ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
CJSSR

CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
Vol.03 No.02 (2025)

MIGRAINE SEVERITY, COGNITIVE IMPAIRMENT AND HEALTH RELATED QUALITY OF LIFE IN MIGRAINE PATIENTS

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ABSTRACT

The present study investigated the relationship among migraine severity, cognitive impairment and health-related quality of life in migraine patients. The sample for this cross-sectional study consisted of 152 migraine patients, age ranging from19 to 35 years. A convenient sampling applied that enabled a wider range of migraine patients to participate. Self-report measures including demographic questionnaire, Migraine Severity Scale (MIGSEV), Cognitive Impairment Scale and Health-Related Quality of Life Short Form (SF-36) were used to assess the study variables. The correlation analysis demonstrated a positive relationship between migraine severity, cognitive impairment and health-related quality of life (physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health) have a relationship with the prevalence of migraine severity and cognitive impairment in migraine patients. Regression analysis also indicated that migraine severity and cognitive impairments positively predicted health-related quality of life in migraine patients. Mediation analysis showed that cognitive impairment mediated the relationship between migraine severity and health-related quality of life in migraine patients.

***Keywords*:** migraine severity, cognitive impairment, health-related quality of life, migraine patients.

INTRODUCTION

Migraine severity has a strong influence on cognitive impairment. Migraine severity and cognitive impairment are strongly associated with health-related quality of life because they affect health-related quality of life. Migraine is a common type of headache. Feeling pain on one side of the head, nausea, vomiting, irritation towards light (photophobia), sound (phonophobia) and smell are the main symptoms of migraine that seriously influence health and behavior of a person. Typically, migraine symptoms appear between 4 and 72 hours. This is repeated in patients, completely disrupting their lives. Thus, their professional, family and social life are strongly influenced. According to the WHO survey, migraine is ranked 19th among all the diseases leading to disability and is the 12th leading cause of years lived with disability among women of all ages worldwide. Research indicates that people with migraine often experience cognitive impairments, particularly in memory and attention, which can exacerbate their overall disability and decrease health-related quality of life (Soto et al., 2022). In a cohort of general medicine patients, 71% of migraine sufferers reported severe symptoms, highlighting the prevalence of severe migraine in clinical settings (Henri et al., 2023). Migraines are complex neurological conditions divided into migraine without aura, migraine with aura, and chronic migraine, all of which have different symptoms and triggering factors. Migraine without aura is characterized by recurrent, throbbing headaches with nausea and photophobia/sound sensitivity, while migraines with aura are characterized by short-lived sensory abnormalities like visual illusions. Chronic migraines occur repeatedly, often impairing quality of life and work function. Risk factors include hormonal imbalances, gender (females being affected more), age, hereditary tendency, and related disorders such as depression and anxiety. Emotional stress, alteration in sleep cycles, food items, and environmental factors greatly play a role in migraine severity. Migraine impact transcends mere physical forms with an effect on work performance, personal relations, mental status, and economic functioning. Research highlights that higher migraine severity is linked with lower quality of life, with a majority of patients being moderately to severely disable. Individualized and extensive management strategies are required to avoid the huge personal and societal burden of migraines.

Cognitive impairment also includes memory, attention, executive function, language and visuospatial skills deficits. These deficits often cause the inability of an individual to perform routine activities and accomplish other things beyond what one would normally expect of a 12 person's age and educational background (Winblad et al., 2004). All these falls under the umbrella of cognitive abnormality: the unusual effect in predator prey interactions, cognitive decline and cognitive therapies in early childhood education are all examples of behaviors that are cognitive abnormality. Common is mild to severe cognitive impairment. As few studies indicate, some early signs of age-related cognitive impairment may emerge in late 20s or 30s. While they suffer cognitive changes, people with mild impairment can carry out everyday tasks. Severe disability can lead to an inability to talk or write and inability to perceive value or meaning of something, making it impossible to live on his own. These factors contribute greatly to cognitive impairment, it is important to consider the

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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role of resilience and adaptive responses in mitigating such effects, suggesting that not all individuals with risk factors will experience cognitive decline (Montine et al., 2020).

An understanding of these methods is needed before treatments can be developed to reduce cognitive decline. The oldest age group, 90-100 years, record the highest rates of cognitive decline; 71.4% are affected (Muhammed et al., 2023). Cognitive impairment can be classified as mild cognitive impairment (MCI) and dementia, with MCI being a transitional phase between normal aging and more severe impairment, and dementia being severe loss of memory, communication, and problem-solving ability. The major risk factors are aging, genetics, lifestyle, sleep disturbances, and substance abuse. Aging is the most important risk factor, particularly over age 80. Cognitive impairment impacts daily functioning, social relationships, work, and quality of life, often resulting in emotional burden and economic strain. Even when some stabilize or get better, others will deteriorate. Regular exercise, social interaction, and avoidance of hazardous habits will decrease the risk and impact of cognitive decline. Addressing cognitive impairment requires a multifaceted approach considering both biological and social dimensions.

Health-related quality of life (HRQoL) means an individual's subjective perception of his or her general well-being and functioning in many domains of life, including physical, mental, emotional and social aspects as they are influenced by his or her health status and any associated medical conditions. HRQoL encompasses not only the absence of disease or disability, but also factors such as functional status, symptom burden, psychological well-being, social support and satisfaction with life (WHOQOL Group, 1995). The term "health-related quality of life" (HRQoL) confines HRQoL to health-related aspects. Nevertheless, there is no single, accepted definition for this very broad and complex concept (Fayers & Machin, 2000). There are, however, two major concepts of HRQoL that form the backbone of most definitions. It is a multi-dimensional concept which can be taken as the latent construct of the person's physical, social, psychological, and role functioning aspects (Bullinger, 1991). Health-related quality of life (HRQoL) consists of multiple important dimensions of an individual's overall well-being. They involve physical functioning, which concerns a person's capability to undertake everyday tasks freely, and body pain, which measures the manner in which pain affects day-to-day living. Role limitations due to physical health issues quantify the impact of physical conditions on an individual's capacity to perform work or social roles, whereas role limitations due to emotional problems quantify the impact of mental health on daily functioning. General mental health indicates emotional stability and the lack of mental illness, and social functioning measures an individual's capacity to sustain relationships and engage in social activities. Energy and fatigue levels also come into play, as they determine one's capability to remain active and interested. Finally, general health perceptions measure an individual's personal assessment of his or her overall physical, mental, and social health. Overall, individuals with migraine have a poorer health-related quality of life as compared to the general population, which may affect their daily functioning and interpersonal relationships (Domitrz & Golicki, 2022). This emphasizes the need for comprehensive treatment methods that address both physical and mental health aspects. Recurring migraine sufferers often report many limitations in daily activity when having this migraine, limited ability to perform in either an occupational or educational setting while attending social interactions which negatively impact overall quality of life (Buse et al., 2012).

Health-related quality of life (HRQoL) is determined by a range of factors, such as psychological traits, health habits, sociodemographic traits, physical and mental well-being, and environmental factors. Poorer HRQoL is associated with lower income, unemployment, and inadequate education, while proper social networks, physical activity, and healthy eating improve HRQoL. Physical and mental well-being have a huge impact on HRQoL, and conditions like depression and chronic diseases deteriorate it. Environmental factors such as housing conditions and the availability of healthcare also play an important role. Low HRQoL has negative physical, psychological, and emotional outcomes such as ineffective disease coping, increased psychological distress, and social isolation. Economically, it also causes extra burden on the individual as well as on healthcare systems in terms of more treatment needs. Improvement in HRQoL requires an overall approach addressing social, medical, and environmental aspects of well-being.

Following is a review of the literature on the association among migraine severity, cognitive impairment and health-related quality of life. Curiosity about investigation the association among migraine severity and cognitive impairment has been expressed by researchers. Thus, migraine patterns and severity have an influence on an individual's cognitive impairment.

Migraine Severity and Cognitive Impairment

Araújo et al. (2012) found that many studies showed migraine patients having problems with memory, attention, and how quickly they think. They found that migraine might make people more likely to have trouble with their cognitive skills, especially remembering things, thinking quickly, paying attention, and making decisions. This demonstrates that migraine causes impairment in the cognitive abilities of the individual. Moreover, Gu et al. (2022) conducted a detailed study on how

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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migraine affects the brain's ability to think and found that migraine patients have lower thinking skills and language abilities than those without migraine. While other brain functions like memory and attention may work properly, migraine sufferers were more likely to have Alzheimer's disease and dementia. So, migraine patients are more likely to develop memory or attention problems as compared to the individuals without migraine. In addition to the research, Vuralli et al. (2018) studied how migraine affects thinking abilities, showing decreased function during migraine attacks and in clinical settings. Brain scans and other tests support these findings, suggesting that medications and other conditions might also play a role. Unlike migraine, tension-type or cluster headaches usually don't cause similar cognitive problems. Martins (2023) studied how migraine can affect how well people think. They found that during migraine attacks, people might have trouble thinking clearly, with symptoms like forgetfulness and difficulty finding words. Different lifestyle choices and types of migraines can influence the cognitive decline of an individual. According to this study, a person's quality of life can be significantly impacted by cognitive deficits, particularly at work, school, or in social situations. Recognizing these obstacles is crucial for better understanding how migraines affect not just physical health but also mental and cognitive functioning.

Cognitive Impairment and Health Related Quality of Life

The relationship between health-related quality of life and cognitive impairment is examined in this review. This investigation is both theoretically required and has real world applications. In Keramat et al. (2023) the authors used data from the HILDA survey to investigate how cognitive impairment impacts upon the health-related quality of life (HRQoL) of older Australians. They found that physical and mental health scores were lower in older people with moderate and severe cognitive impairment than those without and highlighted the need to address cognitive concerns to improve well-being in older people. They pointed out that the 31 findings affected a wide range. Lower mental health scores may indicate you have problems such as depression, anxiety, or loneliness, which tend to be exacerbated by cognitive deficits; and lower physical health scores may indicate problems with mobility, completing daily household chores, or chronic pain. The mix of these traits affects greatly a person's ability to be independent and be able to participate effectively in his community. In another study, Yang et al. (2019) studied whether coexistence of depression symptoms and cognitive impairment has an impact on health-related quality of life in the Shanghai senior Chinese population. In individuals with depressive symptoms and probable mild cognitive impairment, lowest health-related quality of life levels were reported when compared to control subjects, and these differences were mediated by ADL and IADL disability. Instead, they advocated for a complete integrated healthcare solution that covers all mental health, cognitive function, physical capacities as a whole. These interventions, such as targeted mental health support, cognitive training and functional ability improving programs, could potentially contribute to reducing these issues. Su et al. (2015) investigated the impact of mild chronic migraine on health-related quality of life among community living elderly and found that advanced age, female gender, functional disability and depression are important risk factors. In other studies, predictors of health-related quality of life in elderly individuals with MCI were explored, with depression as one notable predictor of poorer outcome, and interventions aimed at increasing health-related quality of life in elderly people with MCI. Among elderly people with MCI depression was identified as a particularly important risk factor for decreasing health-related quality of life.

Depressed symptoms were also linked to lowered emotional well-being, and depressed symptoms about cognitive decline and physical limitations interacted, meaning that the combination of them had a 32 compounding negative effect. In schizophrenia, Rekhi et al. (2023) investigated to what extent cognitive impairment influenced quality of life and tested more than 600 subjects, demonstrating that the more severely thinking the worse quality of life score. The need for improving cognition and creating more cognitive training among schizophrenia patients is underscored by their study. The findings emphasize the importance of the incorporation of cognitive rehabilitation programs and strategies into the treatment plan for people with schizophrenia. The interventions might be cognitive training exercises, medicines that may enhance cognitive function, and supportive therapies designed to train in skills and maintain social integration.

Migraine severity and Health Related Quality of Life

To analyze how migraine impacts on a migraine patient's quality of life, Domitrz and Gölicki (2022) had studied 100 migraine patients. Migraine sufferers had a lower quality of life than non-migraine sufferers, and this finding underscores the effect migraine can have on a person's everyday life. Despite its limitations (one center and one questionnaire only) we could 33 compare the results consistently. But they noted, their findings can help raise awareness about the disturbing effects migraines can have on patients' lives. To see if long term Rimegepant treatment can improve quality of life, Pavlovic et al. (2023) studied adults with frequent migraines. After 12 weeks, emotional function and limitations by daily activities resulting from migraine improved for patients. The benefits continued for at least a year, indicating that Rimegepant provides the quality-of-life benefit

ISSN E: 3006-1466
ISSN P: 3006-1458
CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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of easing the symptoms of people suffering migraine. On the long term, patients continued to report fewer migraines and milder symptoms, and improvement in their quality of life. The long-term effectiveness demonstrates that Rimegepant is effective for acute migraine relief as well as a prophylactic treatment that may enable sustained improvement in health-related quality of life (HRQoL). In contrast, Acikgoz et al (2023) compared differences between quality of life, anxiety and depression by migraine and tension type headaches. While those who suffered from tensiontype headaches were more negatively affected by their condition than migraine patients, treatment with hydromorphone significantly reduced tension, pain, and activity limitations. Very beneficial for the sufferers could be intervention aimed at decreasing the frequency and intensity of migraine attacks and anxiety management measures. Thus, patients with tension type headache should concentrate on the assistance of mental health, for example therapy, and methods of coping, to relieve the feelings of hopelessness and depression. It is underscoring that to improve outcomes for all patient convenience, headache therapy needs to be a complete, tailored approach. In a study conducted by Fayegh et al. (2022) the quality of life between Iranian older people with and without migraines was evaluated. In comparison to those without migraines, 186 participants with migraines reported a worse overall quality of life and more challenges with pain, self-care, mobility, everyday activities, and anxiety/depression. The study found that older adults with migraines have higher levels of anxiety and depression. The chronic nature of the headaches and the unpredictability of the episodes appeared to lead to emotional distress, further reducing their quality of life. This mental burden became worse by migraine-related physical discomfort, resulting in a downward spiral of well-being.

Indigenous Researches

A study on Pakistani women reported that the common risk factors of migraine among females are stress, physical activities, and menstruation. On the other hand, the study established that weight loss and regular meals reduce the risk of migraine attack. These findings establish a link between lifestyle factors of an individual, including a more important role for lifestyle habits in the management of stress, with both the severity and the frequency of migraine; consequently, 35 lifestyle modifications seem necessary in the management approach toward migraine. (Shaheen et al., 2021). The study was aimed at finding out the effect of traumatic brain injury induced cognitive impairment on health-related quality of life. It was an effort to determine how traumatic brain injury induced cognitive deficits affects people's daily functioning and general well-being. The study showed that individuals with traumatic brain injury induced cognitive impairments have significantly reduced HRQoL. This has brought out the extreme impact that cognitive impairment may have on the aspects of daily living, from personal to social and occupational functioning, and the importance of comprehensive rehabilitation approaches aimed at addressing both deficits and improving the quality of life for such individuals (Danial et al., 2023). This study determine the relationship between migraine severity and cognitive impairment in patients. The focus was placed on how migraine attacks interfere with daily functioning. It assessed how severe migraines affected cognitive functioning and the quality of life of sufferers. This research showed that most of the migraine patients experienced extreme disability due to the severity of attacks that made them incapable of even performing simple, routine work, and even social activities. Thus, findings suggest that intensity leads to considerable cognitive and functional impairments due to migraines, and their broad impact on patients extends far beyond the physical symptoms (Jawad et al., 2019).

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ISSN P: 3006-1458
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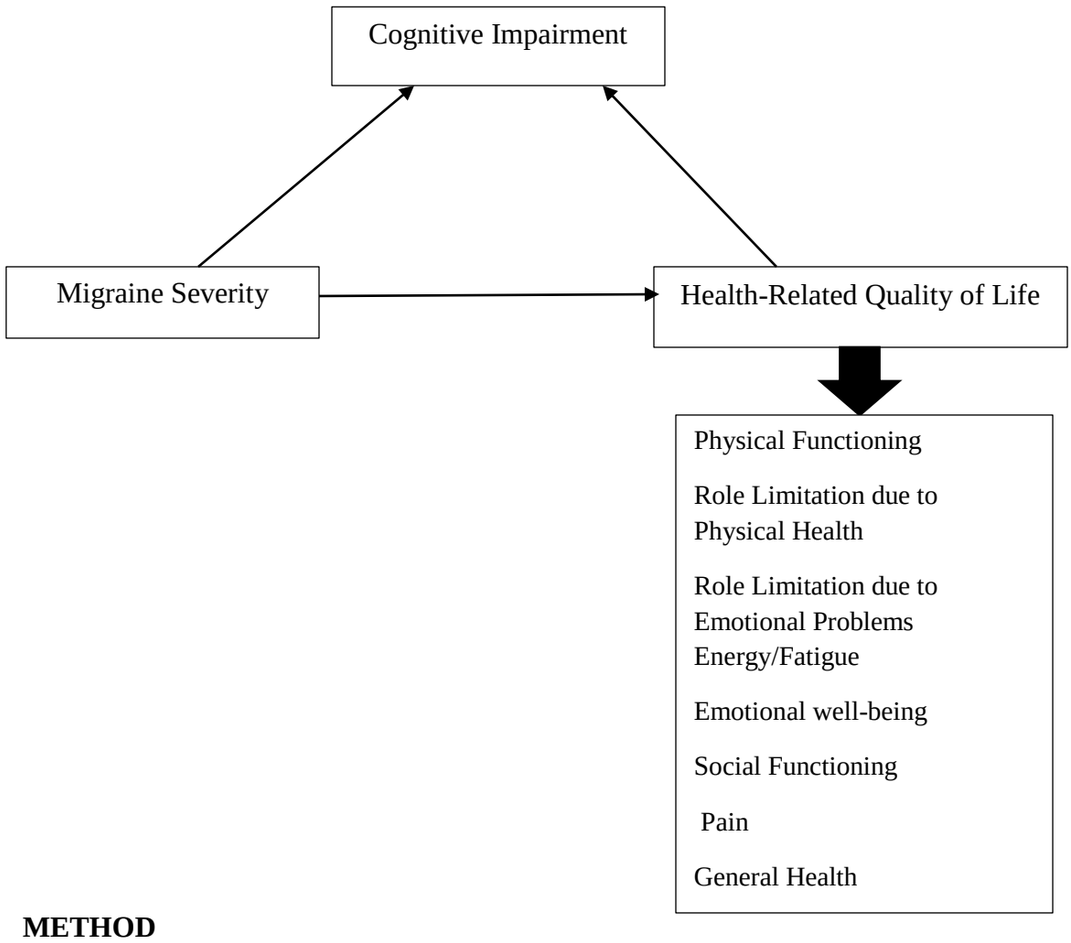
Figure 1



METHOD

Participants: The sample comprised of 152 migraine patients (N=152), with an age range of 19 to 30 years (M = 22.10, SD = 2.71). Purposive sampling technique were employed to gather data from various Lahore hospitals.

Procedure

The researcher obtained permission to use the questionnaires from the authors via email and presented an authority letter from the Humanities Department of COMSATS University. The authorities were informed of the research purpose and gave their consent to manage their schedule accordingly. 152 migraine patients were selected for data collection through purposive sampling and the researcher introduced herself, provided a brief overview of the research purpose, and assured participants of the confidentiality and anonymity of their responses. The participants were also informed that their participation was voluntary and that they could withdraw at any time. A questionnaire was distributed, and instructions were explained. It took 20-25 minutes to get to each hospital, with a total of 152 questionnaires distributed. From hospital A, 30 questionnaires were filled, and from hospital B and C, 52 questionnaires each were filled. Rest of the 68 questionnaires were filled by the students from the university who had the migraine for more than 1 year. Total 80 questionnaires were given to the participants and only 60 person filled questionnaire so the response rate was 80. After multiple visits for data collection, the participants were thanked for their cooperation, and the hospitals authorities were acknowledged for their assistance and collaboration. Finally, the data collected was analyzed, and the results were discussed.

Measures

The strength and effect of a person's migraine symptoms during a migraine headache episode are referred to as migraine severity. It is operationally defined as the intensity and frequency of symptoms like pain, nausea, light and sound sensitivity, and the severity with which they impact daily life. The sum of the items on the migraine severity scale the higher scores showing greater severity and more impacts from the migraine. According to study, migraine severity includes the

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ISSN P: 3006-1458
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intensity of pain, the frequency and duration of attacks, related symptoms including nausea and vomiting, and the disruption of everyday activities and quality of life brought on by the attacks. (Lipton et al., 2003). The extent to which a person's everyday activities are disrupted and the severity of their migraine symptoms during an episode. The Migraine Disability Assessment (MIDAS) questionnaire and other migraine severity rating instruments were used to define the operational definition of migraine severity (Stewart et al., 2001).

Cognitive impairment refers to status that is not able to perform cognitive functions, such as memory, attention, function, language and visuo-spatial (Winblad et al., 2004). It is operationally defined as a measurable decline in one or more cognitive domains, including memory, attention, language, executive function, or visuospatial abilities, as measured by a standardized cognitive assessment tool. It is identified when an individual's total score on the assessment falls below the established threshold for normal cognitive functioning. The sum of the scores of items on cognitive impairment scale represents the score. The lower 43 scores are usually indicative of greater impairment. Rationale based on such assessment tools as the Mini-Mental State Examination (MMSE) and the Montreal Cognitive Assessment (MoCA) is also supported by clinical and research practice (Nasreddine et al., 2005).

Health Related Quality of Life (HRQoL) is the individual's perception of his overall wellbeing and functioning within different domains of life including physical, mental, emotional and social aspects that are affected or affected by health or disease conditions (may). HRQoL encompasses not only absence of disease or disability, but also factors of functional status, symptom burden, well-being on the psychological dimension, satisfaction with social services, and satisfaction with life (WHOQOL Group, 1995). It is operationally defined as an individual perception of how he is doing in terms of physical, mental and emotional and social well-being relative to his health status. The sum of the items on health-related quality of life scale SF36 scale SF-36 scale is used to compute scores for eight health domains i.e. physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health perceptions.

ANALYSIS

Data was analyzed using SPSS version 27. Descriptive statistics for demographic variables and study variables were performed. In the study given, the internal consistency of the scales was analyzed by Cronbach Alpha values. Pearson Correlation was used with real variables to calculate correlations between migraine severity, cognitive impairment and health related quality of life in migraine patients. Lastly, AMOS was used to test a mediation model to see if there is a mediation model to determine the extent to which cognitive impairment predicts health related quality of life, while mediating the relationship between migraine severity and health related quality of life.

Descriptive statistics of demographic variables are given in Table 1.

Table 1

Descriptive statistics of Demographic Variables (N= 152)

Characteristics	*f (%)*	*M(SD)*
Age (in years)		22.10(2.71)
Education (in years)		22.10 (2.71)
No. of siblings (Including you)		4.01 (1.52)
Family system		
Nuclear	94(61.8)	
Joint	58 (38.2)	
Gender		
Male	56 (36.8)	
Female	96 (63.2)	
Employment status		
Full time employed	20 (13.2)	
Part time employed	11 (7.2)	
Self employed	18 (11.8)	
Unemployed	103 (67.8)	
Area of residence		
Rural	18 (11.8)	
Urban	134 (88.2)	

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Characteristics	*f (%)*	*M(SD)*
Migraine Duration History		22.75 (10.48)
Type of migraine		
Migraine with aura	38 (25)	
Migraine without aura	55 (36.2)	
Other	59 (38.8)	
Frequency of migraine attacks per month		2.09 (0.96)
Marital status		
Single	140 (02.1)	
Married	11 (7.2)	
Divorced/Separated/Widowed	1 (0.7)	

Note. For family system; 1=Nuclear and 2=Joint, for employment status; 1= Full time Employed 2= Part time employed, 3= Self-employed and 4=Unemployed, for marital status; 1= Single, 2= Married and 3= Divorced/Separated/Widowed, for area of residence; 1=Urban, 2=Rural Birth Order; 1= Eldest, 2= Middle, 3= Youngest, 4= Only child Migraine Duration History; 1=Less than 1 year, 2=1-1.5 year, 3= more than 2 years, Type of migraine 1=migraine with aura, 2=migraine without aura, 3=other, Comorbid conditions (e.g., Depression, Anxiety, Hypertension, Diabetes) 1= yes , 2= No

Table 2

Descriptive Statists of Study Variables (N=152)

Study Variables	***k***	***α***	***M***	***SD***	***Range***
Migraine Severity	23	.95	53.09	17.92	23-90
Cognitive Impairment	25	.95	64.86	22.48	26-119
Physical Functioning	10	.89	512.5	280.91	0-1000
Role functioning/physical	4	.78	137.50	148.19	0-400
Role functioning/emotional	03	.71	109.21	115.29	0-300
Energy/fatigue	04	.67	304.2	69.07	60-400
Emotional well-being	05	.64	302.3	90.88	40-480
Social functioning	02	.39	111.67	46.02	0-200
Pain	02	.48	135.3	44.39	0-200
General health	06	.46	320.17	72.66	50-500

Note. k= No. of Items, α= Cronbach's alpha, M=Mean, SD=Standard Deviation

The study examines the reliability of various health-related measures, with the results confirming the reliability of the scales. The migraine severity scale (α = 0.95) and the cognitive impairment scale (α = 0.95) show strong reliability. The health-related quality of life scale (α = 0.81) and physical functioning scale (α = 0.89) show good reliability. Role functioning/physical (α = 0.78) and role functioning/emotional (α = 0.71) also show good reliability. The energy fatigue (α = 0.67) and emotional well-being (α = 0.64) also have good reliability. Social functioning (α = 0.39), pain (α = 0.48), and general health (α = 0.46) show slightly low reliability. Overall, the scales for migraine severity, cognitive impairment, and physical and emotional functioning are reliable. (Kline, R. B.,1999).

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Correlational Analysis

Table 3

Correlation of Demographics with Study Variables (N=152)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	-	-.22**	.06	-.05	.27**	.09	.12	.06	.02	-.03	.10	-.00	-.10	.01
2. Education		-	-.05	-.01	.05	.01	-.10	-.03	.02	-.06	-.06	.03	-.05	-.02
3. Migraine Duration			-	-.07	.19*	.16*	.14	.00	-.10	.06	-.07	-.07	-.01	.09
4. Frequency of Migraine Attacks				-	.31**	.26**	-.09	-.11	-.09	-.07	.04	-.31**	-.15	-.18*
5. Migraine Severity					-	.55**	.08	-.17*	-.19*	.05	-.01	-.41**	-.39**	-.30**
6. Cognitive Impairment						-	.00	-.20*	-.33**	-.04	.06	-.48**	-.25**	-.16*
7. Physical Functioning							-	.33**	.22**	-.10	-.14	.10	-.04	-.03
8. Role Limitations Physical Health								-	.56**	.00	.04	.30**	.20*	.14
9. Role Limitation Emotional Problems									-	-.13	.10	.40**	.19*	.17*
10. Energy Fatigue										-	-.08	-.19*	.00	.01
11. Emotional Wellbeing											-	-.03	-.05	.08
12. Social Functioning												-	.32**	.24**
13. Pain													-	.22**
14. General Health														-

Note. *p<.05, **p<.01, ***p<.001

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CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW
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Table 3 shows that migraine severity was positively correlated with cognitive impairment and negatively correlated with role limitations due to physical health, role limitations due to emotional problems, social functioning, pain and general health. Cognitive impairment was negatively correlated with role limitations due to physical health, role limitations due to emotional problems, social functioning, pain and general health. Physical functioning was positively correlated with role limitations due to physical health & role limitations due to emotional problems Role limitation due to physical health was positively correlated with role limitations due to emotional problems, social functioning and pain. Role limitations due to emotional problem was positively correlated with social functioning, pain and general health. Energy fatigue was negatively correlated with social functioning. Social functioning was positively correlated with pain and general health. While pain was correlated with general health.

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Table 4

Model Fit Indices for Migraine Severity, Cognitive Impairment and Health Related Quality of Life (N=152).

Model	X^2	*df*	*P*	CFI	IFI	RMSEA
Model 1	58.37	25	.00	.90	.90	.08

Table 4 shows the results of the absolute fit for Model 1. The path model shows the hypothesized relationships among migraine severity, cognitive impairment and health-related quality of life. In the current model, migraine severity and cognitive impairment were considered exogenous variables, while health-related quality of life (physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health) were treated as endogenous. All exogenous and endogenous variables were included in the path analysis to test relationships. The chi-square value is significant, but the RMSEA is below 0.08, indicating a good fit for the model. The Comparative Fit Index (CFI) and Incremental Fit Index (IFI) both show values of 0.90, supporting a good fit. Direct and indirect effect estimates were calculated using bootstrapping with 95% Confidence Intervals (Chen et al. 2008)

Table 5

Estimates of the Direct Effect of Migraine Severity on Cognitive Impairment (N=152)

	Cognitive Impairment		
	B	*β*	*S.E*
Migraine Severity	.69***	.55	.08

Note. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$; B = Unstandardized Regression Coefficient; *ß* = Standardized Regression Coefficient.

Table 5 revealed that migraine severity was a positive predictor of cognitive impairment.

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Table 6

Estimates of the Direct effect of Cognitive Impairment on physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health

	Physical Functioning			Role Limitations Physical Health			Role Limitation Emotional Problems			Energy/Fatigue			Emotional Wellbeing			Social Functioning			Pain			General Health		
	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E
Cognitive Impairment	-.79	-.06	1.21	-1.07	-.16	.61	-1.66***	-.33	.46	-.29	-.10	.26	.29	.10	.27	-.74***	-.36	.17	-.10	-.05	.17	-.001	.00	.33

Table 6 revealed that cognitive impairment was a negative predictor of role limitations due to emotional problems and social functioning.

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It was hypothesized that cognitive impairment will mediate the relationship between migraine severity, physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health is shown in Table 7.

Table 7

Estimates of Indirect Effect of Migraine Severity on physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain and general health

	Physical Functioning			Role Limitations Physical Health			Role Limitation Emotional Problems			Energy Fatigue			Emotional Wellbeing			Social Functioning			Pain			General Health		
	B	β	S.E	B	β	S.E	B	B	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E	B	β	S.E
Migraine Severity	1.82	.11	1.51	-.65	-.08	.76	-.12	-.02	.57	.38	.113	.33	-.25	-.07	.34	-.55	-.216	.21	-.87***	-.31	.21	-.13***	-.30	.41

Table 7 shows that cognitive impairment was a mediator of the relationship between pain and general health.

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DISCUSSION

This study's main objective was to investigate the complex relationships that exist between migraine severity, cognitive impairment and health related quality of life in migraine patients, acknowledging the significance of these relationships for enhancing clinical settings. By studying these relationships, the study aimed to provide a complete understanding of how migraine severity and cognitive impairment influence the health-related quality of life in migraine patients. Millions of people worldwide suffer from episodic attacks of migraines, a chronic neurological illness. In addition to the well-known physical symptoms, migraines have a significant negative impact on cognitive performance and health-related quality of life.

It was hypothesized that there is likely to be a relationship between migraine severity, cognitive impairment and health related quality of life in migraine patients. Based on findings, it was discovered that the results aligned with the hypothesis and showed a significant positive connection between migraine severity, cognitive impairment and health related quality of life in migraine patients. Previous study by Buse et al (2009) also supported the current research findings, as the aim of their study was to assess and manage all aspects of migraine. The study findings demonstrated that migraine significantly impairs the health-related quality of life and daily functioning. There is another study measuring migraine severity, cognitive impairment and health-related quality of life says that the AMPP Study's findings showed a strong correlation between migraine frequency and severity and increasing disability as well as cognitive impairments associated with paying attention, remembering things, and making decisions. Patients with chronic migraines showed noticeably worse impairments in health-related quality of life (HRQoL) and cognitive deficits than those with episodic headaches. The study emphasized the significant impact that migraines have on day-to-day functioning and the necessity of efficient management techniques to address the cognitive and physical aspects of migraine-related disability (Silberstein et al., 2017). Another found that cognitive impairments in memory and decision-making significantly predict lower HRQoL in individuals with chronic migraines. These cognitive difficulties exacerbate the severity of migraine attacks, affecting social and professional functioning. The study underscores the need for comprehensive care approaches that consider cognitive and psychological aspects (Jensen et al., 2007).

Moreover, it was hypothesized that migraine severity and cognitive impairments will predict health-related quality of life in migraine patients. According to the findings of regression analysis, migraine severity and cognitive impairment predict health-related quality of life. The findings of the study aligned with prior research which suggest that migraine severity and cognitive impairment could be significant predictors or health-related quality of life in migraine patients. In their study, people who suffer from chronic migraines have severe cognitive impairments, especially in memory, attention, and cognitive function, which significantly lowers their quality of life regarding their health (Feleus et al., 2010). Borsook and Maleki (2019) discovered, in their study, that migraine significantly impairs cognitive processes such as memory and attention. This lowers quality of life and emphasizes the need to reduce cognitive symptoms in migraine treatment. HRQoL was significantly lower in people with cognitive dysfunction who had chronic migraines. Reduced quality of life was directly predicted by impairments in cognitive areas such as cognitive functioning and attention. (Vuralli et al., 2018). Health-related quality of life is greatly impacted by the severity of migraines. The study discovered that women with migraine headaches had a lower quality of life as their anxiety, depression, and frustration levels increased in association with the intensity of their migraines (Mariusz et al., 2024).

The final hypothesis states that cognitive impairments mediate the negative relationship between migraine severity and health-related quality of life in migraine patients. The findings of the study align with prior research, people who suffer from migraines have poorer general cognitive performance than people who don't. It focuses on the relationship between migraine and cognitive function, showing that people with migraines have poorer overall cognitive and language function than people without migraines (Lihua et al., 2022). Another study discovered that higher levels of stress and depression, poorer sleep quality, and worse pain intensity are all associated with cognitive impairment in migraine sufferers. The effect of migraine intensity on cognitive function is shown by the correlation between lower cognitive performance and increased attack-related impairment (Doga et al., 2018). The health-related quality of life (HRQoL) of older Australians is adversely affected by cognitive impairment suggesting the decline in general health-related quality of life (Syed et al., 2023). Another study discovered that, when it comes to health-related quality of life and cognitive function, patients with chronic migraines do worse (Buse et al., 2019).

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ISSN P: 3006-1458
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CONCLUSION

After very careful investigation and analysis, this study has examined the relationship between migraine severity, cognitive impairment and health-related quality of life in migraine patients. Based on this study, migraine severity and cognitive impairment are positively correlated with health-related quality of life. That means cognitive impairment is a predictive factor for the prevalence of migraine severity and health-related quality of life in migraine patients and thus individuals with high migraine severity have high chances of developing cognitive impairment. Moreover, the study revealed that patients with high migraine severity have high cognitive impairments. Also, there is high chances of migraine severity in women as compared to the men. This work also opens door for more research and conversation that bridges the gap between the understanding of migraine severity and the therapy practices. Research findings also emphasize the need for increased awareness and support for migraine patients at the public health level. It can be used as an opening for future studies that investigate the other aspects that influence mental health.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The samples have generally been small, impeding the generalizability of the results to wider populations. Self-reports may be heavily affected by subjective interpretations and social desirability bias. People, based on social standards, may downplay the adverse characteristics. Noncontrolled factors including comorbid conditions (e.g., anxiety, depression, or chronic pain), medication use, and lifestyle differences may have impacted the outcomes, narrowing the precision of the findings. The data were collected at one point in time and therefore a cross-sectional study design is limiting for determining the causal relationship between migraine severity, cognitive impairment and HRQoL. Longitudinal data would be helpful to get a better view of these dynamics over time. Clinical methods of treatment can be influenced by understanding the correlation between HRQoL, cognitive impairment, and migraine severity. To improve patient outcomes, medical providers may develop therapies to address cognitive performance, general well-being, and physical symptoms. Research results can direct the creation of therapies meant to reduce the intensity of migraines, lessen cognitive decline, and improve HRoL. To address both migraine symptoms and cognitive deficits, interventions may involve lifestyle changes, cognitive rehabilitation programs, and targeted therapies.

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