R. Dottori-Silva,[1] Luciana Gerchmann,[1] Danielle Rossini,[1] Rodrigo Sato,[1] Beny Lafer,[1,3] Fabiano G. Nery[1,3,4]

[1]*Programa de Transtorno Bipolar (PROMAN), Instituto de Psiquiatria, Faculdade de Medicina, Universidade de São Paulo (USP), São Paulo, SP, Brazil.* [2]*Serviço de Psicologia e Neuropsicologia, Instituto de Psiquiatria, Faculdade de Medicina, USP, São Paulo, SP, Brazil.* [3]*Institute & Departamento de Psiquiatria, Faculdade de Medicina, USP, São Paulo, SP, Brazil.* [4]*Department of Psychiatry and Behavioral Neuroscience, University of Cincinnati College of Medicine, Ohio, USA.*

Objective: To compare social skills and related executive functions among bipolar disorder (BD) patients with a family history of mood disorders (FHMD), BD patients with no FHMD and healthy control (HCs).
Methods: We evaluated 20 euthymic patients with FHMD, 17 euthymic patients without FHMD, and 31 HCs using the Social Skills Inventory (SSI) and a neuropsychological battery evaluating executive function, inhibitory control, verbal fluency and estimated intelligence.
Results: Both BD groups had lower SSI scores than controls. Scores for one subfactor of the social skills questionnaire, conversational skills and social performance, were significantly lower among patients with FHMD than among patients without FHMD ($p = 0.019$). Both groups of BD patients exhibited significant deficits in initiation/inhibition, but only BD patients with FHMD had deficits in verbal fluency, both compared to HC. There were no associations between social skills questionnaire scores and measures of cognitive function.
Conclusion: Euthymic BD patients have lower social skills and executive function performance than HC. The presence of FHMD among BD patients is specifically associated with deficits in conversational and social performance skills, in addition to deficits in verbal fluency. Both characteristics might be associated with a common genetically determined pathophysiological substrate.

Keywords: Bipolar disorder; social skills; executive functions; family history

Introduction

Bipolar disorder (BD) is a severe, chronic psychiatric disorder that has a significant negative impact on the lives of patients and families.[1] Increasing evidence suggests that most individuals with BD, even during periods of prolonged remission, present with severe cognitive and functional deficits that result in significant psychosocial impairment, which is mainly characterized by various interpersonal relationship difficulties and reduced work productivity and can result in lost days or even years of work due to impaired daily activity.[2] A lack of social support from relatives and close friends, negative emotions in the family environment, older age and residual depressive symptoms are important predictors of psychosocial impairment in the future.[3,4] These difficulties probably contribute to making BD patients more socially impaired than those with other affective illnesses.[5]

Recent evidence suggests that part of the psychosocial impairment experienced by BD patients is related to poor social skills.[6] Social skills are defined as behaviors in interpersonal interaction that accurately communicate emotions, feelings, opinions, attitudes, personal rights, and needs.[7] Such behaviors occur in specific situations in which the individual interacts with so-called key social agents, such as colleagues, teachers, and parents. Adequate social functioning promotes positive social outcomes, including acceptance by peers, academic achievement, and professional success.[8]

It has been proposed that the family environment plays an important role in the development of adequate social skills.[9] Among the families of individuals with BD, growing evidence suggests that there is greater conflict, less cohesiveness, and poorer organization when one or more first-degree relatives have a mood disorder.[10-12] Among BD patients, a history of family mood disorders has been associated with greater cognitive impairment, including deficits in verbal memory and executive functioning, specifically in psychomotor processing speed.[13] In addition, there have been several studies addressing social skills training for schizophrenia patients and their families,[14] as well as studies evaluating the use of family-focused treatment in adults and adolescents with BD.[15] However, to our knowledge, there have been no studies addressing the question of whether BD patients whose families include another individual with BD have poorer social skills than BD patients whose families do not.

Correspondence: Francy de Brito Ferreira Fernandes, Serviço de Psicologia e Neuropsicologia, Instituto de Psiquiatria, Hospital das Clínicas, Universidade de São Paulo, Rua Dr. Ovídio Pires de Campos, 785, CEP 05403-010, São Paulo, SP, Brazil.
E-mail: fbf.fernandes@gmail.com
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The objective of this study was to evaluate social skills and related executive functions in BD patients with and without a history of mood disorders among first-degree relatives, as well as in a group of control individuals, drawing comparisons between and among the three groups. We hypothesize that BD patients with family history of mood disorders (FHMD) would present lower social skills than BD patients without FHMD and healthy controls. In addition, we sought to explore whether certain aspects of social skills are correlated with cognitive functions, such as executive function, inhibitory control, verbal fluency, and intelligence, an important consideration to further characterize neural substrates that subserve social functioning in BD patients.

Methods

Participants

The study sample consisted of 37 individuals with BD, diagnosed according to DSM-IV criteria, who were treated as outpatients in the Programa de Transtorno Bipolar (PROMAN), Instituto de Psiquiatria, Faculdade de Medicina, Universidade de São Paulo, in the city of São Paulo, Brazil. The inclusion criteria were age over 18 years, having been diagnosed with BD type I (hereafter, BD), as confirmed by the Structured Clinical Interview for DSM-IV Axis I Disorders, Patient Edition (SCID-I/P),[16] and having been euthymic for at least 4 weeks. Euthymia was defined as a score < 7 on the 21-item Hamilton Depression Rating Scale and < 7 on the Young Mania Rating Scale, in two consecutive measures with an interval of 4 weeks between the two.[17,18] The exclusion criteria were substance use disorder in the last 6 months, a lifetime history of epilepsy or seizures, and having used topiramate or benzodiazepines in the last 2 weeks. FHMD was identified by the Family History Screen.[19] Patients were divided into two groups: those with and without FHMD among first-degree relatives (BD-FHMD+ and BD-FHMD-, respectively).We recruited 31 healthy controls (HCs) from the general community with no personal or family history of DSM-IV axis I disorders, as confirmed by the SCID and the Family History Screen.

The study protocol was approved by the research ethics committee of the Universidade de São Paulo. All study procedures were carried out in accordance with the Declaration of Helsinki, and all participants gave written informed consent.

Instruments

Social skills

To assess social skills, we used the Social Skills Inventory (SSI), a 38-item self-report questionnaire that evaluates how social skills are expressed in an array of different settings, including family, school, work, and everyday situations. The SSI was developed and validated for use in Brazil by Del Prette.[20] It consists of five subscales, referred to as subfactors: self-assertion in coping with risk (subfactor 1); self-assertion in expressing positive feelings (subfactor 2); conversational skills and social performance (subfactor 3); self-exposure to strangers and new situations (subfactor 4); and self-control of aggression in adverse situations (subfactor 5). Lower scores on this instrument indicate impaired social skills.[20]

Neurocognition

Neurocognitive assessment was conducted using the following instruments: the Hayling test, a battery of cognitive tests that evaluates the relationship between the timing of decision making and the conscious decision taken[21]; the Stroop test, which assesses selective attention, mental flexibility, and inhibitory control[22]; the FAS Verbal Fluency Test, which evaluates letter fluency, planning, organization, and sustained attention[23]; and the Wechsler Abbreviated Scale of Intelligence, which allows the intelligence quotient (IQ) to be estimated.[24]

Statistical analysis

We used the chi-square and Kruskal-Wallis tests to compare the groups' demographic and clinical characteristics, as well as social skills and neurocognitive variables. For the variables identified as significant in the Kruskal-Wallis comparison, we performed pairwise comparisons with the Mann-Whitney test. To identify bivariate correlations between social skills and neurocognitive variables within each group, we used Spearman's correlation coefficient. For total or subfactor SSI scores in which an association with FHMD was found, we used logistic regression to predict which variables would be most strongly associated with a given score. Statistical analyses were conducted using SPSS version 14.0. A p-value < 0.05 was considered statistically significant.

Results

There were no significant differences among the three groups in terms of age, sex, or estimated IQ. There was a statistically significant difference among the groups in education level, expressed as years of schooling ($p = 0.022$). The BD-FHMD+ and BD-FHMD- groups were comparable in terms of clinical characteristics (Table 1).

Table 2 shows the results for social skills and cognitive tests. There was a significant difference among the groups for total SSI score ($p = 0.002$), as well as for conversational skills and social performance ($p < 0.001$), self-exposure to strangers and new situations ($p < 0.001$), and self-control of aggression in adverse situations ($p = 0.029$). Compared with the HC group, the BD-FHMD+ and BD-FHMD- groups presented significantly lower total SSI scores ($p = 0.002$ and $p = 0.005$, respectively), lower conversational skills and social performance ($p < 0.001$ and $p = 0.008$, respectively), and lower self-exposure to strangers and new situations ($p < 0.001$ and $p = 0.004$, respectively). For self-control of aggression in adverse situations, the BD-FHMD+ group scored significantly lower than the HC group ($p = 0.007$), although there was no significant difference between the BD-FHMD- and HC ($p = 0.76$). The BD-FHMD+ group presented significantly

Table 1 Demographic and clinical characteristics of patients with bipolar I disorder, with and without a family history of mood disorders among first-degree relatives, and healthy controls

	BD patients			
Characteristic	FHMD (n=20)	No FHMD (n=17)	HC (n=31)	p-value
Age (years)	38±13	37±10	35±7	0.860
Male gender	10 (50)	5 (29.4)	10 (32.3)	0.337
Years of schooling	13±2	12±2	11±2	0.022*
Estimated IQ	100±11	97±8	97±9	0.308
Age of onset of illness	19±4	22±8	-	0.169
Number of episodes	10±4	9±8	-	0.295
Substance use disorder	10 (50)	9 (47)	0 (0)	0.509
Any anxiety disorder	8 (42.1)	7 (41.2)	0 (0)	0.317
Panic disorder	5 (25)	3 (17.64)	0 (0)	0.850
Social phobia	4 (21)	1 (5.9)	0 (0)	0.189
Specific phobia	1 (5.3)	3 (17.6)	0 (0)	0.238
Obsessive-compulsive disorder	5 (26.3)	2 (11.8)	0 (0)	0.271
Post-traumatic stress disorder	1 (5.3)	0 (0.0)	0 (0)	0.352

Results expressed as mean ± standard deviation or n (%).
BD = bipolar I disorder; FHMD = family history of mood disorders; HC = healthy controls; IQ = intelligence quotient.

Table 2 Cognitive variables of patients with bipolar I disorder, with and without a family history of mood disorders among first-degree relatives, and healthy controls

	BD patients			
Cognitive variable	FHMD (n=20)	No FHMD (n=17)	HC (n=31)	p-value
SSI total	42.35±31.08	45.29±29.23	70.00±25.87	0.002
SSI subfactor 1	54.50±29.48	51.35±31.63	65.71±26.44	0.209
SSI subfactor 2	46.35±31.33	46.94±28.94	56.94±29.48	0.339
SSI subfactor 3	24.95±35.29	53.41±34.58	78.26±25.72	0.000
SSI subfactor 4	32.55±23.00	41.47±25.48	64.94±24.81	0.000
SSI subfactor 5	28.50±26.88	46.12±32.55	47.42±24.14	0.029
Hayling test A	15.55±10.77	27.53±36.86	10.61±7.23	0.069
Hayling test B	60.95±33.84	54.53±24.56	42.81±26.37	0.109
Hayling test, n of errors	6.05±4.49	6.82±4.93	7.10±4.62	0.701
Stroop test, card 1 (seconds)	15.15±3.98	15.41±3.41	12.84±2.70	0.023
Stroop test, card 2 (seconds)	18.80±6.59	18.59±4.21	16.45±3.85	0.086
Stroop test, card 3 (seconds)	27.55±10.38	30.88±9.78	26.84±8.93	0.230
FAS test, total score	32.45±6.16	34.41±8.57	38.74±7.52	0.011
FAS test, n of errors	1.10±1.25	2.13±2.66	2.13±1.89	0.088

Results expressed as mean ± standard deviation.
BD = bipolar (I) disorder; FAS = FAS Verbal Fluency Test; FHMD = family history of mood disorders; HC = healthy controls; SSI = Social Skills Inventory.

lower scores for conversational skills and social performance than the BD-FHMD- group (p = 0.014). However, there was no significant difference between the two BD groups for self-exposure to strangers and new situations (p = 0.26), self-control of aggression in adverse situations (p = 0.10), or total SSI score (p = 0.78).

There were statistically significant differences among the groups in terms of mean scores on the Stroop test card 1 (p = 0.023) and the FAS Verbal Fluency Test (p = 0.011), although not in mean scores on parts A and B of the Hayling test (p = 0.069 and p = 0.109, respectively) or on Stroop test cards 2 and 3 (p = 0.086 and p = 0.230, respectively). Pairwise comparison showed that mean scores on Stroop test card 1 were significantly higher in the BD-FHMD- group than in the HC group (p = 0.010). There was no statistical difference between the BD-FHMD+ and BD-FHMD- groups (p = 0.724) or between the BD-FHMD+ and HC groups (p = 0.056). For FAS verbal fluency scores, pairwise comparison showed that the BD-FHMD+ group had significantly lower scores than the HC group (p = 0.002). There were no statistical differences between the BD-FHMD+ and BD-FHMD- groups or between the BD-FHMD- and HC groups ($p > 0.13$ for both).

Exploratory analyses of correlations between conversational skills and social performance and other cognitive variables showed that, within the BD-FHMD- group, the conversational skills and social performance score correlated negatively with FAS verbal fluency errors (r = -0.63, p = 0.008). Within the BD-FHMD+ and HC groups, there were no significant correlations between conversational skills and social performance and any other cognitive variable. Correlations between the other SSI subfactors and all cognitive variables were not significant.

Linear regression analyses with conversational skills and social performance as the dependent variable, and gender, years of schooling, social phobia, age at illness onset, FAS verbal fluency errors, and FHMD as explanatory variables, showed that only FHMD could predict conversational skills and social performance. Conversation skills and social performance scores decreased by 35.54 (95% confidence interval 6.281-64.802, p = 0.019) with FHMD. Linear regression analyses with the other SSI

subfactors revealed that no variable predicted the performance of those subfactors.

Discussion

In this study, we found that euthymic BD patients, with or without FHMD, exhibit significantly poorer social skills than HC, as assessed by a self-report questionnaire. This difference seems driven by difficulties in conversational skills and social performance, and in self-exposure to strangers and new situations, as suggested by significant differences in SSI subscales that evaluate those social skills dimensions. FHMD is associated with an important effect on conversational skills and social performance, as demonstrated by the finding that BD patients with FHMD scored lower on this factor than BD patients without FHMD. Regarding the neurocognitive assessment, we found that both groups of BD patients scored lower than HC in initiation/inhibition measures on the Stroop Card 1 subtest, and that there was an association between FHMD and lower cognitive function only in verbal fluency. The poor performance of BD patients in total social skills scores is consistent with previous studies.[25-28] This deficit is present in patients with a normal theoretical knowledge of social skills but have difficulty in processing emotional cues in social circumstances.[25,26] It is possible that BD patients have difficulties reading the emotional signs present in social situations, which are essential components of social interaction. In fact, different aspects of emotional processing have been found to be altered even in euthymic BD patients, such as facial emotion recognition,[6,29,30] prosodic processing[31] and affective responsiveness.[32]

Another interpretation of this finding could involve the presence of certain psychological characteristics, which have been found associated with BD, such as low self-esteem,[33] perfectionism, and need for approval,[34] which could contribute, at least theoretically, to poor social performance.

We found that FHMD had a specific effect on social skills, especially conversational skills and social performance, as measured by the conversational skills and social performance subfactor of the SSI questionnaire. FHMD has been associated with certain clinical BD characteristics related to disease severity, such as younger age at onset, psychosis, predominant polarity, substance abuse, hospitalizations, suicidal behavior, and level of functioning.[35-37] Furthermore, families affected by BD demonstrate fewer positive and productive strategies, such as positive affect and conflict resolution,[38] which could not only hinder problem resolution but also impair family relationships and communications. Families in which both parents have a mood disorder have been shown to present worse general functioning and problem resolution than those in which only one or neither parent is affected.[39] Among the families of BD patients, there is also evidence of greater conflict, less cohesiveness, and poorer organization when other family members have a history of mood disorders than when they do not.[10-12] Taken together, these findings suggest that a family history of BD is associated with more clinical signs of BD severity and greater family dysfunction. Thus, the lower conversation skills and social performance we found in BD patients with FHMD could be interpreted in two ways. The first is that clinical severity, family dysfunction and poor capacity for conversation are all manifestations of a common pathophysiological substrate that is genetically determined and contributes to these impairments. The second is that a dysfunctional family environment plays a determinant role, damaging normal social skills development in these patients. However, further studies are necessary to better understand the interplay of these variables.

The initiation/inhibition deficits found in both groups of euthymic BD patients are consistent with previous studies.[40] In our study, this characteristic was not associated with familial BD, since we found no difference between BD groups. On the other hand, of both groups of patients, only those with a family history of BD had verbal fluency deficits according to the FAS test. The fact that patients with FHMD also had more conversation and social performance problems suggests that both characteristics belong to a group of highly heritable phenotypic features. Finally, we found no association between measures of executive functioning, inhibitory control, verbal fluency, or IQ and scores on the SSI questionnaire. This association was expected due to evidence that behaviors requiring interpersonal interaction must rely on adequate executive functioning. As demonstrated by McClure et al. and Shamay-Tsoory et al.,[41,42] adaptive social interaction requires the ability to engage in flexible thinking and to monitor, recognize, and respond to unexpected or contradictory situations (executive functioning); to respond rapidly to demands (processing speed); to inhibit irrelevant responses (inhibitory control); and to produce effective communication (verbal fluency). However, these were exploratory analyses, and the study was not powered to investigate such associations. The small sample size might have contributed to these negative findings, and hence, future studies with larger sample sizes could investigate the associations between social skills and executive functioning.

The present study has some limitations. The cross-sectional study design prevented us from drawing any causal inferences from the associations reported here. In addition, social skills were evaluated with a self-report instrument, which could be a source of bias related to how patients view their own social performance. Moreover, although the SSI has been validated for the Brazilian population, this is the first study to apply this instrument to individuals with BD, which raises questions about the validity of the instrument in this population as opposed to a more performance-based assessment. Furthermore, since we did not control for multiple comparisons, these findings should be considered as exploratory. The strengths of our study include the fact that the social skills were assessed using a standardized inventory validated for use in Brazil. This is relevant because social skills are significantly influenced by the culture of a given country.

In conclusion, euthymic BD patients with FHMD presented poorer social skills in specific areas, particularly conversational skills and social performance, than those without it. This impairment might be influenced by deficits in emotion processing, which has been shown to be altered

in many BD studies. Because these social skills difficulties can affect an individual's quality of life, further studies are needed to investigate how FHMD affects the social skills of BD patients.

We believe that there is a real need for neuropsychological interventions aimed at improving the effectiveness of social skills in BD patients. In addition, our findings suggest that BD patients belonging to families in which more than one member is affected by BD can be considered a subgroup to be targeted separately within the proposed intervention, since such patients present greater cognitive and social deficits.

Disclosure

The authors report no conflicts of interest.

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