Care burden and associated factors among caregivers of patients with bipolar type I disorder

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Abstract

Background Family caregivers play a significant role in providing care for these people at home and need new evidence on the outcomes of their caregiving. Caregiving for people with chronic psychiatric disorders, especially Bipolar type I Disorder (BD-I), is a major challenge in the healthcare system. This study aimed to examine the relationship between caregiver burden, resilience and optimism in family caregivers of patients with BD-I.

Methods This study used a cross-sectional design and involved 209 family caregivers of people with BD-I by convenience sampling method. Data were collected using the Zarit Burden Inventory (ZBI), Connor-Davidson Resilience Scale (CD-RISC), and Revised Life Orientation Test (LOT-R). The participants were selected from the list of family caregivers covered by the Ibn Sina Hospital's health clinic in Mashhad, Iran. The data were analyzed using descriptive statistics and multiple regression analysis with a significance level of 0.05.

Results The average ages of the caregivers and their patients were 45.43 (13.34) and 36.7 (14.05), respectively. The average caregiver burden score was 41.92 (19.18), which was moderate (31 to 60). The predictors of caregiver burden in this study were caregiver-related factors such as optimism ($p < 0.001$, $\beta = 0.25$) and employment status (housewife: $p = 0.038$, $\beta = 0.43$; self-employed: $p = 0.007$, $\beta = 0.12$; retired: $p < 0.001$, $\beta = 0.23$), and patient-related factors such as the presence of psychotic symptoms ($p < 0.001$, $\beta = 0.33$), daily caregiving hours ($p < 0.001$, $\beta = 0.16$), history of suicide attempts ($p = 0.035$, $\beta = 0.43$), and alcohol consumption ($p < 0.001$, $\beta = 0.85$). These variables explained 58.3% of the variance in caregiver burden scores.

Conclusion The study concluded that family caregivers of people with BD-I had moderate levels of caregiver burden and low resilience, influenced by various factors related to themselves and their patients. Psychological education interventions within the framework of mental health support systems are recommended to reduce caregiver burden in these people.

Keywords Bipolar, Caregiver burden, Optimism, Resilience

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Background

Bipolar disorder is a chronic mood disorder characterized by alternating manic or hypomanic episodes mixed with distinct periods of depression [1]. This chronic psychiatric disorder is characterized by severe mood swings, high suicide rates, impairment in psychological functions such as self-esteem (feeling of worthlessness during depression and grandiosity during mania), sleep problems, and noticeable aggression [2]. Based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), bipolar disorders are classified as bipolar type I disorder, bipolar type II disorder, cyclothymia, and other types that do not fit these subgroups [3]. Bipolar type I Disorder (BD-I) is typically the most severe form of bipolar disorder. Symptoms of BD-I include increased activity, decreased need for sleep, pressure of speech, irritability, restlessness, and altered judgment [4]. Besides these difficulties, people with bipolar disorder need comprehensive and complete care from their family caregivers [5].

Family caregivers are relatives and friends who offer unpaid care to people with chronic or disabling conditions. They play a crucial role in caring for patients and those cannot attend to their needs [6]. However, caregiving can also harm various aspects of the caregivers' lives and lower their quality of life [7]. Therefore, family caregivers should considered as they have a caregiving burden [8].

Caregiver burden is the negative impact of caring for a patient on the caregivers' mental and physical health, social life, and financial situation [9]. Research in the context of bipolar disorder has shown that caregivers of individuals with the condition experience a significant level of burden. This burden has been studied in relation to factors such as resilience, social support, self-confidence, and optimism [10–13]. Previous evidence suggests that there is an inverse correlation between caregiving burden and resilience; therefore, it is expected that caregivers with high resilience report a lower caregiving burden [14]. Resilience is a relatively new concept in the context of family caregivers.

Resilience is one of the positive psychology constructs that is defined as both an inherent personality trait and a positive adaptation process in dealing with adversities that may manifest differently depending on the situation [15]. According to the literature review, enhancing psychological resilience is important for improving mental health. Resilient people can maintain their normal functioning despite emotional distress and cope effectively with stressors [16]. Therefore, resilience is negatively related to the level of psychological distress and positively related to the way family caregivers handle difficult situations and reduce their caregiving burden. A study among family caregivers of bipolar patients showed that resilience allows caregivers to manage themselves well in times of caregiving burden and respond positively to the patient's caregiving needs [11]. In the present study, resilience refers to the psychological strength and adaptability of family members in dealing with various challenges in caring for patients with bipolar disorder at home.

Another factor that considered as reducing the caregiving burden is optimism. Optimism has different meanings [12]. It defined as a tendency to perceive, explain, and evaluate life in a positive rather than negative way, and to expect future events to be fortunate rather than unfortunate [17]. On one hand, based on a general expectation of success, optimism which reflects a positive attitude toward the future [18]. On the other hand, it can also be based on a set of Generalized Expectancies of Control (GEC). Based on a first-order structure, it includes: (a) self-efficacy, the belief in one's ability to perform effective actions. (b) Contingency or internal locus of control, the expectation that the outcome of any event depends on one's actions. (c) Success or outcome expectations, the probability of achieving a goal or desired outcome [19, 20].

In the context of family caregivers, self-efficacy, optimism, and self-esteem all independently associated with a better "good life" [21]. Previous studies have shown that optimism is negatively related to caregiver burden and positively related to quality of life and well-being in various family caregivers [22–24]. However, there is a lack of studies that explore optimism and caregiver burden in caregivers of people with type I bipolar disorder. Optimism, flexibility, and other positive appraisals may have a protective role in how a caregiver perceives the care situation of their patient. It is worthwhile to investigate the role of these factors in well-being, especially since they may be changeable. Understanding the role of these factors in well-being, especially considering their potential for change, is worth investigating [25].

Family caregivers, with the support of resilience and optimism as internal resources, can improve their well-being and quality of life, which can help them provide appropriate care and reduce the risk of caregiver burden. Therefore, this study was conducted with the aim of evaluating the relationship between caregiving burden with optimism and resilience in family caregivers of patients with BD-I.

Methods

The present study was conducted with a cross-sectional design involving 209 family caregivers of type I bipolar patients in Mashhad, northeastern Iran. After obtaining the necessary permits, the list of patients who visited the clinic of Ibn Sina Psychiatric Hospital (the largest referral center for psychiatric patients in eastern Iran) was reviewed from August 15th to November 20th, 2023. The

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family caregivers of these patients were identified and contacted by phone. The researchers assessed the caregivers for the inclusion and exclusion criteria. The eligible participants were then selected using the convenience sampling method. The inclusion criteria were having a confirmed diagnosis of BD-I in patients by a psychiatrist (as stated in the file), the caregivers' ability to read and write well enough to complete the questionnaires, caring for a patient with BD-I, having no physical disability, and providing care for the patient for at least 6 months [26]. The exclusion criteria were and having severe psychiatric disorders or using neuroleptic drugs (based on the caregivers' self-report). In this study, one caregiver was excluded because they had been caring for less than six months.

Tools

A demographic information form and three questionnaires including the Zarit Burden Inventory (ZBI), the Connor-Davidson Resilience Scale (CD-RISC), and the Revised Life Orientation Test (LOT-R) were used to collect data through self-reporting. These tools were provided to the participants in the form of a web-based questionnaire via an SMS link.

In this study, the demographic information form included questions about age, sex, education, occupation of the patient and the caregiver, marital status, family income level, insurance status, duration of the disease, secondary support for the patient, underlying medical conditions in the caregiver, average hours of patient care, presence of other psychiatric patients in the family, history of suicide attempts, substance abuse, alcohol consumptions and psychotic symptoms in the patient, history of aggression in the patient and relation to the patient.

The Zarit Burden Inventory (ZBI) was developed by Zarit et al. to measure caregiver burden. This tool consists of 22 items that are answered on a five-point Likert scale from never (score 0) to always (score 4). The minimum and maximum possible scores are 0 and 88, respectively, and higher scores indicate greater caregiver burden. The scores were classified as mild (less than 30), moderate (31–60), and severe (61–88) [27]. The internal consistency of the Persian version of this tool was evaluated by Mousaei et al. using Cronbach's alpha coefficient of 0.85 [28].

Resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC). The scale consists of 25 items on a five-choice Likert scale (completely false=0, rarely true=1, sometimes true=2, often true=3, and always true=4). Therefore, the maximum and minimum score is between 0 and 100. A higher score indicates greater resilience [29]. Connor and Davidson reported a Cronbach's alpha coefficient of 0.89 for the resilience scale. The test-retest reliability of this scale was 0.87 over four weeks. The internal consistency of the CD-RISC subscales was estimated by Sharif Nia et al. to be between 0.869 and 0.681 using Cronbach's alpha coefficient [30].

The Revised Life Orientation Test (LOT-R) is a 10-item questionnaire that measures the level of optimism, with a total score of 0 to 24. Higher scores indicate higher optimism. Each item of the questionnaire is rated from zero (totally disagree) to four (I agree). Four items (No. 2, 5, 6, and 8) are filler items and are not scored. The scores of the six remaining items are added together [31]. The internal consistency of this questionnaire was reported to be 0.74 using Cronbach's alpha coefficient. In Iran, the content validity index of the whole test (CVI) was 0.8 and the internal consistency was 0.7 using Cronbach's alpha coefficient, as reported by Kuchi et al. [32].

Sample size

By utilizing the correlation coefficients between caregiving burden and resilience (r=-0.61) as well as between caregiving burden and optimism (r=-0.29), which were documented in previous studies [22, 33], and assuming an alpha of 0.05, 90% power, and accounting for the possibility of data loss, the sample size was estimated at 210 individuals.

Data analysis

The data were reported using descriptive statistics of frequency, percentage (for variables such as gender, marital status, education, occupation, health insurance, and the presence of underlying medical conditions in caregivers and patients, relation to patients in caregivers and substance abuse, alcohol consumptions and psychotic symptoms in the patient), mean and standard deviation (for variables such as patient and caregiver's age, duration of disease and hours of daily care). The multiple linear regression analysis using the backward method to identify the predictors of caregiving burden (all variables were tested by univariate linear regression analysis at the significance level of 0.2 and all significant variables were entered into the multivariate model) in SPSS software, considering the significance level of 0.05.

Ethical considerations

Ethical principles such as avoiding harm to the participants, the right to withdraw from the study, the right to freely enter the research, and the confidentiality of information were observed in this study. Moreover, the researchers adhered to the principles of the Committee on Publication Ethics (COPE) in publishing the findings. The Ethics Committee of Shahroud University of Medical Sciences (SHMU) granted approval for this study under the reference number IR.SHMU.REC.1401.077.

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Table 1 Demographic information of patients and their caregivers

Variables		Caregiver		Patient	
		N	%	N	%
Gender	Male	120	57.4	62	29.7
	Female	89	42.6	147	70.3
Marital status	Single	175	83.7	113	54.1
	Married	34	16.3	96	45.9
Level of education	Elementary school	93	44.5	103	49.3
	Secondary school	57	27.3	75	35.9
	High school	7	3.3	8	3.8
	Academic degree	52	24.9	23	11.0
Employ-ment status	Unemployed	8	3.8	87	41.6
	Housewife	56	26.8	78	37.3
	Self-employed	84	40.2	15	7.2
	Retired	20	9.6	7	3.3
	Employee	36	17.2	5	2.4
	Student	5	2.4	17	8.1
Underlying medical conditions	No	167	79.9	173	82.8
	Yes	42	20.1	36	17.2
		Mean	SD	Mean	SD
Age (year)		45.43	13.34	36.7	14.05

Abbreviations: n: Frequency; %: Percent; SD: Standard deviation;

Table 2 Mean scores of care burden, resilience and optimism among caregivers of patients with BD-I

Variables		N	%
Care burden	Low	60	28.7
	Moderate	110	52.6
	Severe	39	18.7
Resilience	Low	169	80.9
	High	40	19.1
		Mean	Standard deviation
Care burden		41.92	19.18
Resilience		39.74	12.23
Optimism		14.37	4.92

Abbreviations: BD-I: Bipolar Disorder Type 1; n: Frequency; %: Percent;

Results

This study showed that the caregivers and their patients had average ages of 45.43 (13.34) and 36.7 (14.05), respectively. About one-third of the caregivers (71 people) were parents of their patients. Seventy-eight individuals (37.3% of the caregivers) reported that, in addition to the current patient, they also provided care for another family member with a mental illness. The caregivers in the study gave an average of 8.19 (6.20) hours of care to their patients daily. About one-fifth of the patients (37 people) did not have health insurance. Also, 25.8%, 19.1%, and 55.5% of the patients had a history of substance abuse, alcohol consumption, and psychotic symptoms, respectively. On average, 7.55 (7.54) years had elapsed since the diagnosis of BD-I among them. Moreover, 40.7% (85 people) and 90.9% (190 people) of the patients had a history of suicide

Table 3 Assessment the influence of patient-related and caregiver-related variables on the burden of care based on multiple regression analysis

Variables	β	SE	t	p
Intercept	47.39	4.56	10.38	< 0.001
History of suicide attempts	4.43	2.08	2.12	0.035
Student	Reference			
Unemployed	-6.11	3.50	-1.74	0.083
Housewife	-7.43	3.55	-2.09	0.038
Self-employed	-12.50	4.58	-2.72	0.007
Retired	-23.37	5.86	-3.98	< 0.001
Employed	-12.31	6.50	-1.89	0.060
History of alcohol consumption	8.85	2.72	3.25	0.001
Having psychotic symptoms	12.33	1.89	6.51	< 0.001
Daily care hours	1.16	0.15	7.40	< 0.001
Optimism	-1.25	0.19	-6.58	< 0.001

Abbreviations: SE: Standard error; *p*: P value;

attempts and aggression. More information is provided in Table 1.

The results in Table 2 showed that about half of the caregivers (110 people) had moderate caregiving burden, and 80.9% (169 people) had low resilience. More findings are mentioned in Table 2.

To examine the variables that influenced the caregivers' burden, each variable was first tested individually using a univariate linear regression model, and then the variables with significance levels less than 0.2 were entered into the multiple regression model. The final regression model using the backward method showed that the variables in the model explained 58.3% of the variance of the caregiving burden score. The regression model showed that caregivers with patients who had a history of suicide attempts, alcohol consumption, and psychotic symptoms had higher caregiving burden scores by 4.43, 8.85, and 12.33 units, respectively. Also, for each extra hour of caregiving given to the patient per day, the caregiving burden increased by 1.16 units. The model also showed that for each unit increase in the optimism score, the average caregiving burden score decreased by 1.25 units. Caregivers who were employed, retired, or homemakers had lower caregiving burden scores than caregivers who were students by 12.50, 23.37, and 7.43 units, respectively. (Table 3)

Discussion

Caring for people with severe and chronic mental illnesses is a long-term process that has many negative consequences for the family caregivers of these people. In such situations, the caregiver may face special challenges that require resilience and optimism.

The results of this study show that the average score of caregiving burden reported by caregivers was moderate. This is consistent with previous studies that have also

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found a moderate level of caregiving burden in bipolar disorder context [11, 34, 35]. It is important to note that family caregivers of people with neurological and psychiatric conditions experience more burden than caregivers of people with other medical conditions [36]. The chronic nature of these conditions, especially psychiatric ones, can increase the caregiving burden. The findings also show that among severe psychiatric conditions, bipolar disorder has a higher caregiving burden than schizophrenia spectrum disorders [37]. Caregiving experiences and outcomes, such as caregiving burden, are influenced by internal and external factors that stem from various cultural, behavioral, social, and economic factors [38]. Among these outcomes, the optimism and resilience of caregivers can be mentioned, which have been reported in previous studies [11, 12].

In this regard, the current findings show low levels of resilience among the participants, with about 80% reporting low psychological resilience. Previous studies by Dou et al. and Su et al. have shown that resilience among caregivers of bipolar patients was moderate [11, 39]. The discrepancy in the findings can be attributed to the differences in the availability of specific caregiver facilities and support systems in Iran compared to other developed countries [40]. Other factors can also be related to cultural differences and social values in caring for a patient. For instance, in Asian and Middle Eastern countries (especially Iran), taking care of a sick family member, despite the lack of access to appropriate support systems, is highly valued socially and considered a moral and religious duty. Generally, families avoid delegating caregiving responsibilities to others and organizations until they face significant difficulties in their relationship with the patient [41]. Therefore, they may experience a decline in resilience due to providing care for a long time. In the context of mental illnesses, resilience has a special role, as increasing caregivers' psychological resilience can improve the mental health status of patients [42].

The current research has shown that the average optimism score of caregivers of BD-I patients is 14.37 (4.92). The study among family caregivers of people with depression reported a similar score of 16.41 (4.63) [43]. Optimism is closely related to better mental health. The literature review suggests that family caregivers of individuals with psychiatric disorders are commonly engaged in a recovery process. This is a dynamic and deep process that is driven by hope and optimism. Specifically, hope is directly linked to personal goal achievement, while optimism is mainly focused on the quality of expected future outcomes [44]. "Being caregiver" is an identity based on a role that family caregivers are often not ready for. Therefore, self-confidence and optimism about future outcomes are expected to be very important for caregivers. However, negative caregiving experiences may also reduce these valuable psychological resources if caregivers are not well supported [21].

The current research findings have also shown a significant relationship between optimism and caregiving burden. In agreement with this finding, Ayyıldız et al. showed that in the context of BD-I, increased caregiving burden in caregivers is associated with lower self-confidence and optimism [12]. It is worth noting that traditionally, disorders such as bipolar disorder and schizophrenia are considered as degenerative and chronic disorders with limited chances of improvement [45], However, the term "improvement" has different meanings for different people and does not necessarily mean a cure or complete relief of symptoms. In this context, optimism is an important factor related to improvement in terms of readjustment and realignment with the challenges caused by the illness [40, 46]. Optimism plays a central role in caregivers' coping strategies, aiding them in managing the adverse effects of mental illness. It serves as a crucial factor in maintaining caregivers' well-being and enabling them to progress positively in their caregiving journey [47]. As shown in the study by Coloni-Terrapon et al., the main factors related to the recovery process of people with depressive disorder are the duration of the illness and the level of optimism of the caregivers [43]. Similarly, in other psychiatric disorders such as Autism Spectrum Disorder (ASD) and Alzheimer's disease (AD), studies have shown that optimism has a negative correlation with caregiving burden [22, 48].

The current study findings indicate that there is no significant relationship between resilience and caregiving burden. This is contrary to the previous findings in psychiatric contexts that have suggested a significant relationship between these two variables [11, 14, 49, 50]. Despite the high importance of resilience in reducing negative caregiving outcomes, the lack of a significant relationship between these two variables may be due to reasons such as limited sample size or the use of non-specific tools to measure caregiving burden and resilience in caregivers of BD-I patients. The lack of correlation in the current study means that there is no statistically significant relationship that has observed but this relationship may exist in reality, which cannot be evaluated with the design of the current study. Therefore, it recommended that these issues be considered in future studies to examine the relationship between these two variables in the field of BD-I.

Another factor that affects caregiving burden is the employment status of caregivers. Housewives, retirees, and self-employed people reported lower caregiving burden than students. This may be because self-employed people, housewives, and retirees have more flexibility in managing their daily tasks. Since a bipolar patient may have unpredictable needs during the day, it is easier for

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these people to provide better support. Family caregiving in Iran, despite being informal and unpaid, essentially constitutes a full-time commitment that may be incompatible with other full-time income-generating jobs. As a result, caregivers may encounter role conflict, further intensifying the burden of caregiving [51]. This observation can also be viewed from an alternative perspective. Providing unpaid support to family and friends with mental disabilities can limit the caregiver's ability to participate in paid employment, so they may opt for part-time or self-employed jobs [52]. This finding can be interpreted in two ways, but the current study could not examine the cause-and-effect relationships.

In addition to caregiver characteristics, certain aspects of the patients themselves may contribute to the burden of caregiving. For instance, this study identified a significant association between the hours devoted to daily patient care and an elevated caregiving burden. This finding aligns with previous research within the bipolar disorder domain [11, 53]. The authors propose that caregivers who prioritize the care of their family members may find themselves with limited time for their own daily affairs. Apart from the direct burden of caregiving, this constraint may hinder caregivers from addressing their own economic, social, and personal matters, thereby adding concealed and indirect burdens. Recognizing this, there arises a necessity for support systems in the realm of mental disorders. The establishment of a community-based support system could potentially overcome these barriers, subsequently enhancing the health-seeking behaviors and outcomes of the patients [54, 55].

Individuals with BD-I may experience psychotic symptoms, such as delusions or hallucinations, during their manic phases [56]. The present study underscores that the presence of psychotic symptoms in patients constitutes a factor that intensifies caregiver burden. This aligns with the findings of a meta-analysis and systematic review, which demonstrated that providing care for patients with psychiatric disorders featuring psychotic symptoms is more demanding than caring for those without such symptoms [57]. Caregivers of individuals with BD-I who exhibit psychotic features, particularly positive symptoms, should maintain vigilant monitoring due to the potential for harmful behaviors towards themselves or others. This heightened vigilance is crucial because these symptoms may lead to aggression, impulsivity, suicide or homicide risks, poor adherence to treatment, and other behaviors that can exacerbate the caregiving challenges for family members [58].

This study reveals that a history of alcohol consumption in patients serves as a positive predictor of increased caregiver burden. Although there is a paucity of research exploring the correlation between alcohol consumption in patients and caregiver burden within the realm of psychiatric illnesses, analogous studies in other fields have been conducted. Supporting this notion, a study conducted by Shrestha et al. demonstrated that alcohol consumption constitutes a recognized exacerbating factor for caregiver burden among those caring for individuals with cancer and cirrhosis [59]. This could be attributed to alcohol consumption exacerbating the underlying medical conditions, resulting in heightened mood symptoms, drug interactions, and increased complexity in patient care. A review study identified a connection between alcohol consumption in bipolar patients and an elevated risk of suicide [60].

The study found that a history of suicide attempts in patients predicts a heightened caregiver burden, potentially leading to the patient's death. Family caregivers must constantly monitor the patient's condition and take appropriate actions. A qualitative investigation highlighted that caregivers of bipolar patients see suicide as the ultimate threat, struggling to understand and manage suicidal behavior in patients [61]. These caregivers often shoulder the main responsibility for patient safety but may avoid seeking supportive services after a suicide attempt or self-harm incident. A meta-ethnographic study indicated that caring for patients with suicidal thoughts or a history of attempts results in increased psychological distress and decreased well-being for caregivers, surpassing what has been covered in most previous research. This issue is particularly pronounced in Iran, where suicide is culturally and socially stigmatized, discouraging families from seeking needed services [62]. These fears inhibit them from seeking appropriate health and social services. In such circumstances, social support programs and formal support from social and health service providers, as well as their social network (relatives, neighbors, etc.), are often unsatisfactory, further intensifying the caregiver burden [63]. Another qualitative study confirmed that living with individuals with suicidal thoughts or a history of attempts is a significant challenge, negatively affecting the mental and physical health of the entire family [64].

This research has some limitations, including a small sample size and a cross-sectional design. To elucidate causal relationships between variables, future studies should employ larger sample sizes and longitudinal designs. Additionally, the data collected in this study pertaining to caregiving burden, optimism, and resilience relied on caregivers' self-reports, introducing the possibility of response bias and potentially limiting the external validity of the results. However, it is worth noting that this study stands as the sole examination of the role of resilience and optimism as two critical variables in the context of bipolar disorder, serving as potential predictors of caregiving burden in caregivers of BD-I patients. In addition, some variables related to patients (such as

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type of recent episode, number of episodes, number of hospitalizations, and treatment adherence) were not evaluated due to the incompleteness of the database of the referring hospital.

Conclusions
This study found that caregivers of BD-I patients experience a moderate level of burden, influenced by factors such as caregiver optimism, employment status, and patient-related issues including psychotic symptoms, daily caregiving hours, history of suicide attempts, and alcohol use. Although resilience among caregivers was low, it did not significantly correlate with caregiving burden. To alleviate this burden, targeted interventions that focus on boosting optimism are recommended. Moreover, caregivers managing patients with complex needs should receive additional and specialized support.

Abbreviations
BD-I	Bipolar type I Disorder
ZBI	Zarit Burden Inventory
CD-RISC	Connor-Davidson Resilience Scale
LOT-R	Revised Life Orientation Test
DSM-V	The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
CVI	content validity index
COPE	Committee on Publication Ethics
ASD	Autism Spectrum Disorder
AD	Alzheimer's disease

Author contributions
Study design: S. M., F. IP., M. G., S. MM., MH. B., H. E.; Data collection: F. IP., M. G., S. MM.; Data analysis: S. M., MH. B.; Study supervision: S. M., H. E.; Manuscript writing: All authors (S. M., F. IP., M. G., S. MM., MH. B., H. E.). All authors have read and approved the final manuscript.

Data availability
The dataset(s) supporting the conclusions of this article is(are) included within the article (and its additional file(s)).

Declarations

Ethical approval and consent to participate
Ethical principles such as avoiding harm to the participants, the right to withdraw from the study, the right to freely enter the research, and the confidentiality of information were observed in this study. Moreover, the researchers adhered to the principles of the Committee on Publication Ethics (COPE) in publishing the findings. Written and oral informed consent was obtained from all subjects The Ethics Committee of Shahroud University of Medical Sciences (SHMU) granted approval for this study under the reference number IR.SHMU.REC.1401.077. All methods were carried out in accordance with relevant guidelines and regulations or Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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