Resilience and Impulsivity in a Sample of Patients with Bipolar Disorder in Remission: A Cross-Sectional Comparative Study

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Abstract

Background: Bipolar Disorder (BD) is defined as a chronic relapsing mood disorder, and relapses appear to be associated with low resilience and high impulsivity. However, there is a lack of data about resilience in BD patients and its connection with impulsivity, especially in the Arabic culture. The aim of the current study was to investigate the level of resilience and impulsivity in BD patients during remission and their clinical correlates. **Methods:** A cross-sectional comparative study was conducted on 52 participants: 26 patients with BD during remission and 26 matched controls who were free from psychiatric disorders. The assessment included a clinical interview, Structured Clinical Interview for DSM-IV (SCID-I/SCID-II), and Adult ADHD self-report scale v1.1 to confirm the diagnosis of bipolar disorder and exclude ADHD, personality disorders, and other psychiatric comorbidities. Young Mania Rating Scale and Hamilton Depression Rating Scale were also used to exclude patients in episodes. In addition, Connor Davidson Resilience Scale 25 and Barratt Impulsiveness Scale 11 were chosen to assess resilience and impulsivity, respectively. **Results:** Patients with BD in remission showed highly significantly lower resilience scores (44.65±9.13) compared to the healthy control group (68.35±11.24), ($p<0.001$). Additionally, they exhibited higher impulsivity scores (61.19±25.72) than controls (27.81±10.59), with a high significant difference ($p<0.001$). A moderate negative correlation was observed between resilience and impulsivity scores among the whole study sample (rho= -.513), with high statistical significance ($P<0.001$). Age, duration of BD, medications such as risperidone, valproic acid, and lithium were significant predictors of resilience, while female gender, divorce status, duration of BD, number of psychiatric hospitalizations, and risperidone were significantly related to impulsivity. **Conclusions:** The current study suggests considering resilience and impulsivity in the management of BD through their early assessment and developing more therapeutic programs and research to improve them.

Key words: Resilience. Impulsivity, Bipolar disorder, Remission.

1. Background

Bipolar disorder (BD) is a chronic mental disorder characterized by recurrent mood episodes of depression, mania, or hypomania with relatively symptom-free intervening periods [1]. It has a high suicidal risk, psychiatric comorbidities, and a negative impact on the patient, his family, and society, needing better management and prevention [2]. For proper management and prevention of BD, research should focus on the main risk factors that have a role in the onset, course, and prognosis of the disorder such as the interaction between genetic and environmental risk factors. Among the environmental risk factors for BD patients are stressful life events, which usually occur before the development of mood symptoms [3].

The capacity to adjust effectively to challenges, trauma, or even major sources of stress and revert to normal functioning is called resilience [4]. A variety of psychological, social, biological, and cultural factors work together to shape resilience and affect how people cope with stress. Over time, resilience can change depending on one's development and interactions with their surroundings [5]. While some

individuals oppose difficult situations, some require time to come back successfully, whereas others might endure a lifelong disability as in cases of the development of bipolar disorder [6].

Recent research focuses on resilience's role in explaining mental disease onset and prognosis. [7], [8],[9] found that resilience levels in BD patients are lower than in healthy controls during the euthymic stage. Lower resilience levels are linked to higher frequency of depressive episodes, impulsivity [8], lower quality of life [10], and suicidal attempts [7].

One of the key characteristics of BD and probably related to resilience is impulsivity, which continues throughout the euthymic era. Elevated impulsivity is associated with cognitive deficits, making it harder for BD patients to overcome hardships [8]. Studies showed that impulsivity has also been significantly associated with the age of onset, [11], suicidal risk [11], [12], [13], number of hospitalizations, and impairment in function [13], thus impulsivity appears to affect the course and prognosis of BD.

Research on impulsivity in individuals with BD during the euthymic phase is inconsistent. Increased impulsivity was found in all stages of BD, including euthymia, depression, and mania [11]. As a result, it has been proposed that impulsivity, which manifests before and following the acute phase of BD, could be a characteristic of the disorder [13]. However, others have not found any variations between BD patients in remission and control groups [14]. Understanding impulsivity in BD could lead to more personalized treatment options, which would reduce the burden of the disorder [13].

Regarding the link between impulsivity and resilience, a study found in a sample of Korean BD patients that higher levels of impulsivity have been linked to lower resilience [8]. In contrast, resilience and impulsivity were positively correlated in a group of male convicts [15]. These contradictory findings suggest that, based on the study population, resilience may have a positive or negative relationship with impulsivity [8]. There is a lack of data on the connection between impulsivity and resilience in BD patients, particularly within Arabic cultures. Therefore, the current study aimed to assess the levels of resilience and impulsivity in a sample of BD patients in remission, exploring their relationship and clinical correlates, which may be crucial for the prevention and management of BD.

2. Subjects and Methods

The study was conducted as a cross-sectional comparative analysis of two groups of participants selected through simple random sampling, from November 2022 to April 2023.

The first group comprised 26 individuals with bipolar disorder (BD) in remission, recruited from the outpatient adult psychiatric clinic at Port Said Mental Health and Addiction Treatment Hospital. Inclusion criteria involved participants who met DSM-IV criteria for BD, confirmed through clinical interviews and the Structured Clinical Interview for DSM-IV (SCID-I). Also, participants had to be in remission, as evidenced by a score below 7 on Hamilton Depression Rating Scale and below 12 on Young Mania Rating Scale. Other criteria included having been diagnosed with BD for at least one year, being between 18 and 60 years old, literate, and capable of providing informed consent.

Exclusion criteria included the presence of attention deficit hyperactivity disorder (ADHD) or personality disorders such as borderline personality disorder, which may affect the level of impulsivity, other psychiatric comorbidities, poor insight, and chronic debilitating medical conditions affecting mental health.

The control group consisted of 26 healthy individuals with no history of psychiatric disorders, matched for age and sex with the BD group. These participants were recruited from the hospital's employees.

Sample size calculation

For this study, we used G*Power software (version 3.1.9.7) to figure out the sample size. We found that a total sample size of 52 participants (26 in each group) would give us an 80% power of detecting an effect size of 0.8, following Cohen's guidelines. Our calculations were based on a previous study [8] and involved a two-group t-test with a 5% two-sided significance level.

Ethical considerations

Approval was obtained from the Faculty of Medicine's Research Ethics Committee at Suez Canal University before starting the fieldwork with No: 5025. Also, written informed consent was obtained from the participants who agreed to take part in the study, after clarifying the purpose of the study, used procedures, the confidentiality of their data, and their right to refuse to complete the interview at any moment without giving any explanation or exposure to harm.

Measures

1-Semi-structured psychiatric interview:

Sociodemographic and clinical information was gathered through semi-structured interviews based on the psychiatric assessment sheet from the Faculty of Medicine, Suez Canal University. The sociodemographic data included age, sex, marital status, education, occupation, and residence. The clinical data encompassed the duration of BD, the number of mood episodes and hospitalizations, history of suicide attempts, and medications received.

2-Structured Clinical Interview for DSM-IV (SCID-I/SCID-II) [16], [17]:

The Arabic versions of SCID-I [18] and SCID-II [19] were used in the current study to diagnose BD and exclude other psychiatric and personality comorbidities.

3-Young Mania Rating Scale (YMRS) [20], and Hamilton Rating Scale for Depression (HRSD) [21]:

The Arabic version of YMRS [22] and HRSD [23] were used in the current study to confirm that patients are in remission. The YMRS measures mania severity with scores ranging from 0 to 60: below 12 is normal or in remission, 13-19 indicates minimal symptoms, 20-25 is mild mania, 26-37 is moderate mania, and 38-60 is severe mania. The HRSD assesses depression severity with scores represented as follows: 0-7 is normal or in remission, 8-13 is mild depression, 14-18 is moderate depression, 19-22 is severe depression, and above 23 is very severe depression.

4-Adult ADHD self-report scale v1.1(ASRS) was developed by Kessler et al. [24].

This scale is a questionnaire with 18 questions designed to assess attention-deficit/hyperactivity disorder (ADHD) in adults. The current study used the Arabic version [25], to exclude the comorbidity of ADHD with BD that could affect the level of impulsivity.

5-Connor-Davidson Resilience Scale 25 (CD-RISC-25) [26]:

The CD-RISC-25 is a tool (25 items) designed to measure resilience, which is the ability to cope with stress and bounce back from adversity. Five variables were identified from the original scale's factor analysis: individual proficiency, having faith in one's intuition, accepting bad emotions, thriving adaptability to change and stable relationships, control, and spiritual effects. The overall score is between 0 to 100, with higher scores reflecting high resilience. The Arabic version was used in the current study [27].

6- The Barratt Impulsiveness Scale 11 (BIS-11) [28],[29]:

The scale is a well-known self-report questionnaire (30 items) designed to evaluate impulsivity in clinical and research settings. It consists of three subscales: motor impulsivity, attentional impulsivity, and non-planning impulsivity. Factors assessed in this scale include attention, cognitive instability, motor,

preference, self-control, and cognitive complexity. The overall score is between 30 and 120. Higher scores indicate higher levels of impulsivity and a score ≥72 indicates a high level of impulsivity. We used the Arabic version which was validated by Ellouze et al. [30]

Statistical analysis:

Data was analyzed using SPSS version 26.0. Normality was tested with the Shapiro-Wilk test. Quantitative data were presented as means and standard deviations, while qualitative data as numbers and percentages. The chi-square and Kruskal-Wallis tests were used for qualitative data comparisons, and Mann-Whitney U tests and independent t-tests for quantitative data comparisons. Logistic regression assessed if CD-RISC-25 and BIS-11 scores predicted group type (healthy control vs. BD group). Spearman's correlations examined factors linked to BIS-11 scores in the BD group and correlations between CD-RISC-25 and BIS-11 scores across all groups. Simple linear regression explored the relationship between CD-RISC-25 and BIS-11 scores among the study sample. Multiple linear regression identified predictors of CD-RISC-25 scores. A p-value of <0.05 was considered significant, and <0.001 was highly significant.

3. Results

The current study included two groups of participants: the BD group in remission (n=26) and the healthy control group (n=26). Table 1 summarizes the sociodemographic characteristics of the participants. Ages ranged from 21 to 53 years, with mean ages of 33.88±9.42 years for the BD group and 32.73±8.45 years for the control group. Most participants in both groups were male (73.1% in the BD group and 57.7% in the control group). No significant differences were observed between the two groups in terms of sociodemographic data.

Table 1: Socio-demographic characteristics among (BD) and (HC) groups.

Variable	BD group (n=26)	HC group (n=26)	Statistical test
Age/years			
Mean ±SD	33.88±9.2	32.73±8.45	P value 0.644
Range (Min-Max)	(21-53)	(21-53)	t= 0.46a
Gender (N, %)			
Male	19(73.1)	15(57.7)	P value 0.244
Female	7(26.9)	11(42.3)	χ^2 =1.36b
Marital status (N, %)			
Single	18(69.2)	18(69.2)	P value 0.270
Married	4(15.4)	7(26.9)	χ^2 = 2.62b
Divorced	4(15.4)	1(3.8)	
Education (N, %)			
Primary	2(7.7)	5(19.2)	
Preparatory	4(15.4)	3(11.5)	P value 0.601
Secondary	14(53.8)	11(42.3)	χ^2 = 1.87b
University	6(23.1)	7(26.9)	
Occupation (N, %)			P value .266
Unemployed	16(61.5)	12(46.2)	χ^2 =1.24b
Employed	10(38.5)	14(53.8)	
Residence (N, %)			
Urban	14 (53.8)	13(50)	P value 0.781
Rural	12 (46.2)	13(50)	χ^2 =0.08b

BD=bipolar disorder (in remission), HC=Healthy Control, a: t-test, b: Chi-square test

Table 2: Clinical characteristics and current medications of the BD group (in remission).

Variable	BD group (n=26)
Duration of BD (years) (N, %)	
Mean± SD (Min-Max)	9.54± 8.91 (1-33)
<7	12 (46.2%)
≥7	14 (53.8%)
Number of psychiatric Hospitalizations (N, %)	
Mean± SD (Min-Max)	1.08± 1.23 (0-5)
0	10 (38.5%)
1-2	13 (50%)
3-5	3 (11.5%)
Number of BD episodes (N, %)	
Mean± SD (Min-Max)	6.81±4.73 (1-15)
<6	12 (46.2%)
≥6	14 (53.8%)
History of suicidal attempts (N, %)	
Yes	15 (57.7%)
No	11(42.3%)
Current Medications (N, %)	
Risperidone	4 (15.4)
Valproic acid	16 (61.5)
Olanzapine	17 (65.4)
Lithium	10 (38.5)
Combination therapy (N, %)	
Lithium based*	7 (26.9)
Non-lithium based**	12 (46.2)
Total	19 (73.1)
Monotherapy (N, %)	
Lithium	3 (11.5)
Olanzapine	4 (15.4)
Total	7 (26.9)

BD: bipolar disorder * (Lithium + Valproic acid) or (Lithium + Atypical Antipsychotic; Olanzapine or Risperidone) or (Lithium+ valproic acid + Olanzapine). ** Valproic acid + risperidone or olanzapine

Table 2 provides an overview of the clinical characteristics and current medications of the BD group in remission , all of whom were diagnosed with BD type 1. The average duration of the disorder was 9.5 ± 8.91 years, with 53.8% having had BD for 7 years or more. On average, patients experienced 6.8 ± 4.73 mood episodes, and 53.8% had 6 or more episodes. The mean number of psychiatric hospitalizations was 1.1 ± 1.23, with half of patients hospitalized 1-2 times and 38.5% never hospitalized. Additionally, 57.7% of patients reported a history of suicidal attempts.

In terms of current medications, 73.1% of BD patients were on combination therapy, while 26.9% were on monotherapy. The most common medication was olanzapine, used by 65.4% of patients (15.4% as monotherapy and 50% in combination). Valproic acid was used by 57.7% of patients, typically combined

with lithium, olanzapine, or risperidone. Lithium was used by 38.4% of patients, either in combination (26.9%) or as monotherapy (11.5%).

Table 3 illustrates that the BD group in remission had a highly statistically significant lower mean of CD-RISC-25 total score (large effect size, d=2.31) and a higher mean of BIS-11 total score (large effect size, r=0.59) than the control group (P <0.001).

Table 3: Comparison of CD-RISC-25 and BIS-11 total scores between BD and HC groups.

Variable	BD group (N=26)	HC group (N=26)	Statistical test	Effect size
CD-RISC-25 score (M ± SD)	44.65±9.13	68.35±11.24	P <0.001**, t = -8.34a	Cohen's d = 2.31
BIS-11 score (M± SD)	61.19±25.72	27.81±10.59	P <0.001**, U = 106.5b	r = 0.59

BD: bipolar disorder (in remission), HC: healthy control, CD-RISC-25: Connor-Davidson Resilience Scale 25, BIS-11: Barratt Impulsiveness Scale 11
a: t-test, b: Mann Whitney U test, ** P < 0.001 highly statistically significant.
Effect size: Cohen's d, small effect: 0.2, medium effect: 0.5, large effect: 0.8
Effect size (r) according to Cohen (1988): |r| = 0.1 (small effect), |r| = 0.3 (medium effect), |r| = 0.5 (large effect)

Table 4: Logistic regression analysis to assess CD-RISC-25 and BIS-11 total scores as predictors of group type.

Model		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1a	CD-RISC-25 total scores	.376	.164	5.242	1	.022	1.457	1.056	2.011
	BIS-11 total scores	-.166	.074	5.073	1	.024	.847	.733	.979
	Constant	-13.871	6.342	4.784	1	.029	.000		

a. Variable(s) entered on step 1: CD-RISC-25: Connor-Davidson Resilience Scale 25, BIS-11: Barratt Impulsiveness Scale 11 total scores. Cox & Snell R Square: .664, Nagelkerke R Square: .886

A logistic regression analysis revealed that CD-RISC-25 and BIS-11 total scores significantly predicted the group type (healthy control group vs. BD group) with the model being highly significant ($\chi^2 = 56.73$, $p = 0.000$, $n = 52$). Higher resilience scores increased the likelihood of being in the healthy control group ($B = 0.376$, $p = 0.022$), while higher impulsivity scores decreased this likelihood ($B = -0.166$, $p = 0.024$) as shown in Table 4.

Table 5: Correlation between CD-RISC-25 and BIS-11 total scores among studied groups

BD group (in remission) (n=26)		HC group (n=26)		Total (n=52)	
rho	p-value	rho	p-value	rho	p-value
-0.355	.075	-0.187	0.360	-.513	<0.001**

**significant at < 0.01, rho: Spearman correlation, CD-RISC-25: Connor-Davidson Resilience Scale 25, BIS-11: Barratt Impulsiveness Scale 11, BD: bipolar disorder, HC: healthy control.

Table 5 shows no correlation between resilience and impulsivity total scores in both the BD group (r = -0.355, p = 0.075) and the control group (r = -0.187, p = 0.360). However, a moderate negative correlation was found between the two variables in the entire study sample with high statistical significance (r = -0.513, p < 0.001, n = 52). A simple linear regression analysis was also done and reported that impulsivity (BIS-11 total score) predicted resilience (CD-RISC-25 total score) with high statistical significance, explaining 34% of the variance in resilience as shown in figure (1), (R^2 = 0.337, Adjusted R^2 = 0.324, F(1, 50) = 25.391, B = -0.35, β = -0.58, p < 0.001). A one-unit increase in impulsivity score resulted in a 0.35 decrease in resilience score, with a confidence interval from -0.494 to -0.213.

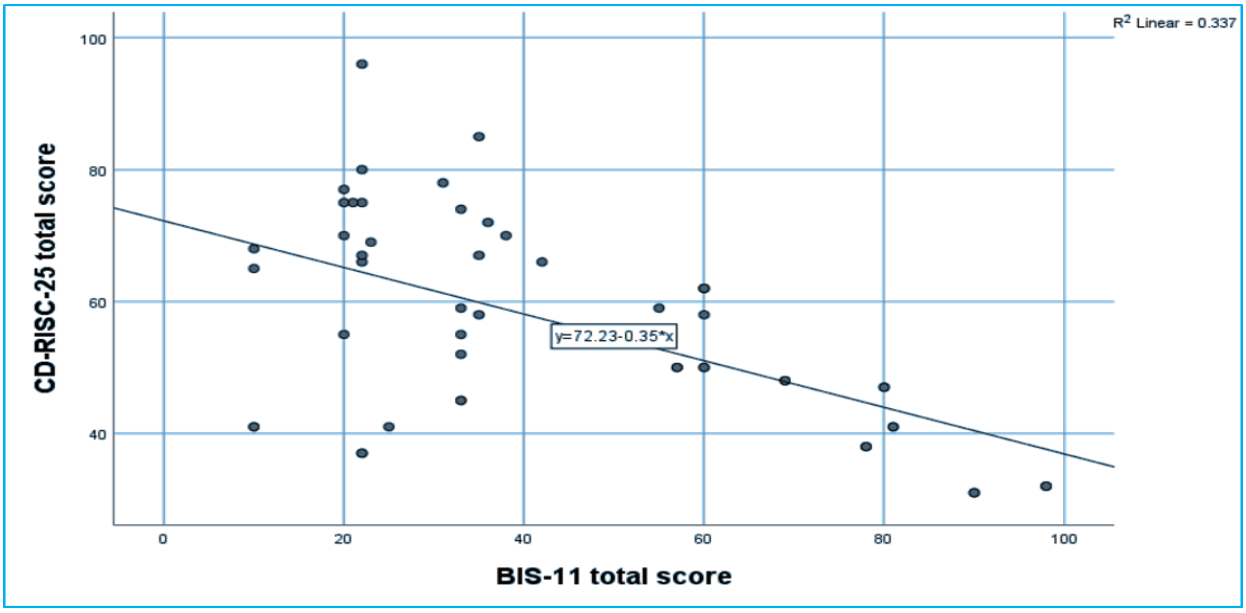

Figure 1: Scatter plot shows the relationship between CD-RISC-25 and BIS-11 total scores among the study sample.

Table 6: Factors related to Barratt Impulsiveness Scale (BIS-11) total scores among BD group (in remission)

Variable		Mean ± SD	Statistical test
Gender	Male Female	53.89±25.28 81.0±14.57	P = .014* t=-2.66a Cohen's d=1.17
Marital status	Single Married Divorced	54.61±26.77 63.0±6.93 89.0±10.39	P = 0.037* χ^2 =6.61c Effect size: η2= 0.11
History of suicidal attempt	No Yes	61.27±29.48 61.13±23.66	P = 0.989 t = -0.01a Cohen's d=0.01
On risperidone	No Yes	56.86±25.59 85±5.77	P = .026* U=12b Effect size (r)=0.45
On valproic acid	No Yes	57.7± 20.61 63.38± 28.88	P = .452 U = 65b Effect size (r)=0.16
On lithium	No Yes	60.88± 30.14 61.7± 17.96	P = .938 t =-0.08a Cohen's d=0.03
On olanzapine	No Yes	65.11±21.86 59.12±27.95	P = .582 t=-0.56a Cohen's d=0.23
Age		rho .231	P= .255
Duration of BD		rho .494	P= .010*
Number of psychiatric hospitalizations		rho .753	P= .000**
Number of BD episodes		rho .360	P= .071
Number of received medications		rho 0.264	P= .192

* Significant at p-value <0.05, ** high significant at p-value < 0.01. rho: Spearman correlation, BD: bipolar disorder.
a: t-test, b: Mann Whitney U test, c: Kruskal-Wallis-Test.
Effect size: Cohen's d, small effect: 0.2, medium effect: 0.5, large effect: 0.8.
Effect size (r) according to Cohen (1988) |r| = 0.1, small effect, |r| = 0.3, medium effect, |r| = 0.5, large effect; Effect size: Small effect: $\eta^2 \approx 0.01$, Medium effect: $\eta^2 \approx 0.06$, Large effect: $\eta^2 \approx 0.14$

Table 6 highlights factors related to impulsivity among BD patients in remission. Females had significantly higher BIS-11 scores than males (p = 0.014) with a large effect size (d = 1.17). Marital status was also significantly associated with impulsivity, the Dunn-Bonferroni test showed that the pairwise group comparison of single and divorced status had an adjusted p-value of. 034. Divorced BD patients showed higher BIS-11 scores than single patients (p = 0.037) with medium effect size ($\eta^2 = 0.11$). Risperidone use was significantly linked to higher impulsivity scores compared to other medications (p = 0.026) with medium effect size (r = 0.45). Additionally, impulsivity had a highly significant strong positive correlation with the number of psychiatric hospitalizations (rho = 0.753, p < 0.001) and a significant moderate positive correlation with the duration of bipolar disorder (r = 0.494, p = 0.01).

Table 7: Multiple linear regression analysis to assess predictors of CD-RISC-25 total score among BD group (in remission)

Coefficients [a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	17.945	5.983		2.999	.010	5.019	30.871
	Age	1.284	.144	1.323	8.924	.000	.973	1.595
	Duration of BD	-.924	.205	-.901	-4.505	.001	-1.367	-.481
	On risperidone	-8.835	2.564	-.356	-3.446	.004	-14.375	-3.295
	On valproic acid	-6.157	1.864	-.334	-3.302	.006	-10.184	-2.129
	On lithium	12.695	2.064	.690	6.150	.000	8.236	17.155
a. Dependent Variable: CD-RISC-25 total score								

CD-RISC-25: Connor-Davidson Resilience Scale 25, BD: bipolar disorder. R Square .936, Adjusted R Square .877

Table 7 presents a multiple regression analysis identifying predictors of resilience (CD-RISC-25 total score) among BD patients in remission. The following variables were entered into the analysis (Age, gender, marital status, occupation, education, duration of the disorder, number of BD episodes and hospitalizations, history of suicidal attempts, and received medications (valproate, lithium, and risperidone). The model was statistically highly significant, explaining 94% of the variance in resilience ($R^2 = 0.936$, Adjusted $R^2 = 0.877$, F (12, 13) = 15.896, p < 0.001). Age (p=.000) and being on lithium (p=.000) were significant positive predictors of resilience, while the duration of BD (p=.001), being on

risperidone (p=.004), and valproic acid (p=.006) were significant negative predictors of resilience. Age was the strongest predictor of resilience.

4. Discussion

The current study assessed resilience and impulsivity in patients with BD in the remission phase in Egypt, finding significantly lower resilience and higher impulsivity total scores in the BD group compared to the healthy control group. Other studies also found lower resilience scores in patients with BD compared to healthy individuals, either in the euthymic phase [7], [8], [9] or any mood status [31]. Although sample sizes, assessment tools, and cultures are different between studies, similar findings confirm the role and importance of resilience as a key risk factor for bipolar disorder and relapses in stress-exposed patients. On the opposite side, resilience can be seen as a dynamic concept [32], where a decline in functionality can worsen it [8], [33]. Fostering resilience in BD patients can mitigate symptoms and improve overall outcomes, requiring clinicians to plan preventive and therapeutic programs.

In line with our findings, multiple studies have shown that euthymic individuals with BD tend to have higher overall impulsivity scores than controls [8], [13], [34], supporting the idea that impulsivity could be both a trait and a risk factor for BD. However, further longitudinal research is needed to determine whether higher impulsivity occurs before illness begins [13].

In terms of the connection between impulsivity and resilience, the study found no significant correlation between them in the BD or healthy control group. However, impulsivity significantly predicted resilience in the whole study sample. This contradicts previous studies, which showed that impulsivity significantly predicted resilience in BD patients [3], and higher resilience was associated with less impulsivity [35]. These contradictory findings with our results may be due to diverse cultures and our small sample size that cannot detect a significant relationship among the BD group only. Despite these conflicting results, the connection between impulsivity and resilience can be partly explained by inverse neural circuit interactions, with low resilience and high impulsivity potentially linked to activity or volume abnormalities in the ventromedial prefrontal cortex and anterior cingulate cortex [8]. Also, resilient people frequently exhibit enhanced cognitive function, including stronger decision-making and problem-solving skills, as well as better emotion-regulating abilities, which all can aid in greater impulse control [36].

Age was found to be a significant positive predictor of resilience in the BD group of the current study, while Choi et al. [8] found no association. Montego et al. [37] suggested that older adults with BD (OABD) may have fewer strategies for coping and lower resilience. The relationship between age and resilience in individuals with BD is complex and multifaceted. While resilience generally increases with age in the general population due to more life experiences, it's not as clear in BD due to the chronic and episodic nature of the disorder that can hinder the development of resilience over time. However, patients with OABD may be considered a survivor group, learning to live with their symptoms and developing useful coping mechanisms as those with the greatest burden die at an early age [37], [38].

Females had significantly higher impulsivity than males in the current study. In contrast to us, Feki et al. [11] found that males have higher impulsivity. It can be explained that the females in our study also had lower resilience than males which may be related to elevated impulsivity. In addition, hormonal fluctuations in females may explain higher impulsivity. Our study also excluded all other potential causes of impulsivity in males such as ADHD, and personality disorders. Divorced status was also associated with significantly higher impulsivity than singles, elevated impulsivity with associated risky behaviors and aggression could explain impairment in relationships.

Additionally, our results revealed that the duration of BD was a significant negative predictor of resilience, while Choi et al. [8] found no significant relationship between them. Furthermore, inconsistent with us,

some studies have reported a negative correlation between resilience scores and the number of depressive episodes in BD [3], [7], [8], [35], as well as the total number of episodes in old age [37]. Specifying depressive episodes and elderly groups in some studies, in addition to different assessment tools could be the cause of the difference between results. Individuals with long duration of BD may have a deeper understanding of their condition and more established coping mechanisms. However, bipolar disorder can lead to decreased resilience, especially during depressive episodes, due to the chronic stress and mental and physical exhaustion of managing the disorder over many years [39]. In addition, those with fewer depressive symptoms may have more robust resilience mechanisms [40].

The study also revealed that the number of psychiatric hospitalizations and duration of BD had a significant positive correlation with total impulsivity scores. Feki et al. [11] and Swann et al. [41] found that high impulsivity was significantly related to the early age of BD onset and thus possibly longer duration of the disorder. Swann et al. [41] also found that higher impulsivity scores were associated with frequent episodes, which is inconsistent with us and Feki et al. [11], where no significant association was found between them which can be explained by our small sample sizes. Impulsivity is often associated with risky behaviors, and functional impairment [13] that may increase the risk of relapses and hospitalizations.

Lithium was a significant positive predictor of resilience in our study, with its neurotrophic effects promoting cellular proliferation and neuroprotective effects preventing cell death. Its neuroprotective properties may improve cognitive functioning, enhancing problem-solving abilities and adaptive thinking, which are crucial for resilience [42]. In contrast to lithium, valproic acid, and risperidone were significant negative predictors of resilience, and risperidone was significantly associated with high impulsivity scores. Some studies suggest that valproate helps stabilize mood, which can indirectly support resilience. However, there are concerns about potential side effects, such as cognitive dulling or emotional blunting, which might impact an individual's ability to cope with stress [43]. Risperidone is particularly effective in reducing aggression in individuals with schizophrenia rather than managing mood symptoms associated with BD. In addition, its side effects such as cognitive and emotional dullness and extrapyramidal side effects, can impact adherence, lead to relapses, reduce quality of life, and hinder daily functioning which can ultimately undermine resilience [44] and elevate impulsivity.

Our findings showed that resilience and impulsivity had no significant relationship with suicidal attempts history like Choi et al. [8], and Lee et al. [9]. In contrast, other studies have found that patients with a history of more suicide attempts tend to have lower resilience [3], [7], [35] and higher impulsivity [11], [41], [45]. A review by Watkins and Meyer [46] found that the connection between suicidality and impulsivity in BD isn't as simple as often thought, and the results of studies were inconsistent. These inconsistencies between studies may be due to different sample sizes, cultures, and assessment tools. In addition, the role of other important risk and protective factors of suicide. In our study, personality disorders and other psychiatric disorders such as substance use disorders which may increase suicidal risk were excluded.

The current study has some limitations that are important to consider. First, our small sample size makes it harder to identify significant relationships and limits how well the findings can be applied to larger populations. Second, because the study is cross-sectional, it's difficult to determine cause-and-effect relationships or understand how variables might change over time. Third, relying on self-reported measures of impulsivity can lead to recall bias and affect the accuracy of the results, as participants might not remember or report their behaviors and feelings correctly and they might report their behaviors in the manic episodes rather than the remission phase. To address these issues, future studies could use larger samples, adopt longitudinal designs to track changes over time, and include more objective measures of impulsivity to strengthen the findings and reduce potential biases.

5. Conclusion

The study found highly significant lower resilience and higher impulsivity among individuals with BD in remission compared to healthy controls, with higher resilience associated with lower impulsivity among the study sample. These results suggest that strengthening resilience may lead to better long-term outcomes. Further studies are needed to explore this relationship and determine whether resilience enhancement programs and cognitive therapies targeting impulsivity could help maintain stability and reduce the risk of relapse in these patients.

Data availability

The data are available from the corresponding author on reasonable request.

List of abbreviations

ADHD: Attention Deficit Hyperactivity Disorder.
BD: Bipolar disorder.
BIS-11: Barrat Impulsiveness Scale-11.
CD-RISC-25: Conner Davidson Resilience Scale –25.
DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, fourth edition.
HDRS: Hamilton depression rating scale.
MDD: Major depressive disorder.
OABD: Older adults with bipolar disorder.
SCID: Structured Clinical Interview for DSM-IV.

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Authors' contributions

Study conceptualization, methodology: WE, ME, MA. Data collection: MA. Data analysis, interpretation: MA, AE, WE, ME. Writing, editing: AE. Supervision and review: WE, ME, AE. Main supervisor: WE. All authors read and approved the final manuscript.

Ethics declarations

Ethics approval and consent to participate.

All methods were conducted according to the ethical principles of the Declaration of Helsinki. Approval for the study was obtained from the Research Ethics Committee at the Faculty of Medicine, Suez Canal University, with approval number 5025, prior to the beginning of the fieldwork. Additionally, written informed consent was obtained from all participants who chose to participate in the study.

Consent for publication

Consent from the subjects was obtained for publication

Competing interests

All authors declare that they have no competing interests.

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