





Effect of childhood trauma on disease severity in patients with fibromyalgia: The mediating role of psychological resilience

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ABSTRACT

Objectives: This study aims to investigate the effect of childhood traumas on the disease severity in fibromyalgia and evaluate the mediating role of psychological resilience in this effect.

Patients and methods: Between June 2017 and January 2018, this study included a total of 80 female patients (mean age: 31.9±4.0 years; range, 20 to 40 years) with fibromyalgia according to the 2010 American College of Rheumatology fibromyalgia diagnostic criteria. All patients were evaluated using the sociodemographic data form, Resilience Scale for Adults (RSA), Childhood Trauma Questionnaire (CTQ), and Fibromyalgia Impact Questionnaire (FIQ).

Results: A positive correlation was observed between the FIQ and CTQ total scores, emotional abuse, physical abuse, and physical neglect scores. The FIQ was negatively correlated with the RSA scores. Path analysis conducted to evaluate mediating effect of psychological resilience revealed that psychological resilience had a mediator role in the correlation between FIQ and emotional abuse, physical abuse, and physical neglect scores.

Conclusion: The main finding of this study is the protective effect of psychological resilience -improvable capacity to cope with early life traumas- on fibromyalgia symptoms that leads to negative functioning of several aspects.

Keywords: Childhood trauma, fibromyalgia, resilience.

Psychological resilience implies the adaptive capacity that helps to overcome difficulties and is influenced by genetic, epigenetic, developmental, neurochemical, and psychosocial factors.¹ This term is mostly used in developmental psychopathology to address the characteristics of children and adolescents with no identifiable psychological disorder, although they are under a considerable risk.² The emergence of resilience themes in the field of child development was based on observations of several children with positive functioning and development, despite the

presence of significant risk factors, such as abuse or low socioeconomic status. In addition, it is believed that this construct is not solely confined to youngsters and that the term “resilience” is a characteristic, which plays a crucial role in human spirituality in all age groups.² The term resilience has been confined to studies on pain in the literature. A review of psychological factors that influence rheumatic diseases discussed the psychological care approach, involving the significance of resilience, and the treatment options that emphasized the resilience factors.³

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Another study revealed that patients with chronic pain who had stronger resilience had better coping patterns or mechanisms, lesser pain behaviors, and fewer tendencies to catastrophe.⁴ Some other authors also reported that resilience mechanisms might alter the disease course by strengthening the reactions to cope with pain.⁵

Several studies have reported the relationship between childhood abuse and chronic pain.^{6,7} Individuals with a history of childhood trauma report a tendency to experience more pain and pain-related conditions than healthy peers.⁸ Roberts specifically clarified the relation between childhood sexual abuse and physical disorders in adults, such as somatization, gastrointestinal difficulties, headache, and chronic pain.⁹ Moreover, a study which investigated three groups of pain (fibromyalgia, myofascial pain, and other pain) demonstrated that rates of childhood physical, sexual, and verbal abuses exceeded 48% in all subgroups-patients with fibromyalgia forming the group with the highest prevalence (65%).¹⁰ Furthermore, it was observed that not all individuals with a history of childhood trauma experienced emotional and mental problems. Moreover, they had significant personal characteristics that not only helped them during any traumatic event, but also ensured their psychological well-being.^{11,12} Developmental psychologists have advocated that resilience is common in children who grew up in disadvantageous conditions.¹³ Notably, resilience is typically discussed in the literature related to protective factors that support positive outcomes and the development of healthy personal characteristics among children who faced harsh life conditions.^{2,13}

The correlation of childhood trauma with chronic pain and fibromyalgia has been long studied in the literature. A good understanding of psychological resilience -an essential adaptive construct against trauma in fibromyalgia-offers a significant database that may help to develop methodologies to enable patients with fibromyalgia to further use personal resources despite the negative effect related to symptoms of fibromyalgia. In the present study, we hypothesized that there would be a significant relationship between childhood trauma, psychological resilience and fibromyalgia disease severity and that psychological resilience would have a mediating and protective effect

in the relationship between childhood traumas and fibromyalgia disease severity. We, therefore, aimed to investigate the effect of childhood trauma and psychological resilience, which are presumably interlinked, on fibromyalgia that is considered a psychosomatic disease.

PATIENTS AND METHODS

This cross-sectional study was conducted at Ağrı State Hospital, Physical Medicine and Rehabilitation outpatient clinic between June 2017 and January 2018. All patients who were for the first time admitted to the outpatient clinic and were diagnosed with fibromyalgia according to the 2010 American College of Rheumatology fibromyalgia diagnostic criteria were screened. Prior to study enrollment, systemic and psychiatric illnesses, as well as treatment histories of the patients were evaluated. Exclusion criteria were psychiatric diagnoses and treatments applied for these diagnoses, including psychosis, severe mood disorders, alcohol and substance use disorder or abuse due to their potential effects on fibromyalgia symptom severity. Patients who used drugs, particularly antidepressants that could affect pain and the severity of fibromyalgia were not included in the study. Known systemic disease (e.g., diabetes mellitus, hypertension, hyperlipidemia, congestive heart failure, chronic renal failure, or rheumatological diseases), having a central or peripheral neurological disease, and secondary fibromyalgia were the other exclusion criteria. As a result of these exclusion criteria, nine of 89 patients interviewed were not included in the study and, finally, a total of 80 female patients (mean age: 31.9±4.0 years; range, 20 to 40 years) were enrolled. A written informed consent was obtained from each patient. The study protocol was approved by the Erenköy Mental Health Training and Research Hospital Ethics Committee (Date: 07.01.2019, No: 4). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Sociodemographic and clinical variables were evaluated with the data form specifically developed for this study. The Resilience Scale for Adults (RSA) was used to evaluate the psychological resilience, while childhood traumatic events were examined with the

Childhood Trauma Questionnaire (CTQ). The severity of fibromyalgia disease was examined using the Fibromyalgia Impact Questionnaire (FIQ).

Data collection tools

The RSA is a five-point Likert scale with 33 items that address positive and negative characteristics in separate lists to avoid a biased assessment, when the items are marked. Dimensions of the scale are called "self-perception," "perception of future," "structural style," "social competence," "familial harmony," and "social resources." Regarding the evaluation, there was no restriction on scoring related to high or low psychological scores, and participants were advised to evaluate the reverse items according to this chart. When scores on the scale increased and resilience was desired to increase, then from left to right, the answer boxes were evaluated as 1, 2, 3, 4, and 5. If the scores decreased and resilience was desired to increase, then the answer boxes were evaluated as 5, 4, 3, 2, and 1. In this study, the evaluation was based on the relation in which the increase in the scores indicated increased psychological resilience. Psychological Resilience Scale for Adults was developed by Friberg et al.¹⁴ and was adapted to Turkish by Basim and Cetin.¹⁵ The reliability coefficient of the scale (Cronbach alpha) was determined as 0.89.

The CTQ is a five-point, self-reporting Likert scale, which was developed by Bernstein et al.,¹⁶ and comprises 70 items that was later reduced to 28 items. The scale covers questions that address emotional, physical, sexual, and verbal abuse in childhood, and it has five elements, namely physical, emotional, and sexual abuse, as well as physical and emotional neglect. Each item is rated from 1 (never) to 5 (very often). Scores range from 5 to 25 for each type of trauma. In the adaptation, validity and reliability studies of the 28-question form of the scale, it was offered as following; for sexual and physical abuse >5 points, for physical neglect and emotional abuse >7 points, for emotional neglect >12 points and as the cut-off score of the total score >35 points. The Turkish adaptation and validity-reliability study were conducted by Şar et al.¹⁷ Cronbach's alpha coefficient for the Turkish version of CTQ-28 was found as 0.93.

The FIQ is a 10-item, self-administered instrument used to assess the quality of life and functional status of patients with fibromyalgia. It was developed by Burckhardt et al.¹⁸ This scale has the following sub-items: physical function, feeling well, inability to go to work, experiencing difficulties at work, pain, tiredness, morning tiredness, stiffness, anxiety, and depression. The first item focuses on the patient's ability to carry out muscular activities. In the next two items, patients are asked to circle the number of days in the past week that they felt good and how often they missed work. Finally, the last seven questions (job ability, pain, fatigue, morning tiredness, stiffness, anxiety, and depression) are measured by Visual Analog Scale. The responses are scaled in a Likert format, from "0, always able to do" to "3, never able to do". The total score ranges from 0 through 100, with a higher score indicating a greater impact of fibromyalgia. Sarmer et al.¹⁹ adapted the scale into Turkish and conducted the validity and reliability study.

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). The distribution of variables was measured using the Kolmogorov-Smirnov test and our study showed a normal distribution. Descriptive data were expressed in mean \pm standard deviation (SD), median (min-max) or number and frequency, where applicable. Independent variables of the study were childhood traumas (emotional neglect, emotional abuse, physical neglect, physical abuse, and sexual abuse), whereas the dependent variable was fibromyalgia severity, and the mediator variable was the total score of psychological resilience. The Pearson correlation analysis was used to examine the correlation among dependent, independent, and mediator variables. The path analysis was performed using the bootstrap method ($n=1,000$) to examine the mediating effect. A p value of <0.05 was considered statistically significant.

RESULTS

Sociodemographic variables of the patients are summarized in Table 1.

According to the CTQ scores, the mean score was found to be 12 ± 2 for emotional abuse, 13 ± 3

Table 1. Sociodemographic variables

	n	%	Mean±SD	Median	Min-Max
Age (year)			31.9±4.0	33	20-40
Education year			8.3±2.5	8	5-14
Place of residence					
Province	46	57.5			
District-village	34	42.5			
Marital status					
Married	75	93.8			
Single	3	3.8			
Widowed or divorced	2	2.5			
Working status					
Not working	76	95.0			
Working	4	5.0			

SD: Standard deviation.

for physical abuse, 11±2 for sexual abuse, 23±2 for emotional neglect, and 18±3 for physical neglect. In addition, 52% of the patients reported any kind of emotional abuse, 42% any kind of physical abuse, 38% any kind of sexual abuse, 79% any kind of emotional neglect, and 68% any kind of physical neglect during childhood and adolescence.

When the mediator variable role of psychological resilience was assessed regarding the correlation between fibromyalgia severity and childhood traumas, the correlation coefficients of variables were analyzed before the mediator variable was analyzed. As presented in Table 2, a positive correlation was observed between FIQ and emotional abuse ($r=0.25$, $p=0.02$), physical abuse ($r=0.40$, $p<0.001$), and physical neglect ($r=0.49$,

$p<0.001$) scores along with a negative correlation with psychological resilience ($r=-0.39$, $p<0.001$). However, the correlations between the FIQ score and sexual abuse and emotional neglect scores did not reach statistical significance ($p>0.05$). No statistically significant correlation was observed among psychological resilience, -the mediator variable,- and sexual abuse, and emotional neglect scores ($p>0.5$). Besides, a negative correlation was observed between psychological resilience and emotional abuse ($r=-0.33$, $p<0.001$), physical abuse ($r=-0.48$, $p<0.001$), and physical neglect ($r=-0.45$, $p<0.001$) scores.

Path analysis was performed using the bootstrap method ($n=1,000$) to examine the mediating effect of psychological resilience. Separate evaluations were made for each CTQ

Table 2. Correlation coefficients among FIQ, CTQ, and RSA in patients with fibromyalgia ($n=80$)

Variables	1	2	3	4	5	6	7
1. FIQ	-	0.25*	0.40**	0.04	0.09	0.49**	-0.39**
2. Emotional abuse	-	-	0.35**	0.43**	0.29**	0.22	-0.33**
3. Physical abuse	-	-	-	0.27**	0.06	0.61**	-0.48**
4. Sexual abuse	-	-	-	-	0.47**	0.14*	-0.09
5. Emotional neglect	-	-	-	-	-	0.29	-0.30
6. Physical neglect	-	-	-	-	-	-	-0.45**
7. RSA	-	-	-	-	-	-	-

FIQ: Fibromyalgia Impact Questionnaire; CTQ: Childhood Trauma Questionnaire; RSA: Resilience Scale for Adults; Pearson correlation analysis; * $p<0.05$; ** $p<0.01$.

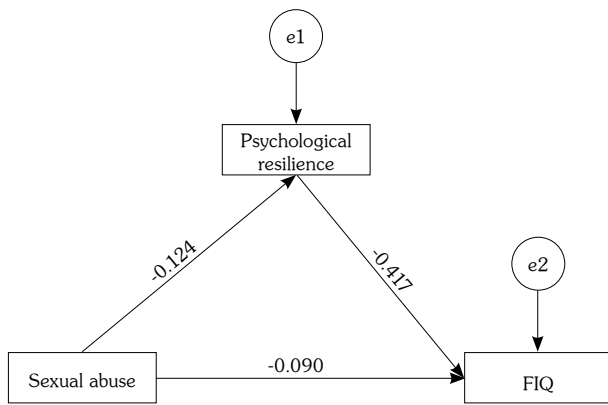


Figure 1. Mediator variable model for sexual abuse (standardized values).
FIQ: Fibromyalgia Impact Questionnaire.

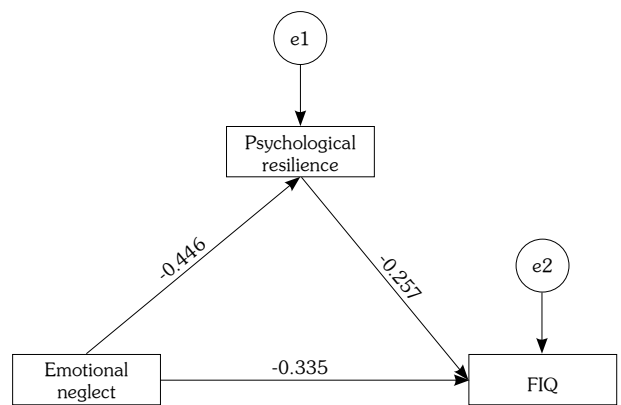


Figure 4. Mediator variable model for physical neglect (standardized values).
FIQ: Fibromyalgia Impact Questionnaire.

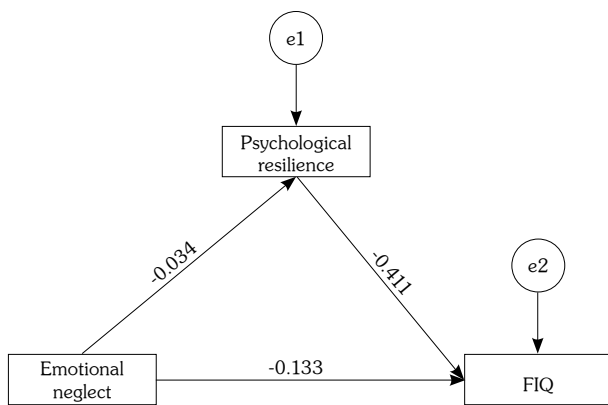


Figure 2. Mediator variable model for emotional neglect (standardized values).
FIQ: Fibromyalgia Impact Questionnaire.

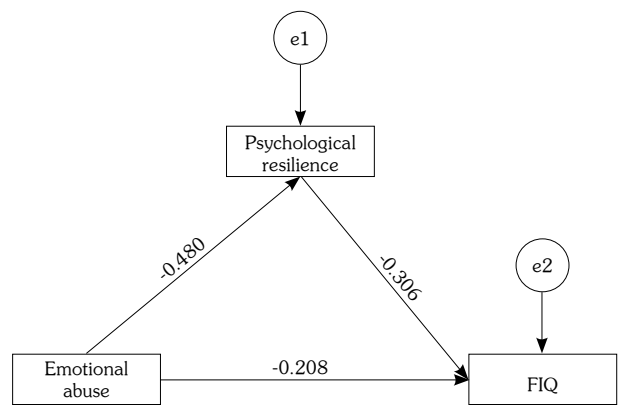


Figure 5. Mediator variable model for physical abuse (standardized values).
FIQ: Fibromyalgia Impact Questionnaire.

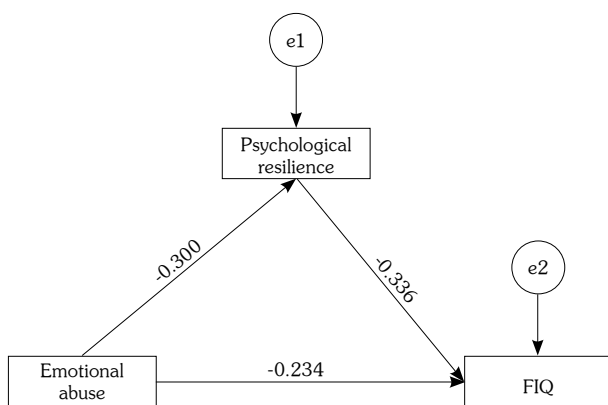


Figure 3. Mediator variable model for emotional abuse (standardized values).
FIQ: Fibromyalgia Impact Questionnaire.

sub-dimension (Figures 1-5). The results of these analyses are presented in Table 3. Accordingly, the total mediator effect for the emotional neglect and sexual abuse sub-dimensions of the CTQ and the direct and indirect effects were statistically insignificant. The total effect was found to be statistically significant for emotional abuse, physical neglect, and physical abuse sub-dimensions ($p=0.004$, $p=0.003$, $p=0.004$, respectively). While the direct effect was found to be significant in emotional abuse and physical neglect sub-dimensions, it was found to be insignificant for the physical abuse sub-dimension, although it was close to significance ($p=0.022$, $p=0.004$, $p=0.052$,

Table 3. Path analysis for the mediating role of psychological resilience in the relationship between childhood traumas and FIQ

	Direct		Indirect		Total	
	Std. beta	<i>p</i>	Std. beta	<i>p</i>	Std. beta	<i>p</i>
Emotional neglect	-0.133	0.235	0.014	0.732	-0.119	0.276
Emotional abuse	0.234	0.022*	0.101	0.001**	0.335	0.004**
Physical neglect	0.335	0.004**	0.114	0.015*	0.449	0.003**
Physical abuse	0.208	0.052	0.147	0.006**	0.355	0.004**
Sexual abuse	-0.090	0.401	0.052	0.227	-0.038	0.715

Std. beta: Standardized beta coefficients; FIQ: Fibromyalgia Impact Questionnaire; * $p < 0.05$; ** $p < 0.01$.

respectively). The indirect effect was statistically significant for all three sub-dimensions of emotional abuse, physical neglect, and physical abuse ($p=0.001$, $p=0.015$, $p=0.006$).

DISCUSSION

In the present study, we evaluated the effect of childhood traumas and psychological resilience on the severity of disease in patients with fibromyalgia, and the correlation of childhood traumas and psychological resilience with fibromyalgia severity was assessed. According to the results, fibromyalgia severity had a positive correlation with childhood trauma scores and a negative correlation with psychological resilience. Moreover, childhood trauma scores were negatively correlated with psychological resilience.

Previous studies have revealed that traumatic experiences, such as emotional, physical, or sexual abuse, are triggering factors for fibromyalgia in vulnerable individuals.^{20,21} In a study conducted with female fibromyalgia patients in Turkey, emotional abuse, physical neglect, physical abuse scores were found to be significantly higher in the fibromyalgia group than the control group.²² Similarly, in a recent study conducted in Turkey, juvenile fibromyalgia was examined as a cause of non-cardiac chest pain.²³ As a result, juvenile fibromyalgia or central sensitization were thought to be an indicator of childhood abuse. In the literature, early childhood traumas were linked to higher basal cortisol levels and their relationship with the stress response in the studies conducted

to evaluate the relationship between childhood traumas and fibromyalgia. It was demonstrated, based on the relation with basal cortisol level, that the risk of stress-related disorders increased in adulthood in individuals with a history of early childhood traumas.²⁴ Moreover, childhood traumas were shown to probably increase the sensitivity to pain by altering the stress reaction responsible for processing the pain stimuli and the foundation of nociceptive systems.²⁴ The literature contains numerous studies investigating childhood traumas in patients with fibromyalgia, as well as limited studies evaluating the correlation between trauma history and fibromyalgia severity. These studies have revealed that early childhood traumas affect the symptom profile of fibromyalgia,²⁵ which is a finding reported in our study, as well. It was reported that fibromyalgia patients with a history of childhood abuse have more severe pain, tiredness, and dysfunction, and they are more likely to use painkillers than those with no history of abuse.²⁶ Surprisingly, our study results did not find a relationship between sexual abuse and severity of fibromyalgia disease, inconsistent with the literature. Many studies in the literature reported that sexual abuse affected both the frequency of fibromyalgia and the severity of the disease. However, in parallel with our study, only Pae et al.²⁷ reported that sexual abuse was not associated with disease severity and poor health status. One possible explanation was that there were few subjects in our study who were severely abused. In addition, our study consisted of a sample of patients who were newly admitted to treatment, who did not have regular follow-up

and did not have a severe history of psychiatric illness. Considering that exposure to severe sexual abuse may have a stronger effect on health care utilization and disability,²⁶ we believe that our patient group may have affected the results in this sense.

In addition, the literature indicates a link between psychological resilience and interoception²⁸ and reveals that patients with fibromyalgia may experience a general lack of resilience.⁴ Zautra et al.²⁹ explored this idea further and argued that the lack of ability to sustain a positive effect in response to stressors of daily life might explain the low psychological resilience, which is very common in patients with fibromyalgia. Our study observed a negative correlation between psychological resilience scores and fibromyalgia severity. Furthermore, another study that evaluated the effect of psychological resilience on fibromyalgia severity and physical functions in patients with fibromyalgia demonstrated a significant correlation between psychological resilience and physical functions,³⁰ consistent with our study results. However, in this study, unlike our study, which evaluated young fibromyalgia patients, the disease severity of patients over the age of 50 years was evaluated. Similarly, a study focused on physical and psychological factors which influence the severity of fibromyalgia symptoms revealed that psychological resilience was a variable that correlates with fibromyalgia severity along with other factors.³¹ In this study, similar to our study, path analysis was established. As a result, the integrated effects of resilience, catastrophizing and physical factors on disease severity were emphasized. However, unlike our study, the results of older patients were evaluated in this study and, particularly physical factors were included. However, considering all studies on this subject, it is conceivable that an excellent understanding of psychological resilience in patients with documented fibromyalgia may help patients to develop more individualized resources to cope with the disease, despite the negative effects associated with disease symptoms.^{30,32}

Since childhood trauma, fibromyalgia severity, and psychological resilience have been shown to be significantly interlinked, the mediator role of psychological resilience in the correlation

between childhood traumas and fibromyalgia severity was investigated in our study. We observed that psychological resilience was a mediator for physical abuse, physical neglect and emotional abuse in this analysis. Based on these results, we conclude that disease severity is low in patients with high psychological resilience, even if they are survivors of childhood traumatic events. Notably, longstanding high concentrations of cortisol affect physical health, cognitive capacity and emotions and increase vulnerability, thereby leading to the onset of a series of immune, metabolic, neuropsychiatric, and endocrine diseases during chronic stress conditions.³³ The neurobiological substrate of the resilience contains various central and environmental systems and processes involved in the relationship between the stress response and individual resilience. The resilience offers protection against possible dendritic changes in the hippocampus and amygdala by contributing to the initiation of the fight-or-flight mechanism during an acute stress condition.³⁴ In this context, not all individuals with a trauma history have symptoms of fibromyalgia, although the onset of fibromyalgia symptoms is more likely and the disease symptoms are more severe in survivors of childhood trauma, indicating the role of psychological resilience. Although the literature points out that patients with fibromyalgia are commonly characterized with a history of clinical abuse and harsh social environment,³⁵ the significance of psychological resilience is particularly expressed in those who are vulnerable to the onset of chronic pain.³⁶ As researchers discovered that not all high-risk children manifested the dire consequences that existing theories of psychopathology have put forward, understanding the processes through which children at risk did not develop psychopathology has become viewed as important for informing theories, and the advances in modern neuroscience represent an unprecedented opportunity to enhance current conceptual and methodological approaches to the study of resilience.³⁷ A number of studies have demonstrated that the brain has ability to recover varying degrees of functioning after injuries to its physical structure³⁸ and, similar to neural plasticity that takes place in response to brain injury, resilience can be considered to be the ability of an individual to recover after exposure to trauma.³⁹ In this view, this might lead to the conclusion that resilient individuals may

have some increased innate capacity (plasticity) to recover from environmental insults that impact the brain. Another concept of resilience is that resilient individuals may not be able to succumb to the potentially damaging effects of adversity on the brain, with their greater capacity than normative resistance. The distinction between these two formulations of resilience and the bidirectional relation between the brain's capacity to either resist damage from adversity versus its restorative capabilities also can generate important research questions concerning the relation of neural plasticity to resilience.³⁹

Clinically, psychological resilience is defined as a multi-dimensional construct that can be adapted to cope with an unfavorable situation or trauma.⁴⁰ Mechanisms of psychological resilience imply cognitions, affects, and behaviors that maintain well-being under stress conditions, help in recovery, and promote new learning or growth.⁴¹ Although childhood trauma has a clear effect on the mental well-being of humans, it is observed that a significant part of childhood trauma survivors are psychologically healthy, and such individuals are defined as more resilient.^{40,42} Some studies have particularly addressed the relationship between childhood problems, psychiatric symptoms (e.g., depression), and resilience,⁴³⁻⁴⁵ and have observed the mediator role of resilience, similar to our study. Poole et al.⁴⁶ conducted a study regarding the effects of psychological resilience on the relationship between childhood trauma and depression and observed a stronger relationship between childhood trauma and depression in those with low resilience. The authors concluded that psychological resilience played a protective role against depression in this group.

Nonetheless, this study has some limitations. First, the data and relevant analyses were derived from a cross-sectional design. Although psychological resilience is often deemed as a construct of personality, some dimensional and longitudinal studies have revealed that it can be altered.⁴⁷ Therefore, it is impossible to obtain a clear conclusion from the observed correlations. Hence, longitudinal studies are warranted on this subject. Another limitation is the study group that involved patients who regularly presented for treatment and exhibited excellent treatment compliance. Therefore, our results cannot be

generalized to patients with fibromyalgia who have heterogeneous characteristics.

In conclusion, the unmet need for new therapeutic targets and strategies that could increase resilience is particularly valid for fibromyalgia, in which environmental factors may play a crucial role, that is a complex combination of positive signs and symptoms subjected to substantial interpersonal variations depending on numerous pathophysiological changes. Notably, the main finding of this study is the protective effect of psychological resilience -improvable capacity to cope with early life traumas and stressors- on fibromyalgia symptoms that leads to negative functioning of several aspects.

Declaration of conflicting interests

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