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FREQUENCY OF MIGRAINE-RELATED DEPRESSION AMONG MIGRAINEURS IN PAKISTAN: A CROSS-SECTIONAL STUDY

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Abstract: *Depressive disorders are among the leading causes of disability globally and can further complicate the clinical manifestation if coupled with other comorbidities.* ***Objective:*** *The main objective of the study is to find the frequency of migraine-related depression among migraineurs in Pakistan.* ***Methods:*** *This cross-sectional study was conducted at Fauji Foundation Hospital Rawalpindi from January 2024 to June 2024. Data were collected from 240 patients. Data were collected through a designed questionnaire which contain all data related to depression and awareness of patients. All the data related to sociodemographic factors, history, disease duration, and frequency of migraine attacks were noted.* ***Results:*** *Data were collected from 240 participants with a mean age of 35.4±9.8 years. Most patients (60%) fall in the 30-45 age range. Regarding the duration of migraines, 45.8% of patients had suffered for 1-5 years, while 41.7% had migraines for more than 5 years. The majority of participants (41.7%) experienced 3-4 migraine attacks per month. Regarding pain severity, half of the patients (50%) reported moderate pain, while 33.3% experienced severe pain. The results showed that 66.7% of migraine patients experienced some level of depression, as measured by the PHQ-9 scale.* ***Conclusion:*** *It is concluded that depression is highly prevalent among migraine sufferers in Pakistan, with more than two-thirds of patients experiencing some form of depressive symptoms. The severity of depression is significantly associated with migraine frequency, duration, and pain intensity.*

Keywords: Depression, Migraine Disorders, Pakistan, Prevalence, Psychiatric Comorbidity.

Introduction

Migraine is one of the most prevalent neurological disorders affecting millions of individuals across the globe. Migraine is an agonizing, chronic type of headache that is often associated with other complaints, such as nausea, vomiting, and increased sensitivity to light and noise, which significantly affects the subject's health and well-being (1). This condition contrasts what is commonly known simply as a mere headache. However, it is a severe neurological condition and a disease that hinders many people from going to work school, or social events. Migraine is not an unusual problem in Pakistan which has become a public health concern mainly because of low awareness and fear of neurological and mental disorders (2). Another neglected feature of the migraine experience is the comorbidity with Mental health disorders, with depression being prominent. Thus, the episodic and unpredictable occurrence of migraine attacks, together with the severely limiting symptoms, tend to cause considerable emotional impact (3). Long-term, the physical pain and the psychological stress that comes with waiting for the next attack contribute to or worsen mental illnesses, particularly depression. Migraine sufferers often experience loneliness, aggravation, and hopelessness on account of the frequency and recurring character of migraines, all of which breed depressive features. Migraine results in 30% of the global population, which makes it a significant world health issue (4). As seen, migraines affect 5% of the global population and are the second most prevalent type of headache. Migraine affected 52. It was observed in 3% of the Pakistan medical students, with a slightly higher incidence in females, 85. 7 % as compared to males 14. 3 % (5).

Internationally, migraines have been known to be associated with depression, which in turn has found that patients with migraines have higher rates of such depression than the population mean (6). Migraine is recognized by the World Health Organization (WHO) as one of the most disabling illnesses, and the stress that this condition causes to the affected person's mental health is incredibly high. It was reported that migraineurs had a higher rate of major depressive disorder, and this was not only because they have to endure a chronic pain condition, but it is thought that the neural networks that produce migraines may also cause depression (7). It has been found that there is an overlap of neurological and psychological pathways involved in the generation of migraine, which affects the approaches toward treatment and management of people with migraine (8). This aspect of migraine, though, remains largely undocumented in Pakistan. Despite the fact that migraines are acknowledged to be a physical health concern, the relationship between migraines and depression is rarely discussed by practitioners and scholars. This lack of research is rather alarming, especially because Pakistan has a poor mental health culture where diseases such as depression are rarely diagnosed or treated (9). Another challenge that compounds matters is the social culture in the country that regards mental health in a negative light, meaning that those with the symptoms will not seek the necessary care when it comes to depressive symptoms associated with migraines. Moreover, there is less access to health care centers and doctors in rural areas of Pakistan,

and therefore, the majority of the migraineurs have to endure their pain, and mental health issues are not given attention or are not well managed. Migraine and depression have been found to have a complex relationship (10). The depression in migraineurs can, therefore, be secondary to the disabling nature of migraine attacks or due to the overlap of various pathophysiological processes between the two disorders. It is hypothesized that the serotonin pathways that govern mood and pain contract may be the reason for the relationship between migraines and depression. In addition, the anxiety states experienced during the onset of the headaches and their variability curtail the emotional health of an individual since it leads to the development of depressive factors (11).

Objective

The main objective of the study is to find the frequency of migraine-related depression among migraineurs in Pakistan.

Methodology

This cross-sectional study was conducted at Fauji Foundation Hospital Rawalpindi from January 2024 to June 2024. Data were collected from 240 patients suffering from migraines.

Inclusion Criteria

Participants aged 18-60 years were diagnosed with migraines by a healthcare professional.

Participants who had experienced at least one migraine attack in the past three months.

Exclusion Criteria

Participants with other severe neurological or psychiatric disorders that could interfere with the study outcomes.

Patients who were currently undergoing treatment for depression or any other mental health disorder.

Data Collection

Data were collected through a structured questionnaire, which included sections on demographic information, migraine characteristics, and mental health assessment. Demographic data include age, gender, educational status, occupation, and family history of migraines. Migraine parameters include the condition's overall duration, attacks, frequency, and severity in terms of the visual analog pain scale and symptoms such as nausea, vomiting, or photosensitive and phono-sensitive aura. The depressive symptoms in the study samples were screened by patient Health Questionnaire-9 (PHQ-9), which is a standard depression screening tool. Specifically, PHQ-9 has nine questions where the participants rate their level on a scale of 0 – indicating 'not at all' and 3, for 'nearly every day'. According to the scores, the severity of depression was categorized as minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19 and severe (20-27).

Data Analysis

Data were analyzed using SPSS v25. Descriptive statistics, such as frequencies and percentages, were used to describe the demographic characteristics of the study population and the prevalence of depression. The association between migraine severity and the presence of depressive symptoms was evaluated using the chi-square test, and a p-value of <0.05 was considered statistically significant.

Results

Data were collected from 240 participants, with a mean age of 35.4±9.8 years. Most patients (60%) fell in the 30-45 age range. Regarding the duration of migraines, 45.8% of patients had suffered for 1-5 years, while 41.7% had migraines for more than 5 years. The majority of participants (41.7%) experienced 3-4 migraine attacks per month. Regarding pain severity, half of the patients (50%) reported moderate pain, while 33.3% experienced severe pain.

Table 1: Demographic and Migraine Characteristics of Participants (N = 240)

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	100	41.7%
Female	140	58.3%
Age (years)		
Mean age: 35.4±9.8		
18-29	50	20.8%
30-45	144	60%
46-60	46	19.2%
Duration of Migraine		
Less than 1 year	30	12.5%
1-5 years	110	45.8%
More than 5 years	100	41.7%
Frequency of Migraine Attacks		
1-2 times per month	90	37.5%
3-4 times per month	100	41.7%
More than 4 times per month	50	20.8%
Pain Severity (VAS Score)		
Mild (1-3)	40	16.7%
Moderate (4-7)	120	50%
Severe (8-10)	80	33.3%

The results showed that 66.7% of migraine patients experienced some level of depression, as measured by the PHQ-9 scale. Among them, 29.2% had mild depression, while 25% experienced moderate depression. Moderately

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severe depression was reported by 16.7% of the patients, and 8.3% suffered from severe depression. Meanwhile, 20.8% of patients reported minimal depression, with a PHQ-9 score of 0-4.

Table 2: Depression Levels Among Migraine Patients (PHQ-9 Scores)

Depression Category	PHQ-9 Score	Frequency (n)	Percentage (%)
Minimal Depression	0-4	50	20.8%
Mild Depression	5-9	70	29.2%
Moderate Depression	10-14	60	25%
Moderately Severe Depression	15-19	40	16.7%
Severe Depression	20-27	20	8.3%
Total (Any Depression)	5-27	160	66.7%

Among patients experiencing 1-2 migraines per month, 54 reported minimal to mild depression, while 36 had moderate to severe depression. Of those with 3-4 migraines per month, 40 had minimal to mild depression, while 60 experienced moderate to severe depression. For patients with more than 4 migraines per month, 16 had minimal to mild depression, and 34 reported moderate to severe depression.

Table 3: Association Between Migraine Frequency and Depression Severity

Migraine Frequency	Minimal to Mild Depression (n)	Moderate to Severe Depression (n)	Total (n)
1-2 times per month	54	36	90
3-4 times per month	40	60	100
More than 4 times per month	16	34	50
Total	110	130	240

The analysis shows a statistically significant association between migraine frequency and depression severity ($p = 0.001$). Patients experiencing more frequent migraines (3-4 times or more per month) were more likely to report moderate to severe depression. Migraine duration also had a significant impact, with those suffering for more than 5 years more likely to have moderate to severe depression ($p = 0.05$). Although gender showed a higher prevalence of moderate to severe depression in females (40%) than males (20%), the p-value of 0.05 suggests the association is on the borderline of statistical significance. Pain severity was highly associated with depression severity ($p = 0.01$).

Table 4: Association Between Migraine Characteristics and Depression Severity with P-values

Variable	Depression Severity	Total (n)	p-value
Migraine Frequency			**0.001**
1-2 times per month	36 (Moderate-Severe)	90	
3-4 times per month	60 (Moderate-Severe)	100	
More than 4 times per month	34 (Moderate-Severe)	50	
Migraine Duration			**0.05**
Less than one year	10 (Moderate-Severe)	30	
1-5 years	40 (Moderate-Severe)	110	
More than 5 years	50 (Moderate-Severe)	100	
Gender			**0.05**
Male	20 (Moderate-Severe)	100	
Female	40 (Moderate-Severe)	140	
Pain Severity (VAS Score)			**0.01**
Mild (1-3)	5 (Moderate-Severe)	40	
Moderate (4-7)	40 (Moderate-Severe)	120	
Severe (8-10)	50 (Moderate-Severe)	80	

Discussion

The findings from this cross-sectional study provide valuable insights into the high prevalence of depression among migraine sufferers in Pakistan. With 66.7% of the participants experiencing some form of depression, and 25% reporting moderately severe to severe depression, the results highlight a critical need for addressing the mental health burden that accompanies migraines (12). It also presents the findings vis-à-vis the existing research discussion and provides possible accounts for the results in the context and practice of healthcare in Pakistan (13). These results in combined prevalence noted in this study reciprocate World data identifying migraine as a disorder with a strong relationship with depressive symptoms among

migraineurs. Research conducted in different countries has also shown the same trends: depression is more frequent among migraineurs than the rest of the population (14). This is because migraine attacks are frequent and unpredictable and are accompanied by severe somatic manifestations that disorient the patients from their normal functioning. The constant pain, as well as the conception of further attacks, can become the cause of stress, anxiety, and, at last, depression. Here in Pakistan, this might become a much bigger issue due to the insufficient ways through which migraine disorders are dealt with effectively (15). The vast majority of people who suffer from migraines do not receive their care or get it insufficiently because of the absence of knowledge, shortages of medical services, and the existence of mental disorders' prejudice. Consequently, migraineurs bear the double disadvantage of chronic pain and untreated depression. As seen in the findings of this study, depression seems to be very rampant. Therefore, it should be acknowledged that migraine patients should undergo mental health evaluation and should be made part and parcel of managing migraine patients (16). The findings of this study also indicated that there is a significant relationship between the frequency of migraine attacks and the intensity of depression, which was verified by a p-value of less than 0.05. It is worthy of note, but those patients who distinguished three or four migraines a month or even more were more inclined to moderate to severe depression (17). This is in line with other findings, which show that repeated attacks may have an accumulation effect resulting in increased emotional cost among sufferers. Increased frequency of migraine attacks hinders normal functioning in society and at the workplace, in addition to reducing social interactions, frustration, hopelessness, and loneliness, which are significant causes of depression development. Another correlation that was discovered was the one between the length of migraines and the level of depression they reached ($p < 0.05$). It was found that those patients who had been diagnosed with migraines for over 5years were more likely to suffer from moderate to severe depression (16). This is because patients with chronic long-term conditions are more at risk of developing depressive symptoms since the medical condition is a persistent one. From the information given, it can be seen that the beatings or restrictions due to pain repeatedly can lead to a certain extent of mental and emotional problems for the sufferers when migraine control is unsatisfactory. Also, in the long run, chronic migraines take a toll on the individual's neurochemical balance hence increasing vulnerability to depression (18). Moreover, the VAS, which reflects pain severity, was also correlated to depression severity ($p < 0.01$). Patients with more severe pain (VAS 8-10) were more likely to have moderate to severe levels of depression in comparison with patients with less severe pain. It is well corroborated in the literature that such pain intensity is related to depression. It is a well-established fact that pain that persists for a long time causes depression since the affected has no control over the situation (19). Further, pain may lead to sleeping disorders and reduced energy levels that hamper the undertaking of daily activities, which consequently cause emotional stress and depression. Despite the strengths that have been identified in this study, it has its' own limitations, which must be addressed here. First, a cross-sectional research design in this study raises again questions of whether migraines and depression are causing each other since the findings allow only for a correlation approach. The study implies that there is a correlation between the two. However, more refined longitudinal studies are required in order to understand whether a cause-and-effect relation is obtained between the two variables. Second, employing convenience sampling may restrict the volume of the study's transformation of the findings within the broad scope of migraine sufferers in Pakistan.

Conclusion

It is concluded that depression is highly prevalent among migraine sufferers in Pakistan, with more than two-thirds of patients experiencing some form of depressive symptoms. The severity of depression is significantly associated with migraine frequency, duration, and pain intensity.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department concerned. (IRB-FUJ-FU-232/23)
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Conflict of interest

The authors declared an absence of conflict of interest.

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