BMC Psychiatry

RESEARCH Open Access

Prevalence of migraine among adults with mood disorders: a Saudi cross-sectional study

Ahmad H. Almadani[1,2,3*], Ayedh H. Alghamdi[1,2,3], Abdulelah A. Bashandi[2], Badr M. Alqarni[2], Falwah S. Alsalman[4], Abdulrahman I. Binbakhit[5], Ziyad B. Alenazi[5], Elaaf A. Albadi[5], Noorah E. Alkhilaiwi[5], Yara A. Alfarraj[5], Abdullah K. Muhnna[5] and Mohammed A. Aljaffer[1,2,3]

Abstract

Background Migraine is characterized by recurrent headaches and frequently coexists with depressive and bipolar disorders, exacerbating disability and complicating management. Data on this association in Saudi Arabia remain limited, however.

Objectives This study aims to investigate how mood disorders and migraine occur together in the Saudi context and understand the extent of disability that migraine may cause in patients with mood disorders.

Methods A cross-sectional study was conducted involving adult patients with mood disorders at a tertiary hospital in Riyadh, Saudi Arabia. Participants were recruited through convenience sampling. The research instrument consisted of a questionnaire developed by the research team to assess sociodemographic factors, along with the Arabic version of the Migraine Screen Questionnaire (MS-Q) for migraine screening and the Arabic version of the Migraine Disability Assessment Scale (MIDAS) to quantify migraine-related disability.

Results A total of 206 participants were included, 10.68% of whom had a prior diagnosis of migraine and 20.87% screened positive for migraine on the MS-Q. The average MS-Q score was 1.48 ± 1.86 and MIDAS score 6.81 ± 19.3, indicating mild to moderate disability. Among those with migraine, 31.25% had severe migraine-related disability. The multivariate analysis identified female sex, psychiatric comorbidity, sleep quality, and family history of migraine as significant predictors for migraine. There was no correlation with age, income, employment status, snoring, or mood disorder type.

Conclusion The results confirm that migraine is a prevalent and disabling comorbidity among individuals with mood disorders, with female sex, family history of migraine, poor sleep quality, and psychiatric comorbidities increasing the risk of migraine. Thus, routine migraine screening in psychiatric settings may improve diagnosis, management, and patient outcomes.

Clinical trial number Not applicable.

Keywords Bipolar disorder, Depression, Disability, Migraine, Mood disorders, Saudi Arabia

*Correspondence:
Ahmad H. Almadani
ahalmadani@ksu.edu.sa

Full list of author information is available at the end of the article

Introduction

Migraine is a common and debilitating primary headache disorder with a substantial genetic component [1]. It is primarily a clinical diagnosis, established through history-taking and the exclusion of secondary causes of headache [1]. One of its standardized diagnostic criteria was established by the International Classification of Headache Disorders, 3rd Edition (ICHD-3), which identifies subtypes of migraine, including migraine with aura and migraine without aura, among others [2]. Migraine, as described by the ICHD-3, is characterized by recurrent episodes of moderate to severe headache pain that may persist for several hours to days, with the headache including two of the following features: unilateral, pulsating, moderate to severe pain, and leading to avoidance of routine physical activity [2].

Migraine is often accompanied by a wide range of neurological, gastrointestinal, and autonomic symptoms [3]. Gastrointestinal manifestations are commonly observed in patients and may include nausea, vomiting, abdominal cramps, and diarrhea [3]. Another prominent symptom of migraine is sensory hyperexcitability, which frequently manifests in photophobia (abnormal sensitivity to light), phonophobia (abnormal sensitivity to sound), and osmophobia (abnormal sensitivity to odors) [3]. Moreover, migraine can significantly affect the quality of life, productivity, and overall well-being of individuals [4].

Migraine continues to be a prevalent medical challenge, affecting approximately 15% of the general population worldwide [5]. Universally, the prevalence of migraine exhibits notable variations between the sexes, with a higher prevalence in females [5]. In Saudi Arabia, a 2023 systematic review and meta-analysis estimated the pooled prevalence of migraine in Saudi Arabia to be 22.6%, based on data from 36 studies [6]. In concordance with global observations, migraine prevalence in Saudi Arabia has been found to be significantly higher among females [6]. Migraine is considered the third leading cause of disability worldwide [7]. Hence, further development and implementation of effective prevention and management strategies to mitigate the increasing global burden associated with this disabling condition are needed [7].

Mood disorders, also known as affective disorders, are among the prevalent and significant mental health conditions [8]. They encompass depressive, bipolar, and other related conditions [8]. Major depressive disorder (MDD) and bipolar disorders have worldwide lifetime prevalences of 16% and 5%, respectively [9]. In a nationally representative sample of the Saudi population, MDD emerged as the third most common psychiatric disorder [10]. Consistent with global observations, the prevalence of MDD is higher among females than among males in Saudi Arabia [9, 10]. The lifetime prevalence rates of MDD in Saudi Arabia are 8.9% for females and 3.1% for males [10]. Compared to MDD, bipolar disorder exhibits a substantially lower prevalence rate in both males and females in Saudi Arabia [10]. The prevalence rate of bipolar disorder is 2.7% in females and 4.0% in males [10].

Both psychiatric and medical comorbidities are observed among individuals with mood disorders [9], with anxiety disorders being the most prevalent psychiatric comorbidity [9]. MDD is also frequently comorbid with various medical conditions, including obesity, hypertension, diabetes mellitus, rheumatologic disorders, immune-mediated dermatologic conditions, and cardiovascular disease [9]. Similarly, medical conditions such as asthma, type II diabetes mellitus, hypercholesterolemia, epilepsy, kidney disease, and thyroid disease are up to six times more prevalent in individuals with bipolar disorder than in healthy controls and those with MDD [11]. Of note, the presence of concurrent medical comorbidities is associated with an increased risk of suicide attempts and completions [9].

Migraine has been found to occur at higher rates in individuals with mood disorders than in the general population [12]. Epidemiological studies have further supported this association, revealing that individuals with migraine have a 50% increased risk of developing depression [13]. Conversely, individuals with depression have a 1.6 to 3.4-fold elevated risk of developing migraine [13]. Bipolar disorder and migraine are hypothesized to share a common pathophysiological mechanism [14]. In a population-based sample, individuals with migraine exhibit bipolar disorder at twice the rate of those without migraine [15]. In a systematic review of 11 studies, the weighted mean prevalence rates of migraine among individuals with bipolar I and bipolar II disorder were 21.1% and 41.7%, respectively [16]. Patients with both affective disorders and migraine experience greater disability, activity limitations, reduced quality of life, and increased use of mental health care compared to those with only one condition or neither [11, 15]. Furthermore, comorbidity with migraine may indicate a more difficult clinical trajectory for patients with bipolar disorder [16]. Such comorbidity manifests with greater psychosocial impairment, more frequent depressive episodes, and higher suicide rates [16]. In patients with MDD, the presence of migraine was found to significantly reduce scores on physical health measures and vitality in quality-of-life assessments [17].

The literature indicates a significant comorbidity between mood disorders and migraine [13, 14]. The bidirectional association between these disorders not only complicates the clinical management of patients with these disorders, but also highlights the need for integrated treatment approaches that address both migraine and mood symptoms concurrently [12, 14]. Research

addressing the topic in the Saudi context remains limited. Our study aims to provide valuable insights into these conditions, thereby contributing to understanding their interplay and potential implications for healthcare in the region.

Methods

Study design, setting, and participants

This quantitative cross-sectional study was conducted at King Khalid University Hospital (KKUH), a tertiary hospital in Riyadh, Saudi Arabia. The inclusion criteria included those aged 18–65 years who have particular mood disorders as per the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). More specifically, the inclusion criteria included those who are diagnosed with MDD, persistent depressive disorder, other specified and unspecified depressive disorders, bipolar I and II disorders, cyclothymic disorder, and other specified and unspecified bipolar and related disorders. The exclusion criteria included those who were younger than 18 or older than 65 years, those with any communication barriers, and those with secondary mood disorders (e.g., substance/medication-induced mood disorders, and mood disorders due to another medical condition). The exclusion criteria also included those with primary psychotic disorders (such as schizophrenia and schizoaffective disorder) and substance use disorders. To confirm participants' diagnoses and apply the inclusion and exclusion criteria, we reviewed the patients' medical charts, specifically the psychiatric notes.

The target population size was determined based on information from KKUH's Information Technology (IT) department. We then calculated our sample size using raosoft.com (http://www.raosoft.com/samplesize.html), based on the total number of individuals who met the inclusion and exclusion criteria, with a 5% margin of error and a 95% confidence level. The estimated calculated sample size was 285 patients. A total of 250 participants initially responded to the survey; however, the final number of participants was 206 due to missing data. Of the 250 eligible individuals contacted, 206 completed the survey, yielding a response rate of 82.4%.

After applying the inclusion and exclusion criteria, the research team created an Excel sheet containing all the eligible individuals. We then contacted potential participants in sequence using their phone numbers from their medical records. The potential participants who did not answer were replaced by the next eligible participant from the Excel sheet list until the targeted sample size was reached. As such, convenience sampling was used to recruit participants for this study. Of note, the data collection process was conducted independently of clinical visits. As elaborated earlier, all participants were diagnosed with a mood disorder and were actively followed in the psychiatry department at the time of data collection.

The research team distributed the study instrument to participants via an electronic survey between the end of December 2024 and April 2025. The study tool was sent to participants via WhatsApp/email after the research team contacted them by phone to explain the study and invite them to participate.

Study instruments

The study instrument included a questionnaire developed by the research team, the Arabic version of the Migraine Screen Questionnaire (MS-Q), and the Arabic version of the Migraine Disability Assessment Scale (MIDAS).

The research team developed a questionnaire to assess sociodemographic and related factors. The first section of the questionnaire collected data on patients' characteristics, such as age, gender, income status, and employment. The second section evaluated psychiatric-related characteristics, including diagnoses of mood disorders, the duration of such diagnoses, personal psychiatric history, the family history of psychiatric disorders, and current usage of psychiatric medications. The third section addressed sleep-related information, such as sleep duration and previous diagnoses of sleep disorders. The fourth section focused on migraine history, inquiring whether participants had been diagnosed with migraine, its duration, its impact on daily functioning, medication usage for migraine, adherence to treatment, and any family history of migraine headaches.

The MS-Q is a scale originally developed in English based on the criteria established by the International Headache Society for the screening of migraine [18]. This questionnaire comprises five questions that assess the frequency and characteristics of headaches, as well as the presence or absence of migraine-related symptoms [18]. Responses are scored such that each negative answer receives 0 points, while each positive answer receives 1 point [18]. A cutoff score of 4 points or higher indicates a suspicion of migraine, whereas a score below 4 indicates no suspicion of migraine [18]. The MS-Q demonstrated a sensitivity of 0.93, specificity of 0.81, positive predictive value (PPV) of 0.83, and negative predictive value (NPV) of 0.92 [18]. Additionally, its internal consistency was reflected by a Cronbach's alpha coefficient of 0.82 [18]. An Arabic version of this scale was developed, and a Saudi study was conducted to translate and validate the MS-Q [19]. The findings indicated strong potential for the Arabic version of the MS-Q scale in migraine screening. The Cronbach's alpha coefficient ranged from 0.81 to 0.83 [19]. The Pearson correlation coefficient demonstrated a high intraclass correlation [19]. Receiver operating characteristic (ROC) curve analysis comparing the

MS-Q and ICHD-3 scores revealed an area under the curve (AUC) of 0.97, with a sensitivity of 0.95 and specificity of 0.99 [19]. Permission to use the Arabic version of the MS-Q in this study was obtained from its authors.

The MIDAS is a scale used to assess disability resulting from migraine headaches [20]. It is a brief, self-administered questionnaire comprising five questions across three dimensions [20]. Questions 1 and 2 evaluate the number of days missed or days with significant impairment (defined as at least a 50% reduction in productivity) in school or work activities (school/job dimension) [20]. Questions 3 and 4 assess missed days or significant impairment in housework activities (housework dimension), while question 5 addresses missed days in family, social, or leisure activities (social dimension) [20]. The cumulative responses to these five questions yield the MIDAS score [20]. Additionally, two supplemental questions regarding headache frequency and average pain intensity (rated on a scale from 0 to 10) enhance its clinical utility but are not included in the final MIDAS score [20]. The total MIDAS score can be categorized into four disability grades: Grade I (little or no disability, score 0–5), Grade II (mild disability, score 6–10), Grade III (moderate disability, score 11–20), and Grade IV (severe disability, score ≥ 21) [20]. An international study involving American and British patients conducted before the introduction of the MIDAS scale assessed its reliability and yielded promising results [21]. Test–retest Spearman correlations for individual items ranged from 0.46 to 0.78, with no significant differences in item-specific correlations between the United States and the United Kingdom [21]. The test–retest Pearson correlation for the overall MIDAS score (the sum of lost days and days with reduced effectiveness in each domain) was 0.80 in the United States and 0.83 in the United Kingdom [21]. Additionally, Cronbach's alpha, indicating internal consistency, was 0.76 in the United States and 0.73 in the United Kingdom [21]. An Arabic version of the MIDAS scale was developed, and a study was conducted among Lebanese patients with migraine, aimed at translating, validating, and evaluating the reliability of this version [22]. The study involved 44 participants who completed the scale on two separate occasions to assess test–retest reproducibility [22]. Internal consistency was evaluated using Cronbach's alpha, which yielded excellent overall consistency for the scale, with alpha coefficients of 0.862 for the initial assessment and 0.957 for the retest [22]. Permission to use the Arabic version of the MIDAS in this study was obtained from its authors.

Confidentiality and ethical considerations

The study was approved by the Institutional Review Board (IRB) at the College of Medicine, King Saud University (research project no. E-24-9386, date of approval 19 December 2024). All participants in the study agreed to participate voluntarily. Participants were assured that all data collected would be strictly anonymous and confidential.

Statistical data analysis

R software version 4.4.0 (R Foundation for Statistical Computing, Vienna, Austria) was used to conduct statistical analyses. Cronbach's alpha coefficient was used to measure the internal consistency of the questionnaire scales, assessing their reliability; an alpha of 0.7 or higher was deemed satisfactory. The Shapiro test and visual examination of Quantile–Quantile(Q–Q) plots were used to assess the normality in continuous variables, which were displayed as mean ± standard deviation (*SD*) and median (IQR). Bivariate analysis was conducted using the Mann–Whitney test because the normality assumptions were unmet. Number (%) was used to represent categorical variables. The difference between proportions was assessed using Fisher's exact test, Freeman–Halton exact test, and chi-squared tests. Logistic regression analysis was used to determine the relationship between various factors and migraine. A statistically significant two-tailed *p*-value was less than 0.05.

Results

Of the 250 eligible individuals contacted, 206 completed the survey, yielding a response rate of 82.4%. Among our participants, the majority (68.45%, $n = 141$) were female. About a quarter of participants (23.30%) fell within the 56–65 years age group, and 21.84% fell within the 26–35 years age group. Nearly half of the participants (44.17%) were married. The income levels ranged from less than Saudi Riyals (SAR) 10,000 per month (65.53%) to more than SAR 25,000 (3.40%). It was also found that 57.77% of the participants were unemployed. Within the study population, 43.69% had chronic diseases, with diabetes being the most prevalent (24.27%, $n = 50$), followed by hypertension (19.42%, $n = 40$). Table 1 details the sociodemographic and clinical characteristics of the participants.

The study included 206 patients with mood disorders, of whom 77.18% had depressive disorder, while 22.82% had bipolar disorder. More than half of the participants (58.74%) had mood disorders with a duration of more than 5 years. It was found that 51 patients (24.76%) were diagnosed with psychiatric disorders other than mood disorders during their lifetime, and 40 of those 51 patients were diagnosed with anxiety disorders. Most (85.44%, $n = 176$) of the patients had taken regular psychiatric medications as prescribed, and 68.45% had taken antidepressant/antianxiety medications. It was found that two-thirds of patients (67.48%) were not admitted to the psychiatric ward; however, 23.30% of patients were admitted once or twice. Half of the participants (50%,

Table 1 Sociodemographic and clinical characteristics of the study participants

	Total *N* = 206
Age (years)	
18–25	39 (18.93%)
26–35	45 (21.84%)
36–45	33 (16.02%)
46–55	41 (19.90%)
56–65	48 (23.30%)
Gender	
Male	65 (31.55%)
Female	141 (68.45%)
Marital status	
Single	76 (36.89%)
Married	91 (44.17%)
Divorced	21 (10.19%)
Widower	18 (8.74%)
Monthly income	
<10,000	135 (65.53%)
10,000–25,000	64 (31.07%)
>25,000	7 (3.40%)
Employment status	
Unemployed	119 (57.77%)
Employed	64 (31.07%)
Retired	23 (11.17%)
Chronic diseases	90 (43.69%)
Type of chronic diseases (*n* = 90)[#]	
Diabetes	50 (24.27%)
Hypertension	40 (19.42%)
Bronchial asthma	12 (5.83%)
Dyslipidemia	9 (4.37%)
Thyroid disorders	12 (5.83%)
Others	34 (16.50%)

[#] More than one answer was allowed

n = 103) had a positive family history of psychiatric diseases; of them, 76 had a family history of mood disorder. About 8.74% encountered substance abuse, 52.43% reported a daily sleep of more than 6 h, and 42.72% reported sleeping without snoring. More than half of the participants (53.88%) were found to have good sleep quality, while 23.30% had poor sleep quality. Thirty-five (16.99%) had known sleep disorders such as insomnia and sleep apnea (Table 2).

Twenty-two participants were previously diagnosed to be migraine positive, showing a prevalence of 10.68%. Of the 22 participants with migraine, 10 (45.45%) had migraine with a duration of 1–5 years, and 10 (45.45%) had migraine with a duration of more than 5 years. Most of the previously diagnosed patients (81.81%, *n* = 18) had migraine that affected their daily activity, 14 (63.64%) patients had taken medication for migraine when needed, and five (22.73%) patients had taken preventive medication regularly. Of the five participants who had

Table 2 Mental health and sleep-related factors of the study participants

	Total *N* = 206
Mood disorder	
Bipolar disorder	47 (22.82%)
Depressive disorder	159 (77.18%)
Duration of mood disorder	
<1 year	13 (6.31%)
1–2 years	27 (13.11%)
2–5 years	45 (21.84%)
>5 years	121 (58.74%)
Associated psychiatric disorder	51 (24.76%)
Type of psychiatric disorder (*n* = 51)[#]	
Anxiety disorders	40 (19.42%)
PTSD	3 (1.46%)
OCD	12 (5.83%)
Other	10 (4.85%)
Regular psychiatric medication	176 (85.44%)
Type of psychiatric medication (*n* = 176)[#]	
Antidepressant/antianxiety medication	141 (68.45%)
Antipsychotic drugs	54 (26.21%)
Mood stabilizers	39 (18.93%)
Other	4 (1.94%)
Admitted to the psychiatric ward	
No	139 (67.48%)
1–2	48 (23.30%)
≥3	19 (9.22%)
Family history of psychiatric disorders	103 (50.00%)
Type of psychiatric disorder (*n* = 103)[#]	
Mood disorders	76 (36.89%)
Anxiety disorders	58 (28.16%)
Psychotic disorders	18 (8.74%)
Other	11 (5.34%)
Ever abused substances	18 (8.74%)
Average sleep hours	
<4	15 (7.28%)
4–6	83 (40.29%)
≥6	108 (52.43%)
Snoring while sleeping	
Yes	52 (25.24%)
No	88 (42.72%)
Not sure	66 (32.04%)
Sleep quality	
Excellent	47 (22.82%)
Good	111 (53.88%)
Poor	48 (23.30%)
Sleep disorders	35 (16.99%)
Type of sleep disorder (*n* = 35)[#]	
Insomnia	29 (14.08%)
Sleep apnea	8 (3.88%)
Other	2 (0.97%)

PTSD: post-traumatic stress disorder, OCD: obsessive-compulsive disorder

[#] More than one answer was allowed

taken preventive medication regularly, four were committed to preventive medicine. Additionally, 22.82% of all studied participants reported a family history of migraine (Table 3).

Table 4 displays the MS-Q and MIDAS results together with their interpretation. The MS-Q scale had good internal consistency, with a Cronbach's alpha of 0.88, and the MIDAS scale had acceptable internal consistency, with a Cronbach's alpha of 0.74. Participants' mean MS-Q and MIDAS scores were 1.48 ± 1.86 and 6.81 ± 19.3, respectively. A total of 206 study participants were assessed for migraine using MS-Q. Of them, 43 (20.87%) had a score of ≥4, suggesting a likely diagnosis of migraine. After sorting the results according to the disability found, the MIDAS revealed that 159 (77.18%) had little or no disability (Grade I), while 21 (10.19%) had severe disability (Grade IV) related to migraine.

Forty-eight patients were found to be migraine positive based on previous diagnosis or MS-Q (score ≥ 4), showing a prevalence of 23.3%. Table 5 shows the association of various sociodemographic and clinical factors with migraine by bivariate analysis. There was a statistically significant difference in the prevalence of migraine between males and females. Females were more common among patients with migraine, with 89.58% compared to 62.03% among patients with no migraine. There were no significant differences in the prevalence of migraine in relation to age, marital status, monthly income, employment status, and history of chronic diseases.

Table 6 shows the association of migraine with other factors. There was a significant association between the type of mood disorder and migraine. Most patients with migraine (89.58%) had depressive disorder, compared to three-quarters (73.42%) among patients with no migraine. Moreover, 39.58% of patients with migraine had psychiatric disorders, compared to 20.25% among patients with no migraine. Obsessive compulsive disorder (OCD) prevalence was 12.5% among patients with migraine, compared to 3.80% among patients with no migraine. The proportion of participants who reported sleeping 4–6 h was 47.92% among patients with migraine, compared to 37.97% among patients with no migraine, while the proportion who reported excellent sleep was 10.42% among patients with migraine, compared to 26.58% among patients with no migraine. Furthermore, 39.58% of patients with migraine had a positive family history of migraine, compared to 17.72% among patients with no migraine. A statistically significant difference was recorded in the MIDAS score (21.8 ± 31.5 among patients with migraine versus 2.27 ± 9.97 among patients with no migraine). Among the participants with migraine, 31.25% had severe disability related to migraine, and 31.25% had no or little disability. In contrast, patients who had no or little disability were more common (91.14%) among patients with no migraine. There were no significant differences in the frequency of migraine in relation to the remaining variables.

In the multivariate analysis, female participants had significantly higher odds of positive migraine (Odds Ratios [OR] = 5.53, 95% Confidence Interval [CI]: 2.08–17.28, $p < .001$) than males. Participants with psychiatric disorders other than mood disorders were significantly more likely to suffer from migraine than those with no psychiatric disorders (OR = 3.00, 95% CI: 1.31–7.09, $p = .009$). A positive family history of migraine significantly increased the risk of suffering from migraine, with an OR of 2.27 (95% CI = 1.02–5.09, $p = .045$). In contrast, participants with excellent sleep quality were associated with lower odds of migraine than those with poor sleep quality (OR = 0.26, 95% CI: 0.07–0.86, $p = .026$). No associations were found for age, monthly income,

Table 3 Migraine-related factors of the previously diagnosed study participants

	Total *N* = 206
Migraine	22 (10.68%)
Duration of migraine (*n* = 22)	
<1 year	2 (0.97%)
1–5 years	10 (4.85%)
>5 years	10 (4.85%)
Affects daily activities (*n* = 22)	
Yes	18 (8.74%)
No	4 (1.94%)
Medication for migraine (*n* = 22)	
When needed	14 (6.80%)
Regular preventive medication	4 (1.94%)
When needed + regular preventive medication	1 (0.49%)
No	3 (1.46%)
Committed to taking preventive medication (*n* = 5)	
Yes	4 (1.94%)
No	1 (0.49%)
Family history of migraine	47 (22.82%)

Table 4 Statistics of MS-Q and MIDAS

	Cronbach's alpha	**Mean ± SD, median (IQR)**	**Min–Max**	**Level of severity**	
MS-Q	0.88	1.48 ± 1.86, 0 (0–3)	0–5	No migraine	163 (79.13%)
				Migraine	43 (20.87%)
MIDAS	0.74	6.81 ± 19.3, 0 (0–3.75)	0–180	Grade I (0–5)	159 (77.18%)
				Grade II (6–10)	
				Grade III (11–20)	13 (6.31%)
				Grade IV (21+)	13 (6.31%) 21 (10.19%)

MS-Q: Migraine Screening—Questionnaire, MIDAS: Migraine Disability Assessment Questionnaire

Table 5 Relationship between migraine and participants' sociodemographic and clinical characteristics

	Migraine ***N*** **= 206**		**Test of significance**	***p*-value**
	No ***n*** **= 158**	**Yes** ***n*** **= 48**		
Age (years)			$\chi^2 = 4.45$	0.349
18–25	26 (16.46%)	13 (27.08%)		
26–35	37 (23.42%)	8 (16.67%)		
36–45	25 (15.82%)	8 (16.67%)		
46–55	30 (18.99%)	11 (22.92%)		
56–65	40 (25.32%)	8 (16.67%)		
Gender			$\chi^2 = 11.70$	**< 0.001***
Male	60 (37.97%)	5 (10.42%)		
Female	98 (62.03%)	43 (89.58%)		
Marital status			Freeman–Halton exact test	0.419
Single	54 (34.18%)	22 (45.83%)		
Married	71 (44.94%)	20 (41.67%)		
Divorced	17 (10.76%)	4 (8.33%)		
Widower	16 (10.13%)	2 (4.17%)		
Monthly income			Freeman–Halton exact test	0.350
<10,000	107 (67.72%)	28 (58.33%)		
10,000–25,000	45 (28.48%)	19 (39.58%)		
>25,000	6 (3.80%)	1 (2.08%)		
Employment status			$\chi^2 = 3.20$	0.202
Unemployed	90 (56.96%)	29 (60.42%)		
Employed	47 (29.75%)	17 (35.42%)		
Retired	21 (13.29%)	2 (4.17%)		
Chronic diseases	66 (41.77%)	24 (50.00%)	$\chi^2 = 0.71$	0.401

χ^2: chi-square test. * $p < .05$

employment status, snoring while sleeping, or type of mood disorder (Table 7).

Discussion

This study aims to determine the prevalence of migraine among adults with mood disorders and the degree of disability associated with it. Additionally, the study examines the clinical and demographic risk factors associated with migraine in this population. In light of the well-established bidirectional relationship between mood disorders and migraine [15], our results could provide clinicians with valuable insights, leading to more targeted interventions and ultimately enhancing the quality of life and care for patients with these comorbid conditions.

In our study, migraine was assessed through both previous clinical diagnosis (self-reported data) and the MS-Q. We found that the prevalence of previously diagnosed migraine was 10.68% of the study population. In contrast, the prevalence of migraine based on the MS-Q screening was roughly one in five participants (20.87%). Using the MS-Q tool, we identified nearly twice as many migraine cases as the clinical diagnosis. Our finding of a higher prevalence of migraine using the MS-Q is consistent with the findings of a study conducted in Europe among a random sample of adult patients in a primary care setting, which reported that migraine is often underdiagnosed when relying on clinical interviews without the use of screening tools [23, 24]. We hypothesize that the higher migraine detection when using the MS-Q in our study may be related to an underestimation of migraine symptoms among the psychiatric population, as clinical emphasis often prioritizes affective and cognitive domains, which may overshadow the recognition of physical symptoms, particularly headaches. In addition, in the DSM-5, the diagnostic criteria for mood disorders does not include headache or migraine, and so it is possible that these symptoms are underreported or neglected in clinical settings [25], making them underrecognized and inadequately addressed in psychiatric settings [25]. This highlights the value of using validated tools, such as the MS-Q, especially when treating high-risk groups such as psychiatric populations.

Furthermore, we found the prevalence of migraine to be 23.3%, according to both previous diagnosis and MS-Q screening (after removing the overlap). The prevalence of migraine in our study is consistent with a worldwide review that documented prevalence of 8% to 22%, with variations by country [26]. The highest rates were reported in Belgium and Italy (~ 22%), aligning with our findings; Ethiopia and Djibouti had the lowest prevalence

Table 6 Relationship between migraine and participants' other variables

	Migraine ***N*** **= 206**		**Test of significance**	***p*-value**
	No ***n*** **= 158**	**Yes** ***n*** **= 48**		
Mood disorder			$\chi^2 = 4.58$	**0.032***
Bipolar disorder	42.00 (26.58%)	5.00 (10.42%)		
Depressive disorder	116.00 (73.42%)	43.00 (89.58%)		
Duration of mood disorder			Freeman–Halton exact test	0.992
<1 year	10.00 (6.33%)	3.00 (6.25%)		
1–2 years	21.00 (13.29%)	6.00 (12.50%)		
2–5 years	34.00 (21.52%)	11.00 (22.92%)		
>5 years	93.00 (58.86%)	28.00 (58.33%)		
Associated psychiatric disorder	32.00 (20.25%)	19.00 (39.58%)	$\chi^2 = 6.38$	**0.011***
Type of psychiatric disorder				
Anxiety disorders	26.00 (16.46%)	14.00 (29.17%)	$\chi^2 = 3.03$	0.082
PTSD	2.00 (1.27%)	1.00 (2.08%)	Fisher's exact test	0.551
OCD	6.00 (3.80%)	6.00 (12.50%)	Fisher's exact test	**0.035***
Psychotic disorders	4.00 (2.53%)	2.00 (4.17%)	Fisher's exact test	0.661
Other	2.00 (1.27%)	2.00 (4.17%)	Fisher's exact test	0.292
Regular psychiatric medication	137.00 (86.71%)	39.00 (81.25%)	$\chi^2 = 0.50$	0.481
Admitted to the psychiatric ward			Freeman–Halton exact test	0.427
No	105.00 (66.46%)	34.00 (70.83%)		
1–2	36.00 (22.78%)	12.00 (25.00%)		
≥3	17.00 (10.76%)	2.00 (4.17%)		
Family history of psychiatric disorders	78.00 (49.37%)	25.00 (52.08%)	$\chi^2 = 0.03$	0.869
Ever abused substances	15.00 (9.49%)	3.00 (6.25%)	Fisher's exact test	0.770
Average sleep hours			Freeman–Halton exact test	**0.044***
<4 h	15.00 (9.49%)	0		
4–6 h	60.00 (37.97%)	23.00 (47.92%)		
≥ 6 h	83.00 (52.53%)	25.00 (52.08%)		
Snoring while sleeping			$\chi^2 = 2.69$	0.260
Yes	42.00 (26.58%)	10.00 (20.83%)		
No	70.00 (44.30%)	18.00 (37.50%)		
Not sure	46.00 (29.11%)	20.00 (41.67%)		
Sleep quality			$\chi^2 = 6.98$	**0.030***
Excellent	42 (26.58%)	5 (10.42%)		
Good	84 (53.16%)	27 (56.25%)		
Poor	32 (20.25%)	16 (33.33%)		
Sleep disorders	25 (15.82%)	10 (20.83%)	$\chi^2 = 0.35$	0.555
Family history of migraine	28.00 (17.72%)	19.00 (39.58%)	$\chi^2 = 8.79$	**0.003***
MIDAS score	2.27 ± 9.97 0 (0–0)	21.8 ± 31.5 11.5 (2.75–25.2)	U = 9.78	**< 0.001***
MIDAS			Freeman–Halton exact test	**< 0.001***
Grade I (Little or No Disability)	144 (91.14%)	15 (31.25%)		
Grade II (Mild Disability)	6 (3.80%)	7 (14.58%)		
Grade III (Moderate Disability)	2 (1.27%)	11 (22.92%)		
Grade IV (Severe Disability)	6 (3.80%)	15 (31.25%)		

PTSD: post-traumatic stress disorder, OCD: obsessive-compulsive disorder, MIDAS: Migraine Disability Assessment Questionnaire, χ^2: chi-square test, U: Mann–Whitney test. * $p < .05$

at ~ 8–9%, which was much lower than our finding [26]. Our results are also consistent with previous evidence from a national survey in Poland and a United States cohort study, with each reporting a robust bidirectional relationship between migraine and mood disorders [27, 28]. Locally, a meta-analysis of the Saudi population reported a pooled prevalence of migraine to be 22.6%, which is close to our findings [6]. Our finding of high migraine prevalence among patients with mood

Table 7 Predictors of migraine among the participants (logistic regression analysis)

	Multivariate		
	OR	95% CI	*p*-value
Age (years) (vs. 18–25)			
26–35	0.53	0.15–1.77	0.303
36–45	0.69	0.19–2.40	0.560
46–55	1.09	0.31–3.75	0.893
56–65	0.50	0.13–1.80	0.289
Gender (vs. male)			
Female	5.53	2.08–17.28	**<0.001***
Monthly income (vs. >25,000)			
<10,000	1.20	0.18–13.29	0.857
10,000–25,000	3.61	0.54–41.24	0.193
Employment status (vs. employed)			
Unemployed	0.93	0.36–2.46	0.885
Retired	0.44	0.06–2.33	0.343
Mood disorder (vs. bipolar disorder)			
Depressive disorder	2.67	0.97–8.66	0.058
Associated psychiatric disorder	3.00	1.31–7.09	**0.009***
Snoring while sleeping (vs. no)			
Yes	1.18	0.41–3.29	0.754
Not sure	1.49	0.63–3.58	0.361
Sleep quality (vs. poor)			
Excellent	0.26	0.07–0.86	**0.026***
Good	0.46	0.19–1.10	0.079
Family history of migraine	2.27	1.02–5.09	**0.045***

OR: odds ratio, CI: confidence interval, BMI: body mass index; * $p < .05$

disorders highlights the importance of early screening in these high-risk psychiatric populations.

We found several factors to be significantly associated with migraine. Our findings indicated that female participants had over five times the odds of having migraine than male participants. Our findings are highly consistent with global research demonstrating that the comorbidity of migraine with MDD and bipolar disorders is more prevalent in females [27–32]. Hormonal influences, genetic polymorphisms, different environmental stressors, and behavioral patterns could play a role in influencing females more than males [32]. As females with mood disorders are more prone to developing migraine [33, 34], healthcare providers should place particular emphasis on migraine in females with mood disorders and plan screening for migraine symptoms in this population, which can lead to quicker diagnosis and more targeted and effective care.

Our study also found that a family history of migraine among mood disorder patients significantly associated with increased risk of migraine. This result is consistent with a previous study conducted at the Research Centre for Mood Disorders of S. Raffaele Hospital in Milan, Italy, which concluded that a family history of mood disorders and migraine in first-degree relatives was significantly related to the risk for comorbidity between the two conditions [35]. The findings of our study and the previously cited study [35] align, supporting an association between migraine and mood disorders and suggesting a shared biological basis for the two conditions [36]. Based on these findings, we recommend early screening of migraine for individuals with a positive family history of migraine, because they might be at increased risk for its development. We also recommend early screening for individuals with a positive family history of psychiatric illness, due to the predisposed genetic association between migraine and psychiatric disorders [14, 15, 36].

Furthermore, independent of the primary mood disorder, participants with psychiatric comorbidities such as anxiety or OCD were three times more likely to have migraine than those without such comorbidities, with anxiety being the most prevalent. Our findings align with those of a study examining the relationship between migraine and anxiety, in which the study indicated that anxiety increases both the risk and severity of migraine [37]. The overlap between migraine and anxiety may be due to shared neural mechanisms, chronic stress, or sleep disturbances, as stress is a well-known trigger for both migraine and anxiety, and sleep problems can occur in both conditions [37]. Also, the previously mentioned European cohort study found that psychiatric comorbidities were prevalent among individuals with difficult-to-treat migraine [28]. These findings highlight how important it is to routinely check for psychiatric conditions, such as anxiety, in individuals with migraine, as this can help ease their overall symptoms and improve their quality of life.

Our study also revealed a strong association between sleep quality and migraine, where participants with excellent sleep quality were associated with lower odds of migraine than those with poor sleep quality. Our findings are supported by a review stating that poor sleep is both a trigger for migraine and a core symptom of mood disorders, which can lead to a vicious cycle exacerbating both conditions [38]. Our findings reflect the importance of addressing sleep problems when caring for people who have both mood disorders and migraine. Helping patients improve their sleep can be a key part of managing both migraine and mood disorders together in a more effective and supportive way [39, 40].

In our analysis, we found that certain sociodemographic variables such as monthly income, employment status, age, and marital status have no correlation with migraine. Our finding of no correlation between monthly income and migraine is inconsistent with findings from a Canadian study, which reported that individuals in the lowest and lower-middle income categories were more likely to have migraine and mood disorders than higher earners [41]. A possible explanation for this discrepancy between our findings and those of the Canadian study is

that most participants in our sample, about two-thirds, had monthly incomes below 10,000 SAR, minimizing the variation in socioeconomic status. Future Saudi studies should therefore investigate this relationship in a more income-diverse population to better assess whether financial stress contributes to migraine risk.

Another sociodemographic variable, employment status, also showed no significant correlation with migraine in our study. However, another study found that individuals suffering from migraine are more likely to be unemployed or to have retired early [42]. Furthermore, in the literature of psychiatric illnesses, particularly regarding MDD, it is well known that depression is associated with lower socioeconomic status and higher unemployment rates [43], whereas this association appears less consistent for bipolar disorders [44]. Thus, even though our results indicated no significant correlation between employment status and migraine, it is still important to examine this particular aspect in the psychiatric population.

A critical finding of our study is the association between migraine and functional disability. Nearly a third of the participants with migraine reported severe disability (Grade IV), compared to just 3.80% of non-migraine participants. Our findings align with other studies that show that migraine can significantly impair quality of life and lead to considerable disability in affected individuals [45]. Moreover, another study demonstrates that when migraine coexists with mood disorders, they can seriously limit a person's ability to function and reduce their overall quality of life [46]. Our results show that migraine is not just a side symptom but rather a major issue on its own that deserves focused clinical attention. Given that migraine significantly affects quality of life [45, 46], it is important to address its prevention and prophylaxis options. Several studies have examined these, including a narrative review by Pellesi et al. [47], which discussed traditional agents such as antihypertensives. Notably, the review emphasized that monotherapy is the first-line approach for prophylaxis, while combination treatments are considered when single therapies are insufficient [47]. Additionally, another study highlighted the importance of considering drug–drug interactions, such as those between antipsychotics and antihypertensives [48].

Our study has strengths and limitations. Strengthwise, we used validated and reliable screening tools, specifically the Arabic versions of MS-Q and MIDAS, adding credibility to our findings [19, 22]. Moreover, a notable strength of our study is the focus on the burden of migraine in a specific and a well-defined population, namely patients with a confirmed diagnosis of mood disorders. Furthermore, our study is among the few studies conducted in Saudi Arabia to address the prevalence of migraine among adults with mood disorders, contributing to addressing a research gap in the region. Nonetheless, another strength of our study is the high response rate, which reduces the likelihood of non-response bias.

Our study also has limitations. It is a cross-sectional study, which restricts the establishment of causality between identified risk factors and migraine. Future Saudi research could address this limitation by adopting a longitudinal study design to better assess the causal relationships. Additionally, recall bias might be another limitation of our study, as we relied on self-reported information for some variables. To minimize the risk of recall bias, researchers could consider conducting a prospective study design or use routinely collected clinical data. Furthermore, we conducted our study in a single tertiary hospital in Riyadh, which may influence the generalizability of our results. Future research should consider involving more than one center across various regions of Saudi Arabia to enhance the generalizability of the findings. Moreover, in relation to the variables we collected, we asked about the classes of psychotropic medications the participants were taking; however, we did not ask about the specific medications being taken. Thus, we did not conduct a detailed analysis regarding the possible association between specific psychotropic medications and migraine. Given the potential role of psychotropic medications in relieving or exacerbating migraine symptoms [49–51], it would be beneficial for future Saudi research to further investigate the association between psychotropic medication-related factors (such as specific classes, dosages, and treatment duration) and their association with migraine. Such research would provide valuable insight for optimizing treatment strategies for patients with co-occurring psychiatric disorders and migraine. It is also important to acknowledge that, although validated Arabic versions of the MS-Q and MIDAS were used, the research team did not conduct pilot testing or cultural adaptation of these scales prior to data collection. Future Saudi studies are hence encouraged to conduct pilot testing and linguistic adaptation of these tools to ensure full comprehension and cultural suitability within Saudi populations, noting that the MS-Q scale has been validated in the Saudi population [19]. Finally, some variables in our study, such as income, exhibited relatively wide CIs, which may reflect smaller subgroup sizes or unequal category distributions. This variability may have affected the precision of certain estimates and should therefore be interpreted with caution.

Conclusion

This study explored how common migraine is among adults with mood disorders and what might make it more likely to occur. A prevalence of migraine of 23.3% was found among our participants, based on both past

diagnosis and MS-Q screening (after removing the overlap). This figure reflects the importance of screening for migraine among individuals with mood disorders. Women in our study were more common among patients with migraine compared to patients without migraine. As such, we encourage psychiatrists to pay extra attention when female patients report headaches. Having a family history of migraine or a personal history of other comorbid psychiatric conditions also seemed to increase the chance of having migraine. As such, clinicians might find it useful to ask about these two elements when assessing patients. Sleep also played a role: fewer participants reported excellent sleep among patients with migraine than among those without migraine. Helping patients improve their sleep might ease both their headaches and their mood symptoms.

Several means could help in detecting and managing migraine in patients with mood disorders in Saudi Arabia. One way could be through using a validated scale, such as the MS-Q, while providing psychiatric care, especially for those at a higher risk for migraine, such as women or those with a family history of migraine. Encouraging a multidisciplinary team approach between psychiatrists and neurologists, especially when migraine is suspected, is another way. Nonetheless, educating patients on factors that could affect the likelihood of migraine, such as sleep habits and stress, is also valuable.

Acknowledgements
The authors extend their appreciation to the Deanship of Scientific Research, King Saud University, for funding through the Vice Deanship of Scientific Research Chairs; SABIC Psychological Health Research and Applications Chair (SPHRAC), Department of Psychiatry, College of Medicine, King Saud University, Riyadh, Saudi Arabia. The research team would like also to thank Lora A. Almusaeeb for her participation in data collection.

Author contributions
Study conceptualization, design, and methods: Ahmad H. Almadani, Ayedh H. Alghamdi, Abdulelah A. Bashandi, Badr M. Alqarni, Falwah S. Alsalman, Abdulrahman I. Binbakhit, Abdullah K. Muhnna, and Mohammed A. Aljaffer Data collection: Ziyad B. Alenazi, Elaaf A. Albadi, Noorah E. Alkhilaiwi, and Yara A. Alfarraj Data analysis and curation: Ahmad H. Almadani, Badr M. Alqarni, and Ayedh H. Alghamdi Writing initial draft of the manuscript: Ahmad H. Almadani, Badr M. Alqarni, Abdulelah A. Bashandi, Falwah S. Alsalman, Ziyad B. Alenazi, Elaaf A. Albadi, Noorah E. Alkhilaiwi, and Yara A. Alfarraj Critical revision of the manuscript: Ahmad H. Almadani, Ayedh H. Alghamdi, and Mohammed A. Aljaffer All authors read and approved the final version of the manuscript.

Funding
This research was funded by the Deanship of Scientific Research, King Saud University, through the Vice Deanship of Scientific Research Chairs; SABIC Psychological Health Research and Applications Chair (SPHRAC), Department of Psychiatry, College of Medicine, King Saud University, Riyadh, Saudi Arabia. The funding source had no involvement in the study.

Data availability
The data of this study will be made available upon reasonable request directed to the corresponding author.

Declarations

Human ethics
This study was approved by the Institutional Review Board at the College of Medicine, King Saud University, Riyadh, Saudi Arabia (research project no. E-24-9386, approval date 19 December 2024), and was conducted in accordance with the Declaration of Helsinki.

Consent to participate
Informed consent to participate was obtained from all participants.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Psychiatry, College of Medicine, King Saud University, Riyadh, Saudi Arabia
[2]Department of Psychiatry, King Saud University Medical City, King Saud University, Riyadh, Saudi Arabia
[3]SABIC Psychological Health Research and Applications Chair, Department of Psychiatry, College of Medicine, King Saud University, Riyadh, Saudi Arabia
[4]College of Medicine, Alfaisal University, Riyadh, Saudi Arabia
[5]College of Medicine, King Saud University, Riyadh, Saudi Arabia

Received: 29 July 2025 / Accepted: 3 November 2025
Published online: 27 November 2025

References

1. Pescador Ruschel MA, De Jesus O, Migraine Headache. 2024 Jul 5. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2024 Jan–. PMID: 32809622.
2. Headache Classification Committee of the International Headache Society (IHS). The international classification of headache Disorders, 3rd edition (beta version). Cephalalgia. 2013;33(9):629–808. https://doi.org/10.1177/0333102413485658.
3. Polimetla A, Kakarlapudi SV, Bias, Suneetha A, Jahnavi Patibandla. Migraine: A review on its History, Symptoms, and its treatment. UPI J Pharm Med Health Sci. 2025:1–6. Published Online July 31.https://doi.org/10.37022/jpmhs.v8i2.133
4. Steinmetz JD, Katrin Maria Seeher, Schiess N, et al. Global, regional, and national burden of disorders affecting the nervous system, 1990–2021: a systematic analysis for the global burden of disease study 2021. Lancet Neurol. 2024;23(4). https://doi.org/10.1016/s1474-4422(24)00038-3.
5. Raggi A, Leonardi M, Arruda M, et al. Hallmarks of primary headache: part 1 – migraine. J Headache Pain. 2024;25(1). https://doi.org/10.1186/s10194-024-01889-x.
6. Albalawi MF, Alanazi WL, Albalawi HS, Alghannami SS, Albalawi AF. Prevalence of migraine headache in Saudi Arabia: A systematic review and Meta-Analysis. Cureus. 2023;15(4):e37560. https://doi.org/10.7759/cureus.37560. PMID: 37193445; PMCID: PMC10183147.
7. GBD 2021 Nervous System Disorders Collaborators. Global, regional, and National burden of disorders affecting the nervous system, 1990–2021: a systematic analysis for the global burden of disease study 2021. Lancet Neurol. 2024;23(4):344–81. https://doi.org/10.1016/S1474-4422(24)00038-3.
8. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Arlington (VA): American Psychiatric Association; 2013.
9. Rakofsky J, Rapaport M. Mood Disorders. Continuum (Minneap Minn). 2018;24(3, Behavioral neurology and psychiatry):804–827. https://doi.org/10.1212/CON.0000000000000604. PMID: 29851879.
10. AlTwaijri Y, Al-Subaie A, Al-Habeeb A. Saudi National Mental Health Survey Technical Report. Riyadh: King Salman Center for Disability Research. 2019.
11. Forty L, Ulanova A, Jones L, Jones I, Gordon-Smith K, Fraser C, Farmer A, McGuffin P, Lewis CM, Hosang GM, Rivera M, Craddock N. Comorbid medical illness in bipolar disorder. Br J Psychiatry. 2014;205(6):465–72. https://doi.org/10.1192/bjp.bp.114.152249. Epub 2014 Oct 30. PMID: 25359927; PMCID: PMC4248234.

12. Dresler T, Caratozzolo S, Guldolf K, Huhn JI, Loiacono C, Niiberg-Pikksööt T, Puma M, Sforza G, Tobia A, Ornello R, Serafini G, European Headache Federation School of Advanced Studies (EHF-SAS). Understanding the nature of psychiatric comorbidity in migraine: a systematic review focused on interactions and treatment implications. J Headache Pain. 2019;20(1):51. https://doi.org/10.1186/s10194-019-0988-x. PMID: 31072313; PMCID: PMC6734261.
13. Steffen A, Nübel J, Jacobi F, Bätzing J, Holstiege J. Mental and somatic comorbidity of depression: a comprehensive cross-sectional analysis of 202 diagnosis groups using German nationwide ambulatory claims data. BMC Psychiatry. 2020;20(1):142. https://doi.org/10.1186/s12888-020-02546-8. PMID: 32228541; PMCID: PMC7106695.
14. Minen MT, Begasse De Dhaem O, Van Kroon A, Powers S, Schwedt TJ, Lipton R, Silbersweig D. Migraine and its psychiatric comorbidities. J Neurol Neurosurg Psychiatry. 2016;87(7):741–9. https://doi.org/10.1136/jnnp-2015-312233. Epub 2016 Jan 5. PMID: 26733600.
15. Antonaci F, Nappi G, Galli F, Manzoni GC, Calabresi P, Costa A. Migraine and psychiatric comorbidity: a review of clinical findings. J Headache Pain. 2011;12(2):115–25. https://doi.org/10.1007/s10194-010-0282-4. Epub 2011 Jan 6. PMID: 21210177; PMCID: PMC3072482.
16. Leo RJ, Singh J. Migraine headache and bipolar disorder comorbidity: A systematic review of the literature and clinical implications. Scand J Pain. 2016;11:136–45. https://doi.org/10.1016/j.sjpain.2015.12.002. Epub 2016 Feb 23. PMID: 28850455.
17. Hung CI, Wang SJ, Yang CH, Liu CY. The impacts of migraine, anxiety disorders, and chronic depression on quality of life in psychiatric outpatients with major depressive disorder. J Psychosom Res. 2008;65(2):135 – 42. https://doi.org/10.1016/j.jpsychores.2008.04.011. PMID: 18655858.
18. Láinez MJ, Domínguez M, Rejas J, Palacios G, Arriaza E, Garcia-Garcia M, Madrigal M. Development and validation of the Migraine Screen Questionnaire (MS-Q). Headache. 2005 Nov-Dec;45(10):1328-38. https://doi.org/10.1111/j.1526-4610.2005.00265.x. PMID: 16324165.
19. Alaqeel AM, Alaqeel SS, Andijani AI, Demyati EA. Validity and reliability of an Arabic version of the migraine screen questionnaire in the primary care setting for identifying hidden migraine. IJMDC. 2021;5(3):906–10. https://doi.org/10.24911/IJMDC.51-1611922218.
20. Stewart WF, Lipton RB, Dowson AJ, Sawyer J. Development and testing of the Migraine Disability Assessment (MIDAS) Questionnaire to assess headache-related disability. Neurology. 2001;56(6 Suppl 1):S20-8. https://doi.org/10.1212/wnl.56.suppl_1.s20. PMID: 11294956.
21. Stewart WF, Lipton RB, Whyte J, Dowson A, Kolodner K, Liberman JN, Sawyer J. An international study to assess reliability of the Migraine Disability Assessment (MIDAS) score. Neurology. 1999;53(5):988 – 94. https://doi.org/10.1212/wnl.53.5.988. PMID: 10496257.
22. Mourad D, Hajj A, Hallit S, Ghossoub M, Khabbaz LR. Validation of the Arabic version of the migraine disability assessment scale among Lebanese patients with migraine. J Oral Facial Pain Headache. 2019 Winter;33(1):1:47–53. https://doi.org/10.11607/ofph.2102. Epub 2018 Aug 28. PMID: 30153314.
23. Ryvlin P, Skorobogatykh K, Negro A, Sanchez-De La Rosa R, Israel-Willner H, Sundal C, MacGregor EA, Guerrero AL. Current clinical practice in disabling and chronic migraine in the primary care setting: results from the European My-LIFE anamnesis survey. BMC Neurol. 2021;21(1):1. https://doi.org/10.1186/s12883-020-02014-6.
24. Manzar MD, Hameed UA, Salahuddin M, Khan MYA, Nureye D, Wakene W, Alamri M, Albougami A, PandiPerumal SR, Bahammam AS. Migraine screen questionnaire: further psychometric evidence from categorical data methods. Health Qual Life Outcomes. 2020;18(1):113. https://doi.org/10.1186/s12955-020-01361-9.
25. Pompili M. Headache and psychopathology: DSM-V vs ICHD-3β vs ICD10. J Headache Pain. 2015;16(Suppl 1). https://doi.org/10.1186/1129-2377-16-S1-A41. A41.
26. Amiri P, Kazeminasab S, Nejadghaderi SA, Mohammadinasab R, Pourfathi H, Araj-Khodaei M, Sullman MJM, Kolahi AA, Safiri S. Migraine: A review on its History, global Epidemiology, risk Factors, and comorbidities. Front Neurol. 2022;12:800605. https://doi.org/10.3389/fneur.2021.800605.
27. Waliszewska-Prosół M, Straburzyński M, Czapińska-Ciepiela EK, Nowaczewska M, Gryglas-Dworak A, Budrewicz S. Migraine symptoms, healthcare resources utilization and disease burden in a large Polish migraine cohort: results from migraine in Poland-a nationwide cross-sectional survey. J Headache Pain. 2023;24(1):40. https://doi.org/10.1186/s10194-023-01575-4.
28. Rosignoli C, Ornello R, Caponnetto V, et al. Resistant and refractory migraine – two different entities with different comorbidities? Results from the REFINE study. J Headache Pain. 2024;25(1). https://doi.org/10.1186/s10194-024-01910-3.
29. Gordon-Smith K, Forty L, Chan C, Knott S, Jones I, Craddock N, Jones L. Rapid cycling as a feature of bipolar disorder and comorbid migraine. J Affect Disord. 2015;175:320–4. https://doi.org/10.1016/j.jad.2015.01.024.
30. Fugger G, Dold M, Bartova L, Mitschek MMM, Souery D, Mendlewicz J, Serretti A, Zohar J, Montgomery S, Fabbri C, Frey R, Kasper S. Clinical correlates and outcome of major depressive disorder and comorbid migraine: A report of the European group for the study of resistant depression. Int J Neuropsychopharmacol. 2020;23(9):571–7. https://doi.org/10.1093/ijnp/pyaa035.
31. Babateen O, Althobaiti FS, Alhazmi MA, Al-Ghamdi E, Alharbi F, Moffareh AK, Matar FM, Tawakul A, Samkari JA. Association of migraine headache with depression, anxiety, and stress in the population of Makkah City, Saudi arabia: a Cross-Sectional study. Cureus. 2023. https://doi.org/10.7759/cureus.39788.
32. Rossi MF, Tumminello A, Marconi M, Gualano MR, Santoro PE, Malorni W, Moscato U. Sex and gender differences in migraines: a narrative review. Neurol Sciences: Official J Italian Neurol Soc Italian Soc Clin Neurophysiol. 2022;43(9):5729–34. https://doi.org/10.1007/s10072-022-06178-6.
33. Jayalakshmi S, Vooturi S. Migraine and mood disorders: Prevalence, clinical Correlations, and disability. J Neurosciences Rural Pract. 2019;10(1):1–2. https://doi.org/10.4103/jnrp.jnrp_323_18.
34. Leo RJ, Singh J. Migraine headache and bipolar disorder comorbidity: A systematic review of the literature and clinical implications. Scandinavian J Pain. 2016;11(1):136–45. https://doi.org/10.1016/j.sjpain.2015.12.002.
35. Franchini L. Migraine headache and mood disorders: a descriptive study in an outpatient psychiatric population. J Affect Disord. 2003;81(2):157–60. https://doi.org/10.1016/s0165-0327(03)00164-2.
36. Pelzer N, de Boer I, van den Maagdenberg AMJM, Terwindt GM. Neurological and psychiatric comorbidities of migraine: concepts and future perspectives. Cephalalgia. 2023;43(6). https://doi.org/10.1177/03331024231180564.
37. Raudenská J, Macko T, Vodičková Š, Buse DC, Javůrková A. Anxiety Disorders, anxious symptomology and related behaviors associated with migraine: A narrative review of prevalence and impact. Curr Pain Headache Rep. 2025;29(1):1–2.
38. Vgontzas A, Pavlović JM. Sleep disorders and migraine: review of literature and potential pathophysiology mechanisms. Headache J Head Face Pain. 2018;58(7):1030–9. https://doi.org/10.1111/head.13358.
39. Duan J, Yang R, Lu W, Zhao L, Hu S, Hu C. Comorbid bipolar disorder and migraine: from mechanisms to treatment. Front Psychiatry. 2021;11:560138. https://doi.org/10.3389/fpsyt.2020.560138.
40. Vgontzas A, Cui L, Merikangas KR. Are sleep difficulties associated with migraine attributable to anxiety and depression? Headache. 2008;48(10):1451–9. https://doi.org/10.1111/j.1526-4610.2008.01175.x.
41. Jette N, Patten S, Williams J, Becker W, Wiebe S. Comorbidity of migraine and psychiatric Disorders—A National Population-Based study. Headache J Head Face Pain. 2008;48(4):501–16. https://doi.org/10.1111/j.1526-4610.2007.00993.x.
42. Shapiro RE, Martin AA, Bhardwaj S, Thomson H, Maculaitis MC, Anderson C, Kymes SM. Relationships between headache frequency, disability, and disability-related unemployment among adults with migraine. J Managed Care Specialty Pharm. 2023;29(2):197–209. https://doi.org/10.18553/jmcp.2023.29.2.197.
43. Lorant V. Socioeconomic inequalities in depression: A Meta-Analysis. Am J Epidemiol. 2003;157(2):98–112. https://doi.org/10.1093/aje/kwf182.
44. Eid L, Heim K, Doucette S, McCloskey S, Duffy A, Grof P. Bipolar disorder and socioeconomic status: what is the nature of this relationship? Int J Bipolar Disorders. 2013;1(1). https://doi.org/10.1186/2194-7511-1-9.
45. R P, C, N. S., S, H., K R. Migraine Disability, quality of life, and its predictors. Annals Neurosciences. 2020;27(1):18–23. https://doi.org/10.1177/0972753120929563.
46. Lipton RB, Seng EK, Chu MK, Reed ML, Fanning KM, Adams AM, Buse DC. The effect of psychiatric comorbidities on headache-related disability in migraine: results from the Chronic Migraine Epidemiology and Outcomes (CaMEO) study. Headache: J Head Face Pain. 2020;60(8):1683-96.
47. Pellesi L, Garcia-Azorin D, Rubio-Beltrán E, et al. Combining treatments for migraine prophylaxis: the state-of-the-art. J Headache Pain. 2024;25(1). https://doi.org/10.1186/s10194-024-01925-w.
48. Buzea CA, Dima L, Correll CU, Manu P. Drug–drug interactions involving antipsychotics and antihypertensives. Expert Opin Drug Metab Toxicol. 2022;18(4):285–98. https://doi.org/10.1080/17425255.2022.2086121.

49. Cascade E, Kalali AH, Smitherman TA. Treatment of migraine and the role of psychiatric medications. Psychiatry (Edgmont (Pa: Township)). 2008;5(10):20–2.
50. Sai Ganesh M. Novel strategies for acute relief and prevention of migraine. J Clin Pharm Res. 2024;4(2):1–3. https://doi.org/10.61427/jcpr.v4.i2.2024.125.
51. Palmer EC, Shuman MD, Oiler IG. Pharmacokinetic and pharmacodynamic considerations with psychiatric disorders and migraines. Mental Health Clinician. 2024;14(3):195–8. https://doi.org/10.9740/mhc.2024.06.195.

Publisher's note