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A Review on Prevalence, Trigger Factors and Self-Medication Practices among Individuals with Migraine

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A B S T R A C T

Migraine is a common and disabling primary headache disorder, and it ranks second among the world's causes of disability. This narrative review brings together published evidence on how common migraine is, what tends to set off attacks, and how people with migraine treat themselves. We searched PubMed/MEDLINE, PubMed Central, Google Scholar and ScienceDirect and compared thirteen key studies side by side, including meta-analyses and community-, clinic- and student-based cross-sectional surveys. Around the world, about 11.6% of people have migraine. Females are affected roughly twice as often as males (13.8% versus 6.9%), and rates are higher in urban than in rural populations; among students, estimates ranged from 4.04% to 28%. Psychological stress and disturbed sleep were the triggers people reported most often, followed by fasting, hormonal changes and sensory or environmental stimuli. Self-medication was widespread and relied mainly on over-the-counter paracetamol and non-steroidal anti-inflammatory drugs. Triptans, the drugs made specifically for migraine, were rarely used, and many patients had never received a medical diagnosis, which raises the risk of medication-overuse headache. Knowing your triggers, keeping a headache diary, diagnosing with ICHD-3 criteria and offering pharmacist-led counselling on sensible analgesic use can all help ease the burden of migraine.

Keywords: Migraine, prevalence, trigger factors, self-medication, over-the-counter analgesics, medication-overuse headache, pharmacist

1. Introduction

Migraine is a recurrent neurological disorder. Attacks are usually moderate to severe, often one-sided and throbbing, and last 4–72 hours. They commonly come with nausea, vomiting, and sensitivity to light and sound (photophobia and phonophobia) (Headache Classification Committee of the IHS, 2018). To diagnose migraine without aura, the International Classification of Headache Disorders, 3rd edition (ICHD-3), requires at least five such attacks. Migraine with aura looks different: it is marked by fully reversible visual, sensory or speech symptoms that build up over at least five minutes and last 5–60 minutes. When headache occurs on fewer than 15 days a month, the migraine is called *episodic*; when it occurs on 15 or more days a month for more than three months, it is called *chronic*.

An attack can move through four phases: the prodrome (yawning, mood change, food craving, neck stiffness), the aura, the headache itself, and the postdrome, which brings fatigue and poor concentration (Ashina, 2020). Migraine is no longer thought of as a purely vascular disease. It is better understood as a disorder of sensory processing, in which activation of the hypothalamus and brainstem, cortical spreading depression and release of calcitonin gene-related peptide (CGRP) from trigeminal nerve endings lead to neurogenic inflammation and central sensitisation (Goadsby et al., 2017). The Global Burden of Disease study ranks migraine second among the causes of disability worldwide, and first among young women (Steiner et al., 2020).

Prevalence, triggers and self-medication have each been studied on their own, but they are usually reported separately. In this review we look at all three together, compare what different populations show, and consider where the pharmacist fits into safe migraine care.

2. Methodology

We carried out a narrative literature review. We searched PubMed/MEDLINE, PubMed Central, Google Scholar and ScienceDirect, as well as the reference lists of key articles, using the terms "migraine", "prevalence", "trigger factors", "precipitating factors", "self-medication", "over-the-counter analgesics", "medication-overuse headache" and "medical students", combined with AND/OR. We included full-text English articles: systematic reviews, meta-analyses, and community-, hospital- and student-based cross-sectional studies. Case reports, editorials, conference abstracts and animal studies were

excluded. For each study we tabulated the author, country, year, design, population and main findings, and then compared them narratively and graphically. Because the studies differ in design and diagnostic criteria, we did not attempt a pooled statistical analysis.

3. Prevalence of migraine

A meta-analysis of community-based studies with about six million participants put the pooled global prevalence of migraine at 11.6% (95% CI 10.7–12.6). Prevalence was higher in females (13.8%) than in males (6.9%), and higher in urban (11.2%) than in rural (8.4%) residents; among students it was 12.4% (Woldeamanuel & Cowan, 2017). By region, estimates ranged from 9.7% in North America to 16.4% in Central and South America (Fig. 1).

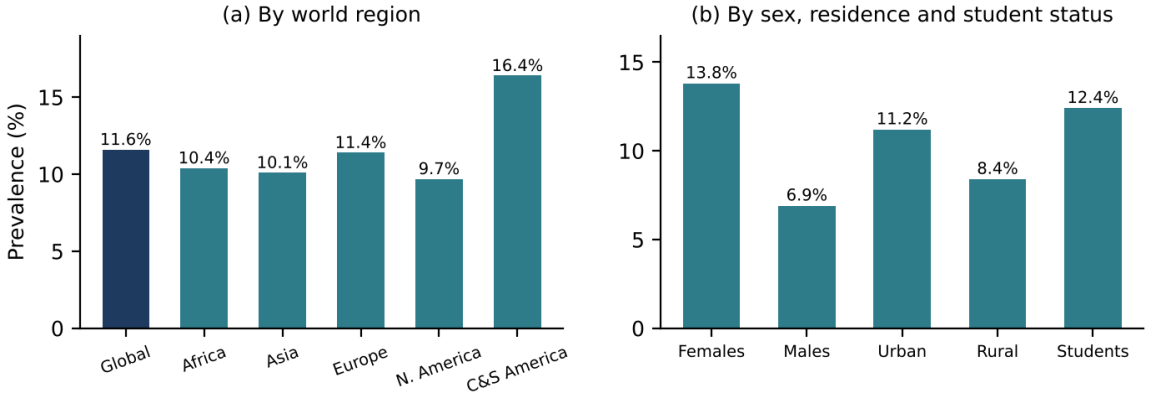


Fig. 1 - Pooled migraine prevalence (a) by world region; (b) by sex, residence and student status (Woldeamanuel & Cowan, 2017).

In India, a community study in Kolkata found a one-year prevalence of 14.12% in adults aged 20–50 years, with women aged 30–34 years carrying the greatest burden (Ray et al., 2017). A population survey in Saudi Arabia found that about one in four adults had migraine (Al Jumah et al., 2020). A review of Arab countries reported 2.6–32% in the general population, 12.2–27.9% in medical students and 7.1–13.7% in schoolchildren (El-Metwally et al., 2020). Student estimates varied more than fourfold, from 4.04% in Dammam (Zafar et al., 2021) to 28% in Indian medical students (Menon & Kinnera, 2013) (Table 1).

Table 1 - Comparison of migraine prevalence across selected studies.

Study	Country	Population	Prevalence	Criteria
Woldeamanuel & Cowan (2017)	Global	Community studies (~6 million)	11.6%	Various
Ray et al. (2017)	India	Adults 20–50 y, Kolkata	14.12%	ICHD-II
Al Jumah et al. (2020)	Saudi Arabia	General adult population	About 25%	Survey
El-Metwally et al. (2020)	Arab countries	General / students / schoolchildren	2.6–32% / 12.2–27.9% / 7.1–13.7%	Review
Menon & Kinnera (2013)	India	Medical students	28%	Questionnaire
Birru et al. (2016)	Ethiopia	Health-science students (n = 720)	13.06%	ICHD
Portela et al. (2018)	Colombia	University students (n = 650)	27.7%	IHS
Zafar et al. (2021)	Saudi Arabia	Medical students (n = 396)	4.04%	ICHD-3

Females were affected more often in the pooled analysis and in the student studies alike (4.6% versus 3.1% in Dammam; 16.0% versus 11.9% in Ethiopia). Most of the differences between studies seem to come down to diagnostic criteria, sampling, the timing of surveys (for example, during examinations) and how easily students can reach support services.

4. Trigger factors

A trigger is any factor that, alone or in combination, is perceived to bring on an attack in a susceptible person (Kelman, 2007). In a meta-analysis of 85 studies (27,122 participants), 81% of patients reported at least one trigger, and stress (58%) and sleep disturbance (41%) were named most often (Pellegrino et al., 2018). Among patients at a tertiary clinic, stress came first, followed by hormonal factors, hunger and weather (Kelman, 2007). Saudi medical students mostly pointed to study-related stress (88%), emotional stress (81%) and sleep disturbance (75%) (Fig. 2a), whereas environmental triggers such as sun exposure, hot humid weather, smoke and noise stood out among children from Eastern India (Chakravarty et al., 2009) (Table 2).

Table 2 - Main trigger factors reported across studies.

Study	Population	Main triggers reported
Pellegrino et al. (2018)	Meta-analysis, 27,122 participants	Stress 58%, sleep 41%; 81% had at least one trigger
Kelman (2007)	Tertiary headache clinic	Stress, then hormonal factors, hunger and weather
Zafar et al. (2021)	Saudi medical students	Study stress 88%, emotional stress 81%, sleep 75%, light and noise 44%, fasting 38%
El-Metwally et al. (2020)	Arab countries (review)	Stress, fatigue, sleep disturbance, sun/heat, hunger
Portela et al. (2018)	Colombian students	Stress 94.9%, fasting 71.3%, short sleep 69.1%, exams 63.8%
Chakravarty et al. (2009)	Children 7–15 y, India	Sun, hot humid weather, smoke, noise, school stress

Taken together, the studies show a fairly consistent order. Psychological stress and disturbed sleep come first, followed by fasting, hormonal factors (menstruation, for example, was reported by a quarter of female Saudi students) and sensory stimuli. These data are heterogeneous and depend on recall. Some perceived triggers, such as food craving, may actually be early warning symptoms of an attack that has already begun (Pellegrino et al., 2018).

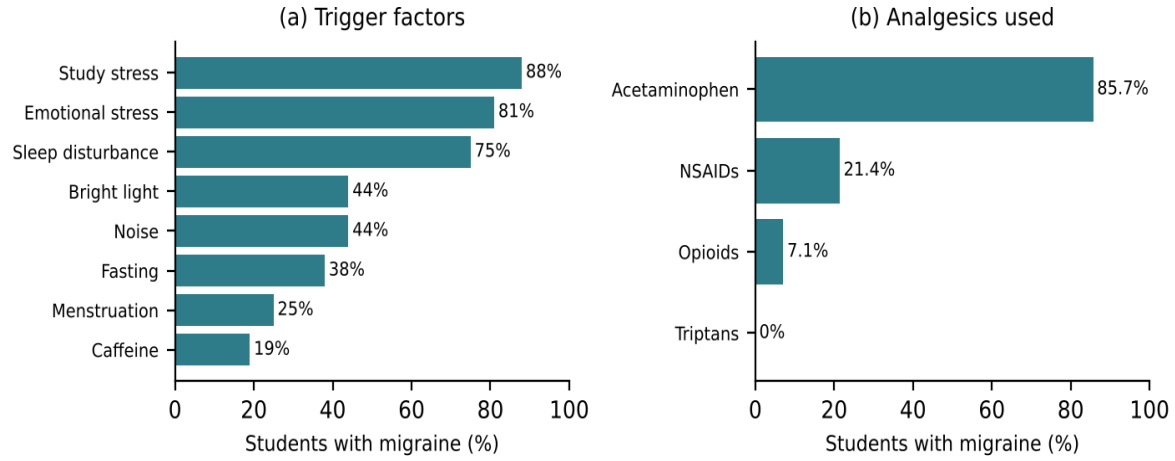


Fig. 2 - (a) Trigger factors and (b) analgesics used by medical students with migraine, Dammam, Saudi Arabia (Zafar et al., 2021).

5. Self-medication practices

Self-medication means using medicines to treat symptoms one has recognised oneself, without consulting a prescriber (World Health Organization, 2000). Several things encourage it: over-the-counter availability, low cost, relief from past use, and a belief that migraine is a minor problem. In Kerman, Iran, 91% of students with migraine self-medicated, mainly with acetaminophen and codeine; only 49% had consulted a physician, and only 53% of those had been correctly diagnosed (Sedighi et al., 2006). In Dammam, 87.5% of students with migraine used analgesics (acetaminophen 85.7%, NSAIDs 21.4%, opioids 7.1%), none used triptans (Fig. 2b), and only 19% sought medical care (Zafar et al., 2021). In Italy, many pharmacy customers who asked for headache remedies turned out to have definite or probable migraine that had never been diagnosed or treated (Brusa et al., 2019) (Table 3).

Table 3 - Comparison of self-medication findings across studies.

Study	Country	Key findings
Sedighi et al. (2006)	Iran	91% self-medicated, mainly acetaminophen and codeine; only 49% consulted a physician
Menon & Kinnera (2013)	India	27% used analgesics as self-medication; awareness of migraine was low
Birru et al. (2016)	Ethiopia	72.45% used drugs; paracetamol commonest; only 6.9% consulted a physician
Portela et al. (2018)	Colombia	93.3% used analgesics, only 44.6% prescribed; 51% diagnosed by a physician
Brusa et al. (2019)	Italy	Definite or probable migraine common among pharmacy customers; many undiagnosed
Zafar et al. (2021)	Saudi Arabia	Analgesics 87.5%; no triptan use; only 19% sought medical care

Frequent use of acute medication can cause medication-overuse headache (MOH). ICHD-3 defines it as headache on 15 or more days a month after more than three months of overuse, where overuse means 15 or more days a month for simple analgesics and NSAIDs, and 10 or more days for triptans, opioids and combination analgesics (Diener et al., 2019). Once MOH sets in, headaches become more frequent and the drugs work less well. This vicious cycle can turn episodic migraine into chronic migraine.

6. Role of the pharmacist

Community pharmacists are often the first, and sometimes the only, health professionals a person with migraine consults, and the Italian survey found pharmacies to be a valuable place to spot probable migraine (Brusa et al., 2019). Pharmacists can help in four main ways:

- **Identification:** recognising probable migraine, and watching for red-flag features such as thunderclap onset, fever, neurological deficit or a new headache after the age of 50.
- **Rational drug use:** recommending a suitable analgesic, taken early in the attack and at the correct dose, and checking for interactions, comorbidity and pregnancy.
- **Preventing overuse:** counselling on how many days a month the patient treats attacks, and steering them away from products that contain codeine or opioids.
- **Lifestyle advice and referral:** encouraging headache diaries, regular sleep and meals, and stress reduction, and referring people with frequent or disabling migraine for migraine-specific and preventive treatment.

7. Discussion

Roughly one in ten people worldwide has migraine, and rates are higher in women, in urban residents and in some student groups. The wide range of student prevalence (4.04–28%) suggests that the burden we see depends heavily on how migraine is defined and measured; studies that apply ICHD criteria give more reliable estimates than self-reported symptoms alone. Stress and sleep disturbance were the most consistent triggers across settings. Both can be modified, which makes them a practical target for education, especially for students who cope with irregular sleep, skipped meals and examination pressure.

The three themes are linked. Stress and poor sleep trigger attacks, attacks are painful and disabling, and easy access to analgesics encourages repeated self-treatment, often without any diagnosis. Triptans were almost never used and few patients saw a physician, which suggests that effective migraine-specific treatment is under-used. At the same time, sustained analgesic use favours progression to MOH and chronic migraine. Prevention therefore has to deal with triggers, diagnosis and medicine use together. The evidence has its limits: study designs and definitions of self-medication vary, the data are self-reported, and few Indian studies measure all three outcomes in the same population.

8. Conclusion

Migraine is common, affecting about 11.6% of people worldwide, and it is more frequent in females. Stress and disturbed sleep are the triggers reported most often. Self-medication with over-the-counter analgesics is widespread and often happens without a confirmed diagnosis. Awareness of triggers, headache diaries, accurate diagnosis using ICHD-3 criteria and pharmacist-led counselling on responsible analgesic use can lower the burden of migraine and the risk of medication-overuse headache. We still need well-designed studies that measure prevalence, triggers and self-medication together, particularly in India.

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