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Original Research Article

Prescribing pattern and quality of life in patients with migraine at a tertiary care teaching hospital

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ABSTRACT

Background: Migraine, a prevalent and disabling neurological disorder, affects over a billion people globally, with a significant impact in India. Despite effective treatments, poor adherence and limited data on drug use and quality of life persist, especially in developing nations. Understanding these patterns is crucial for enhancing patient care, optimizing healthcare resources, and reducing the socioeconomic burden of migraine.
Methods: This one-year prospective observational study was conducted at Shree Krishna Hospital, Gujarat, following ethical clearance. A total of 150 migraine patients diagnosed according to the ICHD-3 (International Classification of Headache Disorders, 3rd Edition) were enrolled. Data on demographics, treatment, and quality of life (via MIDAS [Migraine Disability Assessment] and MIBS-4 [Migraine Interictal Burden Scale]) were collected. Statistical analysis was conducted using STATA 14.2. Informed consent ensured participant confidentiality and adherence to research standards.
Results: Among 150 migraine patients (74.7% female), most had low-frequency episodic migraine with moderate throbbing pain. NSAIDs (mainly naproxen) and TCAs (mainly amitriptyline) were widely used. MIDAS showed 11.3% had severe disability; MIBS-4 revealed 24% experienced severe interictal burden. Sleep disturbance, stress, and anxiety were common triggers, highlighting migraine's multifactorial impact on daily routine affecting quality of life.
Conclusions: Although triptans have proven efficacy as acute treatment, their utilization remains limited. Quality of life assessments using MIDAS and MIBS-4 revealed significant disability, underscoring the need for enhanced management strategies targeting associated psychological conditions such as anxiety and depression. Optimizing prescription practices, improving patient education, and incorporating lifestyle modifications are crucial for effective long-term migraine management. These interventions promise improved patient outcomes.

Keywords: Migraine, Quality of life, MIDAS, MIBS-4, Prescription pattern

INTRODUCTION

Migraine is a highly prevalent and disabling neurological disorder that imposes a significant burden on affected individuals and society as a whole. The severe headaches that occur repeatedly are characterized by autonomic symptoms, including nausea, vomiting, sensitivity to light, and sensitivity to sound.[1] Approximately 1.1 billion people worldwide are suffering from migraines.[2] It is classified as the second leading cause of disability worldwide in terms of disability-adjusted life years (DALYs).[3] More than 488 million people in India experienced headache disorders like migraine in 2019, rendering it the most prevalent neurological issue for that period.[4] Apart from personal hardship, migraines place a significant strain on society due to the expenses involved in healthcare and decreased productivity.[3] Women have a greater likelihood of being impacted, with a prevalence rate of 18% compared to just 6% in men.[4]

The hallmark of migraines is the pulsing, drilling, or hammering pain that can be moderate to severe in intensity and lasts for 4-72 hours, usually found on one side of the head.[5] Symptoms commonly linked to it include nausea, vomiting, sensitivity to light and sound, and early warning signs like excessive yawning, trouble focusing on words, sudden hunger or loss of appetite, and shifts in mood.[5] Quality of life is significantly affected by migraine, impacting daily functions, work productivity, social relationships, and well-being in general.[6] Individuals with migraine often experience greater emotional distress and disturbed vitality and sleep, even between attacks.[6] The burden of migraine extends beyond the individual, affecting productivity and imposing significant economic costs on society.[3]

The management of migraine includes both acute and prophylactic pharmacological approaches. During an attack, acute treatments are focused on alleviating symptoms, while prophylactic therapies aim to decrease the occurrence, length, and intensity of migraine episodes.[5] In developed countries such as Germany, Japan, and Finland, acute treatments (like NSAIDs and triptans) are most commonly prescribed, with preventive medications used less frequently. Analgesics and NSAIDs were the most common acute prescriptions, while triptans were used less frequently.[7-9] In developed countries, migraine treatment often involves a wider range of medications, including triptans and newer CGRP inhibitors, while developing countries may rely more on older, more established drugs like NSAIDs and beta-blockers, with limited access to newer, more expensive therapies. Triptan use for acute migraine is increasing globally due to proven efficacy, but overall prescription remains low, indicating underutilization. Barriers such as cost, safety concerns, and limited awareness-especially among general practitioners-continue to restrict broader adoption.[10-12] Despite the availability of effective treatments, adherence to prescribed medications remains a significant challenge.

Despite the significant burden of migraine, there is a paucity of research on drug utilization patterns and quality of life in developing countries, including India.[6] These patterns must be understood to optimize healthcare resources and improve patient outcomes effectively.

Objectives

Primary objective

Primary objective was to evaluate prescription patterns and assess the quality of life using MIDAS and MIBS-4.[6]

Secondary objective

Secondary objective was exploring triggers, comorbidities, and associations with mental health conditions.

METHODS

Study design and setting

This prospective observational study was conducted over one year (from December 2023 to November 2024) at the Headache Disorders Clinic of the Neurology Outpatient Department (OPD) of Shree Krishna Hospital and Medical Research Centre, Karamsad, Anand, Gujarat, India.

Selection of participants

Patients at the neurology OPD of Shree Krishna Hospital, Karamsad, Anand, Gujarat, diagnosed with migraine per International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria by a qualified neurologist, including those with migraine without aura, migraine with aura, and chronic headache disorder, were eligible. Exclusion criteria included epilepsy, space-occupying lesions, neurodegenerative or systemic disorders, substance abuse, and pregnancy.

Data collection and processing

Following STROBE guidelines, a systematic recruitment process was conducted from December 2023 to November 2024. Of the 210 migraine patients approached at the neurology OPD of Shree Krishna Hospital, 185 met eligibility criteria, and 150 provided informed consent. The sample size was calculated to assess adherence to prophylactic medication, assuming a 70% adherence rate (based on previous studies), ±7% precision, and a 95% confidence level.

Method of measurements

Data collection was carried out through personal and telephonic interviews, case record forms, and electronic medical records (EMR). Eligible patients or their relatives have been informed about the purpose and nature of the research study, and verbal informed consent was obtained in the native language of the patient. Data collection was conducted from December 2023 to November 2024.

Demographic and clinical data

Demographic details of patients, such as age, gender, and diagnosis, were recorded from the case file of Solace. Details of headache such as duration of migraine disease, Type of headache (Episodic/Constant/Daily persistent), Frequency of headache (no. of headache episode in one month), Location, Severity (Mild: 1-4- bothers but not affect ADL, no painkiller required; Moderate: 5-7-affect ADL, painkiller required; Severe: 8-10- to hospital/injection), Type of pain, Associated problems, Associated anxiety/depression problems, family history and trigger factors for headache were recorded.

Drug treatment-related data

Details of migraine treatment were also recorded, including abortive drug therapy, prophylactic drug therapy, and other medications. The number of drugs, brand name, generic name, route of administration, frequency, and number of fixed-dose combinations (FDC) for abortive treatment, prophylactic treatment, and other medications were documented.

Quality of life-related data

Quality of life was assessed using the Migraine Disability Assessment (MIDAS) questionnaire to evaluate ictal functional impairment and the Migraine Interictal Burden Scale (MIBS-4) to assess the interictal burden of migraine. MIDAS categorized disability into four grades: Grade I (0-5, little or no disability), Grade II (6-10, mild disability), Grade III (11-20, moderate disability), and Grade IV (21+, severe disability). Similarly, MIBS-4 classified interictal burden as 0 (no burden), 1-2 (mild burden), 3-4 (moderate burden), and ≥5 (severe burden).[13] Both assessments were conducted through structured interviews and recorded three months (±7 days) after participant recruitment.

Statistical analysis

Data were entered into Microsoft Excel 2021 and analyzed using STATA 14.2 software. Descriptive statistics in terms of frequency counts and percentages were used for variables such as demographic details, migraine-related details, Quality of life assessment, and prescription pattern.

Ethical considerations

Informed written consent was obtained from all participants before enrolment. The study was approved by the Institutional Ethics Committee (IEC-II) of Bhaikaka University, Karamsad, with approval number IEC/BU/148/Faculty/13/367/2023. Confidentiality of all participants was maintained throughout the study.

RESULTS

Out of 150 participants, the majority were female (74.7%), and the age group was 21-40 years (48.8%). Most participants (70.7%) had a history of migraine for 1-5 years, while 10.7% had been experiencing migraines for over five years. A positive family history of migraine was reported in 10% of cases.

Low-frequency episodic migraine (LFEM) [<4 migraine attacks/ month] was the most prevalent type, affecting 86 % of participants, whereas chronic migraine (CM) [≥15 migraine attacks/ month] accounted for 4.67% of cases. The duration of migraine episodes ranged between 4-72 hours in 82% of participants. Moderate pain severity (75.3%) was most commonly reported, with throbbing headaches (82%) being the predominant pain characteristic (Table 1).

Table 1: Migraine characteristics and clinical profile of study participants (n=150).

Migraine-related details		Percentage (N)
History of migraine	<1year	18.7 (28)
	1 - 5 years	70.7 (106)
	More than 5 years	10.7 (16)
Family history	Positive	10.0 (15)
	Negative	90.0 (135)
Type of migraine	Low-frequency episodic migraine	86.0 (129)
	Medium-frequency episodic migraine	8.0 (12)
	High-frequency episodic migraine	1.3 (2)
	Chronic Migraine	4.7 (7)
Duration of each episode	0-4 hours	18.0 (27)
	4-72 hours	82.0 (123)
Severity of pain	Mild	24.7 (37)
	Moderate	75.3 (113)
	Severe	0.0 (0)
Type of headache	Throbbing	82.0 (123)
	Pulsatile	53.3 (80)
	Dull aching	18.0 (27)

A total of 56% of participants experienced unilateral headaches, while 44% reported bilateral involvement. The frontal (41.3%) and temporal (40.67%) regions were the most frequently affected sites. The most commonly reported associated symptoms included nausea (54%), vomiting (48%), photophobia (30%), and phonophobia (26.7%). Among comorbidities, anxiety (31.3%) and dysthymia (22.7%) were the most prevalent.

Lifestyle-related triggers were frequently implicated, with sleep disturbances (92%), emotional stress (85%), fasting habits (78%), and sun exposure (76.7%) being the most commonly reported. Among dietary triggers, Chinese food (MSG) (6%), citrus fruits (5%), and fast food (4%) were notable contributors. These findings underscore the multifaceted nature of migraine, emphasizing the significant role of individual triggers and comorbidities in disease manifestation.

Abortive therapy was predominantly managed with NSAIDs, with naproxen (73.33%) being the most frequently prescribed agent. Triptan usage was minimal, with rizatriptan (0.67%) being the only reported agent. The 5-HT1F receptor agonist, lasmiditan (3.33%), was prescribed in a limited number of cases, reflecting its emerging role in migraine management. Fixed-dose combinations (FDCs) were extensively utilized, with pantoprazole + domperidone (66.67%) being the most frequently prescribed Proton pump inhibitors (PPIs).

Table 2: Prescription patterns in migraine patients: abortive and prophylactic drug (n=150).

Drug class	Drugs	Percentage (N)	Total %
Abortive drugs			
NSAIDs*	Naproxen	73.3 (110)	82
	Etoricoxib	1.3 (2)	
	Paracetamol	2.7 (4)	
	Diclofenac + Paracetamol	4.0 (6)	
Triptans	Rizatriptan	0.7 (1)	0.67
5-HT1F receptor agonist	Lasmiditan	3.3 (5)	3.33
Proton pump inhibitors	Omeprazole / Pantoprazole	7.3 (11)	7.33
FDC†	Pantoprazole + Domperidone	66.7 (100)	80
	Naproxen + Domperidone	8.7 (13)	
	Sumatriptan + Naproxen	0.7 (1)	
	Diclofenac + Paracetamol	4.0 (6)	
Prophylactic drugs			
TCAs‖	Amitriptyline	56.7 (85)	77.34
	Prothiaden	20.7 (31)	
SSRIs§	Escitalopram	8.0 (12)	8
SNRIs**	Duloxetine	1.3 (2)	6
	Desvenlafaxine	4.7 (7)	
GABA analogues	Gabapentin	11.3 (17)	11.33
Benzodiazepines	Clonazepam	6.0 (9)	6
Calcium channel blockers	Amlodipine	0.7 (1)	0.67
Other drugs			
FDC*	Methyl cobalamin + Folic Acid	34.7 (52)	34.67
	Betahistine	2.0 (3)	2

*NSAIDs: non-steroidal anti-inflammatory drugs; † FDC: fixed dose combinations; ‖ TCAs: tricyclic anti-depressants; § SSRIs: selective serotonin reuptake inhibitors; **SNRIs: selective norepinephrine reuptake inhibitors.

Table 3: Migraine frequency and associated ictal and interictal burden (MIDAS and MIBS-4 scores).

Variables	Migraine frequency				
	LFEM* (Total=129)	MFEM † (Total=12)	HFEM‖ (Total=2)	CM§ (Total=7)	Total (150)
	% (N)	% (N)	% (N)	% (N)	% (N)
Disability MIDAS grade**					
Grade 1: little or no disability	39.5 (51)	33.3 (4)	50.0 (1)	42.9 (3)	39.3 (59)
Grade 2: Mild disability	21.7 (28)	25.0 (3)	0 (0)	28.6 (2)	22.0 (33)
Grade 3: Moderate disability	27.9 (36)	25.0 (3)	50.0 (2)	14.3 (1)	27.3 (41)
Grade 4: Severe disability	10.9 (14)	16.7 (2)	0 (0)	14.3 (1)	11.3 (17)
Mean (SD): 9.89 ± 9.32					
Disability MIBS 4†† Categories					
None (0)	62 (80)	41.7 (5)	50.0 (1)	42.9 (3)	59.3 (89)
Mild (1-2)	3.9 (5)	8.3 (1)	0 (0)	14.3 (1)	4.7 (7)
Moderate (3-4)	13.2 (17)	8.3 (1)	0 (1)	0 (0)	12.0 (18)
Severe (5+)	20.9 (27)	41.7 (5)	50.0 (0)	42.9 (3)	24.0 (36)
Mean (SD): 2.37 ± 3.41					

* LFEM: Low Frequency Episodic Migraine (<4 Migraine attack/ Month); † MFEM: Medium Frequency Episodic Migraine (5-9 Migraine attack/ Month); ‖ HFEM: High Frequency Episodic Migraine (10-14 Migraine attack/ Month); § CM: Chronic Migraine (≥15 Migraine attack/ Month); ** MIDAS: Migraine Disability Assessment; †† MIBS 4: Migraine Interictal Burden Scale

Tricyclic antidepressants were the most frequently prescribed prophylactic agents, predominantly amitriptyline (56.67%) and dosulepin (20.67%). SSRIs and SNRIs were used less commonly. GABA analogs and benzodiazepines were included in select cases. Supportive medications, including methylcobalamin + folic acid, were prescribed, likely targeting associated neurological symptoms (Table 2).

The average number of drugs per prescription was 3.2, comprising 1.67 abortive and 1.67 prophylactic drugs. The most common prescription pattern included three (35.3%)

or four (30%) medications per prescription, with a smaller proportion of participants receiving five or more drugs (Figure 1).

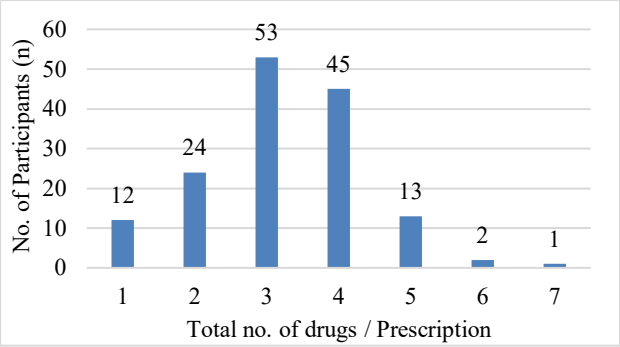

Figure 1: Total number of drugs prescribed per prescription in migraine patients (n=150).

The predominant reliance on NSAIDs and FDCs reflects a strategic approach combining effective pain relief with gastrointestinal protection. The widespread use of TCAs for prophylaxis further underscores their established efficacy in migraine prevention.

Quality of life

MIDAS [ictal burden]

The MIDAS questionnaire evaluating ictal burden indicated not much difference in grade. In terms of migraine frequency, low-frequency episodic migraine, medium-frequency episodic migraine, and Chronic migraine maximum patients had Grade I, followed by Grade IV. High-frequency episodic migraine patients were split equally between Grade I and Grade III (Table 3).

MIBS-4 (interictal burden)

MIBS-4 assessment showed that 59.3% of participants had no interictal burden, and 4.7% had a mild burden. When examined by migraine frequency, the majority of low-frequency episodic migraine patients reported no interictal burden. Medium-frequency episodic migraine patients exhibited a higher proportion with severe burden. In high-frequency episodic migraine, 50% had no interictal burden, while the remaining 50% experienced severe burden. A similar trend was observed in chronic migraine cases (Table 3).

MIBS-4 individual question-level impairment

Most participants (51.3%) reported no impact on work or school outside headache episodes, while 12% experienced this some of the time. Planning social activities due to potential headaches was never a concern for 46.7%, while 10% faced it some of the time. Headaches outside active episodes never impacted life for 47.3%, but 12.7% experienced this some of the time. Helplessness due to migraines outside headache episodes was absent in 51.3%, while 10.7% felt this some of the time (Figure 2).

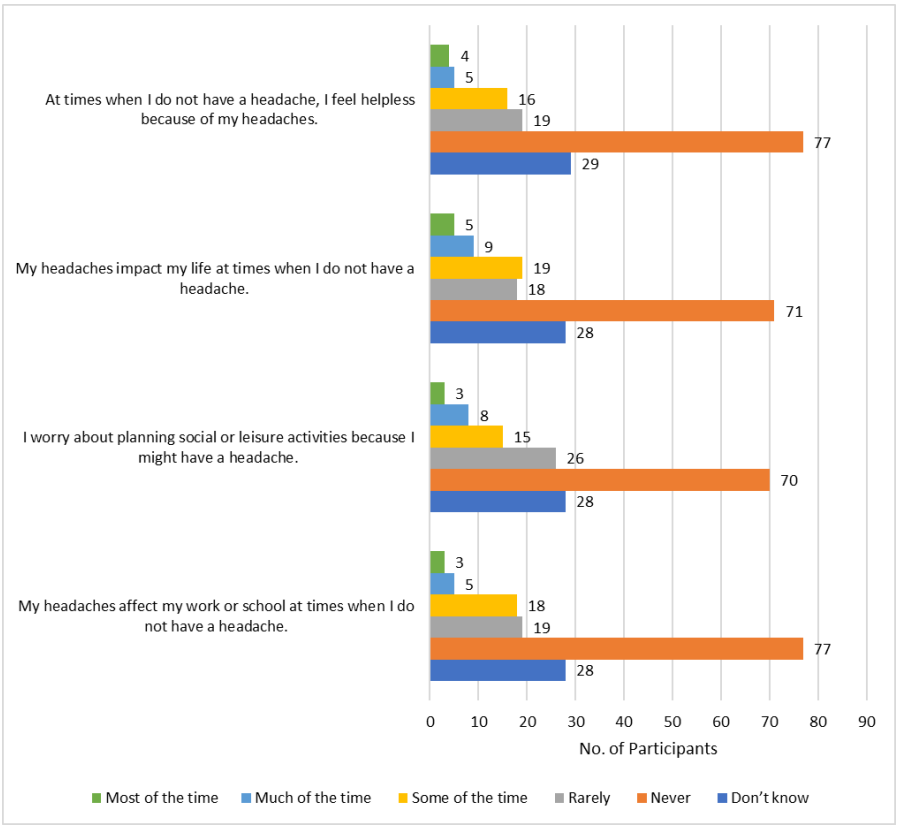

Figure 2: Level of impairment in each MIBS-4 question in study participants (n=150).

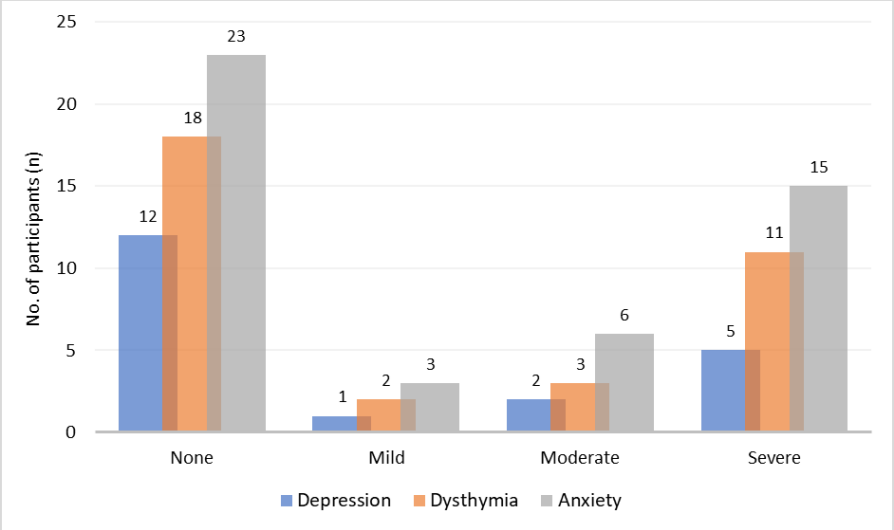

Figure 3: Association between mental health conditions and migraine disability [MIBS-4 Score] (n=150).

Association between mental health conditions and migraine disability (MIBS score)

Anxiety was the most prevalent condition, followed by Dysthymia, and Depression was less common but still notable, with 12 cases among those with no burden and 5 cases in the severe burden group (Figure 3).

DISCUSSION

Age significantly influences migraine prevalence, severity, and management. In this study, most participants were aged 21-40 years, with a mean age of 40.25±13.73 years, aligning with Gurunath et al, Bhide et al and Soni et al. Younger individuals tend to experience more frequent and intense migraines, while older patients may present with altered symptoms due to physiological changes.[14–16] A strong female predominance was noted, consistent with Bhide et al, Soni et al, Gurunath et al and Rawat et al. This is primarily linked to hormonal fluctuations, alongside genetic and environmental factors.[6,14-16] Episodic migraines, particularly low-frequency EM, were most common, while chronic migraines were rare, aligning with Buse et al. but differing from Zebenholzer et al.[17,18] The duration of migraine episodes in our study largely fell within the 4-72 hour range, consistent with ICHD criteria, though Gurunath et al reported longer durations.[14] Pain severity was mostly moderate (score 5-7), requiring analgesics but not hospitalization. Headache localization varied, with 53.3% experiencing pain in specific regions, mainly frontal (77.5%) and temporal (76.25%), contrasting with Kelman et al and Khaskheli et al, who emphasized ocular pain.[19-21] Among associated symptoms, nausea was the most frequent, followed by vomiting, photophobia, and phonophobia, consistent with Rawat et al and Jena et al.[1,6] Anxiety was the most common psychiatric comorbidity, but was lower than in Minen et al and Jevdokimov et al.[22,23] Environmental triggers were predominant, with sun exposure, sleep disturbances, and stress being the most frequently reported. Compared to Rawat et al and Jena et al, where travel and anxiety were major triggers, our study emphasizes the role of external factors in migraine susceptibility.[6,24]

This study highlights a predominant reliance on NSAIDs, particularly naproxen, as the cornerstone of abortive migraine treatment. NSAIDs remain the most frequently utilized pharmacologic agents in migraine management, owing to their over-the-counter availability, cost-effectiveness, and established efficacy in alleviating pain. Despite their widespread use, NSAIDs are associated with notable gastrointestinal adverse effects such as dyspepsia, epigastric discomfort, and peptic ulceration, which can typically be mitigated by co-administration with food, milk, or antacids. Gastroprotective agents, notably pantoprazole+domperidone, were frequently co-prescribed, emphasizing the focus on mitigating NSAID-induced gastric irritation. These prescribing patterns align with Bhide et al, Jena et al, Soni et al and Gurunath et al.[1,14-16]

In contrast, triptan utilization in this study was remarkably low (0.67%), diverging from data reported in U.S. National Surveillance studies (2009), where triptans are the predominant class prescribed for acute and chronic migraine attacks. Although widely employed in developed nations, triptan use may be limited by contraindications in patients with cardiovascular disease or pregnancy. Additionally, studies such as Shao et al have reported a high incidence of adverse effects, potentially discouraging prescribers. Other factors, including previous treatment failures, limited physician familiarity, and high cost, may further contribute to the underutilization of triptans in routine clinical practice.[16]

For migraine prophylaxis, antidepressants dominated. This diverges from studies such as Bhide et al. and Soni et al, where beta-blockers, particularly propranolol, were preferred.[15,16] These findings also contrast with Gurunath et al, who reported dosulepin and flunarizine as leading

choices.[14] Depression frequently coexists with migraine, making antidepressants a clinically appropriate option following NSAIDs. This aligns with current treatment guidelines, which advocate the use of antidepressants in patients presenting with comorbid migraine and depressive disorders to optimize therapeutic outcomes.[16] Additionally, two-thirds of patients received monotherapy for prophylaxis, a trend not widely documented in previous research. Notably, methylcobalamin combined with folic acid was frequently prescribed (34.67%), primarily to address comorbid nutritional neuropathy. This was particularly relevant among rural female patients with vegetarian diet, inadequate with intake of vitamin B12, commonly due to low milk consumption.

In this study, migraine-related disability, assessed via the MIDAS questionnaire, revealed a broad spectrum of impairment. While almost one-third of participants had little to no disability, a significant proportion experienced moderate to severe impairment, underscoring its substantial impact on daily functioning. These findings align with Irfan et al and Kandasamy et al, but contrast with Bhide et al and Soni et al, who reported higher rates of moderate to severe disability, highlighting population-specific variations.[15,16,25,26] Disability levels varied by migraine frequency. In this study, LFEM and CM cases predominantly had minimal disability, whereas MFEM (medium frequency episodic migraine) [5-9 migraine attacks/ month] exhibited a balanced distribution, and HFEM (high frequency episodic migraine) [10-14 migraine attacks/ Month] showed an even split between no disability and moderate disability. Compared to Shapiro et al, this study reported lower severe disability rates across all subtypes.[27] Awaki et al and Hadia et al documented a progressive increase in severe disability, particularly in chronic migraine cases.[28,29]

Interictal burden, reflecting the impact of migraines between attacks, was assessed using MIBS-4. In this study, the majority reported no burden, a notably higher proportion than Ashina et al, Awaki et al and Pascual et al.[28,30,31] Migraine-related impairment was analyzed across four domains: work/school, social activities, overall life impact, and helplessness. Compared to Hubig et al, participants in this study reported lower impairment across all domains, with notably fewer cases of work/school impact, social limitations, and helplessness.[32] Interictal burden differed by migraine frequency. In this study, LFEM cases had the highest proportion with no burden, significantly more than Awaki et al and Pascual et al.[28,31] Among MFEM cases, majority had experienced either no burden or severe burden, aligning with Awaki et al, but diverging from Pascual et al, who reported greater severe burden.[28,31] HFEM cases showed an equal distribution between no burden and severe burden, while CM cases (42.9%) had no burden, contrasting with prior studies reporting greater impairment. This study also highlights a strong association between interictal burden and psychiatric comorbidities, with anxiety being the most prevalent, followed by dysthymia and depression. These findings align with Buse et al, who reported a progressive increase in psychiatric disorders with rising MIBS severity.[33]

Strengths and limitations

The use of validated assessment tools, which enhances the accuracy and consistency of data collection, as well as a systematic recruitment process that supports the internal validity. There were only a few studies conducted that assessed the interictal burden by using the MIBS-4 score in migraine patients in India. The reliance on self-reported data introduces the potential for recall bias, which may compromise data reliability. The absence of a control group limits the capacity to draw causal inferences, and the exclusive focus on a tertiary care setting may constrain the generalizability of findings to broader or primary care populations.

CONCLUSION

Migraine is a widespread and debilitating neurological disorder with a profound impact on quality of life. This study examined prescribing patterns and migraine-related disability in a tertiary care setting in India. Although triptans have proven efficacy as acute treatment, their utilization remains limited. Quality of life assessments using MIDAS and MIBS-4 revealed significant disability, underscoring the need for enhanced management strategies targeting psychological conditions as well as it may be associated with anxiety and depression. Optimizing prescription practices, improving patient education, and incorporating lifestyle modifications are crucial for effective migraine management.

Recommendation

Continuous medical education and dissemination of updates and recent advances for physicians are essential to promote and sustain the rational use of pharmacological therapies. These initiatives should be systematically implemented and rigorously monitored to ensure long-term improvements in prescribing practices. Additionally, there is a critical need for large-scale, prospective analytical studies with stringent follow-up protocols. Such studies should comprehensively evaluate patient-centered outcomes, including adverse drug reaction profiles, treatment adherence, and cost-effectiveness. Emphasizing these parameters will provide robust evidence to guide optimized, safe, and economically viable migraine management strategies.

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