Predicting Sleep Quality Based on Migraine Headaches and Rumination in Women with Panic Attacks

Arezoo. Sarem[1]*⬦, Simin. Valie[2]⬦, Mahvash. Sorkhabi abdolmaleki[3]⬦, Shahrzad. Pazoki[1]⬦, Soroush. Alimardani[4]⬦

[1] M.A in General Psychology, North Tehran Branch, Islamic Azad University, Tehran, Iran
[2] M.A in Educational Psychology, Azad University, Faculty of Medical Sciences, Tehran
[3] M.A of Clinical Psychology, Bandar Gaz Branch, Islamic Azad University, Bandar Gaz, Iran
[4] M.A, Department of Psychology, Neka Branch, Islamic Azad University, Neka, Iran

* Corresponding author email address: arezoo.sarem222@gmail.com

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A B S T R A C T

Objective: The present study aimed to predict sleep quality based on migraine headaches and rumination in women with panic attacks.
Methods: This applied and descriptive-correlational study included a sample of women who visited psychological clinics in the city of Isfahan. Using convenience sampling, 210 participants were selected. Data were collected using the Pittsburgh Sleep Quality Index (1989), Ahvaz Migraine Headache Symptoms Questionnaire (1997), and the Rumination-Reflection Questionnaire by Trapnell and Campbell (1999). For data analysis, simultaneous multiple regression was performed using SPSS version 21.
Findings: The findings indicated that migraine headaches and rumination could explain 30.5% of the variance in sleep quality among patients with panic attacks. Specifically, with each standard deviation increase in migraine headache and rumination scores, there was a corresponding increase of 0.532 and 0.371 standard deviations in sleep quality scores, respectively (P < 0.01).
Conclusion: Based on the results, migraine headaches and rumination can predict sleep quality in patients with panic attacks.
Keywords: Sleep quality, Migraine headaches, Rumination, Panic attacks

1. Introduction

Panic disorder is one of the anxiety disorders characterized by recurrent panic attacks involving intense anxiety that is not confined to a specific situation or context and is often unpredictable. In other words, unexpected anxiety attacks are considered the hallmark of panic disorder. Although, like other anxiety disorders, the predominant symptoms can vary from person to person, common symptoms include sudden onset, palpitations, chest pain, hot flashes, dizziness, and feelings of unreality (depersonalization and derealization) in most patients. In

many cases, there is a fear of dying, losing control, or going insane (Milrod et al., 2014).

Research has shown a relationship between rumination and migraine headaches in individuals with panic attacks (Ameli et al., 2005; Kaiya, 2016; Olatunji et al., 2013). Migraine is a severe type of headache that may be accompanied by symptoms such as intense head pain, nausea, sensitivity to sound and light, and in some cases, severe pain on one or both sides of the head that can impair work ability (Goli et al., 2020). Some studies have indicated that individuals with panic attacks and anxiety may be at a higher risk of experiencing migraine headaches (Senaratne et al., 2010). Rumination and stress may be factors that reinforce this relationship. In other words, stress and worry may exacerbate migraine symptoms (Kokonyei et al., 2016).

Rumination can also lead to increased stress and anxiety. When individuals with panic attacks engage in rumination, they may intensely analyze their negative thoughts and worries, which can lead to heightened tension and stress (McLaughlin & Nolen-Hoeksema, 2011). These states can exacerbate migraines or even lead to their onset in individuals who previously did not suffer from migraines (Bakhshandeh Larimi et al., 2021; Breslau et al., 2001). Additionally, individuals with panic attacks may experience sleep problems, which can result in decreased sleep quality and a failure to improve their physical and mental state (Davidoff et al., 2012). Rumination experienced by the patient may exacerbate panic attack symptoms and lead to decreased sleep quality (Jamieson et al., 2021). Overall, the relationship between panic attacks and sleep quality is complex and can have various effects. Individuals with these issues may benefit from stress and anxiety management techniques such as breathing exercises, meditation, and cognitive-behavioral therapy. In more severe cases, physicians may prescribe medications to help control anxiety and improve sleep. Ultimately, this study aims to answer the question of whether migraine headaches and rumination can predict sleep quality in patients with panic attacks.

2. Methods

2.1. Study Design and Participants

The present study aimed to predict sleep quality based on migraine headaches and rumination in women with panic attacks. This study was applied and descriptive-correlational in nature. The study population consisted of women who visited psychological clinics in the city of Isfahan. Using

convenience sampling, 210 participants were selected. Data were collected using the Pittsburgh Sleep Quality Index (1989), the Ahvaz Migraine Headache Symptoms Questionnaire (1997), and the Rumination-Reflection Questionnaire by Trapnell and Campbell (1999).

2.2. Measures

2.2.1. Sleep Quality

Developed by Buysse et al. (1989) at the University of Pittsburgh's Psychiatry Institute to assess the quality and pattern of sleep in individuals. This questionnaire contains 18 items that evaluate seven aspects of sleep quality over the past month: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each of the seven subscales is scored from 0 to 3, with higher scores indicating poorer sleep quality. Buysse et al. (1989) reported an internal consistency of 0.83 using Cronbach's alpha. Kassin and Kliger (2009) reported a reliability of 0.83 based on Cronbach's alpha in their research. The validity of this questionnaire for the Iranian population was confirmed by the Tehran Psychiatric Institute, with a Cronbach's alpha of 0.83. In Iran, this questionnaire was initially translated into Persian by researchers and then back-translated into English to confirm its accuracy, with a reported validity and reliability of 0.78 and 0.82, respectively. In another study, the reliability of the questionnaire was found to be 0.46 using Cronbach's alpha and 0.52 using the split-half method (Vajari, 2024). In the present study, Cronbach's alpha was 0.70.

2.2.2. Migraine Headache Symptoms

This questionnaire was developed by Najarian (1997) in a sample of 382 students from Shahid Chamran University and Islamic Azad University of Ahvaz, comprising 25 items and validated accordingly. The items on this scale are scored on a four-point Likert scale, ranging from never, rarely, sometimes, to often. Najarian (1995) reported a reliability coefficient of 0.80 for this test using test-retest and internal consistency methods for the entire sample. The reliability of this questionnaire was conducted on both genders, with an overall reliability of 0.80. The validity of this questionnaire was established through correlation with the Anxiety and Depression scale, the Minnesota Multiphasic Personality Inventory, and Aggression, showing a positive correlation

between the scores (Mehrmanesh et al., 2023). In the present study, Cronbach's alpha was 0.904.

2.2.3. Rumination

This scale was developed by Trapnell and Campbell (1999) in an effort to distinguish between maladaptive and adaptive components of rumination. They differentiated between rumination-focused and reflection-focused self-attention based on the distinction between neuroticism and openness to experience, which are related to the Big Five personality traits. They then developed a questionnaire to assess rumination and reflective traits. After reviewing the relevant literature on neuroticism, they included items in the rumination scale that involved repetitive thinking related to negative states such as anxiety, depression, and anger. Their conceptualization of rumination closely aligns with the definition by Martin and Tesser. They also included items that assessed adaptive self-reflection in the questionnaire. The reflection subscale items represent traits related to openness to experience, such as intellectual curiosity and intrinsic interest in abstract or philosophical thinking. The final version of the Rumination-Reflection Questionnaire (RRQ) contains 24 items, with 12 items assessing ruminative self-focus and 12 items assessing adaptive reflective thinking. Responses to each item are rated on a five-point Likert scale, ranging from 5 (strongly agree) to 1 (strongly disagree). Five items on the reflection scale are reverse scored. The overall score for each subscale is divided by 12, so the individual's score on each subscale ranges from 1 to 5. Trapnell and Campbell examined the construct validity of this scale and reported that the rumination subscale showed a strong positive relationship with neuroticism symptoms, while the reflection scale showed the strongest relationship with openness to experience. Trapnell and Campbell reported good internal consistency for both reflection and rumination using Cronbach's alpha, with values of 0.91 and 0.90, respectively. These two factors showed minimal correlation with each other (0.22). In Iran, Manavipour and Shahhosseini (2015) examined the psychometric properties of this scale. Of the 24 items, after several rounds of item deletion and modification, they retained 11 items with a reliability coefficient of 0.73, explaining 71.78% of the variance in rumination through three factors: reflection, introspection, and immersion in thought. Additionally, in the study by Ghorbani, Watson, and Hargis (2008), good psychometric properties were demonstrated for this instrument, with internal consistency reported as 0.84 in Iran and 0.80 in the United States (Askari Masuleh & Taheri, 2023; Mahvash et al., 2024).

2.3. Data analysis

For data analysis, simultaneous multiple regression was performed using SPSS version 21.

3. Findings and Results

The present study was conducted on a sample of 210 women who visited psychological clinics in the city of Isfahan (Mean = 39.28, SD = 9.51). To examine the assumption of normal distribution, skewness, and kurtosis were assessed, and to evaluate the assumption of multicollinearity, the variance inflation factor (VIF) and tolerance coefficient were analyzed (Table 1).

Table 1

Descriptive Statistics of Research Variables

Variable	Mean	SD	Skewness	Kurtosis	Tolerance	VIF	Durbin-Watson
Sleep Quality	11.86	5.63	-0.254	-1.022			
Migraine Headaches	54.57	22.114	0.089	-0.911	0.914	1.094	1.70
Rumination	2.86	1.248	0.274	-0.868	0.914	1.094	

Analysis of the research data showed that the skewness and kurtosis values of the research variables were within the range of ±2, indicating a satisfactory distribution of the data. The Kolmogorov-Smirnov test for all variables was above 0.05, indicating the normal distribution of the variables. Additionally, considering that the variance inflation factor was less than 10 and the tolerance coefficient was greater than 0.10, no multicollinearity occurred among the research variables. The Durbin-Watson test (1.70) was used to examine the independence of observations (independence of residuals), indicating that the assumption of error independence was met. The descriptive statistics of the research variables are reported in Table 1. The correlations between the research variables are presented in Table 2.

Table 2

Correlation Between Research Variables

Variable	1	2	3
Sleep Quality	1		
Migraine Headaches	0.423	1	
Rumination	0.215	0.293	1

p<0.01

The findings indicated that the relationship between sleep quality and migraine headaches (r = 0.423) and rumination (r = 0.215) was positive and significant at the 0.01 level. To determine the contribution of each component in predicting sleep quality, simultaneous multiple regression analysis was used (Table 3).

Table 3

Multiple Regression Analysis for Predicting Sleep Quality Based on Migraine Headaches and Rumination in Patients with Panic Attacks

Predictor Variable	F	p	R	R²	Adjusted R²	b	SE	β	t	p
Constant						0.312	1.346		0.232	0.817
Migraine Headaches	45.347	0.001	0.552	0.305	0.298	0.135	0.015	0.532	8.772	0.001
Rumination						0.273	0.118	0.371	6.118	0.001

As shown in Table 3 (F = 45.347, p = 0.001), the model is statistically significant, and the variables of migraine headaches and rumination can explain 30.5% of the variance in sleep quality among patients with panic attacks. The t-test for the significance of the regression coefficients for migraine headaches (β = 0.532) and rumination (β = 0.371) was significant at the 0.01 level. This finding suggests that for every one standard deviation increase in migraine headaches and rumination scores, there is a corresponding increase of 0.532 and 0.371 standard deviations in sleep quality scores, respectively.

4. Discussion and Conclusion

The aim of this study was to predict sleep quality based on migraine headaches and rumination in women with panic attacks. The findings of the present study indicated that migraine headaches and rumination could predict sleep quality in patients with panic attacks. Research has shown that there is a relationship between rumination and migraine headaches in individuals with panic attacks (Ameli et al., 2005; Olatunji et al., 2013). Additionally, some studies have suggested that individuals with panic attacks and anxiety may be at greater risk for experiencing migraine headaches (Senaratne et al., 2010). Research has also shown that rumination and stress exacerbate migraine symptoms (Kokonyei et al., 2016). This condition can further aggravate migraine headaches (Breslau et al., 2001).

Furthermore, individuals with panic attacks may experience sleep problems, which can lead to reduced sleep quality and failure to improve their physical and mental state (Davidoff et al., 2012). Rumination is among the factors that exacerbate panic attack symptoms and lead to decreased sleep quality (Jamieson et al., 2021). The relationship between sleep quality and migraine headaches is a complex research topic and may be influenced by various factors. Migraine headaches may affect sleep quality. During a migraine attack, symptoms such as severe head pain, sensitivity to light and sound, nausea, and vomiting can disrupt sleep, causing nocturnal awakenings and deep sleep disturbances. Individuals with migraine headaches may experience irregular sleep patterns, nocturnal awakenings, or shallow sleep due to pain and associated symptoms. They may also experience increased stress and anxiety, which can lead to decreased sleep quality and sleep problems. Factors such as sleep disorders, stress, anxiety, and psychological issues may play a role as common factors between migraine headaches and sleep quality. In line with the results of the present study, scientific research has observed that certain factors may affect sleep quality, which may include migraine headaches or panic attacks. The pain of a migraine headache may disrupt sleep and affect sleep quality. Additionally, individuals with panic attacks may face sleep problems, as panic attacks can affect the nervous system and damage sleep quality (Cervena et al., 2005; Hacimusalar & Karaaslan, 2020; Hovland et al., 2013; Sheikh et al., 2003).

Research has also shown that rumination can have an impact on sleep quality (Guastella & Moulds, 2007). Rumination is a thought pattern in which an individual continuously focuses on and analyzes negative or problem-focused thoughts and fantasies. This type of thinking typically leads to increased stress, anxiety, and depression, which in turn may negatively affect sleep quality. In relation to patients with panic attacks, the rumination experienced by them may exacerbate panic attack symptoms and lead to decreased sleep quality (Jamieson et al., 2021). In other words, stress and worries associated with panic attacks may drive an individual towards rumination, and such thoughts can negatively affect sleep quality. On the other hand, poor sleep quality may exacerbate rumination, thus creating a negative cycle. For example, individuals who experience constant stress and anxiety due to poor sleep quality may be more prone to negative thoughts and rumination.

Given the results obtained, since sleep quality was poor in most panic patients, therapists should focus more on sleep problems and the factors affecting sleep quality, and implement appropriate interventions to improve patients' sleep. It is suggested that by employing interventions tailored to the needs of patients, efforts should be made to modify thought patterns, reduce rumination, and address migraine headaches to control patients' sleep needs in clinical settings and facilitate their treatment process. Overall, the relationship between rumination, panic attacks, and migraine headaches may be complex and influenced by various factors. Further research and consultation with physicians and related specialists are recommended to gain a more precise understanding of this relationship and its impact on individuals with panic attacks and migraine headaches.

5. Suggestions and Limitations

This study has several limitations that should be acknowledged. First, the sample was limited to women from psychological clinics in Isfahan, which may not represent broader populations or other geographical areas. Additionally, the cross-sectional design of the study limits the ability to infer causality between migraine headaches, rumination, and sleep quality. Self-reported measures, such as the Pittsburgh Sleep Quality Index, may also introduce bias, as they rely on participants' subjective assessment rather than objective measures of sleep quality. Furthermore, the study did not account for potential confounding variables such as medication use, lifestyle factors, or the presence of other comorbid conditions, which could influence the results.

Future research should consider a longitudinal design to explore the causal relationships between migraine headaches, rumination, and sleep quality over time. Expanding the sample to include diverse populations, such as different age groups, men, and individuals from various cultural backgrounds, would enhance the generalizability of the findings. Additionally, incorporating objective measures of sleep quality, such as polysomnography or actigraphy, alongside self-reported measures, could provide a more comprehensive understanding of how migraine headaches and rumination impact sleep. Investigating the role of potential mediating factors, such as stress management techniques or psychological interventions, could also provide valuable insights into mitigating the negative effects on sleep quality.

The findings of this study suggest that clinicians should be mindful of the interconnectedness between migraine headaches, rumination, and sleep quality in patients with panic attacks. Interventions targeting the reduction of rumination, such as cognitive-behavioral therapy or mindfulness-based approaches, could be beneficial in improving sleep quality in this population. Additionally, addressing migraine headaches through appropriate medical treatment or lifestyle modifications may also contribute to better sleep outcomes. Clinicians should consider a holistic approach that integrates both psychological and physiological factors when developing treatment plans for individuals with panic attacks, to enhance overall well-being and reduce the impact of these interrelated conditions on sleep.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript. This article is derived from the first author's doctoral dissertation.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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References

Ameli, J., Gholamreza, K., Kazem, Q., Hossein, K., Alireza, S., Vahid, P., & Mirmohsen, S. (2005). The frequency of panic attacks in patients with migraine headaches in patients referred to Baqiyat Elah Hospital. *Faiz*, *10*(2 (sequentially 38)), 35-38. https://www.sid.ir/paper/444509/fa

Askari Masuleh, S., & Taheri, F. (2023). Predicting Organizational Commitment by Rumination. *KMAN Counseling & Psychology Nexus*, *1*(2), 157-163. https://journals.kmanpub.com/index.php/psychnexus/article/view/1953

Bakhshandeh Larimi, N., Zebardast, A., & Rezaei, S. (2021). The effectiveness of acceptance and commitment therapy on cognitive flexibility, rumination, and distress tolerance in persons with Migraine headache [Research]. *Shenakht Journal of Psychology and Psychiatry*, *8*(2), 74-87. https://doi.org/10.32598/shenakht.8.2.74

Breslau, N., Schultz, L. R., Stewart, W. F., Lipton, R., & Welch, K. M. A. (2001). Headache types and panic disorder: directionality and specificity. *Neurology*, *56*(3), 350-354. https://doi.org/10.1212/WNL.56.3.350

Cervena, K., Matousek, M., Prasko, J., Brunovsky, M., & Paskova, B. (2005). Sleep disturbances in patients treated for panic disorder. *Sleep Medicine*, *6*(2), 149-153. https://doi.org/10.1016/j.sleep.2004.08.008

Davidoff, J., Christensen, S., Khalili, D. N., Nguyen, J., & IsHak, W. W. (2012). Quality of life in panic disorder: looking beyond symptom remission. *Quality of Life Research*, *21*, 945-959. https://doi.org/10.1007/s11136-011-0020-7

Goli, Z. S., Mirseify fard, L. S., & Shamkhi, F. (2020). The Effectiveness of Stress and Anger Management Skills Training on Quality of Life and Resilience and Reducing the Severity of Pain in Patients with Migraine. *medical journal of mashhad university of medical sciences*, *62*(5.1), 1879-1886. https://doi.org/10.22038/mjms.2020.15335

Guastella, A. J., & Moulds, M. L. (2007). The impact of rumination on sleep quality following a stressful life event. *Personality and individual differences*, *42*(6), 1151-1162. https://doi.org/10.1016/j.paid.2006.04.028

Hacimusalar, Y., & Karaaslan, O. (2020). Assessment of sleep quality of patients with panic disorder and generalized anxiety disorder during remission: a case-control study. *Archives of Clinical Psychiatry (São Paulo)*, *47*, 19-24. https://doi.org/10.1590/0101-60830000000224

Hovland, A., Pallesen, S., Hammar, Å., Hansen, A. L., Thayer, J. F., Sivertsen, B., Tarvainen, M. P., & Nordhus, I. H. (2013). Subjective sleep quality in relation to inhibition and heart rate variability in patients with panic disorder. *Journal of affective disorders*, *150*(1), 152-157. https://doi.org/10.1016/j.jad.2012.12.017

Jamieson, D., Kannis-Dymand, L., Beaudequin, D. A., Schwenn, P., Shan, Z., McLoughlin, L. T., Lagopoulos, J., & Hermens, D. F. (2021). Can measures of sleep quality or white matter structural integrity predict level of worry or rumination in adolescents facing stressful situations? Lessons from the COVID-19 pandemic. *Journal of adolescence*, *91*, 110-118. https://doi.org/10.1016/j.adolescence.2021.08.002

Kaiya, H. (2016). Anxious-depressive attack: an overlooked condition a case report. *Anxiety Disorder Research*, *8*(1), 22-30. https://doi.org/10.14389/jsad.8.1_22

Kokonyei, G., Szabo, E., Kocsel, N., Edes, A., Eszlari, N., Pap, D., Magyar, M., Kovacs, D., Zsombok, T., Elliott, R., & Anderson, I. M. (2016). Rumination in migraine: Mediating effects of brooding and reflection between migraine and psychological distress. *Psychology & Health*, *31*(12), 1481-1497. https://doi.org/10.1080/08870446.2016.1235166

Mahvash, M., Yamini, M., & Mahdian, H. (2024). Comparing the Effectiveness of Instructional Mental Imagery and Tolerance of Ambiguity Training on Students' Academic Procrastination [Research Article]. *Iranian Journal of Educational Sociology*, *7*(1), 10-20. https://doi.org/10.61838/kman.ijes.7.1.2

McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research and Therapy*, *49*(3), 186-193. https://doi.org/10.1016/j.brat.2010.12.006

Mehrmanesh, E., Hafezi, F., Ehteshamzadeh, P., & Bakhtiarpour, S. (2023). Comparing the effectiveness of cognitive behavioral therapy, biofeedback and EMDR on anxiety sensitivity in women with migraine. *Journal of Personality and Psychosomatic Research (JPPR)*, *1*(1), 10-14. https://doi.org/10.61838/kman.jppr.1.1.3

Milrod, B., Markowitz, J. C., Gerber, A. J., Cyranowski, J., Altemus, M., Shapiro, T., Hofer, M., & Glatt, C. (2014). Childhood separation anxiety and the pathogenesis and treatment of adult anxiety. *American Journal of Psychiatry*, *171*(1), 34-43. https://doi.org/10.1176/appi.ajp.2013.13060781

Olatunji, B. O., Naragon-Gainey, K., & Wolitzky-Taylor, K. B. (2013). Specificity of rumination in anxiety and depression: A multimodal meta-analysis. *Clinical Psychology: Science and Practice*, *20*(3), 225-239. https://doi.org/10.1037/h0101719

Senaratne, R., Van Ameringen, M., Mancini, C., Patterson, B., & Bennett, M. (2010). The prevalence of migraine headaches in an anxiety disorders clinic sample. *CNS Neuroscience & Therapeutics*, *16*(2), 76-82. https://doi.org/10.1111/j.1755-5949.2009.00103.x

Sheikh, J. I., Woodward, S. H., & Leskin, G. A. (2003). Sleep in post-traumatic stress disorder and panic: Convergence and divergence. *Depression and Anxiety*, *18*(4), 187-197. https://doi.org/10.1002/da.10066

Vajari, S. M. (2024). The Effectiveness of Active Music Therapy on Anxiety and Sleep Quality in Adolescents Aged 11-14

With Stargardt Disease. *Jayps*, *5*(1), 19-26.
https://doi.org/10.61838/kman.jayps.5.1.3