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ORIGINAL ARTICLE

Resilience and Family Factors in Fibromyalgia: Associations with Disease Severity and Impact

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Abstract

Background: Fibromyalgia is a chronic pain syndrome influenced by biological and psychosocial factors, making resilience and family environment potential determinants of disease outcomes. This study aimed to evaluate psychological resilience and family-related factors in women with fibromyalgia and to examine their association with disease severity and impact.

Methods: A cross-sectional case-control study was conducted with 176 women aged 25-45 years; 88 fibromyalgia and 88 healthy controls. Fibromyalgia severity was assessed using the Fibromyalgia Score (FS) and the Revised Fibromyalgia Impact Questionnaire Score (FIQRS). Resilience was measured with the 10-item Connor-Davidson Resilience Scale (CD-RISC-10). Demographic and family-related data, such as number of children, number of siblings, and presence of a severely ill family member, were also collected.

Results: Women with fibromyalgia had lower resilience scores than healthy controls ($p < 0.001$). They grew up in larger families, more often reported having a severely ill family member during childhood, and currently had more children. Within the fibromyalgia group, lower resilience was associated with greater disease severity and impact (FS: $\varrho = -0.23$, $p = 0.034$; FIQRS: $r = -0.36$, $p < 0.001$). In healthy controls, resilience was positively correlated with the number of children, a relationship not observed in fibromyalgia patients.

Conclusion: Women with fibromyalgia demonstrated lower psychological resilience and reported a higher number of siblings and children compared to healthy controls. Lower resilience was associated with more severe fibromyalgia symptoms, highlighting resilience as a clinically relevant factor associated with symptom burden and a potentially modifiable target for supportive interventions.

Keywords: Fibromyalgia, psychological resilience, chronic pain, family, psychosocial factors.

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INTRODUCTION

Fibromyalgia is a syndrome marked by persistent, widespread muscle and soft tissue pain, often accompanied by fatigue, sleep disturbances, mood changes, and heightened pain sensitivity (1,2). It is one of the most common chronic pain disorders, affecting 2% to 4% of the global population, with its rising incidence placing an increasing burden on healthcare systems (3,4).

The etiology and pathophysiology of fibromyalgia involve neurotransmitter dysregulation, central sensitization, immune system involvement, and genetic predisposition (2). However, psychosocial and biological factors are suggested to play a role in its onset and severity, though the exact mechanisms remain unclear (5). Risk factors include childhood difficulties, female sex, middle age, smoking, high body mass index, alcohol abstinence, and pre-existing medical disorders. The strongest associations are found with sleep disorders, headaches, depression, and illness behavior (6). Recent large-scale studies estimate that around 60% of cases occur in women, who also experience greater symptom burden, including higher pain levels, greater symptom counts, and increased distress (7).

As fibromyalgia is influenced by both biological and psychosocial factors, treatment targets both physical symptoms and psychological well-being. Non-pharmacological approaches, particularly patient education and exercise, are the most strongly recommended for improving pain, function, and well-being. Cognitive-behavioral therapy is advised to address mood disorders and maladaptive coping strategies. Preferred pharmacological treatments are antidepressants such as duloxetine and amitriptyline, alongside pregabalin (8).

Given fibromyalgia's link to stress and emotional regulation, psychosocial factors may influence its onset and progression. Resilience is the ability to adapt to change, withstand stress, and recover from adversity, enabling individuals to cope effectively and prevent significant dysfunction. It involves the capacity to maintain stability and well-being after experiencing trauma, accidents, tragedies, or illness, fostering a return to a healthy state despite life's challenges (9). It is a dynamic process shaped by psychological, biological and environmental influences (10). Higher resilience is associated with reduced vulnerability and a lower risk of illness, while lower resilience may be associated with increased fibromyalgia severity by impairing stress adaptation (9).

This study aims to examine psychological resilience, family size indicators (number of children, number of siblings), and the presence of a severely ill family member during childhood in women with fibromyalgia versus healthy controls. Additionally, it examines whether resilience is associated with the severity and impact of the disease in fibromyalgia patients. The findings may offer deeper insights into the etiology and progression of fibromyalgia, contributing to more personalized treatment strategies and improved patient care.

This study posits that females with fibromyalgia will exhibit lower resilience levels, and they would report a higher number of siblings and children and more frequent exposure to a severely ill family member during childhood, compared to healthy individuals. The null hypothesis states that there will be no differences in these factors between the two groups. Additionally, the study proposes that lower resilience will be associated with higher fibromyalgia severity and impact, whereas the null hypothesis assumes that no such relationship exists.

MATERIALS AND METHODS

Study Design and Setting

This study was designed as a comparative cross-sectional study conducted in the Physical Medicine and Rehabilitation Department of a tertiary care hospital between November 2024 and March 2025. Data were collected in the outpatient clinics, where structured face-to-face surveys were administered.

Ethical approval was obtained before the study commenced (Ethical approval number: 17/11; date: 07/11/2024), and the study was registered at ClinicalTrials.gov (Identifier: NCT06777667). Although the preregistered plan included items on family environment, family attitudes, and childhood trauma, we did not administer them because these constructs are best assessed with validated instruments and standardized, multidisciplinary evaluation. To preserve measurement validity, we limited the present report to prespecified demographic indicators (number of siblings, number of children) and one childhood exposure item (presence of a severely ill family member). Reporting followed

the STROBE checklist for case-control studies to ensure methodological rigor.

Participants

Participants included women aged 25 to 45 years, divided into two groups: those diagnosed with fibromyalgia according to the 2016 revised American College of Rheumatology (ACR) diagnostic criteria (11). All participants provided written informed consent before participation. Exclusion criteria included autoimmune diseases, cancer, cardiovascular diseases, pulmonary disorders, inflammatory joint diseases, severe psychiatric disorders, and recent surgical procedures. Individuals using medications primarily prescribed for severe psychiatric disorders (e.g., antipsychotics, mood stabilizers, or benzodiazepines used regularly) were excluded. Medications commonly used for fibromyalgia management (e.g., duloxetine, amitriptyline, pregabalin) were not an exclusion criterion. Healthy controls had no history of fibromyalgia or other chronic pain syndromes and did not meet any exclusion criteria; the same exclusion criteria applied to both groups. Participants were evaluated by a physician before enrollment.

A total of 194 participants were initially recruited. During data evaluation, individuals with missing or conflicting data were excluded until the target sample size of 88 participants per group (N=176) was reached. Once this was achieved, recruitment was stopped.

Demographic Variables

We collected age, marital status, education, employment, number of children, number of siblings, and whether a severely ill family member was present during childhood. A 'severely ill family member during childhood' was defined as a first-degree relative or household member with a serious chronic disease, disability, or life-threatening condition that required ongoing care or substantially affected daily family life. Marital status is categorized as single, married, divorced, or widowed. Education level included seven years of compulsory education, high school, or university. Employment status is recorded as student, unemployed, full-time employee, or part-time employee.

Data Sources

Fibromyalgia severity was measured in the fibromyalgia group using two complementary measures. First, the Fibromyalgia Score (FS) was calculated as the sum of the Widespread Pain Index (WPI) and the Symptom Severity Scale (SSS), recorded during physician assessment according to the 2016 ACR criteria. Scores range from 0 to 31, with higher scores indicating greater severity (11). Second, severity and impact were further assessed using the Revised Fibromyalgia Impact Questionnaire (FIQR). The resulting FIQR Score (FIQRS) ranges from 0 to 100, with higher scores indicating greater disease severity and impact (12).

Psychological resilience was measured in both groups using the Connor-Davidson Resilience Scale (CD-RISC-10), scored from 0 to 40 (higher scores indicating greater resilience) (13). Both FIQR (long form) and CD-RISC-10 are validated for the patient population (14,15). Measurement bias was minimized by using standardized, validated self-report scales.

Study Size

The sample size was calculated using GPower software with a moderate effect size (0.5), a significance level of 0.05, and a statistical power of 0.95 for a one-tailed hypothesis with equal group allocation. A total of 176 participants (88 per group) were required, and 194 were recruited to account for a 10% dropout rate.

Statistical Methods

All statistical analyses were performed using SPSS 29.0.2.0, with significance set at $p < 0.05$. Descriptive statistics were presented as means, standard deviations, medians, interquartile ranges, and effect sizes. The FS was categorized as follows: 0–3 (remission), 4–7 (mild), 8–11 (moderate), 12–19 (severe), and 20–31 (very severe). The FIQRS was defined as follows: 0–23 (remission), 24–40 (mild), 41–63 (moderate), 64–82 (severe), and 83–100 (very severe) (16).

Before comparisons, normality tests were performed (Supplementary Table 1). Comparative analyses used independent t-tests for normally distributed continuous variables and Mann-Whitney U tests for non-normally distributed or ordinal variables. Chi-square tests were applied for categorical variables. Correlations between parameters were assessed using Pearson or Spearman tests, depending on data distribution. For ANCOVA, we examined key assumptions, including linearity be-

tween the covariate and outcome, homogeneity of regression slopes, and inspection of residuals. No meaningful violations were observed.

RESULTS

Descriptive Statistics

Among participants aged 25-45, the mean age was 36.38 (SD = 6.51) in the fibromyalgia group and 34.88 (SD = 4.99) in the control group. In 88 fibromyalgia patients, the mean WPI score was 9.50 (SD = 3.18), ranging from 5 to 18, while the mean SSS score was 9.18 (SD = 1.74), with a range of 5 to 12. The FS had a mean of 18.68 (SD = 4.04), ranging from 12 to 30. The FIQRS had a mean of 62.87 (SD = 14.90), ranging from 27.66 to 91.

Based on severity categorizations, the fibromyalgia group had severe disease according to the FS and moderate disease according to FIQRS. The unemployment ratio was higher in the fibromyalgia group (37.5%) than in the healthy group (9.1%). Additional descriptive parameters for both groups are provided in Table 1.

Comparability of Groups

Before conducting group comparisons, we assessed whether the fibromyalgia and control groups were comparable in terms of age and education level. Group differences did not reach statistical significance for age ($p = 0.055$) or education level ($p = 0.076$), although a trend toward significance was observed for both variables (Supplementary Table 2). Given the borderline p-value for age, this variable was included as a covariate in subsequent analyses to account for potential confounding effects.

Comparison of Fibromyalgia Patients with Healthy Controls

Resilience levels were compared between the fibromyalgia and control groups using an independent t-test. The analysis revealed a significant difference ($p < 0.001$), with individuals in the fibromyalgia group exhibiting lower resilience levels than healthy controls. The effect size ($d = 0.49$) indicates a moderate and meaningful difference between the groups, suggesting that resilience is noticeably lower in individuals with fibromyalgia (Table 2).

ANCOVA was conducted with resilience as the dependent variable, group (fibromyalgia vs. control) as the fixed factor, and age as a covariate. The analysis confirmed that the difference in resilience remained statistically significant after adjusting for age ($F(1,173) = 11.105$, $p = 0.001$, partial $\eta^2 = 0.060$). Age was not a significant predictor of resilience ($p = 0.343$). These results indicate that the observed group difference in resilience is not confounded by age (Supplementary Table 3).

The number of children and the number of siblings were compared between the fibromyalgia and control groups using the Mann-Whitney U test. Significant group differences were observed for the number of children ($p=0.002$) and the number of siblings ($p=0.014$); no other family variables showed group differences. However, the effect sizes for the significant differences ($r = 0.24$ and $r = 0.18$) indicate that although a difference exists, it is small (Table 3).

Chi-square test was conducted to compare the presence of a severely ill family member during childhood in fibromyalgia and control groups, and a significant difference was found ($p < 0.05$). (Table 4).

Correlation Analysis

Resilience was negatively correlated with fibromyalgia severity as measured by both FS ($\rho = -0.23$, $p = 0.034$) and FIQRS ($r = -0.36$, $p < 0.001$), indicating that lower resilience levels were associated with more severe fibromyalgia symptoms (Table 5). We also examined the relationship between resilience and childhood family demographics. In healthy controls, resilience was positively correlated with the number of children ($p < 0.001$), a relationship not observed in the fibromyalgia group (Table 5). To further assess whether these correlations differed significantly between groups, we applied Fisher's Z test. This analysis confirmed that the positive association between resilience and the number of children was significantly stronger in healthy controls compared to fibromyalgia patients (Fisher's $Z = 2.90$, $p = 0.004$), suggesting a differential association pattern between resilience and family structure across groups (Supplementary Table 4).

DISCUSSION

Summary of Findings

This study showed that women with fibromyalgia had significantly lower resilience than healthy controls.

Table 1. Sociodemographic and Family-Related Characteristics of Participants

Variable	Fibromyalgia group (mean ± SD / % (n))	Healthy group (mean ± SD / % (n))
Age	36.38 ± 6.51 (min:25, max:45)	34.88 ± 4.99 (min:25, max:45)
Marital status	13.6% (n=12) single, 68.2% (n=60) married, 17% (n=15) divorced, 1.1% (n=1) widowed	18.2% (n=16) single, 77.3% (n=68) married, 4.5% (n=4) divorced, 0% (n=0) widowed
Education level	8% (n=7) compulsory education, 35.2% (n=31) high school graduate, 56.8% (n=50) university graduate	9.1% (n=8) compulsory education, 19.3% (n=17) high school graduate, 71.6% (n=63) university graduate
Employment status	3.4% (n=3) students, 37.5% (n=33) unemployed, 51.1% (n=45) full-time working, 8% (n=7) part-time working	6.8% (n=6) students, 9.1% (n=8) unemployed, 80.7% (n=71) full-time working, 3.4% (n=3) part-time working
Number of children	1.51 ± 1.13 (min:0, max:4)	1.01 ± 1.15 (min:0, max:5)
Number of siblings	3.11 ± 1.97 (min:1, max:10)	2.53 ± 2.22 (min:0, max:13)
Severely ill family member (childhood)	35.2% (n=31) present, 64.8% (n=57) not present	11.4% (n=10) present, 88.6% (n=78) not present
CD-RISC-10 score	20.78 ± 6.75 (min:5, max:40)	24.25 ± 7.45 (min:2, max:40)

Values are presented as mean ± standard Deviation (SD) for continuous variables or percentage (n) for categorical variables. CD-RISC-10: Connor-Davidson Resilience Scale 10 item.

Table 2. Comparison of Resilience Scores Between the Fibromyalgia and Control Groups

Variable	Mean ± SD FG	Mean ± SD HG	df	95% CI	p value	Effect size
CD-RISC-10	20.78 ± 6.75	24.25 ± 7.45	174	1.35 to 5.58	< 0.001*	0.49

CD-RISC-10: Connor-Davidson Resilience Scale- 10 item. FG: fibromyalgia group, HG: healthy group. df = degrees of freedom; CI = Confidence Interval; diff: difference * indicates statistically significant result ($p < 0.05$).

Table 3. Comparison of Family Variables Between the Fibromyalgia and Control Groups

Variable	Median (IQR) HG	Median (IQR) FG	Mann-Whitney U value	p value	Effect size
Number of children	1 (2)	2 (2)	2851.00	0.002*	0.24
Number of siblings	2 (2)	3 (2)	3062.00	0.014*	0.18

HG: healthy group, FG: fibromyalgia group. IQR = Interquartile Range. * indicates statistically significant results ($p < 0.05$).

Table 4. Comparison of the Presence of a Severely ill Family Member During Childhood Between the Fibromyalgia and Control Groups

Group	Present n (%)	Not present n (%)	χ^2	p value	Effect size
Fibromyalgia	31 (35.2%)	57 (64.8%)	14.023	<0.001*	0.28
Healthy	10 (11.4%)	78 (88.6%)			

Table 5. Correlation Analysis Between Resilience, Fibromyalgia Severity, and Demographics

Variable 1	Variable 2	Effect size	p-value	95% CI
CD-RISC-10 score	FS	-0.23	0.034*	-0.422,-0.012
CD-RISC-10 score	FIQRS	-0.36	<0.001*	-0.528,-0.161
CD-RISC-10 score	Number of children HG	0.45	<0.001*	0.263, 0.609
CD-RISC-10 score	Number of children FG	0.04	0.699	-0.175, 0.255
CD-RISC-10 score	Number of siblings HG	0.07	0.520	-0.148, 0.281
CD-RISC-10 score	Number of siblings FG	0.02	0.885	-0.201, 0.230
CD-RISC-10 score	Severely ill family member HG	-0.19	0.084	-0.385, 0.031
CD-RISC-10 score	Severely ill family member FG	0.18	0.090	-0.035,0.382

CD-RISC-10: Connor-Davidson Resilience Scale 10-item. HG: healthy group; FG: fibromyalgia group. The correlation between the FIQRS and the CD-RISC-10 score was analyzed using Pearson's correlation, while all other correlations were calculated using Spearman's rho (ϱ). * indicate statistically significant results ($p < 0.05$).

They grew up in larger families, more often reported having a severely ill family member during childhood, and currently had more children. Within the fibromyalgia group, lower resilience was associated with greater disease severity and impact. In healthy controls, resilience was positively related to the number of children, but this association was absent in fibromyalgia patients.

Overall, our findings support the hypotheses: fibromyalgia patients demonstrated lower resilience, reported a higher number of siblings/children, and more often reported childhood exposure to a severely ill family member. Additionally, lower resilience was linked to more severe disease outcomes.

Comparison with Existing Literature

Resilience, a protective factor that enables individuals to cope more effectively with stress and adversity, has been increasingly examined in relation to fibromyalgia and other chronic pain conditions. Casale et al. emphasized that in fibromyalgia, where both genetic and environmental factors play a major role, resilience may

shape how symptoms are perceived and how well patients adapt to the condition (17).

Several studies have consistently reported reduced resilience in fibromyalgia patients. Karakoyun et al. demonstrated that resilience was significantly lower in fibromyalgia patients compared with both rheumatoid arthritis patients and healthy controls, highlighting the importance of interventions to strengthen resilience and reduce health anxiety (18). In juvenile fibromyalgia, resilience has also been shown to play a critical role, with lower resilience associated with a higher risk of suicidality (19).

Beyond psychological distress, resilience appears to influence symptom burden. McAllister et al. found that lower resilience was associated with greater symptom severity in fibromyalgia patients, suggesting that resilience functions as a protective factor in moderating symptom expression (20). However, evidence is not entirely consistent. Teixeira et al. recently reported that low resilience in fibromyalgia is not associated with higher pain intensity, but it is linked to greater disruption of daily life by pain (21).

Taken together, the literature suggests that resilience in fibromyalgia is generally reduced compared to other populations and that lower resilience is linked to greater disease severity, symptom burden, and psychological distress. Consistent with these findings, our study showed that psychological resilience was inversely correlated with both fibromyalgia severity and impact, further supporting the role of resilience as a key factor in understanding disease expression.

Similarly, the literature shows that resilience is associated with lower anxiety in patients with inflammatory bowel disease, reduced depressive symptoms in individuals with cardiac disease, and an overall inverse relationship with depression and stress; thus, enhancing resilience may improve quality of life (22-24).

Reporting a higher number of siblings and childhood exposure to a severely ill family member may reflect differences in family context and resource allocation; however, this interpretation should be tested using validated measures of family environment. This finding is consistent with research showing that fibromyalgia patients score significantly lower on the Expressing Emotions Scale compared to healthy controls, indicating greater difficulty in emotional expression (25). Similarly, another study demonstrated that writing about traumatic experiences, which offers a form of emotional expression, led to improvements in pain, fatigue, and psychological well-being in fibromyalgia patients compared to control groups (26). Actually, family structure may have both protective and adverse implications depending on cultural context. In societies with strong family ties, larger families can provide social support and practical assistance, potentially buffering stress. Future studies should directly measure perceived family support and family functioning using validated instruments to clarify these pathways.

Additionally, having a seriously ill family member during childhood may be consistent with social learning explanations (learned illness behavior), which should be tested in longitudinal designs. This aligns with evidence suggesting that chronic illness behavior may be learned, with social learning contributing to the development of conditions like irritable bowel syndrome (27). Similarly, early observations of parental illness behaviors have been shown to influence how individuals adjust to chronic conditions such as arthritis later in life (28).

Interestingly, in our analyses, having more children was associated with greater resilience in healthy controls; however, this link was absent in the fibromyalgia group. For healthy individuals, parenting may enhance resilience by providing purpose, emotional support, and social connection. In some cultures, having children also brings social validation and a sense of completeness, further contributing to psychological resilience. In contrast, for women with fibromyalgia, the physical and emotional burden of chronic pain and fatigue may overshadow these benefits, making parenting more of a stressor than a source of resilience. Unmeasured caregiving burden/social support and possible reverse causation may partly explain this group difference.

In light of our findings, several clinical implications can be drawn. Since current treatment outcomes in fibromyalgia remain limited, interventions targeting emotional regulation, coping strategies, and resilience may be considered as part of comprehensive care; however, intervention studies are needed to determine whether modifying these factors improves outcomes (29-31). Resilience itself may also represent a therapeutic target, although this area of research is still underdeveloped (17). Training programs designed to strengthen resilience and improve emotional regulation could be explored as strategies to lessen symptom burden (20). In line with previous work, our findings further highlight the importance of interventions aimed at enhancing resilience and reducing health anxiety in fibromyalgia (18).

These approaches may not only improve the quality of life but also contribute to reducing the clinical and economic burden of fibromyalgia. Clinicians are encouraged to monitor patients closely and consider integrating trauma-focused as well as resilience-based therapies into comprehensive treatment plans (32).

This study has several limitations. First, the presence of an ill family member during childhood was assessed through self-report, which may be prone to recall bias. Verification with medical or family records could strengthen future research. Second, the study included only women aged 25-45 years to achieve a homogeneous sample. While this reduces variability, it also limits generalizability to male patients, older adults, and younger populations. Third, the cross-sectional design precludes conclusions about causality; longitudinal studies are needed to clarify whether low resilience contributes to fibromyalgia severity or develops as a consequence of chronic illness. Additionally, standardized assessments of family environment, family member attitudes, and childhood trauma were not included and should be addressed in future research. Finally, this study did not account for potential cultural or socioeconomic influences on resilience and family structure, which should be explored in future research.

This study demonstrates that women with fibromyalgia have significantly lower psychological resilience compared to healthy controls. They also reported a higher number of siblings and more frequent childhood exposure to a severely ill family member. These family-related factors were associated with reduced resilience, which in turn correlated with greater fibromyalgia severity and impact.

Our findings emphasize the importance of assessing psychosocial and family factors in the management of fibromyalgia. Resilience-focused approaches may be considered within multidisciplinary management; future longitudinal and interventional studies are needed to clarify whether enhancing resilience improves disease outcomes. Future research should include male patients, broader age ranges, and other chronic pain conditions to gain a more comprehensive understanding of the interplay between resilience, family background, and chronic pain outcomes.

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Abbreviations List

FS: Fibromyalgia Score
FIQR: Revised Fibromyalgia Impact Questionnaire
FIQRS: Revised Fibromyalgia Impact Questionnaire Score
CD-RISC-10: Connor-Davidson Resilience Scale 10-item.
FG: Fibromyalgia Group
HG: Healthy Group.

Ethics Approval and Consent to Participate

Local ethical committee approval was obtained from the Ministry of Health Antalya City Hospital Ethical Committee (Ethical approval number: 17/11; date: 07/11/2024), and the study was conducted in accordance with the Helsinki Declaration of Human Rights before the study.

Consent for Publication

Informed consent was obtained from all the participants.

Availability of Data and Materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request. The data supporting the findings of this study, including the supplementary materials/tables referred to in the manuscript, are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors Contributions

Idea/Conceptualization: VA, ZDS, SYM. Methodology: VA, ZDS, SYM. Validation: VA, ZDS, SYM. Formal analysis: VA, ZDS, SYM. Investigation: VA, ZDS, SYM. Resources: VA, ZDS. Data curation: VA, ZDS, SYM. Writing- original draft: SYM. Writing- review & editing: VA, ZDS, SYM. Visualization: VA, ZDS, SYM. Supervision: VA, ZDS, SYM. Project administration: VA, ZDS, SYM. Funding acquisition: VA, ZDS, SYM.

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