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Review Article

Psychological resilience and mood disorders: a systematic review and meta-analysis

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Psychological resilience and mood disorders: a systematic review and meta-analysis

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Conflict of interest

On behalf of all authors, I assure that there are no conflicts of interest between authors and institutions where the project was developed.

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Manuscript Details

The manuscript has 4427 words. There are 2 Figures and 1 Table. The last literature search was completed on November 6, 2020.

Abstract

Objective: This systematic review is aimed at describing the relationship between psychological resilience and mood disorders.

Methods: This is a systematic review and meta-analysis. The following databases were searched: PubMed, PsycINFO, and Embase on November 6, 2020.

Results: 23 articles were included, and the majority of the studies included (95.7%) showed a positive impact of psychological resilience in mood disorders. Our meta-analysis showed that individuals with bipolar disorder presented significantly lower levels of psychological resilience as compared to controls (Standardized Mean Difference (SDM): -0.99 [CI 95%: -1.13 – -0.85], p<0.001). In addition, individuals with depression had significantly lower levels of psychological resilience as compared to controls (SDM: -0.71 [CI 95%: -0.81 – -0.61], p<0.001).

Conclusion: Our results showed that individuals with mood disorders are less resilient than individuals without mood disorders. Our findings reinforce the importance of investigating interventions that may help to increase psychological resilience considering its positive impact in the context of mood disorders.

1. Introduction

Mood disorders present a high prevalence worldwide and are associated with increased rates of disability. The lifetime prevalence of major depressive disorder (MDD) in high-income countries is 14.6%[1], and the prevalence in low-middle income countries is 11.1%[1], while the lifetime prevalence of bipolar disorder (BD) worldwide is 2.4%[2]. Mood disorders are associated with reduced quality of life[3], increased functional impairment[4], and increased suicide risk[5], even in a young adult population. Importantly, in a large population-based cohort study, Frey et al., (2020) showed that mood disorders were associated with elevated and early rates of disability services[6]. This data reinforces the negative impact of mood disorders in an individual's life. Hence, evaluating strategies that can potentially limit this negative impact is necessary.

Current literature suggests a relationship between childhood adversity and mood disorders. Being a victim of bullying and emotional abuse or emotional neglect during childhood has been shown to be strong predictors of depression[7]. Importantly, a recent study showed that resilience partly mediated the association of childhood trauma to both mood disorders and severity of depression, meaning that individuals who suffered from trauma but were more resilient were less likely to develop mood disorders[8]. This reinforces the importance of studying resilience in the context of mood disorders.

Resilience is a complex multidimensional construct defined as the ability to adapt successfully in the face of stress and adversity, maintaining normal psychological and physical functioning[9]. According to the American Association of Psychology, psychological resilience is the ability to be able to "bounce back" from stressful times[10]. Currently, to the best of our knowledge, there are only two systematic reviews that assessed the relationship between mental health and resilience. Siriwardhana et al., (2014) examined the relationship between mental health and resilience in adults who were forced to migrate and showed a positive

impact of resilience on the mental health of these individuals[11]. In addition, Färber et al. (2018) examined the relationship between mental health and resilience in somatically ill adults and concluded that higher resilience led to better mental health when participants were suffering from a physical illness[12]. It is important to highlight that these reviews were focused on specific populations (individuals forced to migrate and individuals with somatic illness), and they did not specifically assess the impact of psychological resilience on mood disorders.

Thus, the aim of our systematic review was to describe the impact of psychological resilience in mood disorders.

2. Methods

The Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines were followed for the present review.

2.1. Protocol Registration

A protocol for this systematic review was registered prospectively in PROSPERO under the ID "CRD42020214767" on November 23, 2020.

2.2. Search strategy

A literature search with no year or language restrictions was conducted on November 6, 2020, using the following databases: PubMed, PsycINFO, and Embase. We searched for a combination of the following search items ("mood disorder" OR "mood disorders" OR "depression" OR "major depression" OR "major depressive disorder" OR "depressive episode" OR "dysthymia" OR "bipolar disorder" OR "bipolar disorders" OR "mania" OR "manic" OR "hypomanic") AND ("resilience" OR "Psychological Resilience" OR "Psychological Resiliences"). The search yielded 15, 749 articles: (PubMed= 5,052, PsycInfo= 4,783, and Embase= 5,914), with 9,903 remaining after duplicate removal (5,846 removed).

To determine whether an article was relevant to our study, we used the following inclusion criteria: (1) the study should present original data, (2) cross-sectional studies should include individuals with depression or bipolar disorder and

compare their levels of resilience with individuals without depression or bipolar disorder, (3) prospective cohort studies and clinical trials should include individuals with depression or bipolar disorder and assess the effect of resilience on mood symptoms over time. The exclusion criteria were: (1) reviews and meta-analyses, (2) case reports or case series, and (3) conference abstracts.

The studies were assessed by two blinded raters (ST and AI), who determined if the studies met the inclusion criteria. The two raters assessed manuscripts independently using the Rayyan platform, and divergences were resolved in a meeting with another researcher (TC). Firstly, the raters screened articles by title and abstract, and after by full text. All articles not fulfilling the search criteria were excluded. The details of the search strategy are presented in Figure 1.

Figure 1: PRISMA 2009 Flow Diagram.
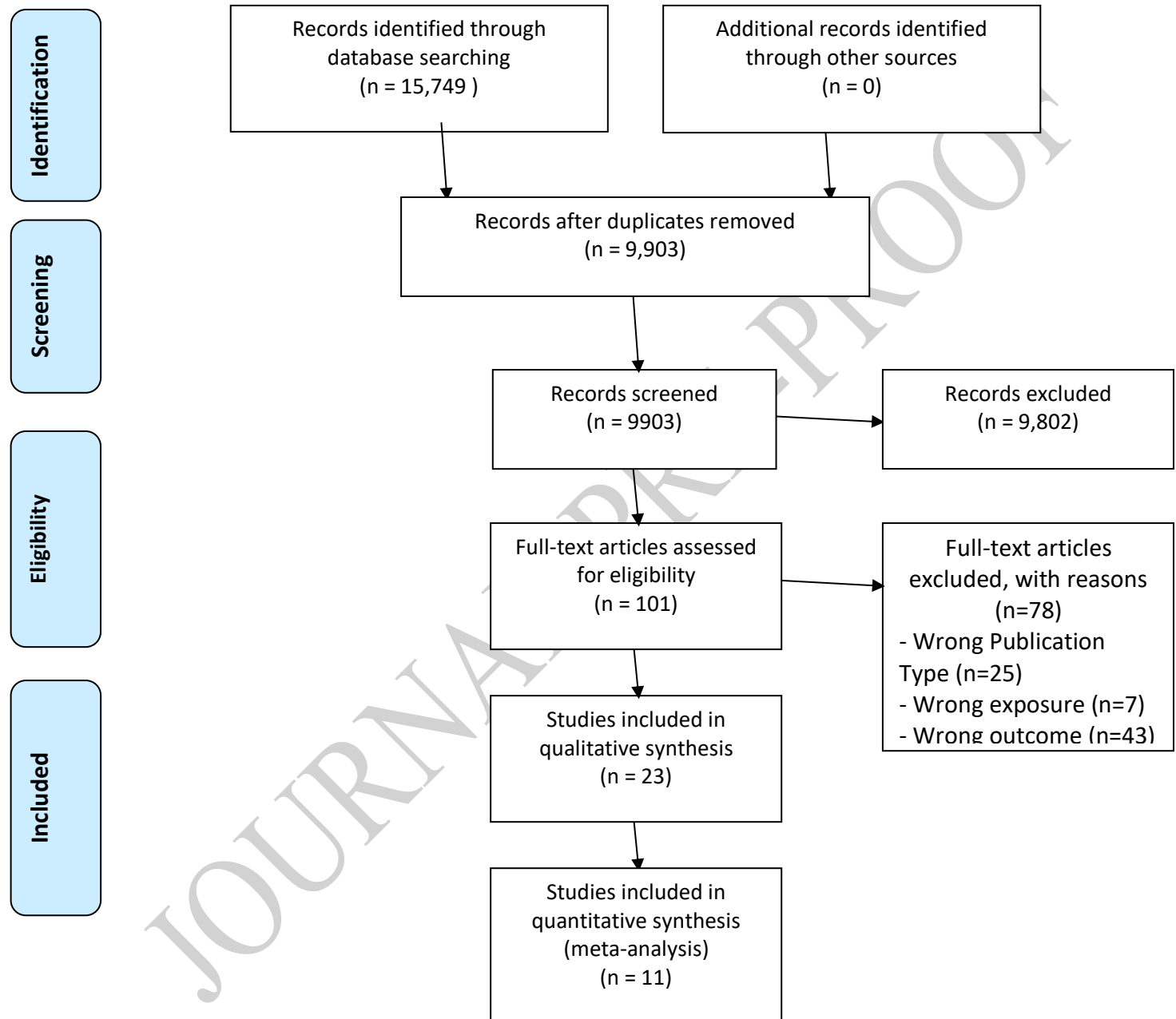
2.3. Data extraction

Two researchers (ST and AI) were involved in the data extraction process. We extracted: authorship, year of publication, the country where the study took place,

study aims, characteristics of the population, confounding variables controlled, assessments, and main results.

2.4. Quality assessment

All 23 studies included were independently assessed by two blind researchers (ST and AI) using the JBI critical appraisal tools. Disagreements were resolved during a meeting with another researcher (TC).

2.5. Statistical analysis

Meta-analyses were conducted using the software Review Manager 5.4. Random effects analyses were performed to compare the psychological resilience scores between individuals with BD and controls, as well as between individuals with depression and controls. For this purpose, the reported means, sample sizes, and standard deviation were used to compute the standardized mean difference between the groups. Significance was set as $p < 0.05$. Cochrane's Q test was performed to assess statistical heterogeneity, and the Higgins I2 statistic was used to determine the extent of variation between sample estimates with values ranging from 0 to 100%. If the information was not reported in the paper, we contacted the authors asking for additional information in order to include their paper in the meta-analysis.

3. Results

The literature search resulted in 15,749 articles from the three databases PubMed (5,052), PsycINFO (4,783) and Embase (5,914). Of these, 5,846 were duplicates, and 9,802 studies were excluded as the titles and abstracts were not relevant to the research topic, leaving 101 potentially eligible studies for full-text screening. After this stage, 78 studies did not meet the inclusion criteria, and a total of 23 studies were included in the systematic review.

The characteristics of the studies included are described in Table 1. The publication dates ranged from 2000 to 2020. The studies were conducted in many different countries, such as: the United States (*n*=5), China (*n*=3), South Korea (*n*=3), Brazil (*n*=2), Turkey (*n*=2), Taiwan (*n*=1), Russia (*n*=1), Japan (*n*=1), Austria (*n*=1),

Greece (*n*=1), Sweden (*n*=1), Belgium (*n*=1) and Scotland (*n*=1). All studies had a total sample size that ranged from 52 to 213,693 individuals. All studies included individuals with mood disorders (depression and/or bipolar disorder) and assessed psychological resilience. The Connor-Davidson Resilience Scale (CD-RISC) was the most common assessment used to measure psychological resilience. MDD was most commonly assessed using the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). BD was most commonly assessed using the ICD criteria. Seventeen studies had a cross-sectional design, four studies had a longitudinal study design, and two were interventional studies.

3.1. Psychological resilience and mood disorders: evidence from cross-sectional *studies*

Seventeen cross-sectional studies compared psychological resilience between individuals with mood disorders (depression or BD) and individuals without mood disorders. The studies assessed a diverse population, including pregnant women, children, adults, and individuals facing stressful/traumatic situations. All 17 studies found that individuals with mood disorders were less resilient than individuals without mood disorders.

3.1.1. Psychological resilience and mood disorders during pregnancy

Zhang et al., (2020) examined the prevalence of prenatal depression and explored its associated factors[13]. The study included 605 pregnant women divided into women with prenatal depression (*n*=172) and women with no prenatal depression (*n*=433). Depression was assessed using the self-reported instrument "Center for Epidemiologic Studies Depression Scale (CES-D)." The study found that women with prenatal depression had a lower psychological resilience score than women without prenatal depression.

3.1.2. Psychological resilience and mood disorders in children

Elmore et al., (2020) examined the association between adverse childhood experiences and positive childhood experiences on the outcome of depression[14]. The

study included 40,302 children 8 years or older <mark>that were</mark> divided into a currently depressed group (*n*=2,174) and a not currently depressed group (*n*= 38,128). Depression was assessed using a self-reported assessment, the National Survey of Children's Health (NSCH). The study found that child psychological resilience reduced the odds of depression four-fold, and children who were currently depressed were less likely to report child psychological resilience.

3.1.3. Psychological resilience and mood disorders in adults

Seok et al., (2012) examined the relationship between early-life stress, depression tendency, and psychological resilience in individuals with MDD[15]. The sample included 52 individuals divided into a group with MDD (*n*=26) and a group without MDD (*n*=26). Depression was assessed using the Korean version of the Structured Clinical Interview for DSM-IV. The study concluded that psychological resilience scores were lower for the group with MDD than the group without MDD. **Cha et al., (2014)** examined the demographic and clinical factors related to psychological resilience in euthymic patients with BD[16]. The sample included 124 individuals divided into a group with BD (*n*=62) and a group without BD (*n*=62). BD was diagnosed following the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV-TR) criteria. The study concluded that psychological resilience scores were lower in the group with BD than in the group without BD. **Ozawa et al., (2017)** examined the degree and quality of psychological resilience in patients with depression who had never been investigated in the context of remission status, spirituality/religiosity, and family members' psychological resilience levels prior to participating in this study[17]. The sample included 136 individuals divided into individuals without depression (*n*=36) and individuals with depression (*n*=100). Depression was assessed using the International Classification of Diseases (ICD) criteria. The study concluded that psychological resilience scores were lower in the depressed group compared to the control group. **Deng et al., (2018)** examined the relationship between psychological resilience and cognitive functioning in individuals with schizophrenia and BD[18]. The sample included 167 individuals divided into a group with schizophrenia (*n*=81), a group with BD (*n*=34) and a group with no mood disorders

(*n*=52). Mood disorders were diagnosed with a clinical interview. The study concluded that psychological resilience scores were lower in groups with schizophrenia and BD compared to the control group. **Bozikas et al., (2018)** examined the association between resilience and social functioning in patients with BD[19]. A sample of 80 individuals was divided into a group with BD (*n*=40) and a group without BD (*n*=40). BD was diagnosed according to DSM-IV, and the diagnosis was confirmed by the Greek version of the Mini-International Neuropsychiatric Interview. The study concluded that psychological resilience scores were lower in the group with BD than in the control group. **Post et al., (2018)** examined the impact of psychological resilience, internalized stigma, and psychopathology on Quality of Life (QoL)[20]. The sample included 137 individuals divided into a group with BD (*n*=60) and a group without BD (*n*=77). BD was diagnosed following the DSM-IV-TR criteria. The study concluded that psychological resilience scores were lower in the group with BD compared to the group with no BD. **Vieira et al., (2020)** examined the mediation effect of psychological resilience on the relationship between childhood trauma and mood disorders[8]. The sample included 1,244 individuals that were divided into a group with MDD (*n*=317), a group with BD (*n*=90) and a group with no mood disorders (*n*=837). Mood disorders were assessed using the Mini-International Neuropsychiatric Interview (MINI-PLUS). The study concluded that psychological resilience scores were lower in mood disorder groups than in the control group. **Uygun et al., (2020)** examined the association of psychological resilience with the onset of disease, QoL, and prognosis of BD in euthymic patients[21]. The sample included 120 individuals divided into a group with BD (*n*=90) and a group without BD (*n*=30). BD was diagnosed through a clinical interview. The study concluded that psychological resilience scores were lower in the group with BD compared to the group with no BD.

3.1.4. Psychological resilience and mood disorders during stressful/traumatic situations

Aroian et al., (2000) examined the relationship between psychological resilience, demographic characteristics, immigration demands, and depression in a sample of 450 adult Russian immigrants to Israel between 1990 and 1995[22]. The

sample was divided into a group with depression (*n*=241) and a group without depression (*n*=209). Depression was assessed using the self-reported 13-item Depression Scale (Russian language version of the Symptom Checklist 90-R). The study concluded that individuals with high psychological resilience scores had more than a two-fold likelihood of not being depressed compared to individuals with a low psychological resilience score. **Hsieh et al., (2016)** examined the relationship among recent workplace violence, depressive tendency, social support, and psychological resilience of victimized nurses[23]. The sample was recruited from two hospitals in Taiwan. 159 nurses met the inclusion criteria and were divided into a group with a depressive tendency (*n*=74) and a group without a depressive tendency (*n*=85). Depression was assessed using the self-reported instrument "Center for Epidemiologic Studies Depression Scale (CES-D)", with the cut-off for depressive tendency being 14. The study findings concluded that the group with a depressive tendency was significantly less resilient than the group without a depressive tendency. **Blackmon et al., (2017)** examined the relationship among depression, psychological resilience, and other sociodemographic factors of highly exposed individuals to Hurricane Katrina in 2005 and the Deepwater Horizon Oil Spill in 2010[24]. The sample included 294 Mississippi Gulf Coast residents living near the Gulf of Mexico and was divided into a group with depression and a group without depression. 21% of the sample had depression. Depression was assessed using the self-reported scale "Center for Epidemiologic Studies Depression Scale (CES-D)", with a cut-off for depression being 16. The study concluded the individuals with depression were significantly less resilient than individuals without depression. **Simpkin et al., (2018)** examined how stress from uncertainty relates to psychological resilience among pediatric residents and whether these attributes are associated with depression and burnout[25]. The sample included 86 residents, and depression was assessed using the self-reported instrument "Harvard National Depression Screening Scale". The study concluded that the pediatric residents with depression were significantly less resilient than the pediatric residents without depression. **Poudel-Tandukar et al., (2019)** examined the association between psychological resilience and anxiety or depression in resettled Bhutanese adults in Western Massachusetts[26]. The sample included 450 Bhutanese

refugees aged 20–65 residing in Massachusetts. The sample was divided into refugees with depression (*n*=54) and refugees without depression (*n*=171). Depression was assessed using the self-reported scale "Hopkins Symptom Checklist-25" with a mean cut-off of ⩾1.75 for moderate to severe symptoms. The study concluded that refugees with the highest tertile of psychological resilience scores had a significantly decreased risk of depression. **Yörük et al., (2021)** examined the relationship between psychological resilience, burnout, stress, and sociodemographic factors with depression in nurses and midwives during the COVID-19 pandemic[27]. The sample included 377 midwives and nurses and was divided into a group with depression (*n*=120) and a group without depression (*n*=257). Depression was assessed using the self-reported scale "Beck Depression Inventory (BDI)", with the cut-off for depression being 17. The study concluded that the midwives and nurses with depression were significantly less resilient than the midwives and nurses without depression. **Barzilay et al., (2020)** examined the role of psychological resilience for healthcare workers during the COVID-19 pandemic[28]. The total sample size was 3,042 people, and depression was assessed using the self-reported scale "Patient Health Questionnaire-2". The study concluded that with every 1 standard deviation increase in psychological resilience scores, there was a 69.3% decrease in the possibility of depression.

3.1.5. Psychological resilience and mood disorders: evidence from the meta-analysis of the cross-sectional studies

Our meta-analysis showed that individuals with BD presented significantly lower levels of psychological resilience as compared to controls (Standardized Mean Difference (SDM): -1.00 [CI 95%: -1.35 − -0.66], *p*<0.001) (Figure 2A). In addition, individuals with depression had significantly lower levels of psychological resilience as compared to controls (SDM: -0.98 [CI 95%: -1.31 − -0.64], *p*<0.001) (Figure 2B).

Figure 2: Meta-analysis comparing the psychological resilience scores between individuals with Bipolar Disorder and controls (A), and individuals with depression and controls (B).

A

B
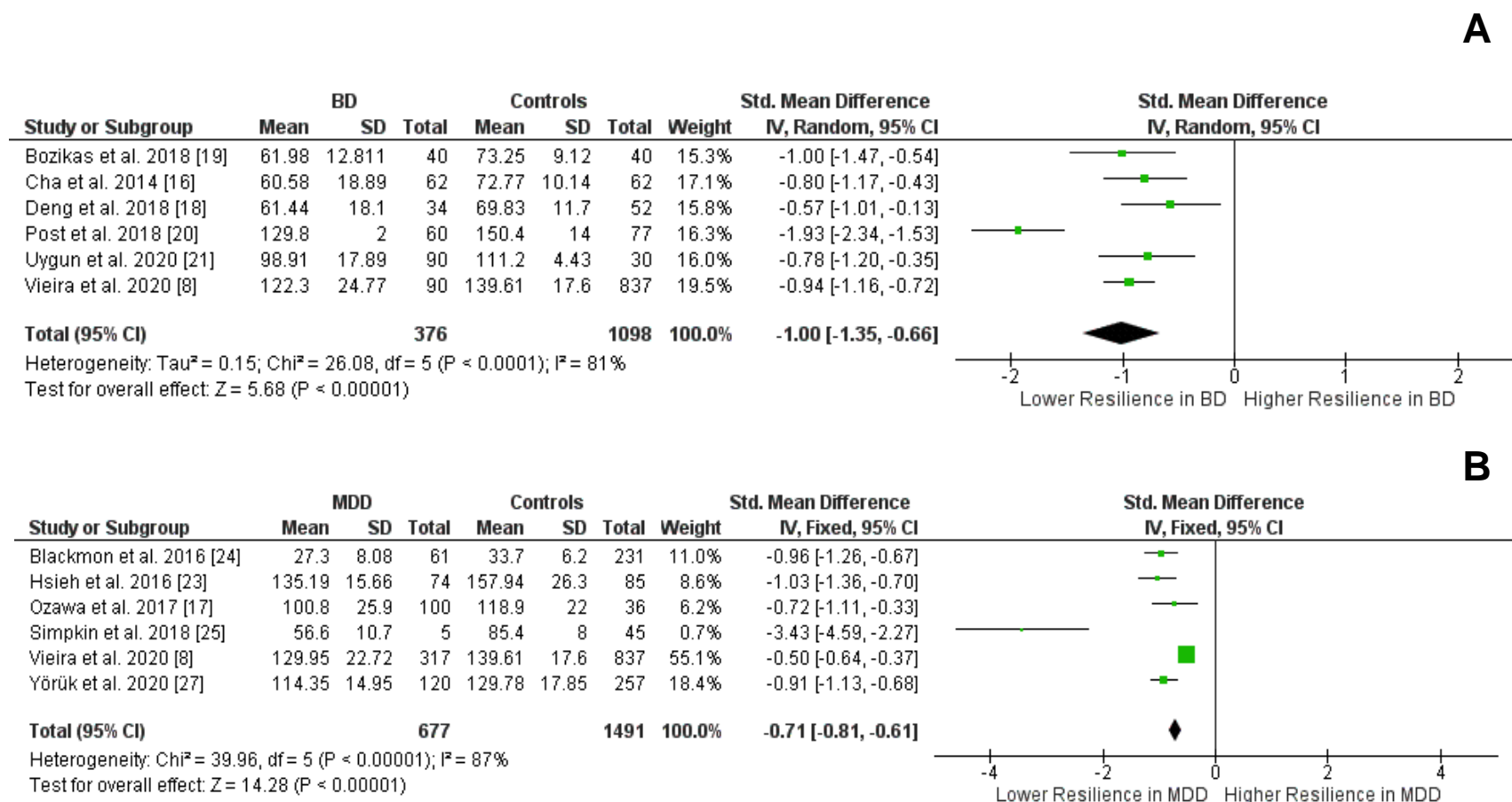
Legend: BD: Bipolar Disorder; MDD: Major Depressive Disorder.

3.1.6. Quality assessment for cross-sectional studies

The quality of all 17 cross-sectional studies was assessed using Joanna Briggs Institute (JBI) Systematic Review's Checklist for Analytical Cross-Sectional Studies. However, we decided to omit question 4 because we were not assessing any specific condition. Hence, each article got a total score out of 7. Our assessment showed that the total scores ranged from 4 to 7. The mean score from the 17 articles was 5.8 (Table 1).

Table 1: Characteristics of the studies included.

Cross-sectional Studies							
Author, Year, Country	**Aim**	**Sample Characteristics**	**Assessments**	**Confounding Factors Controlled**	**Main Results**	**Quality**	**Are individuals with mood disorders less resilient than the controls?**
Zhang et al., 2020, China[13]	To assess the prevalence of prenatal depression and explore its associated factors.	605 pregnant women from three hospitals in two provincial capitals (Shenyang and Zhengzhou) and one municipality (Chongqing) were included. The maximum age was 35. 433 women had no prenatal depression. 172 had prenatal depression.	A smartphone questionnaire was used to assess prenatal depression using the CES-D. Resilience was measured using The 14-item Ego RS.	N/A	Individuals with prenatal depression had a higher likelihood (75%) of being in the group with lower resilience scores (80 or less) as compared to individuals without prenatal depression (40.9%,.p<0.001).	6/7	Yes
Elmore et al., 2020, United States[14]	To examine the associations between adverse childhood experiences,	Non-institutionalized households with at least one child between 0 and 17	Resilience and depression were measured using the National Survey of Children's Health	Race, age, relation to the child, insurance, adult education, special healthcare needs, and caregiver	Children who were currently depressed were less likely to report child resilience. The presence of child resilience reduced the odds of depression by fourfold.	5/7	Yes

	exposures and positive childhood experiences on depression.	in the United States were randomly selected for the survey. If the parent or caregiver had more than one child, the interviewer randomly chose a single child for the interview. These children were 8 years or older. The final sample was 40,302 children. The sample was divided between currently depressed (n= 2,174) and not currently depressed (38,128).	(NSCH) survey. Depression was self-reported. In order to be a part of the depression group, parents had to answer yes to the following questions: "Has a doctor ever told you this child has..." for 26 independent health conditions. If they answered yes, a secondary question, "If yes, does this child CURRENTLY have this condition?" is answered.	mental health.	Unadjusted Odds Ratio: 8.17[*] Adjusted Odds Ratio (95% CI) 3.74 (2.88-4.84)		
Seok et al., 2012, South Korea[15]	To assess the relationship between depressive symptoms with early-life stress (ELS) and resilience in	26 patients with MDD (7 males and 19 females; mean age of 31.9±1.8 years) were recruited by	Diagnosis of MDD was confirmed using the Korean version of the Structured Clinical Interview for DSM-IV.	The control group and the group with MDD were matched based on gender and age.	Controls had higher resilience scores than individuals with MDD. Resilience was divided into the factors below: Self-efficacy MDD: 12.8±1.4 Control: 17.1±1.1	7/7	Yes

[*] Manually calculated using data from Table 2

	MDD.	hospital staff psychiatrists. 26 age- and gender-matched healthy controls (mean age of 32.3±1.7 years) were recruited from the community.	Resilience was measured using the CD-RISC. Resilience was split into 5 factors.		T-score: -2.358 p-value: 0.022 Self-confidence MDD: 11.8±1.3 Control: 20.0±0.8 T-score: -5.258 P-value: <0.001 Optimism MDD: 8.2±0.7 Control: 10.9±0.6 T-score: -2.860 p-value: 0.006 Self-control MDD: 5.6±0.7 Control: 9.7±0.5 T-score: -4.502 -value: <0.001 Spirituality/autonomy MDD: 5.5±0.7 Control: 7.2±0.5 T-score: -2.506 p-value: 0.041		
Cha et al., 2014, South Korea[16]	To investigate the demographic and clinical factors related to resilience in euthymic patients with BD. The association between impulsivity and resilience was also investigated.	A total of 62 outpatients with BD type I, II, and NOS who were in remission were recruited, along with 62 healthy individuals that matched with the BD group in terms of age and sex were recruited.	Cases were diagnosed in accordance with the DSM-IV-TR criteria. Resilience was measured using the CD-RISC.	Length of education and employment status. The control group and the group with BD were matched based on age and sex.	The resilience scores were higher in controls (72.77 ±10.14) than in individuals with BD (60.58 ±18.89, p<0.001). The results remained significant after adjusting for confounders.	7/7	Yes
Ozawa et al., 2017, Japan[17]	To address the degree and quality of resilience in	The sample was collected from ten psychiatric	Depression was diagnosed with ICD-10.	There were no significant differences between	The RS total score was higher in controls (118.9 ±22.0) than in individuals with depression (100.8 ±25.9, p<0.001).	6/7	Yes

		hospitals and clinics in Tokyo and Saitama, Japan. The sample was outpatients 18 years and older. The control group were family members with no depression. There were 36 people in the control group. 100 outpatients with depression were examined.	Resilience was measured using the 25-item RS.	the control group and the group with depression in terms of years of education.			
Deng et al., 2018, China[18]	To examine the relationship between resilience and cognitive function in patients with schizophrenia, BD, and healthy controls.	81 patients with schizophrenia; and 34 with BD were recruited from the inpatient and outpatient units of the Department of Psychiatry of the Second Xiangya Hospital of Central South University, Changsha, China. 52 people were in the healthy control group.	BD was diagnosed using the SCID for DSM-IV. Resilience was measured using the CD-RISC (Chinese version).	Years of education, gender, marital status and employment. The control group, the group with BD, and the group with schizophrenia were matched based on age.	The resilience scores were higher in controls (69.83 ±11.70) than in individuals with BD (61.44±18.1, p<0.02). The difference between schizophrenia, BD and controls remained significant after adjusting for confounders.	7/7	Yes

Bozikas et al., 2018, Greece[19]	To examine the association between resilience and social functioning in patients with BD.	40 clinically stable patients with BD type I and BD type II were included. 40 healthy controls matched for age, sex, and educational background were also included.	BD diagnosis was completed using the DSM-IV and diagnosis was confirmed using the Greek version of the MINI. Resilience was measured using the CD-RISC.	The control group and the group with BD were matched based on age, sex and educational background.	The resilience scores were higher in controls (73.25 ± 9.12) than in individuals with BD (61.98 ± 12.811, p<0.001).	7/7	Yes
Post et al., 2018, Austria[20]	To examine to which extent resilience, internalized stigma, and psychopathology are correlated to QoL.	60 outpatients diagnosed with BD-I and 77 healthy control subjects from the general community were included.	BD was diagnosed in accordance with the DSM-IV criteria. Resilience was measured using the 25-item RS.	There were no significant differences between the control group and the group with BD in terms of years of education and age.	The resilience scores were higher in controls (150.4 ± 14) than in individuals with BD (129.8 ± 2, p<0.001).	7/7	Yes
Vieira et al., 2020, Brazil[8]	To assess the mediation effect of resilience on the relationship between childhood trauma and mood disorders, as well as the severity of depressive symptoms in a population-based sample.	There were 837 individuals in the control group. There were 317 individuals in the MDD group. There were 90 individuals in the BD group.	Mood disorders were assessed using the MINI- PLUS. The severity of depressive symptoms was assessed using the MADRS scale. Resilience was measured using the 25-item RS.	N/A	The resilience scores were higher in controls (139.61 ± 17.60) than in individuals with MDD (129.95 ± 22.72) and BD (122.30 ± 24.77, p<0.001).	5/7	Yes

Uygun et al., 2020, Turkey[21]	To examine the relationship between perceived social support and resilience in individuals with BD.	90 euthymic individuals with BD and 30 controls were included. The age ranged between 18-65 years.	Patients were already diagnosed with BD prior to the study. Resilience was measured using the Psychological Resilience Scale for Adults.	The control group and the group with BD were matched based on age, gender, marital status, and level of education.	The resilience scores were higher in controls (111.2 ±4.43) than in individuals with BD (98.91 ±17.89, p= 0.0001).	7/7	Yes
Aroian et al., 2000, Russia[22]	To assess the relationships between resilience, demographic characteristics, immigration demands, and depression in a sample of 450 adult Russian immigrants to Israel.	450 Russian immigrants who emigrated from the former Soviet Union to Northern Israel between 1990 and 1995. 241 people had depression. 209 did not have depression.	Depression was measured using the 13-item Depression Scale of the Symptom Checklist 90-R (Russian Version). Resilience was measured using the Resilience Scale developed by Wagnild and Youngís (1993).	N/A	The odds of not being depressed given an increase in resilience was about twofold (p=0.0001).	6/7	Yes
Hsieh et al., 2016, Taiwan[23]	To examine the relationship among recent workplace violence, depressive tendency, social support, and resilience of victimized nurses.	The sample was recruited from two hospitals in Taiwan. 159 nurses met the inclusion criteria and were divided between a	Depressive tendency was measured using the CES-D. The cut-off used for depressive tendency was 14. Resilience was measured using the	There were no significant differences between the group without a depressive tendency and the group with a depressive tendency in terms of education and age.	The group without a depressive tendency had higher resilience scores (157.94 ± 26.30) compared to the group with a depressive tendency (135.19 ± 15.66, p <0.001).	4/7	Yes

		group with a depressive tendency (n= 74) and a group without depressive tendencies (n= 85).	Resilience Scale developed by Friborg et al. (2006)				
Blackmon et al., 2017, United States[24]	To examine relationships among depression, psychological resilience, and other sociodemographic factors of highly exposed individuals to Hurricane Katrina in 2005 and the Deepwater Horizon Oil Spill in 2010.	A spatially stratified random sample of 292 Mississippi Gulf Coast residents living close to the Gulf of Mexico was assessed.\n\n61 people (21%) had depression.\n\n231 people did not have depression.	Depression was measured using the CES-D. The cut-off used was 16.\n\nResilience was measured using the self-rated measure from the 10-item CD-RISC.	Education (less than high school vs. bachelor's degree or higher), health insurance, Katrina-related damages and oil spill-related damages.\n\nThere were no significant differences between the group without depression and the group with depression in terms of gender.	Individuals without depression had higher resilience scores (33.70 ±6.2) than individuals with depression (27.30 ±8.08, p<0.001).	6/7	Yes
Simpkin et al., 2018, United States[25]	To determine how stress from uncertainty is related to resilience among pediatric residents and whether these attributes are associated with	50 residents were surveyed from pediatric residency programs from 4 urban freestanding children's hospitals in NorthAmerica in	Depression was measured using the Harvard National Depression Screening Scale.\n\nResilience was measured using the 14-item RS.	N/A	Individuals without depression were had higher resilience scores (85.4±8.0) than individuals with depression (56.6±10.7, p<0.001).	4/7	Yes

		depression and burnout.	2015. 5 residents fulfilled the criteria for depression criteria. 45 were non-depressed.					
Poudel-Tandukar et al., 2019, United States[26]	To assess the association between resilience and anxiety or depression in resettled Bhutanese adults in Western Massachusetts.	450 Bhutanese refugees aged 20–65 residing in Massachusetts were included. 54 had depression. 171 did not have depression.	The Hopkins Symptom Checklist-25 was used to measure anxiety (10-item) and depression (15-item) with a cutoff mean score of ⩾1.75 for moderate to severe symptoms. Resilience was measured using the 25-item Wagnild and Young's RS.	Age, sex, marital status, education, occupation, duration in the United States, alcohol intake, smoking, physical activity, history of any chronic disease, coping style and social support.	Participants with the highest tertile of resilience scores had a significantly decreased risk of depression (OR: 0.16 [95% CI: 0.04–0.60], p= 0.010).	6/7	Yes
Yörük et al., 2020, Turkey[27]	To determine the relationship between psychological resilience, burnout, stress, and sociodemographic factors with depression in nurses and midwives during	377 (120 with depression and 257 without depression) midwives and nurses were included.	Depression was measured using the BDI. The cut-off for depression was 17. Resilience was measured using the RS for adults developed by Friborg et al.	N/A	The group without depression had higher resilience scores (129.78±17.85) than the group with depression (114.35±14.95, p<0.001).	4/7	Yes

Author, Year, Country	Aim	Sample Characteristics	Assessments	Confounding Factors Controlled	Main Results	Quality	Is Resilience a Protective Factor Against Mood Disorders?
					the COVID-19 pandemic.		
Barzilay et al., 2020, United States[28]	To assess the role of resilience for healthcare workers during the COVID-19 pandemic.	This was a web survey. The total sample size was 3,042 people.	Depression was measured using the PHQ-2. Resilience was measured through the website questionnaires made by the authors of the article.	Age, gender, race, education, income, occupation, marital status, country of residence, number of people in the household, and date the survey was taken.	The study concluded that with every 1 standard deviation increase in psychological resilience scores, there was a 69.3% decrease in the possibility of depression (OR=0.31 [95% CI: 0.252–0.383], p<0.0001).	5/7	Yes

Cohort Studies

Author, Year, Country	Aim	Sample Characteristics	Assessments	Confounding Factors Controlled	Follow-up Duration	Main Results	Quality	Is Resilience a Protective Factor Against Mood Disorders?
Wu et al., 2017, China[29]	To examine the longitudinal effects of psychological resilience on childhood depression in a sample of left-behind children.	The sample consisted of 386 left-behind children. The mean age and range were 12.2 years (8–17).	Depression was measured using the CDI. Resilience was measured using the Self-rating Scale of Psychological Resilience.	Age, sex and baseline depressive symptoms.	A follow-up survey was completed a year later.	Higher psychological resilience was a significant protective factor of developing depression among left-behind children (OR: 0.96 [95% CI: 0.94–0.99], p= 0.001).	8/10	Yes
Hiyoshi et al., 2017, Sweden[30]	To examine if physical and psychological	The sample consisted of 213,693 men born	BD and depression were measured using the ICD-8.	Age, sex, BMI, asthma, allergies, grip strength,	Follow-up started immediately	Higher stress resilience was associated with a lower risk of BD and depression.	9/10	Yes

	characteristics in late adolescence, including factors previously linked with BD (body mass index, asthma and allergy), are associated with subsequent BD in adulthood.	between 1952 and 1956 who participated in compulsory military conscription assessments in late adolescence. These assessments happened between the ages of 17-20. Total cohort n=213,693 BD: n=1495 Depression N=7106	Resilience was measured using a semi-structured interview with a psychologist.	cognitive ability, height, erythrocyte sedimentation rate, disease at conscription, region of residence, household crowding and socioeconomic index in 1960.	after the conscription assessment and ended on the date of the first diagnosis of BD (or anxiety or depression), death, emigration or 31 December 2009, whichever occurred first.		
Hoorelbekee t al., 2019, Belgium[31]	To test the role of positive affect as a central resilience factor following remission from depression.	85 patients were examined in a seven-day intervention that explored the interplay between five transdiagnostic vulnerabilities and protective factors in daily life.	Depression was measured at baseline using the BDI-II-NL. Resilience was measured through self-reported questionnaires associated with the intervention.	N/A	The follow-up period lasted for 7 days.	The findings suggested a central role for positive affectivity as a key resilience factor because it positively impacted the cognitive risk and protective factors over time in RMD patients.	3/10	Yes
Navrady et al., 2017, Scotland[32]	To examine whether increased neuroticism and	Participants were sampled from the Generation	Participants were screened for a clinical diagnosis of	Age at re-contact.	The baseline took place between 2006	Resilience protected against MDD. Odds Ratio (SCID):	8/10	Yes

| | reduced resilience are downstream mediators of genetic risk for depression and whether they contribute independently to risk. | Scotland: Scottish Family Health Study.

At baseline, 664 individuals met the criteria for clinical MDD (16%), and 3502 were non-MDD cases (84%).

A total of 1068 individuals in the mental health follow-up sample met the criteria for self-reported MDD (26%), with 3098 classified as non-MDD cases (74%). | MDD at baseline using the SCID for DSM-IV Axis I Disorders.

During re-contact, self-reported MDD was measured using the CIDI-SF.

Resilience was measured using the Brief RS. | | and 2011. In 2014, participants were contacted and invited to participate in a follow-up assessment | 0.44, (95% CI 0.40, 0.48), p< 0.001

Odds Ratio (CIDF-SF):
0.43, (95% CI 0.40, 0.47), p< 0.001 | | |

Interventional Studies								
Author, Year, Country	**Aim**	**Sample Characteristics**	**Assessments**	**Confounding Factors Controlled**	**Follow-up Duration**	**Main Results**	**Quality**	**Is Resilience a Protective Factor Against Mood Disorders?**
Konradt et al., 2018, Brazil[33]	To assess the effects of resilience on the severity of depressive and anxious symptoms	Ninety-one drug-free adults (18-29 years) with MDD were included in this study.	MDD diagnosis was measured using the SCID. The severity of	N/A	Patients were assessed at baseline, post-intervention and at six-	The resilience scores at post-intervention (125.2±24.2) and at six-month follow-up (128±28.53) were significantly higher than at baseline (105.5±22.47, p<0.001). Also, higher	11/11	Yes

	after brief cognitive psychotherapy for depression.	68 patients completed the study and were assessed post-intervention. 61 patients were assessed at a six-month follow-up.	depressive symptoms was measured using the HDRS. Resilience was measured using the 25-item RS.		month follow-up.	baseline resilience indicated lower depressive symptoms later on.		
Seo et al., 2017, South Korea[34]	To examine whether basic military training can strengthen resilience in males with probable bipolar depression and probable unipolar depression.	All participants were men. Probable unipolar depression: n=66 Probable bipolar depression: n=66 Controls: n=66	The MDQ scale was used to screen for bipolar depression. The CES-D scale was used to screen for unipolar depression. The CD-RISC was used to measure resilience.	The control and mood disorder groups were matched based on age, education level, and BIS-11-R scores.	Follow up after 5 weeks of basic military training	There was no difference between the mood disorder group and the control group at baseline for resilience and the intervention did not change psychological resilience scores over 5 weeks	7/9	No

Legend: BD: Bipolar Disorder; BDI: Beck Depression Inventory; BIS-11-R: Barratt Impulsiveness Scale-11-Revised; CDI: Children's Depression Inventory; CD-RISC: Connor-Davidson Resilience Scale; CES-D: Center for Epidemiologic Studies Depression Scale; CIDI-SF: Composite International Diagnostic Interview– Short Form; DSM: Diagnostic and Statistical Manual of Mental Disorders; HDRS: Hamilton Depression Rating Scale; ICD: International Classification of Diseases; MADRS: Montgomery-Asberg Depression Rating; MDD: Major Depressive Disorder; MDQ: Mood Disorders Questionnaire; MINI: Mini-International Neuropsychiatric Interview; NOS: Not Otherwise Specified; PHQ-2: Patient Health Questionnaire-2; QoL: Quality of Life; RS: Resilience Scale.

3.2. Psychological resilience and mood disorders: evidence from longitudinal studies

Four cohort studies were included in the systematic review. All the studies showed that psychological resilience protects against the development of mood disorders.

Wu et al., (2017) examined the longitudinal effects of psychological resilience on depression in a Chinese sample of left-behind children[29]. The prevalence of depression at the baseline and 1-year follow-up was 12.7% and 8.5%, respectively. The study found that children with higher baseline psychological resilience (adjusted OR=0.97; 95% CI=0.95, 0.99) were at a decreased risk for developing depression at the 1-year follow-up, adjusting for age, sex, and baseline depressive symptoms. **Hiyoshi et al., (2017)** examined if physical and psychological characteristics in late adolescence were associated with subsequent BD in adulthood[30]. A total of 213,693 men born between 1952 and 1956 who participated in compulsory military conscription assessments in late adolescence were followed up to 2009, excluding men with any psychiatric diagnoses at baseline. Psychological resilience was measured using a semi-structured interview with a psychologist and was stratified into "low," "medium," and "high" psychological resilience. "High" resilience was protective against depression (adjusted OR=0.61; 95% CI= 0.56, 0.66) and BD (adjusted OR=0.83; 95% CI= 0.70, 0.98). The study adjusted for age, sex, BMI, asthma, allergies, grip strength, cognitive ability, height, erythrocyte sedimentation rate, disease at conscription, region of residence, household crowding and socioeconomic index in 1960. **Hoorelbeke et al., (2019)** examined the cognitive risk and protective factors following remission from depression[31]. The study utilized a seven-day experience sampling period in 85 patients with remitted depression and examined the interplay between five transdiagnostic vulnerabilities and protective factors (including psychological resilience) in daily life. The study suggests a significant role for positive affectivity as a key resilience factor. It positively impacted cognitive risk and protective factors over time in remitted patients with depression. **Navrady et al., (2018)** assessed the moderating and mediating relationships between depression, Polygenic Risk Score, neuroticism, resilience, and clinical and self-reported depression in a large, population-based

cohort[32]. Participants were screened for a clinical diagnosis of MDD at baseline using the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID). During the reassessment visit, self-reported MDD was assessed using a questionnaire developed by the World Health Organization: The Composite International Diagnostic Interview– Short Form (CIDI-SF). A total of 1,068 individuals in the mental health follow-up sample met the criteria for self-reported MDD (26%), with 3,098 classified as non-MDD cases (74%). A strong inverse relationship was found between resilience and clinically diagnosed depression (adjusted OR= 0.44; 95% CI= 0.40, 0.48). A similar relation was found between resilience and self-reported MDD (adjusted OR= 0.43; 95% CI= 0.40, 0.47). These findings were adjusted for age, sex, and polygenic risk score.

3.2.1. Quality assessment for longitudinal studies

The quality of all 4 cohort studies was assessed using Joanna Briggs Institute (JBI) Systematic Review's Checklist for Cohort Studies. However, from the checklist, we decided to omit question 6 because our methodology did not necessarily require the subjects to be free of the outcome at the baseline. Hence, each article had a maximum total score of 10. The total scores ranged from 3 to 9. The mean score from the 4 articles was 7 (Table 1).

3.3. Psychological resilience and mood disorders: evidence from interventional studies

Two interventional studies were included in the systematic review. One out of the two studies (50%) found that the intervention increased the psychological resilience score and found that higher baseline psychological resilience indicated lower depressive symptoms at follow-up among individuals diagnosed with MDD. **Konradt et al., (2018)** conducted a randomized clinical trial including 91 young adults diagnosed with MDD and assessed the effects of psychological resilience on the severity of depressive symptoms after brief cognitive psychotherapy interventions (Cognitive Behavior Therapy or Narrative Cognitive Therapy) for depression[33]. The study found a higher psychological resilience at post-intervention and at six-month

follow-up. Moreover, higher baseline psychological resilience indicated lower depressive symptoms at post-intervention and at six-month follow-up. **Seo et al., (2017)** conducted a quasi-experimental study and examined whether basic military training can strengthen the psychological resilience in males with probable bipolar depression (PBD) and probable unipolar depression (PUD)[34]. The study population consisted of Korean conscripts admitted to a basic military training camp in 2015. All participants were men. 66 were in the PUD group, 66 in the PBD group and 66 in the control group. There were no differences between the mood disorder groups and the control group at baseline regarding psychological resilience and the intervention did not change resilience scores over 5 weeks. These findings are probably justified by the short follow-up period (5 weeks).

3.3.1. Quality assessment for interventional studies

The quality of the RCT study was assessed using JBI Systematic Review's Checklist for Randomized Controlled Trials. However, we decided to omit questions 4 and 5. Question 4 was omitted as it was not possible to blind participants to the treatment with psychotherapy. Similarly, question 5 was omitted as it was not possible to blind those delivering treatment. Hence, the maximum total score was 11. The RCT included in this systematic review had a score of 11 (Table 1).

The quality of the quasi-experimental study was assessed using JBI Systematic Review's Checklist for Quasi-experimental studies. The maximum total score was 9. The quasi-experimental study included in this systematic review had a score of 7 (Table 1).

4. Discussion

Our meta-analysis of the cross-sectional data showed that individuals suffering from mood disorders had lower psychological resilience scores than individuals without mood disorders. Moreover, results from our systematic review showed evidence from longitudinal studies suggesting that higher psychological resilience protected against the development of mood disorders. Lastly, few interventional studies indicated that psychotherapy interventions may improve psychological

resilience. One interventional study also showed that higher baseline psychological resilience indicated lower depressive symptoms at follow-up in individuals with MDD.

Psychological resilience is the ability to effectively cope with the stressors of life to maintain good mental health[10]. 22 out of the 23 (95.7%) studies included in the present systematic review concluded that either individuals suffering from mood disorders had lower psychological resilience scores than individuals without mood disorders or psychological resilience protected against the development of mood disorders. These conclusions are in line with two other systematic reviews in the field demonstrating that psychological resilience positively impacts the mental health of individuals[11-12,]. However, it is important to highlight that these reviews were focused on specific populations (individuals forced to migrate and individuals with somatic illness), and they did not specifically assess the impact of psychological resilience on mood disorders.

There is no current gold standard assessment to measure psychological resilience. However, Windle et al., (2011) systematically reviewed the psychometric rigour of resilience measurement scales developed for use in general and clinical populations[35]. In this review, the CD-RISC, the Resilience Scale for Adults and the Brief Resilience Scale received the best psychometric ratings[35]. In this sense, it is important to highlight that 12/23 (52%) studies included in our systematic review used one of the three aforementioned resilience scales.

It is known that mood disorders have a multifactorial aetiology. For instance, a recent study showed that childhood trauma partly mediated the impact of family history on mood disorder diagnosis in adulthood, which suggests that childhood trauma might act as an environmental trigger that, by interacting with a vulnerable genetic background, can lead to the onset of mood disorders[36]. Psychological resilience has also been found to moderate the relationship between stress and childhood depression[37], indicating that individuals who suffered from stress but were more resilient, were less likely to develop depression. The same findings were replicated by Vieira et al. 2020, where they showed that psychological resilience mediated the relationship between childhood trauma and mood disorders in young

adults. This data reinforces the importance of investigating psychological resilience in the context of mood disorders.

Importantly, interventions such as mindfulness show promise in increasing psychological resilience. Galante et al. (2018) conducted an RCT to assess whether mindfulness courses for university students would improve their resilience to stress38. Their findings suggest that mindfulness courses effectively increased resilience to stress in university students[38]. Moreover, a recent systematic review found that interventions based on a combination of Cognitive Behavioural Therapy and mindfulness techniques appear to impact individual resilience positively[39]. We believe more research into mindfulness techniques and interventions can establish a more concrete understanding of the relationship between psychological resilience and mood disorders.

Our findings should be interpreted considering some limitations. First, the systematic review only included two interventional studies that had conflicting results. Hence, looking at more interventional studies would have strengthened the conclusions made based on interventions. Second, only four longitudinal studies were included, and the causal relationship between psychological resilience and mood disorder still has a weak level of evidence. Finally, a meta-analysis of interventional and longitudinal studies was not performed taking into consideration the heterogeneity of the studies included. Despite these limitations, our systematic review incorporated a diverse population, including children and adults who experienced several types of stressful situations (ex. childhood trauma, immigration, pregnancy, dealing with the COVID-19 pandemic, etc.). This allowed us to describe the impact of psychological resilience in mood disorders in the context of various stressful situations individuals may face.

In conclusion, to the best of our knowledge, this systematic review is the first in its field to look at the relationship between resilience and mood disorders through various circumstances endured by the individuals. Our results showed that individuals suffering from mood disorders had lower psychological resilience scores than individuals without mood disorders. In addition, higher psychological resilience scores may lead to reduced rates of mood disorders in the context of many adverse

situations. In terms of future research into the impact of psychological resilience on mood disorders, we recommend research into more longitudinal studies to establish a causal relationship between psychological resilience and mood disorders. Also, more research is needed on interventions that can positively impact individuals with mood disorders.

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