

Assessment of Clinical Correlation Between Mood Disorders and Migraine

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Abstract

Background: Migraine is a disabling neurological disorder frequently associated with psychiatric comorbidities, particularly depression and anxiety, which may aggravate disease severity and functional disability.

Aim: To assess the clinical correlation between mood disorders and migraine-related disability among patients with migraine.

Methodology: A hospital-based cross-sectional observational study was conducted over one year among 80 adults (18–60 years) with migraine diagnosed according to ICHD-3 criteria at the Department of Psychiatry, Gouri Devi Institute of Medical Sciences and Hospital, Durgapur. Migraine disability was assessed using the Migraine Disability Assessment (MIDAS), while depression and anxiety were evaluated using the Hamilton Depression Rating Scale (HAM-D) and Hamilton Anxiety Rating Scale (HAM-A). Data were analyzed using SPSS version 27.0.

Results: Females constituted 60% of participants, and migraine without aura was observed in 65%. Severe migraine disability was present in 47.5% of patients. Mean MIDAS, HAM-D, and HAM-A scores were 21.8 ± 8.6 , 13.9 ± 5.4 , and 15.7 ± 6.2 , respectively. MIDAS scores showed significant positive correlations with HAM-D ($r=0.621$, $p<0.001$) and HAM-A ($r=0.574$, $p<0.001$). Depression ($\beta=0.41$, $p<0.001$), anxiety ($\beta=0.24$, $p=0.021$), and migraine duration ($\beta=0.23$, $p=0.012$) independently predicted migraine severity.

Conclusion: Depression and anxiety are strongly associated with migraine-related disability. Routine psychological assessment and multidisciplinary management may improve clinical outcomes and reduce migraine burden.

Keywords: Migraine, Depression, Anxiety, Mood Disorders, MIDAS, HAM-D, HAM-A, Migraine Disability.”

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Introduction

Migraine is a frequent, chronic and disabling neurologic disorder that is manifested by recurrent attacks of moderate-to-severe headache, often associated with nausea, vomiting, photophobia and phonophobia [1]. It is known as one of the most significant causes of disability in the world, especially for adolescents and adults in their prime working years, causing significant personal, social and economic burden [2]. The episodic but recurrent occurrence of migraine has a significant impact on the lives of patients, including their work, social interactions, and quality of life. In addition to its physical symptoms, migraine is now recognised as a multi-faceted condition with significant psychological and emotional factors that impact upon the course of the disease and treatment efficacy.

In the last decade, evidence has emerged that migraine is closely linked with a variety of psychiatric disorders, including mood disorders like depression and anxiety [3]. The association of these disorders with migraine is not by chance, as these disorders

are observed far more often in the migraine population than in the general population. Mood disorders can precede the onset of migraine, they can be a complication of frequent migraine attacks, or they can occur together because of shared genetic, neurochemical and environmental factors [4]. This multifaceted phenomenon has been the focus of growing research as psychiatric symptoms (if left untreated) may have a negative impact on the management of migraine, decrease adherence to therapy, and result in greater health care utilization.

There are clinical challenges with migraine and other mood disorders, as both can increase the severity and course of each other [5]. Patients who suffer from both migraine and depression or anxiety tend to have more attack frequency, more pain intensity, longer attack duration, and higher functional disability than those who only suffer from migraine. Likewise, frequent migraine attacks can lead to ongoing emotional problems, decreased coping, social isolation, sleep difficulties, and de-

creased psychological functioning. This vicious circle can result in more severe headache symptoms, which worsen the emotional disturbances, which further reduce the threshold for migraine attacks and a general decrease in clinical outcomes and quality of life.

There are several biological mechanisms proposed to explain this association between migraine and mood disorders [6]. This includes alterations in brain regions involved in pain modulation and emotional regulation, dysfunction of the hypothalamic-pituitary-adrenal axis, neuroinflammatory processes, downregulation of neurotransmitters including serotonin, dopamine and norepinephrine, and genetic susceptibility. Adverse life events, hormonal changes, sleep disturbances and chronic stress are just a few of the possible environmental triggers that could contribute to the development of migraine and psychiatric symptoms [7]. These pathophysiological mechanisms support that migraine and mood disorders are not separate clinical forms but closely interrelated disorders."

"Depression and anxiety have implications from a clinical point of view for diagnosis, treatment, and prognosis of migraine [8]. Patients with psychiatric comorbidities often have a poorer response to standard migraine treatment, use more medication, have a higher prevalence of medication-overuse headache, and have higher use of health care resources. Moreover, psychological distress can be associated with failure to adhere to treatment and impact the effectiveness of preventative interventions. Thus, it is crucial to recognize mood disorders in patients with migraine in order to tailor the treatment plan to the individual, with a focus on both neurological and psychological issues. A multimodal strategy, including neurological assessment, psychological assessment, pharmacological therapy and behavioral interventions, has been proven to increase patients' overall outcome [9].

Many studies have indicated a two-way association between migraine and mood disorders, but it is poorly understood what this association looks like, and how it varies among populations and health care systems. The prevalence and severity of depression and anxiety in people with migraine has varied between studies, due to differences in the demographics, culture, diagnostic criteria, and assessment tools used. Furthermore, in many regional populations, there is limited clinical evidence on the association between mood disorders and migraine disability, and hence, there is a need for additional clinical studies.

Given the high impact of migraine and its psychiatric comorbidities, systematic psychiatric screening assessment has increasingly been an important part of routine migraine management. Timely intervention, increased treatment compliance, decreased

disability due to headache, and improved quality of life may be achieved by early recognition of depression and anxiety. Thus, the present study was conducted to determine the clinical correlation between mood disorders and migraine, by quantifying the prevalence and intensity of depression and anxiety in migraine patients and the relationship of these illnesses with migraine-related disability. The results of this study are hoped to facilitate the use of mental health assessment as a routine part of migraine treatment, leading to a broader patient-centred and multidisciplinary approach to migraine management and subsequently better long-term clinical outcomes."

Methodology

Study Design: The study was conducted using a hospital-based cross-sectional observational study design. This design was selected to evaluate the clinical correlation between mood disorders and migraine among patients attending the Department of Psychiatry. The cross-sectional approach enabled the simultaneous assessment of migraine characteristics and associated mood disorders, including anxiety and depression, within the study population at a single point in time. This design was considered appropriate for identifying the prevalence and strength of the association between migraine severity and mood disorder symptoms without any therapeutic intervention.

Study Area: The study was carried out in the Department of Psychiatry, Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal, India.

Study Duration: The study was conducted over a period of one year.

Study Participants: The study included adult patients attending the Psychiatry Outpatient Department (OPD) who were clinically diagnosed with migraine and fulfilled the eligibility criteria. Patients were recruited consecutively during the study period after obtaining written informed consent.

Inclusion Criteria

- Adult patients aged 18–60 years.
- Patients diagnosed with migraine according to the International Classification of Headache Disorders, Third Edition (ICHD-3) criteria.
- Patients who were willing to participate and provided written informed consent.
- Patients who were able to understand and respond to the study questionnaires.
- Patients with both newly diagnosed and previously diagnosed migraine attending the Psychiatry Department."

Exclusion Criteria

- Patients with severe psychiatric illnesses such as schizophrenia, bipolar disorder, or psychotic disorders.
- Patients with secondary headache disorders or other significant neurological diseases.
- Patients with severe cognitive impairment or intellectual disability that interfered with assessment.
- Patients with serious medical illnesses affecting psychological evaluation, such as advanced malignancy or end-stage organ failure.
- Pregnant or lactating women.
- Patients who declined to participate or provided incomplete clinical information.

Sample Size: A total of 80 participants fulfilling the inclusion criteria were enrolled in the study using consecutive sampling.

Procedure: Eligible patients attending the Psychiatry Outpatient Department during the study period were screened for migraine based on the International Classification of Headache Disorders, Third Edition (ICHD-3) diagnostic criteria. After obtaining written informed consent, each participant underwent a detailed clinical interview conducted by trained psychiatrists. Baseline demographic characteristics, including age, sex, educational status, occupation, marital status, and socioeconomic background, were recorded using a structured case record form. Clinical information related to migraine, including duration of illness, frequency of headache episodes, presence or absence of aura, family history of migraine, associated symptoms, precipitating factors, and treatment history, was documented.

The severity and disability associated with migraine were assessed using the Migraine Disability Assessment Test (MIDAS). Symptoms of depression were evaluated using the Hamilton Depression Rating Scale (HAM-D), whereas anxiety symptoms were assessed using the Hamilton Anxiety Rating Scale (HAM-A). These standardized clinician-administered instruments ensured uniform assess-

ment of mood disorders among all participants. Each assessment session lasted approximately 30–45 minutes, and all evaluations were completed during a single outpatient visit. Confidentiality of patient information was maintained throughout the study by assigning unique identification numbers, and all collected data were recorded in predesigned case record forms before being entered into the study database for analysis.

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequency and percentage. Associations between categorical variables were analyzed using the Chi-square test or Fisher's exact test, as appropriate. Correlations between migraine severity (MIDAS score) and mood disorder scores (HAM-D and HAM-A) were assessed using Pearson's or Spearman's correlation coefficient. A multiple linear regression analysis was performed to identify independent predictors of migraine severity. A p-value < 0.05 was considered statistically significant."

Result

Table 1 presents the baseline demographic characteristics of the 80 study participants. The largest proportion of participants belonged to the 31–40 years age group (32.5%), followed by 18–30 years (27.5%), 41–50 years (22.5%), and 51–60 years (17.5%). Female participants constituted the majority of the study population (60%), while males accounted for 40%. Regarding marital status, most participants were married (61.3%), whereas 38.7% were unmarried. In terms of occupation, employed individuals represented the largest group (46.3%), followed by homemakers (26.2%), students (15%), and unemployed participants (12.5%), indicating a diverse demographic profile of the study population.

Table 1: Baseline Demographic Characteristics of the Study Participants (N = 80)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
18–30	22	27.5
31–40	26	32.5
41–50	18	22.5
51–60	14	17.5
Gender		
Male	32	40
Female	48	60
Marital Status		
Married	49	61.3
Unmarried	31	38.7
Occupation		
Employed	37	46.3

Homemaker	21	26.2
Student	12	15
Unemployed	10	12.5

Table 2 presents the clinical characteristics of migraine among the 80 study participants. Migraine without aura was the most common subtype, affecting 65% of participants, while 35% experienced migraine with aura. The majority of participants had a migraine duration of 2–5 years (42.5%), followed by more than 5 years (33.7%) and less than 2

years (23.8%). Regarding attack frequency, nearly half of the participants (47.5%) reported experiencing 4–8 migraine attacks per month, whereas 28.8% had fewer than 4 attacks and 23.7% experienced more than 8 attacks monthly. A family history of migraine was present in 36.3% of participants, while 63.7% reported no family history.”

Table 2: Clinical Characteristics of Migraine Among the Study Participants (N = 80)		
Clinical Variable	Frequency (n)	Percentage (%)
Type of Migraine		
Migraine without aura	52	65
Migraine with aura	28	35
Duration of Migraine		
<2 years	19	23.8
2–5 years	34	42.5
>5 years	27	33.7
Attack Frequency		
<4 attacks/month	23	28.8
4–8 attacks/month	38	47.5
>8 attacks/month	19	23.7
Family History of Migraine		
Present	29	36.3
Absent	51	63.7

“Table 3 presents the distribution of migraine disability and mood disorder scores among the 80 study participants. The mean MIDAS score was 21.8 ± 8.6 , indicating a moderate to severe level of migraine-related disability, while the mean HAM-D and HAM-A scores were 13.9 ± 5.4 and 15.7 ± 6.2 , respectively, reflecting the presence of depressive and anxiety symptoms. Based on severity categories,

nearly half of the participants (47.5%) had severe migraine disability, whereas 30% and 22.5% had moderate and mild disability, respectively. Moderate depression (46.2%) and moderate anxiety (48.7%) were the most common mood disorder categories, followed by severe depression and anxiety (27.5% each), highlighting a substantial psychological burden among migraine patients.

Table 3: Distribution of Migraine Disability and Mood Disorder Scores (N = 80)		
Variable	Mean $\pm$ SD	
MIDAS Score	21.8 ± 8.6	
HAM-D Score	13.9 ± 5.4	
HAM-A Score	15.7 ± 6.2	
Severity Category	Frequency (n)	Percentage (%)
MIDAS Grade		
Mild	18	22.5
Moderate	24	30
Severe	38	47.5
Depression (HAM-D)		
Mild	21	26.3
Moderate	37	46.2
Severe	22	27.5
Anxiety (HAM-A)		
Mild	19	23.8
Moderate	39	48.7
Severe	22	27.5

Table 4 demonstrates the correlation between migraine disability and mood disorder scores among the 80 study participants. A statistically significant positive correlation was observed between MIDAS and HAM-D scores ($r = 0.621$, $p < 0.001$), indicating that greater migraine-related disability was associated with higher levels of depressive symptoms. Similarly, MIDAS scores showed a signifi-

cant positive correlation with HAM-A scores ($r = 0.574$, $p < 0.001$), suggesting that increased migraine disability was related to greater anxiety severity. Furthermore, HAM-D and HAM-A scores exhibited the strongest positive correlation ($r = 0.688$, $p < 0.001$), highlighting the close association between depression and anxiety among patients with migraine."

Table 4: Correlation Between Migraine Disability and Mood Disorder Scores (N = 80)

Variables Compared	Correlation Coefficient (r)	p-value
MIDAS Score vs HAM-D Score	0.621	<0.001
MIDAS Score vs HAM-A Score	0.574	<0.001
HAM-D Score vs HAM-A Score	0.688	<0.001

"Table 5 presents the multiple linear regression analysis identifying predictors of migraine severity, as measured by the MIDAS score, among the 80 study participants. Age was not a significant predictor of migraine severity ($\beta = 0.07$, $p = 0.221$), while female gender showed a borderline but non-significant association ($\beta = 0.15$, $p = 0.054$). Duration of migraine emerged as a significant predictor

($\beta = 0.23$, $p = 0.012$), indicating that longer disease duration was associated with greater migraine-related disability. Both HAM-D score ($\beta = 0.41$, $p < 0.001$) and HAM-A score ($\beta = 0.24$, $p = 0.021$) were significant independent predictors, with depression demonstrating the strongest association with migraine severity.

Table 5: Multiple Linear Regression Analysis for Predictors of Migraine Severity (MIDAS Score) (N = 80)

Variable	Standardized β Coefficient	Standard Error	p-value
Age (years)	0.07	0.051	0.221
Female Gender	0.15	1.243	0.054
Duration of Migraine (years)	0.23	0.091	0.012
HAM-D Score	0.41	0.079	<0.001
HAM-A Score	0.24	0.076	0.021

Discussion

In the current study, a significant clinical link was found between migraine-related disability and mood disorders, with depression, anxiety, and longer duration of migraine all being independent risk factors for more severe migraine. The results of this study add to a growing body of evidence that migraine is a biopsychosocial condition, and that psychological factors significantly contribute to disease burden and patient outcome."

"The demographic profile of the present study showed the age group with the maximum population was 31-40 years (32.5%) and the female population (60%) was maximum. The results obtained are in line with the earlier studies showing that hormone-related and psychosocial factors are the key reasons for the predominance of migraine in females during their most productive life span (Antonaci et al., 2011; Minen et al., 2016) [10,11]. In a similar study, Rammohan et al. [12] found that the female gender predominated (67%) with a mean age similar to the present study (34.8 years). Similarly, in the population studied by Ligthart et al. (2013), [13] prevalence of migraine was found to be significantly higher in females and young-to-

middle-aged adults, confirming the common epidemiological patterns observed in our population.

Clinical features of the study showed that 65% of the population had migraine without aura, whereas almost half reported having 4-8 attacks of migraine per month, reflecting a population with frequent and clinically relevant migraine. A similar finding was described by Santangelo et al (2016) [14], who reported that almost 70% of patients in the neurological clinics were migraine without aura. Rammohan et al. (2019) also confirmed that most of the migraine patients had established disease with higher frequency of attacks per month, and longer duration of illness with significant functional disability. The results of these studies are consistent, indicating that chronicity of migraine is an important factor in exacerbating the neurological symptoms and psychological state of migraineurs.

The present study found an overall mean MIDAS score of 66.2 (moderate to severe) with 47.5% of participants having severe disability due to migraine. These findings are very similar to those of Abu Bakar et al., 2016 [15] who found that migraine significantly affects the occupational productivity, social relationship and quality of life, especially when the attacks occurred frequently.

Similarly, Rammohan et al. (2019) reported that about 45% of the migraine patients suffered from high disability (MIDAS score), which is close to 47.5% in the present study. Conversely, Buse et al. (2012) [16] found relatively lower rates of disability in patients attending headache clinics, perhaps due to the fact that they were patients being followed up regularly, and that headache treatment was optimized in their study, leading to fewer functional impairments.

The present study also revealed that moderate depression (35%) and moderate anxiety (33.8%) were the most frequent psychological categories, whereas 28.8% and 26.3% of patients had severe depression and severe anxiety, respectively. The results of this study are highly congruent with previous studies that have shown that mood disorders are common in patients with migraine. Rammohan et al. (2019) reported that about 52% of all migraine patients were depressed, and 49% were anxious; patients who had more headache disability had higher psychiatric scores. Likewise, Lee et al. (2017) [17] reported that when compared to patients without depression, patients who had depressive symptoms had impaired cognitive function, higher anxiety scores and lower QOL scores. In a systematic review of psychiatric comorbidities in migraine, Dresler et al. (2019) [18] found that depression and anxiety disorders were one of the most common comorbid disorders in migraine, with almost one third to one half of migraine patients experiencing these conditions. It is noteworthy that the prevalence was slightly lower than in the current study, which may be due to study setting, assessment scales and patient characteristics."

"The most important result of the present work was the strong positive correlation between the MIDAS disability scores and depression and anxiety scores. The psychological symptoms worsened with increasing migraine disability, and the strongest positive correlation was between depression and anxiety. Ligthart et al. (2013) also showed high correlation between migraine, depression, anxiety and chronic pain, pointing to common biological or genetic mechanisms of these disorders. In the same way, Minen et al. (2016) [19] demonstrated that psychiatric comorbidities appeared to exacerbate migraine frequency, disability, health care utilization and treatment resistance, thus supporting the bi-directional relationship found in the current study. Additionally, Dresler et al. (2019) highlighted that chronic migraine and mood disorders may be linked by common neurobiological pathways, including serotonergic dysfunction, dysfunction of the hypothalamic-pituitary-adrenal axis and altered pain processing.

In the present study, Multiple linear regression analysis showed that HAM-D score ($\beta = 0.41$, $p < 0.001$) was the most significant independent factor

for migraine disability, followed by HAM-A score ($\beta = 0.29$, $p = 0.004$) and duration of migraine ($\beta = 0.23$, $p = 0.012$); age was not significant. Similar results were found by Rammohan et al. (2019) who after controlling for demographic parameters, found that depression was the strongest factor associated with the disability of migraine. Likewise, Ligthart et al. (2013) found no age or sex differences in the relationship between anxiety, depressive disorders, and pain severity. However, Balaban et al. (2012) [20] found that among Turkish medical students, migraine was more strongly associated with post-traumatic stress symptoms than with depression alone, which indicates that psychosocial stressors may affect the psychological predictors of migraine.

In general, the results of the present study confirm the results of previous studies, showing that there is a strong link between migraine and mood disorders. Overall high levels of depression and anxiety, combined with their strong association with migraine disability, and their independent predictive power highlight the importance of assessing more than just the headache characteristics. Regular psychological assessment with a validated questionnaire (e.g., HAM-D and HAM-A) and prompt psychiatric referral, if needed, can help to facilitate early intervention, optimize adherence to therapy, reduce disability from migraine and ultimately improve quality of life for patients. The results of this study reinforce the concept of multimodality treatment with neurologists, psychiatrists, psychologists and primary care physicians, all working together to manage the neurological and psychological aspects of migraine.

Conclusion

The present study demonstrated a significant clinical correlation between migraine-related disability and mood disorders, highlighting the substantial psychological burden experienced by patients with migraine. Depression and anxiety were highly prevalent and showed strong positive associations with migraine disability, indicating that worsening psychological symptoms are accompanied by greater functional impairment. Longer duration of migraine, higher depression scores, and higher anxiety scores independently predicted increased migraine severity, with depression emerging as the strongest predictor. In contrast, age and gender were not significant determinants after adjustment. These findings emphasize that migraine should be managed as a multidimensional disorder requiring evaluation of both neurological and psychological factors. Routine screening for depression and anxiety using validated assessment tools, along with timely multidisciplinary intervention, may improve treatment outcomes, reduce migraine-related disability, enhance quality of life, and promote more

comprehensive, patient-centered care for individuals living with migraine.”

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