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Emotional reactivity profiles and stress coping patterns in migraine: Implications for clinical management

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Abstract

Background & Objective: Migraine is a prevalent and disabling neurological disorder, often accompanied by psychosocial factors such as emotional reactivity and stress-related coping patterns. While stress is a well-established trigger, limited evidence exists regarding how emotional reactivity dimensions and coping styles are related in individuals with migraine. This study examined the associations between emotional reactivity dimensions "sensitivity, arousal/intensity reactivity, and persistence" and stress coping strategies in patients diagnosed with migraine, using a structural equation modeling (SEM) framework. *Methods:* A cross-sectional study was conducted with 382 patients meeting ICHD-III diagnostic criteria for migraine. Participants completed the Emotion Reactivity Scale and the Stress Coping Styles Inventory, along with a sociodemographic questionnaire. Data were analyzed using SPSS 26 and AMOS 24. Path analysis was performed to examine the relationships among emotional reactivity dimensions and coping strategies. *Results:* Sensitivity was significantly associated with both adaptive coping strategies (self-confident: $\beta = 0.219$, $p < .001$; optimistic: $\beta = 0.284$, $p < .001$) and maladaptive coping (helpless: $\beta = 0.148$, $p = .007$). Arousal/intensity reactivity was negatively associated with optimism ($\beta = -0.301$, $p < .001$) and positively associated with helpless ($\beta = 0.453$, $p < .001$), submissive ($\beta = 0.226$, $p = .003$), and social support–seeking ($\beta = 0.167$, $p = .031$) coping strategies. Persistence was not significantly associated with coping styles. Sociodemographic factors including age, education, income, and marital status were also related to coping strategies.
Conclusion: Overall, higher levels of arousal/intensity reactivity were associated with greater reliance on avoidant and passive coping strategies, whereas sensitivity was related to both constructive and dysfunctional coping patterns. These findings highlight the complex role of emotional reactivity in migraine and underscore the importance of considering emotion regulation and stress management within psychosocial interventions for migraine care.

Keywords: Migraine, arousal/intensity reactivity, coping strategies, stress

INTRODUCTION

Migraine is a complex neurological disorder affecting approximately 14% of the global population and representing a leading cause of disability among young adults worldwide.[1-3] Beyond recurrent headache attacks, migraine is frequently accompanied by psychiatric comorbidities such as depression, anxiety, sleep disturbances, and marked difficulties in emotion regulation, all of which substantially increase disease burden and impair quality of life.[4-6] This pattern of comorbidity indicates that migraine may be conceptualized within a biopsychosocial framework, in which neurobiological mechanisms interact with emotional regulation, stress reactivity, and lifestyle-related factors that contribute to migraine burden and clinical outcomes. Large-scale and conceptual reviews have highlighted the role of stress, emotional regulation, and lifestyle-related factors in modulating migraine burden and clinical outcomes.[7]

Emotional reactivity

Emotional reactivity refers to individual differences in the threshold, intensity, and duration of emotional responses to internal or external stimuli.[8] Individuals with high

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emotional reactivity tend to respond to stressors with stronger emotional arousal and prolonged affective activation, which may compromise adaptive emotion regulation.[9] In migraine populations, heightened emotional reactivity has been associated with increased pain sensitivity, higher headache-related disability, and poorer psychological functioning.[10,11] Neuroimaging studies further suggest that this heightened reactivity is linked to altered limbic system activity and dysregulated pain modulation pathways, reinforcing the conceptualization of migraine as a disorder involving emotional processing mechanisms.[12,13] In addition, heightened emotional reactivity, frequently observed among migraine patients, amplifies pain perception and reduces quality of life.[10,11] Neuroimaging findings indicate that this hyper-reactivity is closely related to limbic system functioning and pain modulation mechanisms, suggesting that migraine may also be conceptualized as a disorder of emotion regulation.[12,13]

Stress coping styles

Stress coping styles encompass the cognitive and behavioral strategies individuals employ to manage demands appraised as stressful or exceeding available resources.[14] In migraine, coping styles play a critical role in shaping symptom severity, attack frequency, and functional outcomes. Active coping strategies such as self-confident problem solving, optimism, and seeking effective social support have generally been associated with better psychological adjustment and reduced migraine-related disability. In contrast, passive or avoidant strategies, including helplessness, submissiveness, and withdrawal, are consistently linked to greater pain intensity, emotional distress, and migraine chronification.[15-17]

Importantly, coping styles are not static traits but are influenced by emotional characteristics and stress responsivity. Individuals with heightened emotional reactivity may be more likely to perceive stressors as threatening and to rely on maladaptive coping strategies, particularly in chronic pain conditions such as migraine.[18,19]

Sensitivity, arousal/intensity reactivity, and persistence

Within emotional reactivity models, sensitivity, arousal/intensity reactivity, and persistence are conceptualized as distinct yet interrelated dimensions.[8,20] Sensitivity reflects heightened awareness and responsiveness to emotional and environmental cues. While emotional sensitivity may facilitate empathy and social attunement, excessive sensitivity has been associated with increased vulnerability to stress and emotional overload in migraine patients.[21,22]

Arousal/intensity reactivity refers to the magnitude of emotional and physiological activation in response to stressors. High arousal/intensity reactivity has been linked to amplified negative affect, impaired emotion regulation, and a greater tendency toward avoidant or passive coping strategies.[11,16] In migraine, heightened arousal has been shown to intensify pain perception and worsen headache-related disability.[10]

Persistence denotes the tendency for emotional responses to be sustained over time and is often considered a resilience-related dimension within emotional reactivity frameworks. Although persistence may reflect emotional endurance and recovery capacity, prolonged emotional activation has also been associated with cumulative stress exposure and adverse health outcomes, as described in the perseverative cognition hypothesis.[23] Evidence regarding the role of persistence in migraine coping remains limited and mixed, warranting further investigation.[24]

The present study

Although previous research has documented associations between migraine, stress, emotional dysregulation, and coping, studies integrating emotional reactivity dimensions—sensitivity, arousal/intensity reactivity, and persistence—within a single explanatory model remain scarce. Moreover, findings regarding the relationship between emotional reactivity and stress coping styles in migraine have been inconsistent, with some studies reporting adaptive coping patterns and others highlighting predominant maladaptive responses.[25,26] Therefore, the present study aimed to examine the associations between emotional reactivity dimensions and stress coping styles in patients with migraine using a structural equation modeling (SEM) approach. By elucidating these relationships, this study seeks to advance understanding of psychosocial mechanisms underlying migraine and to inform the development of individualized, emotion-focused interventions in migraine management.

METHODS

Study design

This study employed a cross-sectional, relational design to examine the associations between arousal/intensity reactivity and stress-coping styles among individuals diagnosed with migraine.

Participants and sampling

The study population comprised patients who presented to outpatient neurology clinics of a state hospital in a metropolitan area of Turkey between January 2019 and January 2020 and met the diagnostic criteria for migraine according to the *International Classification of Headache Disorders, Third Edition* (ICHD-III)[27]. Participants were recruited using a non-probability sampling method. Inclusion criteria were: (1) age ≥18 years, (2) confirmed diagnosis of migraine, and (3) voluntary consent to participate.

Sample size considerations were informed by recommendations for multivariable analyses and structural equation modeling rather than prevalence estimation. For SEM and path analysis, a minimum sample size of 10–20 participants per estimated parameter is commonly recommended. The final sample of 382 participants exceeded these recommendations and was considered adequate to ensure stable parameter estimates and sufficient statistical power for detecting medium effect sizes. In addition, a post hoc power analysis conducted using GPower 3.1 indicated a statistical power greater than 0.95 for medium effect sizes ($f^2 = 0.15$) with five determinants. A total of 382 participants were recruited, exceeding the minimum requirement. Post-hoc power analysis using G*Power 3.1 confirmed a statistical power above 0.95 for detecting medium effect sizes ($f^2 = 0.15$) with five determinants, indicating adequate statistical power and model stability.

Measures

Sociodemographic form: A structured questionnaire developed by the researchers was used to assess participants' demographic characteristics including age, sex, marital status, education, occupation, and income.

Emotion Reactivity Scale (ERS): Developed by Nock *et al*. (2008)[7] and adapted to Turkish by Seçer *et al*. (2013)[26], this 17-item scale assesses three subdimensions: sensitivity, arousal/intensity reactivity, and persistence subscales. Items are rated on a 4-point Likert scale (range: 17–68). Reported internal consistency coefficients are acceptable ($\alpha = .71–.82$).

Stress Coping Styles Inventory (CSI): Originally developed by Folkman and Lazarus[13] and adapted to Turkish by Şahin & Durak (1995)[28], the CSI consists of 30 items rated on a 4-point Likert scale. It includes five subscales: self-confident approach, helpless approach, submissive approach, optimistic approach, and seeking social support. Subscales can be grouped into active coping (self-confident, optimistic, social support-seeking) and passive coping (helpless, submissive). Higher scores indicate greater use of the corresponding strategy.

Data collection procedure

Eligible patients were invited to participate following their clinical visit. After providing informed consent, participants completed the questionnaires in a private setting. Data collection was supervised by trained research staff.

Data analysis

Data were analyzed using IBM SPSS Statistics v26 and AMOS v24. Descriptive statistics (frequency, percentage, mean, standard deviation) summarized sociodemographic and clinical variables. Normality was assessed via skewness and kurtosis. Between-group differences in coping strategies by demographic and clinical variables were examined using independent samples *t*-tests and one-way ANOVA with LSD post-hoc tests. Associations among scale scores were evaluated with Pearson correlation.

To test hypothesized relationships, structural equation modeling (SEM) with path analysis was performed. Model fit was assessed using multiple indices, including χ^2/df, Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). Standardized regression coefficients (β) were reported to indicate effect sizes.

Ethics

The study was approved by the Clinical Research Ethics Committee of the Ordu University, Faculty of Health Sciences (approval no:

91120269-050.02.04-E.00000490569/2020/55, date: 26/03/2020). Written informed consent was obtained from all participants.

RESULTS

Participant characteristics

Table 1 presents the socio-demographic and migraine-related characteristics of the participants. The majority of the sample consisted of women, married individuals, and housewives, with the most common age group being 36–45 years. Most participants reported low to middle monthly income levels. Regarding migraine-related features, participants were almost evenly distributed between episodic and chronic migraine. The most frequently reported migraine duration was 1–5 years, and throbbing pain was the predominant headache type (Table 1).

Stress coping styles

Descriptive analyses indicated that participants predominantly used active and self-confident coping strategies (M = 3.10 ± 0.43), accompanied by a tendency toward optimistic thinking. Moderate levels of seeking social support (M = 2.94 ± 0.41), helpless coping (M = 2.56 ± 0.53), and submissive (passive) coping strategies (M = 2.26 ± 0.43) were also observed.

Since the data demonstrated a normal distribution, parametric tests were applied. Independent samples t-tests and one-way ANOVA were conducted to examine differences in coping styles across socio-demographic and clinical variables. As shown in Table 2, educational level, monthly income, and marital status were associated with significant differences in coping styles, whereas gender and migraine type did not yield statistically significant differences.

Emotional reactivity and correlational findings

Correlation analyses revealed significant positive associations among emotional reactivity dimensions and stress coping styles (Table 3). Notably, arousal/intensity reactivity showed a strong positive correlation with helplessness-oriented coping ($p < .01$), suggesting that heightened emotional arousal is closely linked to maladaptive coping responses.

Sensitivity, arousal/intensity reactivity, and persistence: Path analysis

Path analysis demonstrated significant associations between emotional reactivity dimensions and stress coping styles (Figure 1, Table 4). Sensitivity was significantly associated with constructive coping strategies, whereas arousal/intensity reactivity was predominantly associated with avoidant and passive coping strategies. Persistence did not demonstrate a statistically significant associative role.

Further examination of the SEM results (Figure 2, Table 5) indicated that the sensitivity sub-dimension had positive and significant associations on the self-confident approach ($\beta = 0.219$, $p < .001$), optimistic approach ($\beta = 0.284$, $p < .001$), and helpless approach ($\beta = 0.148$, $p = .007$). These findings suggest that emotionally sensitive individuals may simultaneously engage in both adaptive (self-confident, optimistic) and maladaptive (helpless) coping strategies. Sensitivity was not significantly associated with submissive coping ($p = .651$) or seeking social support ($p = .071$).

The associations of arousal/intensity reactivity were more pronounced. This dimension showed a significant negative effect on the optimistic approach ($\beta = -0.301$, $p < .001$) and significant positive associations on helpless coping ($\beta = 0.453$, $p < .001$), submissive coping ($\beta = 0.226$, $p = .003$), and seeking social support ($\beta = 0.167$, $p = .031$). These findings indicate that individuals with high arousal/intensity reactivity tend to rely on more passive and avoidant coping strategies when facing stress.

In contrast, persistence did not show a significant effect on any of the stress coping styles (all $p > .05$), suggesting that this dimension may not directly influence coping preferences in migraine patients within the examined model.

DISCUSSION

The present study examined the associations between emotional reactivity dimensions (sensitivity, arousal/intensity reactivity, and persistence) as well as stress coping styles in individuals with migraine. The findings indicated that sensitivity was associated with both adaptive (self-confident and optimistic) and maladaptive (helpless) coping strategies, whereas arousal/intensity reactivity was primarily associated with passive and avoidant coping styles, including helplessness, submissiveness, and seeking social support. Persistence was not significantly associated with coping strategies. Together, these findings suggest that migraine may be conceptualized within a biopsychosocial

Table 1: Demographic characteristics of the participants (n = 382)

Variable	Category	f	%	Variable	Category	f	%
Gender	Female	289	75.7	**Occupation**	Housewife	200	52.4
	Male	93	24.3		Student / unemployed	51	13.4
Monthly income	Less than 2000	170	44.5		Retired	10	2.6
	2000–5000 TL	190	49.7		Self-employed	49	12.8
	More than 5000 TL	22	5.8		Civil servant	31	8.1
Marital status	Married	287	75.1		Worker / Farmer / Security / Secretary	41	10.7
	Single	76	19.9	**Perceived Economic Status**	Poor	115	30.1
	Widowed	19	5.0		Moderate	243	63.6
Education status	Literate	105	27.5		Good	24	6.3
	Primary School	25	6.5	**Age**	18–25	73	19.1
	Middle School	55	14.4		26–35	88	23.0
	High School	109	28.5		36–45	132	34.6
	Associate degree	24	6.3		46–55	64	16.8
	University	64	16.8		56 and above	25	6.5
Migraine duration	1-5 years	269	70.4	**Headache Type**	More than two type	128	33,5
	6-10 years	34	8.9		Throbbing	79	20.7
	10 years and above	79	20.7		Explosive	23	6.0
Migraine type	Acute	198	51.8		Heavy feeling	18	4.7
	Chronic	184	48.2		Oppressive	17	4.5
	4 or more per month	218	57.1		Boring	12	3.1
					Throbbing + Heaviness feeling	40	10.5
					Throbbing + Numbness	30	7.9
					Throbbing + Oppressive	17	4.5
					Throbbing + Explosive	17	4.5
					Oppressive + Heaviness feeling	1	0.3

Table 2: Comparison of scale scores across demographic characteristics

Group	Category	n	Stress Coping Styles (M/ SD)	Emotional Reactivity (M/ SD)	Group	Category	n	Stress Coping Styles (M/ SD)	Emotional Reactivity (M/ SD)
Gender	Female	289	3.2250 / 0.2602	2.5247 / 0.5565	Migraine Type	Acute Migrain	198	3.2127 / 0.2619	2.4848 / 0.5893
	Male	93	3.1993 / 0.2446	2.4206 / 0.5466		Chronic Migrain	184	3.2253 / 0.2510	2.5150 / 0.5171
	t / p	382	0.841 / 0.401	1.576 / 0.116		t / p	382	-0.483 / 0.630	-0.530 / 0.596
Age	18-25	73	3.1145 / 0.2347	2.5278 / 0.6055	**Migraine Duration**	1-5 years	269	3.2091 / 0.2546	2.4833 / 0.5497
	26-35	88	3.1737 / 0.2285	2.4405 / 0.5210		6-10 years	34	3.2017 / 0.2245	2.5588 / 0.5570
	36-45	132	3.2435 / 0.2662	2.4688 / 0.5723		10 years and above	79	3.2590 / 0.2739	2.5287 / 0.5772
	46-55	64	3.3170 / 0.2560	2.5248 / 0.5180		**F / p**	**382**	1.242 / 0.290	0.417 / 0.660
	56 and above	25	3.3000 / 0.2324	2.7200 / 0.4949	**Monthly income**	Less than 2000 TL	170	3.2773 / 0.2468	2.5644 / 0.5394
	F / p	**382**	7.451 / **0.000**	1.422 / 0.226		2000–5000 TL	190	3.1722 / 0.2612	2.4591 / 0.5671
	LSD (Post Hoc)		18-25<36-45;46-55;56 and above			5000 TL and above	22	3.1688 / 0.1972	2.3449 / 0.5325
Marital Status	Married	287	3.2409 / 0.2540	2.5106 / 0.5498		**F / p**		8.288 / **0.000**	2.535 / 0.081
	Widowed	19	3.3383 / 0.2576	2.6285 / 0.6235		**LSD (Post Hoc)**		2000–5000 TL <2000 TL'den az	
	Single	76	3.1053 / 0.2315	2.4249 / 0.5566	**Education Level**	Literate	105	3.3068 / 0.2454	2.5877 / 0.5119
	F / p		11.145 / **0.000**	1.257 / 0.286		Primary school	25	3.3686 / 0.3258	2.7435 / 0.6165
	LSD (Post Hoc)		Single<Widowed			Secondary School	55	3.2805 / 0.2657	2.5989 / 0.5888
Occupation group	Housewife	200	3.2582 / 0.2633	2.5638 / 0.5636		High School	109	3.1379 / 0.2395	2.4215 / 0.5426
	Student / unemployed	51	3.0889 / 0.2135	2.4890 / 0.5280		Associate degree	24	3.2173 / 0.1685	2.3995 / 0.5461
	Retired	10	3.3429 / 0.3274	2.5706 / 0.5730		University	64	3.1010 / 0.1953	2.3438 / 0.5403
	Self-employed	49	3.2026 / 0.2450	2.4526 / 0.5748		**F / p**		10.949 / **0.000**	3.557 / **0.004**
	Civil servant	31	3.1129 / 0.1665	2.1385 / 0.4486		**LSD (Post Hoc)**		**University<Primary school**	**University<Primary school**
	Worker / Farmer / Security / Secretary	41	3.2570 / 0.2526	2.5093 / 0.5102	**Perceived Economic Status**	Poor	115	3.2901 / 0.2337	2.5857 / 0.5686
	F / p	**382**	5.629 / **0.000**	3.368 / **0.005**		Moderate	243	3.1953 / 0.2648	2.4614 / 0.5429
	LSD (Post Hoc)		Student, unemployed< retired	officer< housewife; retired		Good	24	3.1146 / 0.1959	2.4706 / 0.5908
Migraine frequency	1 or fewer times per month	18	3.2123 / 0.2527	2.5686 / 0.5080		**F / p**	**382**	7.703 / **0.001**	2.001 / 0.137
	Between 1 and 4 per month	146	3.2065 / 0.2579	2.5044 / 0.5589		**LSD (Post Hoc)**		poor>Moderate;good	
	4 more times per month	218	3.2276 / 0.2565	2.4903 / 0.5583	**n**: Number of participants **M**: Mean **SD**: Standard Deviation **t**: t-test statistic (used for comparisons between two groups) **F**: ANOVA test statistic (used for comparisons among three or more groups) **p**: Significance level **LSD (Post Hoc)**: Pairwise comparison results indicating significant differences between groups				
	F / p	**382**	0.301 / 0.740	0.175 / 0.840					

Table 3: Correlation between the scales and its sub-dimensions

Variables	**Stress Coping Styles**	Self-Confident Approach	Sub-Dimension Optimistic	Approach Sub-Dimension Helpless	Approach Sub-Dimension Submissive	Approach Sub-Dimension Social Support	**Seeking Sub-Dimension Emotional Reactivity**	Scale Sensitivity Sub-Dimension	Arousal/ Intensity Sub-Dimension	Persistence Sub-Dimension
Stress coping style Scale	1	.564**	.553**	.596**	.631**	.520**	.348**	.347**	.303**	.253**
Self-Confident Approach		1	.567**	-.093	-.008	.301**	-.001	.104*	-.056	-.043
Sub-Dimension Optimistic			1	-.101*	.132*	.177**	-.100	.078	-.195**	-.123*
Approach Sub-Dimension Helpless				1	.457**	.182**	.524**	.394**	.530**	.424**
Sub-Dimension Submissive					1	.098	.265**	.178**	.273**	.229**
Approach Sub-Dimension Social Support						1	.191**	.171**	.185**	.134**
Seeking Sub-Dimension Emotional Reactivity							1	.815**	.903**	.889**
Scale Emotional Sensitivity Sub-Dimension								1	.551**	.602**
Emotional Reactivity Sub-Dimension									1	.752**
Psychological Resilience Sub-Dimension										1

** → $p < .01$; * → $p < .05$

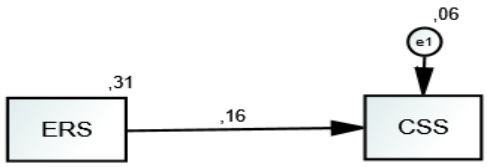

Figure 1. AMOS output
ERS :Emotional Reactivity Scale; CSS: Coping Styles Scale

Table 4: PATH analysis findings

Independent variable (Predictor)	Dependent variable (Outcome)	B (Regression coefficient)	β (Standardized coefficient)	S.E. (Standard error)	C.R. (Critical value değer)	p value	Explained variance (R^2)
Emotional reactivity (ERS)	**Stress Coping Styles (CSS)**	0.161	0.348	0.022	7.255	***	0.121

framework, in which biological mechanisms interact with emotional, psychological, and stress-related processes that themselves have identifiable neurobiological correlates and stress-related coping patterns.[3,4,21]

Emotional sensitivity and coping

The finding that emotional sensitivity was associated with both constructive and dysfunctional coping strategies highlights its dual role in migraine. Emotional sensitivity may facilitate adaptive coping through heightened awareness, empathy, and cognitive engagement with stressors, thereby supporting self-confident and optimistic approaches.[26,29] However, increased sensitivity may simultaneously heighten vulnerability to emotional overload, leading to helplessness-oriented coping when

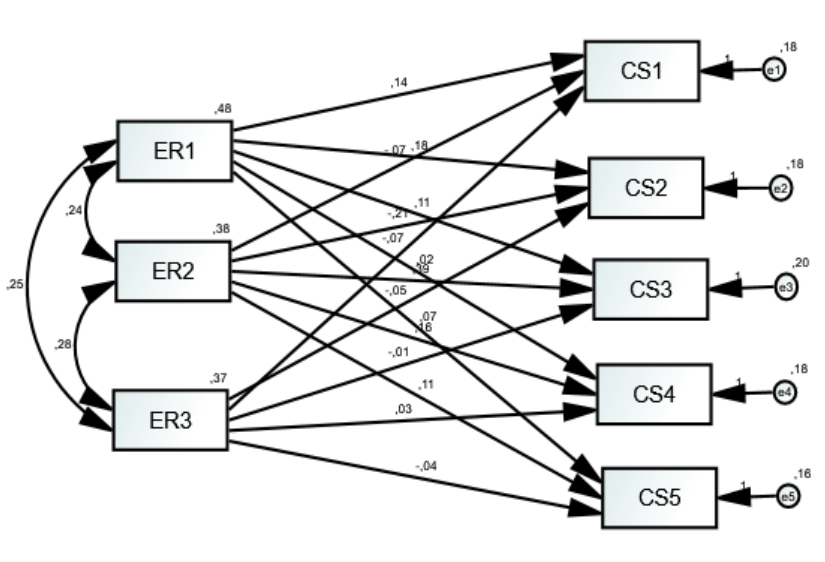

Figure 2. AMOS output for relationships between sub-dimensions

Table 5: Effects of emotional reactivity sub-dimensions on coping with stress styles (path analysis results)

Independent Variable	Dependent Variable	B (Estimate)	Stand. B (Beta)	S.E.	C.R.	P	Meaningfulness
Sensitivity	Self-Confident Approach	0.137	0.219	0.040	3.415	***	Significant
Sensitivity	Sub-Dimension Optimistic	0.180	0.284	0.039	4.557	***	Significant
Sensitivity	Approach Sub-Dimension Helpless	0.114	0.148	0.042	2.708	0.007	Significant
Sensitivity	Approach Sub-Dimension Submissive	0.018	0.028	0.039	0.453	0.651	Non-significant
Sensitivity	Approach Sub-Dimension Social Support	0.069	0.115	0.038	1.805	0.071	Non-significant
Arousal/Intensity Reactivity	Self-Confident Approach	-0.073	-0.103	0.055	-1.319	0.187	Non-significant
Arousal/Intensity Reactivity	Sub-Dimension Optimistic	-0.215	-0.301	0.054	-3.981	***	Significant
Arousal/Intensity Reactivity	Approach Sub-Dimension Helpless	0.393	0.453	0.058	6.822	***	Significant
Arousal/Intensity Reactivity	Approach Sub-Dimension Submissive	0.160	0.226	0.054	2.966	0.003	Significant
Arousal/Intensity Reactivity	Approach Sub-Dimension Social Support	0.112	0.167	0.052	2.152	0.031	Significant
Persistence	Self-Confident Approach	-0.070	-0.098	0.058	-1.207	0.227	Non-significant
Persistence	Sub-Dimension Optimistic	-0.048	-0.067	0.057	-0.851	0.395	Non-significant
Persistence	Approach Sub-Dimension Helpless	-0.006	-0.007	0.061	-0.094	0.925	Non-significant
Persistence	Approach Sub-Dimension Submissive	-0.006	-0.007	0.061	-0.094	0.925	Non-significant
Persistence	Approach Sub-Dimension Social Support	0.030	0.042	0.057	0.534	0.593	Non-significant
Persistence	Self-Confident Approach	-0.041	-0.061	0.055	-0.748	0.455	Non-significant

Independent Variable: The variable whose effect is being examined; also referred to as the explanatory variable.
Dependent Variable: The variable expected to be affected; also known as the outcome variable.
B (Estimate): Regression coefficient; indicates the magnitude of the effect of the independent variable on the dependent variable.
Standardized B (Beta): Standardized regression coefficient; allows for comparison of the relative effects of variables measured on different scales.
S.E. (Standard Error): The standard error of the estimated coefficient; reflects the reliability or precision of the estimate.
C.R. (Critical Ratio): The ratio of the coefficient to its standard error; corresponds to a t-value or z-value.
p-value: Significance level; a value less than 0.05 is typically considered statistically significant.
Significance: Indicates whether the result is statistically significant ($p < 0.05$).

stress is perceived as overwhelming. Similar dual patterns have been reported in migraine and other chronic pain populations, suggesting that sensitivity may function as a risk or protective factor depending on contextual and regulatory capacities.[21,22,26,29]

Arousal/intensity reactivity and maladaptive coping

In contrast, arousal/intensity reactivity showed a more consistent association with maladaptive coping styles. Higher levels of emotional arousal were linked to increased helplessness, submissiveness, and reliance on social support, alongside reduced optimism. These findings suggest that heightened emotional intensity may be associated with the perception of stressors as more threatening and experience difficulty engaging in active problem-solving strategies.[19,34,35] This pattern is consistent with emotion regulation models emphasizing that excessive emotional arousal impairs cognitive flexibility and promotes avoidance-based coping.[9,11] In migraine, such dysregulated emotional responses have been associated with increased pain severity, headache chronification, and poorer quality of life.[30-33]

Persistence and psychological resilience

Interestingly, persistence, a resilience-related dimension of emotional reactivity was not significantly associate with stress coping styles in the present study. This finding aligns with emerging evidence suggesting that resilience may not directly influence coping strategies during stress exposure but may instead play a role in recovery processes following stress.[35] From this perspective, persistence may contribute more to emotional recovery and long-term adaptation rather than immediate coping responses, which could explain its nonsignificant role within the current model.

Sociodemographic and occupational influences

The demographic findings of this study were largely consistent with the existing literature. Age, education, income, and marital status were found to influence coping strategies, with individuals of lower socioeconomic status demonstrating greater reliance on maladaptive coping styles. These findings support prior research indicating that socioeconomic vulnerabilities exacerbate migraine burden and restrict access to adaptive coping resources[4,9,10,11] association between marital status and coping may reflect differences in perceived and actual social support availability, which has been shown to buffer stress-related migraine outcomes.[36]

Occupational differences further underscored the role of contextual stressors in shaping emotional reactivity and coping. Consistent with previous studies, individuals working in high-demand professions such as healthcare and education demonstrated heightened emotional burden and more limited coping capacities.[37-39] These findings highlight the importance of occupation-specific psychosocial interventions in migraine management.

Clinical implications

Overall, the present findings emphasize the central role of emotional reactivity in shaping stress coping styles among individuals with migraine. While emotional sensitivity may support adaptive coping under certain conditions, heightened arousal/intensity reactivity appears to be associated with maladaptive coping patterns that may exacerbate migraine-related disability. These results are consistent with broader emotion regulation literature demonstrating strong associations between maladaptive strategies such as rumination, suppression, and withdrawal and negative affectivity.[18,19,34]

Implications for intervention

Taken together, these findings underscore the importance of individualized psychosocial interventions in migraine care. Interventions should aim to enhance the adaptive aspects of emotional sensitivity while reducing maladaptive responses associated with excessive emotional arousal. Psychoeducational and behavioral interventions incorporating emotion regulation training, mindfulness-based approaches, and stress management techniques have demonstrated efficacy in improving coping, reducing headache-related disability, and enhancing quality of life in individuals with migraine.[40-42]

Limitations and future directions

Given the cross-sectional design of this study, causal inferences cannot be drawn regarding the directionality of the observed associations. While emotional reactivity may be related to the adoption of certain coping strategies, it is also plausible that habitual coping styles influence individuals' self-reported emotional experiences. Furthermore, increased migraine burden and

symptom severity may exacerbate emotional disturbance, thereby strengthening these associations. Longitudinal and experimental studies are needed to clarify the temporal and causal relationships among emotional reactivity, coping styles, and migraine outcomes.

In addition to the issue of causal inference, this study relied on self-report measures, which may be subject to social desirability and recall bias. Future research should employ longitudinal and experimental designs to investigate the long-term association of emotional processes on migraine and integrate neuroimaging methods to explore their neural underpinnings.

Another important limitation of this study is the absence of direct measurement or statistical control for psychiatric morbidity, such as depressive or anxiety symptoms. Given the high prevalence of psychiatric comorbidities in individuals with migraine, unmeasured emotional distress may have influenced both emotional reactivity and self-reported coping styles. As a result, the observed associations may partially reflect the impact of underlying psychiatric symptoms rather than migraine-related emotional processes alone. Future studies should incorporate standardized assessments of psychiatric morbidity and consider controlling for these variables to better isolate the specific contribution of emotional reactivity to coping patterns in migraine.

While the study provides insight into emotional and coping processes in individuals with migraine, the absence of objective migraine burden measures (e.g., attack frequency, MIDAS, HIT-6) restricts conclusions regarding symptom severity and functional impact. Although the present study focused on emotional reactivity and stress coping patterns, the lack of clinical severity indices limits the ability to examine how these psychological factors relate to migraine burden. Future studies should integrate validated migraine-specific burden measures to strengthen clinical interpretability and applicability.

Another important limitation of this study is that participants were recruited exclusively from neurology outpatient clinics. Therefore, the sample may represent individuals with more severe symptoms or higher healthcare utilization, and the findings may not be fully generalizable to individuals with migraine in the general population. Future studies should include community-based samples to enhance external validity.

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DISCLOSURE

Data availability: The data that support the findings of this study are available on re-quest from the corresponding author. The data are not publicly avail-able due to privacy or ethical restrictions.

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