AN EVALUATION OF CLINICAL ASSESSMENT TOOLS FOR MIGRAINE WITH EMPHASIS ON QUALITY OF LIFE

Astha Mathur[1*], A. N. Mathur[2], Rajesh Kumar Meena[3], Puneet R Shah[4], Ruchi Singh[5], Himani Choudhary[6], Neha Modiyani[6], Quainat Bano[7]

1. Ph.D Scholar, Homoeopathy University, Jaipur
2. President, Homoeopathy University, Jaipur
3. Associate Professor, Department of Homoeopathic Pharmacy, University College of Homoeopathy, Kekri, Ajmer (Constituent College of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur).
4. Principal & Medical Superintendant, University College of Homoeopathy, Kekri, Ajmer (Constituent College of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur).
5. Professor, Department of Organon of Medicine, Dr. M.P.K. Homoeopathic Medical College, Hospital & Research Centre, Jaipur
6. Resident Medical Officer, University College of Homoeopathy, Kekri, Ajmer Ajmer (Constituent College of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur).
7. BHMS Scholar, University College of Homoeopathy, Kekri, Ajmer (Constituent College of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur).

***Correspondence:Dr. Astha Mathur (Ph. D Scholar, Homoeopathy University)**

Assistant Professor, Dept. of Homoeopathic Pharmacy,University College of Homoeopathy, (Constituent College of Dr. Sarvepalli Radhakrishnan Rajasthan Ayurved University, Jodhpur),Old CHC Building, Ajmeri Gate, Kekri – 305404.
Email: astha.mathur872@gmail.com

ABSTRACT

A migraine is a type of headache characterized by intense throbbing or pulsing pain, typically affecting one side of the head. It is commonly accompanied by nausea, vomiting, and heightened sensitivity to light and sound. The assessment tools reviewed include the Migraine Disability Assessment (MIDAS), Headache Impact Test (HIT-6), International Classification of Headache Disorders (ICHD) Criteria, Impact of Migraine on Partners, Adolescent and Children (IMPAC), Visual Analogue Scale (VAS), and Patient Health Questionnaire-9 (PHQ-9). Each tool was examined for its reliability, validity, and the specific QoL parameters it addresses, such as functional impairment, pain intensity, psychosocial effects, and emotional well-being. The analysis underscores the importance of a multidimensional approach in assessing migraines, emphasizing that a combination of these tools can provide a holistic understanding of the condition's impact on patients' lives.

KEYWORDS- Clinical Assessment Tools, HIT-6, ICHD Criteria, IMPAC, MIDAS, Migraine, Quality of Life, PHQ-9, VAS.

INTRODUCTION

Migraine is a form of headache that involves repeated episodes of moderate to severe throbbing and pulsating pain, typically on one side of the head. This pain arises due to the stimulation of nerve fibers located within the walls of blood vessels in the brain, which travel through the meninges (the three protective layers surrounding the brain and spinal cord).[1]

Migraines are categorized into subtypes by the International Headache Society's classification committee. [2]These include:

- **Migraine without aura:** Recurrent headaches lasting 4 to 72 hours, typically on one side of the head, with a throbbing quality, moderate to severe intensity, worsened by physical activity, and often accompanied by nausea, light sensitivity (photophobia), and sound sensitivity (phonophobia). [2]
- **Migraine with aura:** recurrent, fully reversible attacks lasting minutes, with one or more unilateral symptoms such as visual, sensory, speech, motor, brainstem, or retinal disturbances, usually followed by headache and other migraine symptoms. [2]
- **Chronic migraine:** headaches occurring on 15 or more days per month for over three months, with migraine features on at least eight of those days. [2]
- **Probable migraine** - symptomatic migraine attack that lacks one feature needed to meet the criteria for a specific migraine subtype or another headache type. [2]
- **Episodic syndromes potentially associated with migraine** include:
  - **Recurrent gastrointestinal disturbances** are episodes of abdominal pain, discomfort, nausea, and vomiting possibly linked to migraines.
  - **Benign paroxysmal vertigo** has brief, recurring episodes of vertigo.
  - **Benign paroxysmal torticollis** is recurrent episodes of head tilt to one side.[2]
- **Complications of migraine** include: [2]
  - **Status migrainosus**- severe migraine attack lasting more than 72 hours.
  - **Persistent aura without infarction** - an aura lasting over a week without evidence of brain infarction on neuroimaging.
  - **Migrainous infarction-** one or more aura symptoms associated with brain ischemia seen on neuroimaging during a typical migraine attack.
  - **Migraine aura-triggered seizure-** seizure triggered during a migraine with aura.

The pathogenesis of migraines involves a complex interaction between the peripheral and central nervous systems. The trigeminovascular system, which includes the trigeminal ganglion and its connections to the meninges and intracranial blood vessels, is crucial in mediating migraine pain. This system communicates with key brain regions, including the brainstem, hypothalamus, and thalamus,[3] leading to the release of neuropeptides like calcitonin gene-related peptide(CGRP), which contribute to pain through blood vessel dilation and central pain modulation.[4,5,6]While the role of neurogenic inflammation in migraine has been debated, the sensitization of neurons within this system remains central to the migraine process, potentially leading to chronic migraines. Brainstem regions, such as the

periaqueductal grey matter (PAG) and dorsolateral pons (DLP), play a significant role in initiating and modulating migraine attacks, with brain dysfunction and external factors contributing to the complex onset and progression of migraine.[7,8]

The hypothalamus plays a crucial role in migraine, particularly in initiating and facilitating pain and premonitory symptoms like yawning and thirst. Functional neuroimaging studies show that altered hypothalamic connectivity with brainstem and cortical regions is linked to migraine development and chronicity.[9] The thalamus, central to sensory processing, contributes to central sensitization and migraine symptoms like photophobia and allodynia.[10] Structural and functional changes in the thalamus, particularly its connectivity with pain-modulating areas, have been observed in migraine patients. The cerebral cortex, especially during the aura phase, is also implicated in migraine, with changes in cortical networks linked to cognitive and emotional symptoms. Additionally, genetic studies suggest that variations in genes related to glutamatergic neurotransmission might contribute to abnormal cortical excitability in migraine. Overall, the hypothalamus, thalamus, and cortex interact in complex ways to drive the onset, progression, and sensory symptoms of migraines.[11]

Migraine attacks are typically divided into four phases, each of which may be experienced during an episode:[12]

- **Premonitory Phase/ Prodrome**:[13,14] This phase can occur up to 24 hours before the migraine begins and may include symptoms such as food cravings, sudden mood changes (either depression or euphoria), excessive yawning, fluid retention, or increased urination.
- **Aura**:[2,15,16]Some individuals experience visual disturbances like flashing or bright lights, or what appear to be heat waves, just before or during the migraine. Others may feel muscle weakness or have sensations of being touched or grabbed.
- **Headache**:[2,15,16] The headache phase of a migraine usually starts gradually and intensifies over time. However, it's possible to have a migraine without a headache.
- **Postdrome**:[2,15,16] After the migraine subsides, individuals often feel fatigued or confused. This recovery phase, known as the postdrome, can last up to a day before they feel completely normal again.

Migraine diagnosis is based on patient history, physical examination, and meeting specific criteria. Key information includes the patient’s demographics, onset of the headache, pain location and intensity, pain characteristics, duration, timing, evolution, frequency, triggers, associated symptoms, relation to sleep, and response to medications.[17]

Neuroimaging is not required for patients with migraines who have a normal neurological exam and no atypical features or warning signs. However, an MRI may be considered if there are unusual or severe symptoms, such as prolonged aura, changes in migraine patterns, first or worst migraines, migraines with brainstem aura, motor symptoms, or headaches associated with trauma.[18]

Migraines can shift between chronic and episodic forms, with remissions and relapses common. The frequency and severity of attacks often peak between ages 35 and 39 but tend to decrease with age, especially after menopause.[19]

Many people with migraines find relief by resting in a quiet, dark room with cooling pads on the painful side of their head. Medications like acetaminophen, NSAIDs (e.g., aspirin, ibuprofen), and triptans are commonly used for pain relief, some of which are available over the counter. However, frequent use of these medications can worsen headaches, so it's recommended to limit their use to no more than ten days per month and consult a doctor to confirm the diagnosis of migraines.[20]

Alternative migraine treatments include lifestyle changes, regular exercise, yoga, relaxation training, cognitive-behavioral therapy, and biofeedback. Social support is crucial for improving mental health and patient involvement. Additional strategies involve reducing triggers, detoxification, and supplements like butterbur and melatonin.[17]

Clinical assessment tools for migraines are essential for accurately diagnosing, managing, and monitoring the condition. Here's an overview of some key clinical assessment tools, their importance, and application:

❖ **Migraine Disability Assessment (MIDAS)[21]**

- **Importance:** MIDAS is widely used to measure the impact of migraines on daily life and to assess the level of disability they cause. It helps to quantify the number of days in the past three months that a patient was affected by migraines.
- **Application:** Patients fill out a questionnaire, which asks about days missed from work or school, days when productivity was reduced, and the impact on social and leisure activities. This tool helps in tailoring treatment plans and monitoring changes over time.[22]

❖ **Headache Impact Test (HIT-6)[23]**

- **Importance:** HIT-6 is designed to measure the impact of headaches on a patient's ability to function in daily activities. It provides a quick assessment that can help guide treatment decisions.
- **Application:** Patients respond to six questions that assess the severity of headaches and their impact on work, social life, and cognitive functions. Scores are used to determine the intensity of the headache's impact and to monitor treatment effectiveness.[24]

❖ **The International Classification of Headache Disorders (ICHD) Criteria[2]**

- **Importance:** The ICHD criteria are used globally for the diagnosis of different types of headaches, including migraines. It ensures that patients are correctly diagnosed according to standardized criteria.
- **Application:** Clinicians use these criteria to categorize headaches based on specific characteristics such as duration, frequency, associated symptoms, and triggers. Accurate diagnosis is crucial for effective treatment and management.[25]

❖ **Impact of Migraine on Partners, Adolescent and Children (IMPAC)[26]**

- **Importance:**IMPAC is crucial for understanding the broader impact of migraines on family members, helping healthcare providers address not just the patient's symptoms but also the emotional and social well-being of the entire household.
- **Application:**IMPAC is used in clinical assessments, research, and family therapy to gather insights into how migraines affect partners, adolescents, and children, guiding more holistic treatment and support strategies.[27]

❖ **Visual Analogue Scale (VAS)[28]**

- **Importance:** The VAS is a simple tool used to measure the intensity of migraine pain, allowing for a subjective assessment of the patient's experience.
- **Application:** Patients mark a point on a line that represents the intensity of their pain, from "no pain" to "worst pain imaginable." This tool helps in assessing pain levels during treatment and monitoring response to therapy.[29]

❖ **Patient Health Questionnaire-9 (PHQ-9)[30]**

- **Importance:** Since migraines are often associated with mood disorders, the PHQ-9 is used to screen for depression in patients with chronic migraines.
- **Application:** The questionnaire assesses the frequency of depressive symptoms over the past two weeks. Addressing co-existing depression is important for comprehensive migraine management.[31]

METHOD

The literature search was conducted using PubMed, Web of Science, and Scopus, as these three databases are the most thorough and effective resources for performing a systematic review of medical literature. Following search terms were combined using the Boolean operator 'AND', 'OR':(Migraine OR Headache disorders) AND (Clinical assessment tools OR Evaluation tools) AND (Quality of life OR QoL) AND (Questionnaire OR Scale). Articles published up to January 2024 were included in this search.A manual search was performed, which involved examining the reference lists of the studies identified, as well as reviewing scientific conference databases for relevant assessment tools. After an comprehensive search and screening process, 15 studies were selected for the final analysis. These studies were included based on their relevance, quality, and their contribution to the assessment of clinical tools for migraines, particularly regarding quality of life (QoL).

RESULT

The evaluation of these clinical assessment tools highlights their significant strengths in assessing the impact of migraines on quality of life (QoL). Each tool brings valuable insights into different aspects of the migraine experience.

S. No.	Result Scale	Type of Scale	Parameters Covered	Dimensions Covered	Clinical Utility	Applicability
1.	Migraine Disability	Questionnaire	Measures migraine-	Functional, Social	Assesses migraine's	Migraine patients

	Assessment (MIDAS)[21, 22]		related disability and impact on daily life		impact on quality of life, helping clinicians evaluate treatment effectiveness	
2.	Headache Impact Test (HIT-6)[23,24]	Questionnaire	Measures headache impact on daily life and well-being	Comprehensive	Evaluates headache's impact on quality of life, helping clinicians monitor treatment effectiveness	Headache patients (including migraine and tension-type headache)
3.	The International Classification of Headache Disorders (ICHD) Criteria[2,25]	Diagnostic criteria	Defines and classifies headache disorders (including migraine, tension-type headache, and others)	Diagnostic	Standardizes headache diagnosis, helping clinicians accurately diagnose and treat headache disorders	Headache patients
4.	Impact of Migraine on Partners, Adolescent and Children (IMPAC)[26, 27]	Questionnaire	Measures migraine's impact on family members (partners, adolescents, and children)	Social, Psychological	Evaluates migraine's effects on family dynamics, helping clinicians consider the broader impact of migraine	Family members of migraine patients
5.	Visual Analogue Scale (VAS)[28,29]	Pain assessment tool	Measures pain intensity	Pain intensity	Quickly assesses pain severity, helping clinicians monitor	Patients with pain conditions (including headache and migraine)

					treatment effectiveness	
6.	Patient Health Questionnaire-9 (PHQ-9)[30,31]	Questionnaire	Measures depression severity	Psychological	Screens for depression, helping clinicians identify co-morbid depression in patients with headache/ migraine	Patients with suspected depression or co-morbid depression with headache/migraine

DISCUSSION

Migraine Disability Assessment (MIDAS)- TheMIDAS measures the impact of migraines on daily functioning by tracking the number of days productivity is lost due to migraine attacks. It has shown strong test-retest reliability, meaning it consistently measures migraine-related disability over time. MIDAS simple design and clear scoring enhance its reliability. The MIDAS is highly effective in assessing the functional impact of migraines, particularly on work productivity, household responsibilities, and social activities. However, it does not fully address the emotional or social dimensions of quality of life (QoL).[32]

Headache Impact Test (HIT-6)- TheHIT-6 evaluates the overall impact of headaches on daily life through six dimensions: pain, social and role functioning, vitality, cognitive function, and emotional distress. It is highly reliable, with strong internal consistency and test-retest reliability, and is well-validated by its correlation with other headache impact measures. HIT-6 offers a comprehensive view of how migraines affect quality of life.[33]

The International Classification of Headache Disorders (ICHD) Criteria- The ICHD Criteria offer a comprehensive classification and diagnostic framework for various headache disorders, including migraines, by specifying symptoms, duration, and frequency. These criteria are highly reliable, ensuring consistent and precise diagnoses across different clinical environments. They have strong face and construct validity due to their broad acceptance and regular updates based on current research. While the ICHD Criteria focus primarily on diagnostic accuracy rather than directly measuring quality of life (QoL), a precise diagnosis is essential for effective treatment planning, which can indirectly impact QoL.[34]

Impact of Migraine on Partners, Adolescent and Children (IMPAC)- The IMPAC tool assesses the social and familial impact of migraines, focusing on how the condition affects the patient's partners, adolescents, and children. It demonstrates good internal consistency and reliability across various family demographics. The tool has strong content validity in evaluating these social and familial effects, offering insights that other tools may not cover. IMPAC explores how migraines influence family dynamics, relationships, and the emotional

well-being of both the patient and their family members, highlighting the broader impact on the entire family unit.[27]

Visual Analogue Scale (VAS)- The VAS is a simple tool used for measuring pain intensity, where patients rate their pain from "no pain" to "worst pain imaginable." It is highly reliable in test-retest scenarios, making it effective for tracking pain over time in clinical settings. VAS has strong face validity as it directly assesses pain intensity, a crucial symptom in evaluating migraines. While it focuses specifically on pain intensity, an important aspect of quality of life for migraine sufferers, it does not cover other dimensions like emotional, social, or functional well-being.[35]

Patient Health Questionnaire-9 (PHQ-9)- PHQ-9 is a standardized tool used to assess the severity of depression, often a comorbidity in patients with chronic migraines. It shows excellent internal consistency and test-retest reliability, establishing it as a dependable measure for assessing depression severity. The PHQ-9 has strong construct validity, correlating effectively with other depression assessments and capturing the psychological impact of migraines. It primarily focuses on the emotional and psychological aspects, specifically measuring depression severity and addressing how migraines influence mental health, a key component of quality of life for many patients.[36]

The discussion of individual scales highlights the importance of considering reliability and validity, as well as the specific QoL (Quality of Life) parameters each tool assesses.

CONCLUSION

When assessing migraines with various clinical tools, each offers unique benefits for evaluating the impact on quality of life. The Migraine Disability Assessment (MIDAS) is effective in measuring functional impairment, while the Headache Impact Test (HIT-6) gives a comprehensive overview of the overall impact of migraines. The International Classification of Headache Disorders (ICHD) Criteria ensures accurate diagnosis. The Impact of Migraine on Partners, Adolescent, and Children (IMPAC) focuses on the social and familial effects, the Visual Analogue Scale (VAS) measures pain intensity, and the Patient Health Questionnaire-9 (PHQ-9) addresses the psychological aspects related to migraines.Although these scales have shown reliability and validity, future research should aim to further develop and refine these tools. Improvements might involve including a broader range of quality-of-life parameters and incorporating input from patients across various demographic groups. Moreover, there is a need for new scales designed to capture the distinct aspects of migraine experiences that current tools may not fully address.[37] To accurately assess migraines within the Indian population, it is essential to use scales that are culturally adapted and validated for this group. While current tools such as MIDAS and HIT-6 are reliable, they might be improved by addressing regional variations in how migraines are experienced and their impact. Creating and validating new scales that take these cultural and regional factors into account will not only refine assessment accuracy but also better inform treatment strategies suited to the Indian context.[38]

Future research should focus on advancing and validating these assessment tools by including diverse populations and a wide range of migraine experiences to improve their accuracy and relevance. Additionally, exploring the creation of new tools to address the shortcomings of current scales could provide more detailed understanding of the complex

impacts of migraines. Clinicians should employ a range of assessment tools to achieve a comprehensive understanding of a patient's migraine experience. Enhancing existing tools and developing new, culturally tailored scales will enable more effective and personalized treatment plans. It is crucial to adapt tools for specific populations, such as the Indian demographic, to accurately capture cultural and regional differences in migraine experiences. Researchers should focus on developing new scales and refining current ones through rigorous methods. Collaboration among researchers, clinicians, and patients can foster the creation of innovative tools that provide in-depth insights into the impact of migraines. Additionally, further studies should assess the effectiveness of these tools across various clinical settings and populations to enrich the knowledge base and improve educational resources for healthcare professionals.

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