



Psychological Resilience and Cognitive Distortions and their Relationship to Migraine Severity in a Sample of University Students in Jordan

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Abstract

Objectives: Recent research highlights the role of psychological and behavioral factors in the onset and severity of migraines, one of the most prevalent primary headaches. Despite medical advancements, the exact causes of migraines remain unclear, and symptoms can range from moderate to severe, lasting hours or even days. This study aims to examine the relationship between psychological resilience, cognitive distortions, and migraine severity among Jordanian university students.

Methodology: A descriptive-correlational comparative approach was employed. The study sample included 100 male and female students from Jordanian universities. To assess the key variables, the Resilience Scale, Cognitive Distortions Scale, and Migraine Disability Assessment Test (MIDAS) were used. Correlation and regression analyses were conducted to examine relationships among the study variables.

Findings: The correlation between migraine severity (MIDAS scores) and cognitive distortions or psychological resilience was weak and not statistically significant ($r = -0.041, p = 0.672$; $r = 0.138, p = 0.151$). However, students diagnosed by a physician exhibited significantly higher cognitive distortion scores ($B = 18.397, p = 0.022$), suggesting a potential link between medical diagnosis and cognitive perception of migraine symptoms.

Implications: These findings contribute to understanding the psychological aspects of migraine severity, indicating that cognitive distortions may play a role in how diagnosed individuals perceive and experience their migraines. This insight could inform psychological interventions to support migraine sufferers.

Conclusions: No significant relationship was found between psychological resilience, cognitive distortions, and migraine severity. However, physician-diagnosed students exhibited higher cognitive distortions, emphasizing the need for further research into the psychological impact of medical diagnoses on migraine perception.

Key words

Psychological Resilience, Cognitive Distortions, Migraine.

Introduction

Migraine, characterized by recurrent and debilitating headaches often accompanied by sensory disturbances known as “aura”, represents a significant global health challenge (Amiri, et al., 2022). These headaches can manifest unilaterally or bilaterally and are frequently associated with visual disturbances, such as flashing lights and auditory symptoms (Amiri, et al., 2022). The timing of the aura can vary, occurring either before the onset of a headache or even after it has begun.

According to surveys conducted in (2019), migraine stands as the most prevalent neurological disorder worldwide, affecting an estimated 1.1 billion individuals (Agbetou, Adoukonou, 2022). This staggering figure underscores the widespread impact of migraine on global health systems and individuals' quality of life. It is noteworthy that the majority of migraine sufferers are female, constituting (75%) of all cases reported (Amiri, et al., 2022). The incidence of migraine shows distinct patterns across different age groups: before puberty, migraine occurs more frequently in males, whereas after puberty, females tend to experience migraine more frequently than males (Dasari, et al., 2021).

Despite significant advancements in the medical field, the exact causes of migraines remain elusive. Recent study suggests that psychological and behavioral factors play a significant role in the onset and exacerbation of migraines (Gatchel, et al., 2007).

Psychological resilience, the ability to adapt to change and challenges, is a crucial protective factor against numerous psychological and physical ailments. This study posits that individuals with high levels of psychological resilience are less susceptible to migraines and are better equipped to manage their symptoms. Conversely, cognitive distortions, charac-

terized by difficulties in thinking, memory, and attention, have been linked to certain psychological disorders such as depression and anxiety. Some studies indicate that cognitive distortions may contribute to increased migraine severity and impair quality of life.

Literature Review

Psychological resilience in migraine patients is significantly predicted by a self-confident approach, social support-seeking behavior, and a high level of psychological well-being. Interventions designed to enhance psychological resilience, which is inversely correlated with depression, are anticipated to elevate the quality of life for migraine sufferers (Gürsoy & Toksoy, 2023). Furthermore, study indicates that traits associated with resilience diminish the likelihood of severe headache-related disability, while anxiety, depression, and headache frequency are strongly linked to increased disability (Avneet et al., 2023). Even in individuals without coexisting psychiatric conditions, specific behavioral and psychological factors are connected to migraine, particularly in its chronic form. Accurate identification of these factors is crucial for optimizing migraine management through non-pharmacological approaches (Francesca et al., 2022).

Patient personal experiences, which impact emotions, are demonstrated through their behaviors. These thoughts and behaviors, when utilized to cope with a situation specific to such personal experiences, are referred to as coping strategies (Dubey, Agarwal, 2007). Coping strategies can be classified into active (controlling or functioning with pain) or passive (withdrawal, avoidance, and negative self-statements about pain). Additionally, coping strategies can be divided into cognitive (imagination, distraction, negative self-statements) or behavioral (engaging in activities or planning rest breaks, sometimes abusing medications) strategies (Craighead, Nemeroff, 2001). The cognitive component of pain involves anticipa-

tion and attention, whereas the behavioral component refers to the expression of pain by the patients either verbally or otherwise (Francesca et al., 20007). These cognitive and behavioral aspects play a key role in pain perception and how patients adjust to pain.

Previous studies have explored the relationship between psychological resilience and other factors. Jais's study (Jais, 2015). found a positive correlation between psychological resilience and problem-solving ability, while the opposite was true for psychosomatic disorders. The study also identified gender differences in psychological resilience, favoring males. In another context, other studies have investigated the role of cognitive distortions in various aspects of life, such as their relationship to the meaning of life in adolescents (Al-Assar, 2015). and life satisfaction among university students (Shaqoura, 2012).

The results of the study by)Al-Zabin & Abdullah, 2023) indicated a positive correlation between cognitive distortions (overgeneralization, personalization, catastrophic thinking, selective abstraction, and ignoring positives) and symptoms of avoidant personality disorder. However, no correlation was found between cognitive distortions (dichotomous thinking and magnification) and symptoms of avoidant personality disorder.

Preliminary study suggests that maladaptive responses to stressful events, leading to biological and psychological difficulties in adapting, may be associated with chronic pain in youth.

Terminology

a. Psychological Resilience: is an individual's ability to effectively cope with different situations, respond rationally, and establish good relationships with others based on mutual respect and acceptance of others (Shaqoura, 2012).

b. Cognitive Distortions: according to Al-Assar, 2015, are defined as "the distortions and cognitive errors in processing information that individuals use automatically about life events in a negative way, causing them to feel distress and pain (Al-Assar, 2015).

c. Migraine: is a neurological disease or disorder characterized by recurrent moderate to severe headaches often in association with a numerous symptoms of autonomic nervous system (Magis et al. 2012).

Study Problem

Migraine is a chronic health issue that significantly impacts university students due to their psychological and academic pressures. Literature suggests that psychological resilience may help reduce migraine severity, while cognitive distortions exacerbate pain responses (Gürsoy & Toksoy, 2023), (Avneet et al., 2023), (Dubey & Agarwal, 2007). However, studies linking these factors to migraine severity in the Jordanian context are limited. This study aims to explore the impact of psychological resilience and cognitive distortions on migraine severity, contributing to the development of psychological support strategies to improve students' quality of life.

Study Objectives:

- (1) To measure the levels of psychological resilience, cognitive distortions, and migraine severity in the sample.
- (2) To determine the relationship between psychological resilience and migraine severity.
- (3) To determine the relationship between cognitive distortions and migraine severity.
- (4) To identify any other demographic factors that may influence migraine severity.

Study Questions:

a. Is there a significant relationship between the level of psychological resilience and migraine severity?

b. Is there a significant relationship between the presence of cognitive distortions and migraine severity?

c. Do demographic and occupational factors influence migraine severity?

Method

a. Design

To answer the study questions, verify the hypotheses, interpret the results, and identify the relationships between the study variables, a descriptive-correlational comparative approach was used.

b. Study Population

The study population consisted from male and female students at Jordanian universities. The approximate number of university students in Jordan in 2024 is 474,618.

c. Study Sample

The study sample consisted of (100) male and female students from Jordanian universities. And from all stages of university study, including bachelor's, master's, and doctoral degrees.

d. Sampling Procedure

We used a systematic random sampling technique to select (100) students who were included in the study. Table (1) presents the sociodemographic characteristics of the participants. The mean age of the participants was 32.25 years (SD = 10.03), with a median age of 27.25 years, ranging from 21 to 53 years. In terms of gender distribution, most of the participants were female, accounting for 81.8%, while

males made up 18.2%. Additionally, 36.4% of the participants reported being diagnosed by a physician, whereas 63.6% had no prior diagnosis by a medical professional. These characteristics provide a snapshot of the demographic composition of the study group.

Table (1): Sociodemographic Characteristics of Participants

Sociodemographic			
Age	Mean (SD)	32.25(10.03)	
	Median (Min.-Max.)	27.25(21-53)	
		N	%
Gender	Male		18.2
	Female		81.8
Diagnosed by Physician	Yes		36.4
	No		63.6

Study Instruments

a. Resilience Scale: Given the existence of a resilience scale with psychometric properties, applied to university students through the study by Shaqoura (2012), the final version of the scale consists of 40 items. Additionally, the Resilience Scale demonstrated strong reliability in the pilot study, which initially targeted 30 participants. the Resilience Scale also demonstrated excellent internal consistency, with a Cronbach's Alpha of 0.958 across 40 items, confirming that it is a reliable tool for assessing resilience in this population.

b. Cognitive Distortions Scale: Previous theoretical literature related to cognitive distortions was reviewed to determine an appropriate scale for this study. The study relied on the scale developed by Al-Ma'aytah (Al-Ma'aytah, 2016), which, in its final form, consists of 42 items across six dimensions:

(1) Arbitrary Inference: Drawing conclusions from an event or situation, represented by items (01-06).

(2) Selective Abstraction: Focusing on negative details while ignoring positive aspects, represented by items (07-15).

(3) Overgeneralization: Making broad generalizations based on a single situation, represented by items (16-20).

(4) Labeling or Mislabeling: Developing negative views about oneself through applying absolute labels based on certain mistakes, represented by items (21-27).

(5) Mind Reading: Interpreting reality through negative thoughts, where the person holds themselves responsible for all failures around them, represented by items (28-33).

(6) Magnification or Minimization: Exaggerating failures or mistakes and viewing them as catastrophic, represented by items (34-42).

The Likert scale was used, with responses based on a five-point scale (previously mentioned), where higher scores on the negatively worded items indicate higher overall scores, with a maximum score of 210 and a minimum of 42.

Additionally, the cognitive distortions Scale demonstrated strong reliability in the pilot study, which initially targeted 30 participants. The results showed excellent internal consistency with a Cronbach's Alpha of 0.966 across 42 items, indicating that the scale is a highly reliable tool for measuring cognitive distortions.

The MIDAS questionnaire: The MIDAS question-

naire captures headache-related disability in all life domains over a 3-month period. This time interval was chosen by the authors to balance the accuracy of self-reported information with the clinical relevance of headache experience over time. It contains only seven questions and has simple and intuitive scoring rules. The first five questions investigate the influence of headache on three domains: questions 1 and 2 investigate paid work, enquiring as to the number of days off work due to headache and the number of days in which productivity was reduced by 50% or more; questions 3 and 4 ask the same questions about household work; question 5 enquires about missed days of recreational, social and family activities. Two additional questions (A and B) concern headache frequency (number of days with headache in the previous three months) and headache intensity (average pain intensity of headache attacks); they are not scored to calculate disability, but were included to provide the physician with clinical information. The total score is obtained by summing the scores (number of days affected) of the first five questions.

To test the reliability of the MIDAS (Migraine Disability Assessment Test), a pilot study was conducted, initially targeting 30 participants. The results showed a good internal consistency for the MIDAS test, with a Cronbach's Alpha of 0.778 across 7 items. This level of reliability suggests that the MIDAS test is a reliable tool for assessing migraine-related disability in this population.

Population-based studies conducted in the USA and UK (Magis et al., 2012), showed that MIDAS is a sound instrument with good test-retest reliability (Spearman's correlation coefficients, 0.78 and 0.77, respectively). Internal consistency was also good (Cronbach's alpha greater than 0.7). The validity of MIDAS was evaluated by comparison with diary-based measures (Stewart et al, 2000), in which

patients complete a daily card, recording and scoring all activities and headache characteristics. The results indicate that the questionnaire provides a reasonably accurate measure of headache-related disability (Al-Ma'aytah, 2016).

Results

Table (2) presents the correlation among participants' total scores for the MIDAS (Migraine Disability Assessment Test), Cognitive Distortions, and Psychological Resilience. The correlation between the MIDAS total score and cognitive distortions total score is weak and not statistically significant ($r = -0.041$, $p = 0.672$). Similarly, the correlation between the MIDAS total score and psychological resilience total score is weak and also not statistically significant ($r = 0.138$, $p = 0.151$). However, a significant moderate negative correlation is observed between cognitive distortions total score and psychological resilience total score ($r = -0.487$, $p < 0.001$). This indicates that higher cognitive distortion scores are associated with lower psychological resilience scores among the participants.

Table (2): Correlation Among the Participants Total Scores Regarding MIDAS (Migraine Disability Assessment Test), Cognitive Distortion and Their Psychological Resilience Total Scores

		MIDAS total score	Cognitive Distortions total score	Psychological Resilience total score
MIDAS total score	R	1	-0.041	0.138
	p value	-	0.672	0.151
Cognitive Distortions total score	R	-	1	-0.487**
	p value	-	-	<0.001

Table (3) presents the correlation between participants' total scores on the MIDAS (Migraine Disability Assessment Test) and various cognitive distortion domains, including Arbitrary Inference, Selective Abstraction, Overgeneralization, Labeling or Mislabeled, Self-Blame, and Emotional Reasoning. The results show weak and mostly non-significant correlations across these domains. Arbitrary Inference has a slight positive correlation with MIDAS ($r = 0.145$, $p = 0.130$), while Labeling or Mislabeled and Overgeneralization show small negative correlations ($r = -0.170$, $p = 0.076$; $r = -0.148$, $p = 0.124$, respectively). Other domains, such as Selective Abstraction, Self-Blame, and Emotional Reasoning, have minimal correlations, with p-values indicating no significant relationships ($p > 0.5$). Overall, these findings suggest that cognitive distortions have little to no significant association with migraine disability as measured by MIDAS in this sample.

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Table (3): Correlation among the participants total scores regarding MIDAS (Migraine Disability Assessment Test) and the Cognitive Distortion Domains total score:

		Arbitrary Inference	Selective Abstraction	Overgeneralization	Labeling or mislabeling	Self-Blame	Emotional Reasoning
MIDAS total score	R	0.145	-0.010	-0.148	-0.170	0.01	-0.054
	p value	0.130	0.919	0.124	0.076	0.916	0.575

Table (4) outlines the participants' total scores regarding their MIDAS (Migraine Disability Assessment Test), cognitive distortions, and psychological resilience based on gender and whether a physician diagnosed them.

For gender, males had a mean MIDAS score of 99.8 (SD = 72.2), a cognitive distortion score of 73.5 (SD = 47.2), and a psychological resilience score of 44.5 (SD = 38.4). Females had slightly higher mean scores for MIDAS (113, SD = 93.2) and cognitive distortions (79.4, SD = 35.9), but a significantly higher psychological resilience score (72.1, SD = 34.3). The difference in psychological resilience between males and females was statistically significant ($p = 0.004$), while the differences in MIDAS and cognitive distortion scores were not significant.

tions scores were not significant ($p = 0.98$ and $p = 0.33$, respectively).

Regarding the diagnosis by a physician, participants who were diagnosed ($N=40$) had significantly higher MIDAS scores (mean = 173.25, $SD = 96.3$, $p < 0.001$) compared to those who were not diagnosed ($N=70$) (mean = 74.8, $SD = 62.03$). However, there was no significant difference in cognitive distortions ($p = 0.35$) or psychological resilience ($p = 0.76$) between those diagnosed and those not diagnosed by a physician.

This table highlights key differences in psychological resilience between genders and a notable disparity in migraine disability between those diagnosed by a physician and those who were not.

Table (4): Participants Total Score Regarding their MIDAS, Cognitive Distortion and their Psychological Resilience

MIDA		MIDAS Mean (SD)	Cognitive distortions Mean (SD)	Psychological Resilience Mean (SD)
Gender	Male	99.8(72.2)	73.5(47.2)	44.5(38.4)
	Female	113(93.2)	79.4(35.9)	72.1(34.3)
P value		0.98	0.33	0.004
Diagnosed by physician	Yes (N=40)	173.25(96.3)	81.6(32.6)	62.8(22.9)
	No (N=70)	74.8(62.03)	76.4(40.9)	69.5(42.3)
P value		<0.001	0.35	0.76

The multiple linear regression analysis for predictors of MIDAS total score, presented in Table 5, reveals that being diagnosed by a physician significantly predicted higher MIDAS scores ($B = 107.110$, $p < 0.001$), while cognitive distortions total score was a significant negative predictor ($B = -0.509$, $p = 0.019$), indicating that higher cognitive distortions were associated with lower MIDAS scores. Psychological resilience also significantly predicted higher MIDAS scores ($B = 0.657$, $p = 0.007$). Neither gender nor age were significant predictors. The model was statistical-

ly significant ($F = 11.6$, $p < 0.001$), explaining 32.7% of the variance in MIDAS scores.

Table (5): Multiple linear regression for MIDAS total score predictors

Predictors	B	t	P value
(Constant)	48.847	0.889	0.376
Gender (Ref.=Males)	14.023	0.700	0.485
Age (years)	-0.213	-0.266	0.791
Diagnosed by physician (Ref.=Not diagnosed)	107.110	7.231	<0.001
Cognitive distortions total score	-0.509	-2.381*	0.019
Psychological Resilience total score	0.657	2.736	0.007

*Significant at $p < 0.05$, Significant at $p < 0.001$ $F=11.6$, $p < 0.001$, Adj. $R^2 = 32.7\%$

Besides, the multiple linear regression analysis for predictors of cognitive distortions total score, shown in Table 6, indicates that the constant was significant ($B = 56.390$, $p = 0.021$). Being diagnosed by a physician was also a significant positive predictor ($B = 18.397$, $p = 0.022$), suggesting that those diagnosed had higher cognitive distortion scores. The MIDAS score negatively predicted cognitive distortions ($B = -0.101$, $p = 0.019$), indicating that higher MIDAS scores were associated with lower cognitive distortions. Psychological resilience was a strong negative predictor ($B = -0.578$, $p < 0.001$), showing that higher resilience was linked to lower cognitive distortions scores. Gender and age were not significant predictors. The overall model was significant ($F = 8.6$, $p < 0.001$), explaining 25.9% of the variance in cognitive distortion scores.

Table (6): Multiple linear regression for MIDAS total score predictors

	B	t	P value
(Constant)	56.390	2.353*	0.021
Gender (Ref.=Males)	-6.046	-0.676	0.500
Age (years)	-0.042	-0.117	0.907
Diagnosed by physician (Ref.=Not diagnosed)	18.397	2.329*	0.022
MIDAS score	-0.101	-2.381*	0.019
Psychological Resilience total score	-0.578	-6.069**	<0.001

*Significant at $p < 0.05$, Significant at $p < 0.001$ $F=8.6$, $p < 0.001$, Adj. $R^2 = 25.9\%$

Discussion

This study aimed to investigate Psychological Resilience and Cognitive Distortions and their Relationship to Migraine Severity in a Sample of University Students in Jordan and explore the influences of sociodemographic factors on the prevalence of Migraine Severity disorders. Additionally, this study aimed to examine the impact of Migraine Severity on academic performance, and Psychological Resilience and Cognitive Distortions of university students in Jordan. The findings of this study shed light on the Migraine Severity within the university student population and provide insights into the sociodemographic factors associated with these disturbances. The study findings revealed weak and not statistically significant total scores on the Cognitive Distortions Scale and the Psychological Resilience. These results are not consistent with existing research highlighting the Psychological Resilience and Cognitive Distortions and their Relationship to Migraine among university students globally (Avneet et al., 2023), (Francesca et al., 2022), (Craighead, Nemeroff, 2001), (Al-Zabin & Abdullah, 2023)(Gürsoy & Toksoy, 2023).

Conclusion

There was no significant association found between psychological resilience, cognitive distortions, and the severity of migraines, This result did not align with the studies of (Gürsoy & Toksoy, 2023), (Avneet et al., 2023), (Francesca et al., 2022), (Dubey & Agarwal, 2007). being diagnosed by a physician was significantly associated with higher cognitive distortion scores. These findings suggest a need for further study to investigate the relationship between migraines and cognitive distortions in a sample of patients with a confirmed diagnosis of migraine by a specialist. This is due to the overlapping symptoms between migraines and other conditions such as otitis, ophthalmological disorders, and sinusitis.

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