



## Frequency of Depression in Patients Presenting with Migraine at Tertiary Care Hospital Quetta

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### ARTICLE INFO

**Keywords:** Migraines, Prevalence, Depression, Nausea, Neurological.

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### Declaration

#### Authors' Contribution

All authors equally contributed to the study and approved the final manuscript

**Conflict of Interest:** No conflict of interest.

**Funding:** No funding received by the authors.

### Article History

Received: 03-02-2025    Revised: 11-04-2025  
Accepted: 20-04-2025    Published: 30-04-2025

### ABSTRACT

Headache is one of the commonest complaints of patients of all ages and both genders. General headaches have a lifetime prevalence of more than 95% to 97% and it is common knowledge that almost every individual experiences a headache in his life, which is mostly benign and subsides with self-medication. International classification of headache disorders in its 2nd edition has discussed a large number of Primary Headaches including migraine. **Objective:** The objective of the current study was to evaluate the frequency of depression in patients presenting with migraine at the tertiary care hospital Quetta. **Methods:** Cross sectional study Non-probability convenience-based sampling technique was used to calculate the sample size of N=119 patients. The sample population included all patients between 18-60 years of age and either gender (i.e. male or female) having a history of migraine headache of two months' duration. Study was conducted Baluchistan Institute of Psychiatry and Behavioral Sciences) BIPBS Quetta. **Duration of the Study:** Duration of Study: From 15th July 2022 to 15th January 2023. **Result:** This study involved 119 migraine patients, with a mean age of 27.59±5.37 years, a median duration of six months, and three migraine attacks. Most were males, married, or unmarried. The highest proportion was graduates, followed by intermediate-level individuals. **Conclusion:** The results report a high prevalence of depression amongst patients with Migraines. These migraine attacks are also reported to be associated with nausea and changes in vision.

### INTRODUCTION

Headache is one of the commonest complaints of patients of all ages and both genders. General headaches have a lifetime prevalence of more than 95% to 97% and it is common knowledge that almost every individual experiences a headache in his life, which is mostly benign and subsides with self-medication.<sup>1</sup> International classification of headache disorders in its 2nd edition has discussed a large number of Primary Headaches including migraine.<sup>2</sup> World Health Organization has ranked migraine among the top 20 causes of disability.<sup>3</sup> Headache or cephalalgia is the experience of pain sensation anywhere in the region of the head. With respect to etiology, a primary headache is considered as not having an underlying organic origin, while a secondary headache is due to a causal pathological lesion.<sup>27</sup> Most importantly, primary headache syndromes comprise a migraine, with or without aura, a tension-type headache (TTH), a cluster headache, and a combined tension-type/migraine variant<sup>8</sup>.

Headache disorders are a source of great morbidity and have been aptly ranked amongst the 10 most disabling conditions in the world by the World Health

Organization<sup>9</sup>. Primary headache disorders are rampant globally and have an estimated prevalence of 46% in the adult population worldwide. In this respect, TTH and migraine are the common most, affecting approximately 42% and 11% of the adult population, respectively<sup>9</sup>. Furthermore, epidemiological studies suggest that primary headache disorders have a lifetime prevalence of 90%.

In spite of the aforementioned facts, these disorders are on the whole neglected and uncared-for ailments, placing a huge burden on the patients and their families<sup>8</sup>.

Migraine is very common type of headache, with a prevalence of 10-12%, ranks 19th among disease affecting about 18% of females and 6% of males. It imposes a high socio-economic burden on society and Compromises the quality of life in migraineurs.<sup>4</sup>

Tension-type headache and migraine are the two most common headaches disorders affecting 42% and 11% adult are respectively.<sup>5</sup> Migraines and headaches affect one in seven across the world<sup>10</sup>. In 2010, headache accounted for greater than 3% of all emergency room visits, and was documented as the fourth leading cause of visits to the emergency department within the developed

and developing countries<sup>11</sup>. This has considerable financial implications, through utilization of healthcare resources and lost productivity in the workplace. Indirect costs, including disability<sup>12</sup>, lost productivity and absence from work account for more than 50–70% of the economic burden from headaches<sup>13</sup>. Within the military, headache accounts for greater than 50% of outpatient Neurology encounters<sup>14</sup>. It is a cause for medical attention in 4% of all service members, placing significant demands on the healthcare system<sup>15</sup>. Although migraine and persistent post-traumatic headache often share phenotypic characteristics, few studies have interrogated the pathophysiological differences underlying these headache types.

While there is now some indication of differences in brain structure between migraine and persistent post-traumatic headache, Differences in brain function have not been adequately investigated. The objective of this study was to compare static and dynamic functional connectivity patterns in migraine versus persistent post-traumatic headache using resting-state magnetic resonance imaging. This case-control study interrogated the static functional connectivity and dynamic functional connectivity patterns of 59 a priori selected regions of interest involved in pain processing. Pairwise connectivity (region of interest to region of interest) differences between migraine (n = 33) and persistent post-traumatic headache (n = 44) were determined and compared to healthy controls (n ).

## LITERATURE REVIEW

In one study conducted by Idrees, M et al<sup>9</sup> had reported that out of one hundred patients with migraine, 64 (64%) had comorbid anxiety or Depression. Eighteen (18%) of them had anxiety only, **27 (27%)** had depression only. People with chronic migraine often experience depression or other types of mood disorders due to the tough nature of the condition, says Sehat. “They often live with stress, low productivity, and reduced quality of life People who experience more frequent migraine headaches report having lower quality of life than people with occasional headaches. Disability and lower quality of life are also worse when people with chronic migraine have depression or an anxiety disorder. Some even report worsening headache symptoms after an episode of depression. All these factors can lead to depression In another study conducted by Shabazz N et al,<sup>(10)</sup> had reported 40% depression in migraine patients while an international study showed 28.%, 44.44%, 47% and 57% in migraine patients in different regions.<sup>(11,12)</sup>

In another study the overall prevalence of depression in Pakistan in migraine patients as a co-morbid condition is much higher (56.8%) than its prevalence in general Population, women account for 66% of cases as compared to 33% men. Majority of the patients (75%) aged between 20 and 50 years suggests that emotions associated with chronic migraine include resentment, frustration, embarrassment, anxiety related to migraine pain, and depression a 2020 study found that people with migraine might even feel a need to hide these emotions from others.<sup>13</sup> Another study in Pakistan reported 58.8% depression in migraine patients, females account for 71.66% and males 28.33%.<sup>(14)</sup> Doctors and researchers

have found links between migraine and depression for some time several studies have shown that if you have one of these disorders, you are more likely to have the other.<sup>(1, 2)</sup> Both migraine and depression are common. Migraine impacts nearly 40 million people in the United States, or almost 1 in 6 people of these, 4 out 5 people with migraine are women.<sup>(3,4)</sup> As with migraine, 1 in 5 Americans will have a mental illness at some point in their lives. Depression is a mental illness and is the leading cause of disability in the world. Women have depression at much higher rates than men.<sup>(5,6)</sup> Depression and migraine rates help to understand the number of people impacted but these disorders commonly happen together for more than 1 reason doctors have also learned that migraine and depression can occur together because of genes, environment, and hormones.<sup>(7)</sup> Some studies say that migraine and depression might run in families This might be because of changes (mutations) in genes. Doctors are not sure how much the environment plays a role in how these diseases are passed down in families.

## Aim of the Study

The aim of the study was to determine the frequency of depression in patients with migraine so as to help the clinician treat depression for better management of migraine. Local studies have shown the available frequency of depression all these studies were more than 5 years old.

This study helped to explore in knowing the current magnitude that helps in the future while devising strategies for the control of depression.

## Objectives of the Study

The objective of the current study was to evaluate the frequency of depression in patients presenting with migraine at the tertiary care hospital Quetta.

The following objectives will be explored:

- To access the frequency of depression in patients presenting with migraine at the tertiary care hospital Quetta.
- To access the frequency among gender differences of depression in patients presenting with migraine at tertiary care hospital Quetta.

## Operational Definitions

The following were the terms that were used in to explore the intensity of depression among patients with the complaint of migraine at the tertiary care hospital, Quetta.

### Migraine

The criteria designed by the International Headache Society were used for the recruitment of Patients having the symptoms of migraine. The diagnosis was at least 6 months.

### Depression

Patients with five or more signs and symptoms at least for 2 weeks, as described by DSM 5, will be labeled as having depression.

## MATERIALS AND METHODS

**Study Design:** cross sectional study

**Setting:** Quetta Baluchistan,

(Baluchistan institute of psychiatry and behavioral sciences) BIPBS

### Duration of Study

Six months after approval of synopsis from 15<sup>th</sup> July 2022 to 15<sup>th</sup> January 2023 the cross-sectional study was conducted after getting ethical permission from the University while presenting the research protocol. The study was conducted in the "Department of Psychiatry" at Bolan Medical Complex Hospital, Quetta. The study was conducted in the 6 months from 15<sup>th</sup> July 2022 to 15<sup>th</sup> January 2023. The sample size was Calculated using WHO formula of sample size calculation by assuming the following criteria:

- Prevalence of depression in patients with migraine = 27%
- Confidence level = 95%
- Absolute precision = 8%
- Sample Size (n) = 119

**Study Technique:** Non-probability consecutive sampling technique

### Sample Selection

#### Inclusion Criteria

1. All the patients presenting with migraine with duration > 3 months.
2. Patients in age between 18-60 years
3. Both male and female
4. Can read and give consent form

#### Exclusion Criteria

1. Pregnant lady (assessed on history).
2. Patients with a history of head trauma.
3. Patients with comorbid severe psychotic disorder, major medical illness, visual or hearing problems].
4. Patients receiving anti-depressants or any psychotropic medications will also rule out.

All the above mentioned conditions that affect fetal Outcomes will be excluded to avoid bias in the study.

### Sampling Strategy

Non-probability convenience-based sampling technique was used to calculate the sample size of N=119 patients. The sample population included all patients between 18-60 years of age and either gender (i.e. male or female) having a history of migraine headache of two months' duration. All patients were labeled as having depression as per operational definition.

### Psychological Instruments

The following psychological instruments were used to access the symptoms of depression and headache:

- **Patient Health Questionnaire PHQ-9:** The Patient Health Questionnaire (PHQ) is a simple 9-item self-report questionnaire<sup>27</sup>.
- **Beck Depression Inventory (BDI):** This is a 21 items scale measuring symptoms of depression. Higher scores on the scale indicate greater severity of depression. The Cronbach's alpha for the BDI-II total score was 0.89<sup>28</sup>. The Urdu-translated version of the scale has already been used in Pakistan<sup>26</sup>.
- **Headache Impact Test (HIT-6):** HIT-6 score is a validated tool for headache, including migraine and chronic migraine. Scores range from 36 to 78 and correlate with the level of impact on daily life and ability to function.

Scores greater than or equal to 60 indicate a severe impact on the patient's life<sup>25</sup>.

### Procedure

The study was started after getting Approval from the CPSP and concerned departments of the Bolan University of Medical Quetta. In the second stage, permission was getting from the hospitals to recruit the participants. Each participant will be oriented to the study procedures by a trained researcher at the initial meeting to ensure the Participant comprehends the study protocol, fosters protocol adherence, and minimize drop-out following from the study. Following this, informed consent will be obtained, and an assessment was conducted after checking the inclusion criteria.

Individuals expressing interest in participating in the study will be approached by research clinicians to establish if the eligibility criteria are met. A participant information leaflet was developed and shared with the participant. Sufficient time was allowed to read and understand the information (>24 hours).

Those agreeing to participate in the study will be asked to provide written consent. All the above-mentioned information including age, gender, and marital status, duration of disease, socio-economic status, education level, occupation residence, hypertension, diabetes mellitus, and smoking status will be recorded on a pre-designed demographic form.

### Statistical Analysis

All statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 23.0. Frequencies and percentages were computed for categorical variables like sex, marital status, education status, occupation status, monthly income, and depression. Mean and standard deviations were computed for continuous variables like age and duration of illness.

Effect modifiers like age, sex, duration of illness, marital status, education status, occupational status, and socioeconomic status were controlled through stratification by applying Chi-square and Fischer's exact test. A p-value of  $\leq 0.05$  was considered statistically significant.

## RESULTS

### Socio-demographic and Clinical Characteristics of the Participants

A total of 119 migraine patients participated in this study. The mean age of the patients was  $27.59 \pm 5.37$  years. The median duration of the migraine disease in our sample population was six [interquartile range (IQR)=6] months while the median number of migraine attacks was 3 (IQR=6). Nearly three-fifths (n=87, 59.1%) of our sample population were males while (n=32, 40.9%) were females. Nearly two-thirds (n=43, 65.2%) of patients were married while (n=23, 34.8%) were unmarried the highest proportion of migraine patients in our study were graduates (n= 39.4%) followed by (n=116.7%) in the intermediate level, while equal proportions of our participants were not formally educated and received secondary degrees (n= 12.1%). Equal proportions received primary and master degrees (n= 9.1%) The highest proportion of participants in our survey was

privately employed (n= 45.5%) followed by government employees (n= 19.7%) and industrial workers (n=21.2%).

Half of the patients (n=33, 50.0%) earned a monthly income of fewer than 30,000 rupees, followed by (n=59,

46.9%) earned between 31,000 and 70,000 rupees, while a very minor proportion (n=61, 3.03%) earned greater than 70,000 rupees.

**Table 1**

Scale	Men (n=70)		Women (n=49)		t (df)	P	95% C. I		Cohen's d
	M	SD	M	SD			LL	UL	
PHQ-9	87.55	16.498	32.44	13.476	.573(198)	.0525	- 2.973	5.406	0.1165
BDI	57.85	14.608	88.58	13.524	1.879(198)	.717	- 7.670	.168	- 0.265
HIT-6									

**Table 2**

S.no	Variables	Items	M	SD	Range	$\alpha$	Skew(se)	PHQ-9
1	PHQ-9	9	65.43	14.99	20 - 105	.89	-.131(.172)	-
2	BDI	21	86.77	14.15	53 - 122	.79	.103(.172)	32**
3	HIT-6	6	26.05	5.24	12 - 38	.51	-.067(.172)	.32**

### Prevalence of Depression in Migraine Patients

Nearly three-quarters (n=87, 74.2%) of our participants were suffering from depression as determined while administering psychological assessment. The highest prevalence of depression (n=59, 57.1%) was observed in patients aged 26-30 years, however, this did not reach statistical significance (p=0.708).

Depression was more common in male patients (n=87, 55.1%) in comparison to females (n=32, 44.9%), however, the difference was not statistically significant (p=0.263). Furthermore, depression was not significantly associated with the marital status of the patients (p=0.525). In contrast, depression was significantly associated with the disease duration (p=0.027) as nearly three-quarters (n=75.5%) of the depressed participants had a disease duration of two to three months while only a quarter (n=24.5%) of migraine patients that had depression reported a disease duration of greater than three months. Depression was also significantly associated with the number of migraine attacks (p=0.015) as a greater proportion (n=73.5%) of patients that had depression experienced two to three migraine attacks in comparison to those with four to five migraine attacks (n=26.5%).

In the headache population, the average PHQ-9 self-assessment score was 8, consistent with a diagnosis of mild depression. PHQ-9 scores were positive for depression in 65% of screened patients presenting with a primary headache disorder. Of patients who met the criteria, 37% had a formal diagnosis of depression made by a medical provider and 38% had been engaged with mental health at the time of presentation to Neurology. 15% of patients met the criteria for severe depression. Of patients meeting the criteria for severe depression, 71% had a documented diagnosis and 68% of these patients were engaged with mental health.

Depression was more likely in patients who had a history of prior mTBI, with a prevalence of 81%. Of patients with a history of mTBI and depression, 49% had a diagnosis and 45% were engaged with mental health services.

Migraine significantly affects the functional capacity of an individual making most of the daily tasks impossible to perform. The study provides the hindsight that depression is as common among migraine sufferers as patients suffering from other chronic diseases.

The population had been exposed to unique environmental and physical factors, including changing

environments, inconsistent schedules, atypical work conditions, and a higher frequency of traumatic brain injuries. These factors have been shown to affect headaches and migraines and may predispose patients to higher PHQ-9 or HIT-6 scores<sup>16</sup>.

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Patients with higher depression scores were significantly more likely to have active duty work restrictions or be medically boarded for migraines. Duty restrictions placed as a result of headaches or migraine occurred in 3.8% of patients who did not meet the criteria for depression.

In patients with depression, 29% had similar duty restrictions. Inpatients scoring for mild, moderate, or severe depression, duty restrictions had been placed on 8.3%, 32.5%, and 53.8%, respectively. Patients with higher severity of depression had a significant increase in the number of medical boards and duty limitations as a result of a headache. Of all patients undergoing a medical board or limited duty restrictions for headaches, 94% had a PHQ-9 score consistent with a diagnosis of depression. There was no change in the number of medical boards or duty limitations based on the HIT-6 scoring system or other headache characteristics including headache days or duration.

This Quality Improvement project can serve as a proof of concept for future research and a possible target for growing healthcare costs<sup>16</sup>.

This small cohort accounted for a revenue loss of 31 million dollars. The estimated cost to the United States healthcare system would be in the billions<sup>29</sup>. Treatment of comorbid psychiatric conditions may have considerable financial implications in the headache population, especially within developed and developing countries population. The study utilized a standardized and validated screening tool to detect comorbid psychiatric conditions in patients presenting with headaches. Through recognition of comorbid depression, access to care for mental health services was improved further research is needed to define the effect of treating depression on

productivity and healthcare costs in patients with headaches or migraine.

## CONCLUSION

The results report a high prevalence of depression amongst patients with Migraines. These migraine attacks are also reported to be associated with nausea and changes in vision. This neurological disorder affects the quality of life (QOL) of an individual and results in a significant loss of productivity. In conclusion, migraine is consistently related to depression. This association can have several important clinical implications as the prevalence of depression was found to be significantly high among migraine patients. For good prognosis and management of the disease, physicians should evaluate for the presence of depression among migraine subjects, both disorders should be taken.

More studies are needed to better clarify the links between anxiety, depression, and migraine in children,

adolescents and adults. To ensure the validity of future studies, the following remarks should be taken into account.

The distinction between headache and migraine is not always clear, even when ICHD criteria are used. The children considered to have migraines often have a variety of diagnoses. Future studies should only use the ICHD 2nd edition criteria. Children suffering from migraine are almost always recruited from specialized headache centers in hospitals. This is a very specific population and probably not representative of children with migraine in the general population. In the future, researchers should do their best to avoid this recruitment bias. The questionnaires used in these studies often contain questions related to migraine symptoms such as headache, nausea, vomiting, etc. Several authors have therefore questioned the validity of results from these questionnaires with migraine patients.

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