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Factors contributing to inaccurate migraine diagnosis: a prospective study at a tertiary hospital in Southern Thailand

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Abstract

Background Migraine is a common and disabling neurological disorder, yet diagnostic accuracy remains suboptimal, especially in non-specialist settings. Misdiagnosis may lead to delayed treatment, medication overuse, and reduced quality of life. The objective of this study was to estimate the proportion of patients with migraine attending the headache clinic who were misdiagnosed or not diagnosed as having migraine before attending the headache clinic, and to identify factors associated with inaccurate migraine diagnosis among patients before attending a tertiary hospital in Southern Thailand.

Methods A prospective, cross-sectional study was conducted at Songkhla Hospital between July 2024 and April 2025. Adult patients (≥ 18 years) with a final migraine diagnosis confirmed by two blinded independent neurologists were enrolled. Participants were divided into two groups: (1) an appropriate diagnosis group, defined as patients who received a correct diagnosis of migraine at their initial consultation with any physicians prior to attending the headache clinic; and (2) an inappropriate diagnosis group, defined as patients who were previously misdiagnosed with another headache disorder or had not been diagnosed with migraine before their headache clinic visit. Data on demographics, clinical features, and the specialty of the first attending physician were analyzed using univariable and multivariable logistic regression.

Results 90 patients were included (87.8% female, mean age 43.4 ± 14.8 years). 43.3% had been misdiagnosed at their initial visit. The most common incorrect diagnoses were tension-type headache and sinusitis. Multivariable analysis identified five independent factors significantly associated with inappropriate diagnosis: male sex (adjusted OR 7.77, 95% CI 1.07–56.50, $p = 0.043$), bilateral headache (aOR 3.90, 95% CI 1.25–12.13, $p = 0.019$), lack of worsening by physical activity (aOR 5.09, 95% CI 1.54–16.89, $p = 0.008$), presence of vertigo/dizziness (aOR 4.39, 95% CI 1.22–15.83, $p = 0.024$) and initial consultation with a non-neurologist (aOR 7.92, 95% CI 2.63–23.88, $p < 0.001$),.

Conclusion Misdiagnosis of migraine remains frequent in clinical practice, particularly among patients initially evaluated by non-neurologists. Atypical symptom profiles—such as bilateral pain, lack of activity-related exacerbation,

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or associated vertigo—contribute to diagnostic inaccuracy. Enhanced awareness and targeted education for primary physicians are essential to improve diagnostic precision and reduce treatment delay.

Keywords Migraine, Misdiagnosis, Diagnostic accuracy, Headache, Primary care, Thailand

Introduction

Migraine is one of the most prevalent and disabling neurological disorders worldwide, affecting approximately 17.9% of women and 10.6% of men [1]. It ranks among the top five causes of years lived with disability (YLDs) globally, with a particularly high burden during the most productive years of life [1, 2]. The complex and heterogeneous symptomatology of migraine—including unilateral or bilateral headache, sensory hypersensitivity, nausea, aura, and vestibular symptoms—often complicates accurate diagnosis.

Accurate and timely migraine diagnosis is essential for initiating appropriate acute and preventive treatment, reducing disability, and avoiding unnecessary investigations [3]. Conversely, delayed or incorrect diagnosis contributes to disability, reduced quality of life, increases the risk of medication overuse headache and chronic migraine transformation, and places significant economic strain on both patients and healthcare systems [4, 5].

In low- and middle-income countries, such as those in Southeast Asia, cultural and systemic healthcare factors exacerbate these diagnostic challenges. Migraine awareness among patients is relatively low, and individuals often first seek care from general practitioners rather than neurologists [6]. Studies from Thailand report migraine prevalence ranging from 20% to 25% among adults, yet diagnostic accuracy remains limited [7]. Many patients undergo unnecessary neuroimaging or prolonged symptomatic treatment before receiving an accurate diagnosis [8].

Despite clear diagnostic criteria outlined by the International Classification of Headache Disorders, 3rd edition (ICHD-3), migraine remains underdiagnosed and frequently misclassified in clinical practice [9]. Global evidence indicates that up to 50% of migraine patients are not accurately diagnosed and are instead labeled as having tension-type headache, sinusitis, or stress-related pain [8, 10, 11]. Several factors contribute to misdiagnosis. These include limited training in headache medicine among non-neurologists, unfamiliarity with diagnostic criteria, limited time in outpatient clinic, and unusual presentations of migraine such as bilateral headache or vertiginous symptoms [7, 12].

Understanding the clinical characteristics and demographic profiles of patients with headache is vital for improving local diagnostic pathways, enhancing training for frontline physicians, and optimizing patient referral to neurologists or specialized headache clinics. Therefore, the primary objective of this study was to determine the proportion of patients with migraine attending the headache clinic who were misdiagnosed or not diagnosed as having migraine prior to attending the headache clinic, and to identify the clinical and system-level factors associated with inaccurate migraine diagnosis among patients before attending the Neurology and Headache Clinics at Songkhla Hospital.

Methods

Study design and setting

This was a cross-sectional observational study with an exploratory design investigating factors associated with inappropriate migraine diagnosis. The study was conducted at the Neurology and Headache Clinics of Songkhla Hospital, a tertiary care center in Southern Thailand. The clinic operates two sessions per week and provides care for an estimated total of more than 700 headache-related visits annually, encompassing both new and follow-up consultations. The headache clinic has the capacity to accommodate approximately 3 new patients per week. Our clinic receives referrals from 8 district hospitals in Songkhla Province and 5 provincial hospitals in Southern Thailand. Our services include an interventional clinic for headache patients requiring procedures such as onabotulinumtoxin A injections and peripheral nerve blocks, as well as a comprehensive headache clinic with a multidisciplinary team, including neurologists, physiotherapists, and practitioners of traditional Thai medicine, to provide holistic care for migraine patients. The study period for patient recruitment and data collection was from July 2024 to April 2025. Ethical approval was obtained from the Institutional Review Board of Songkhla Hospital (SKH IRB2024-Md-In3-1084). All participants provided informed consent before enrollment.

Participants

Patients aged 18 years and older who were referred to or consulted for a first visit at the Neurology and Headache Clinics of Songkhla Hospital and received a definitive diagnosis of migraine by two independent, blinded neurologists (KS and SS) during the study period were recruited between July 2024 and April 2025. The diagnosis of migraine was established based on the ICHD-3 criteria [9]. Patients diagnosed with secondary headache disorders, such as subdural hematoma or intracranial hypotension, were excluded. Furthermore, to ensure homogeneity in the diagnosis of migraine, patients with discordant diagnoses between the two blinded neurologists were also excluded.

Data collection

Detailed clinical data were collected through face-to-face interviews and reviews of medical records, including referral documents. Patient data included age, sex, educational level, and headache clinical characteristics such as localization, lateralization, character, associated symptoms, comorbidities, first diagnosis and the specialist physician who made the diagnosis, time to definitive diagnosis of migraine by a neurologist, and history of treatment, including abortive and preventive medications and medication overuse headache.

Patients were classified into two groups: appropriate migraine diagnosis and inappropriate migraine diagnosis. The appropriate diagnosis group included individuals who had received a correct diagnosis of migraine at their initial consultation with any physician (e.g., general practitioners, internal medicine physicians, ophthalmologists, otolaryngologists, or rehabilitation physicians) before enrollment in the headache clinic. In contrast, the inappropriate diagnosis group included individuals who had not been previously identified as having migraine despite presenting with symptoms consistent with migraine, or who had received an incorrect alternative diagnosis (e.g., tension-type headache, sinus headache [headache attributed to disorders of the nose or paranasal sinuses]) before enrollment in the headache clinic.

Statistical analysis

Patients' clinical and demographic characteristics were summarized using mean and standard deviation (SD) for continuous variables, and as frequency and percentage for categorical variables. Characteristics were compared between the appropriate and inappropriate diagnosis groups using independent t-tests or Mann-Whitney U test for continuous variables and Fisher's exact test for categorical variables, as appropriate. Univariable logistic regression analysis was conducted to assess the association between individual and inappropriate migraine diagnosis, presented as univariable odds ratios (uORs) with 95% confidence intervals (CI). Subsequently, multivariable logistic regression analysis was performed to identify independent factors associated with inappropriate diagnosis, with factors showing a p-value of <0.2 in univariable analysis considered for inclusion in the multivariable model. Results from the multivariable model are reported as multivariable odds ratios (mORs) with 95% CIs. A p-value of <0.05 was considered statistically significant for all analyses. All statistical analyses were performed using Stata/SE 17.0 (StataCorp, College Station, TX, USA).

Results

Patient characteristics

A total of 90 patients were included in the analysis (Fig. 1), of whom 87.8% were female. The mean age was 43.4 ± 14.8 years. Of all patients, 51 (56.7%) received an

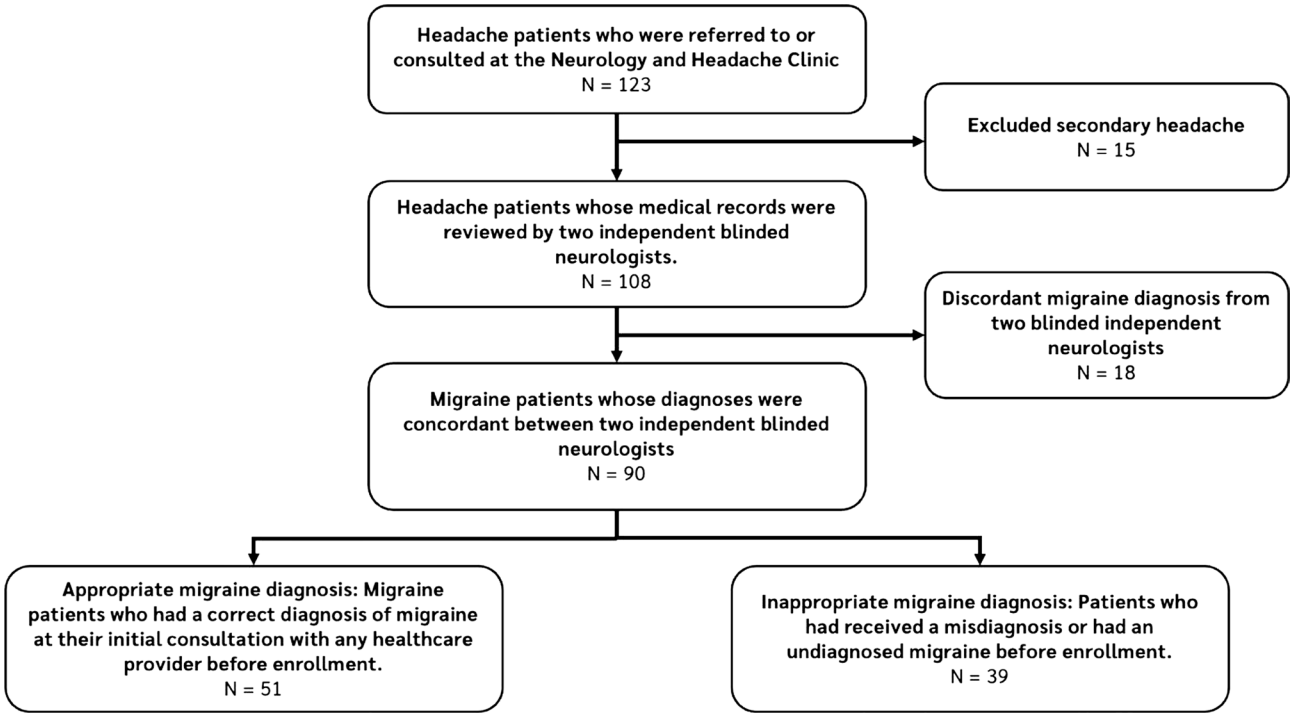

Fig. 1 Flow chart of this study

Table 1 Demographic and general characteristics of patients by diagnosis group

Characteristic	Appropriate Diagnosis (*n* = 51)	Inappropriate Diagnosis (*n* = 39)	*p*-value
Female, n (%)	48 (94.1)	31 (79.5)	0.05
Age, years (mean ± SD)	43.4 ± 14.4	45.7 ± 15.5	0.48
Education level, n (%)			0.83
Below bachelor's degree	27 (52.9)	22 (56.4)	
Bachelor's degree or higher	15 (29.4)	11 (28.2)	
Family history of migraine, n (%)	18 (35.3)	8 (20.5)	0.16
Comorbidity, n (%)			1.00
No	23 (45.1)	17 (43.6)	
Yes	28 (54.9)	22 (56.4)	
Each Comorbidity, n (%)			
- Hypertension	8 (15.7)	7 (18.0)	0.78
- Diabetes mellitus	5 (9.8)	1 (2.6)	0.23
- Any psychiatric disorder	4 (7.8)	5 (12.8)	0.49
Duration of illness, months (mean ± SD)	97.6 ± 103.4	143.0 ± 144.3	0.31
First attending doctor, n (%)			< 0.005*
Neurologist	16 (31.4)	2 (5.1)	
Non-neurologist	35 (68.6)	37 (94.9)	
Headache frequency (days/month), n (%)			0.48
1–4	14 (27.5)	8 (20.5)	
5–10	11 (21.6)	5 (12.8)	
11–14	6 (11.8)	4 (10.3)	
15–29	9 (17.7)	13 (33.3)	
Daily	11 (21.6)	9 (23.1)	

* Statistically significant (p value < 0.05)

All continuous data is presented as mean (SD). All categorical data is presented as a number (percentage)

appropriate diagnosis of migraine at their initial visit, while 39 (43.3%) had an inappropriate diagnosis prior to neurologist consultation. The initial diagnoses were made by various specialists, including neurologists (19.9%), general practitioners (28.9%), general medicine physicians (35.6%), and other specialists—such as ophthalmologists, rehabilitation physicians, and emergency physicians (15.6%). The most common initial misdiagnoses were tension-type headache (41.0%), sinus headache or headache attributed to disorders of the nose or paranasal sinuses (28.2%), and myofascial pain syndrome (5.1%). Additionally, 25.7% of patients were undiagnosed, having been recorded as unspecified chronic headache or headache. Patients with inappropriate diagnoses were significantly more likely to have been initially evaluated by a non-neurologist compared with those correctly diagnosed (94.9% vs. 68.6%, $p < 0.003$). Demographic data are summarized in Table 1.

Table 2 Clinical characteristics of headaches

Clinical Feature	Appropriate Diagnosis (*n* = 51)	Inappropriate Diagnosis (*n* = 39)	*p*-value
Localization of headache, n (%)			
Frontal	9 (17.7)	10 (25.6)	0.44
Temporal	44 (86.3)	31 (79.5)	0.41
Occipital	33 (64.7)	21 (53.9)	0.39
Orbital	19 (37.3)	16 (41.0)	0.83
Lateralization, n (%)			
Unilateral	37 (72.6)	21 (53.9)	0.08
Bilateral	10 (19.6)	15 (38.5)	< 0.05
Both sides alternately	4 (7.8)	3 (7.7)	1.00
Character of pain, n (%)			
Throbbing	30 (58.8)	19 (48.7)	0.40
Heaviness	27 (52.9)	22 (56.4)	0.83
Band-like	28 (54.9)	21 (53.9)	1.00
Stabbing	19 (37.3)	13 (33.3)	0.83
Burning	6 (11.8)	4 (10.3)	1.00
Cervical pain	22 (43.1)	23 (59.0)	0.20
Associated features, n (%)			
Aura	18 (35.3)	11 (28.2)	0.50
Nausea	30 (58.8)	25 (64.1)	0.67
Vomiting	16 (31.4)	12 (30.8)	1.00
Photophobia	21 (41.2)	14 (35.9)	0.67
Phonophobia	19 (37.3)	13 (33.3)	0.87
Worsening with physical activity	33 (64.7)	15 (38.5)	0.019*
Vertigo/dizziness	14 (27.5)	15 (38.5)	0.36
Cranial autonomic symptoms	17 (33.3)	19 (48.7)	0.19
Medication overuse headache (MOH)	16 (31.4)	17 (43.6)	0.27

* Statistically significant (p value < 0.05)

All continuous data is presented as mean (SD). All categorical data is presented as a number (percentage)

Clinical characteristics

Headache localization and accompanying symptoms are summarized in Table 2. The temporal region was the most common site of headache, reported by 83.3% of all patients. A bilateral headache pattern was more frequent among patients in the inappropriate diagnosis group than in the appropriate diagnosis group ((38.5% vs. 19.6%, $p = < 0.05$). A smaller proportion of patients in the inappropriate diagnosis group reported worsening with physical activity (38.5% vs. 64.7%, $p = 0.019$). Vertigo or dizziness occurred slightly more often in the inappropriate group (38.5% vs. 27.5%, $p = 0.363$). No significant differences were observed in the prevalence of nausea, vomiting, photophobia, or phonophobia between groups.

In the univariable analysis of demographic and general characteristics (Table 3), several variables showed significant or near-significant associations with inaccurate migraine diagnosis. Patients who were male were more likely to have been misdiagnosed (uOR 4.1, 95% CI 1.0–16.8, $p = 0.047$). A non-neurologist as the first attending

Table 3 Univariable logistic regression analysis for inappropriate migraine diagnosis (Demographic and general Characteristics)

Characteristic	uOR	95% CI	*p*-value
Male	4.1	1.0–16.8	< 0.05*
Age (years), mean ± SD	1.0	0.9–1.0	0.48
Education (ref: < Bachelor's)			
Bachelor's degree or higher	0.8	0.4–2.0	0.74
Family history of migraine	2.1	0.8–5.6	0.13
Comorbidity	1.1	0.4–2.5	0.89
- Hypertension	0.8	0.3–2.6	0.78
- Diabetes mellitus	4.1	0.5–36.9	0.20
- Psychiatric disease	0.6	0.1–2.3	0.44
Duration of illness (months)	1.0	0.9–1.0	0.09
First attending doctor			
Neurologist	0.1	0.0–0.6	< 0.01*
First attending doctor			
Non-neurologist	8.5	1.8–39.5	< 0.01*
Frequency of headache			
5–10 days	0.8	0.2–3.1	0.74
11–14 days	1.2	0.2–5.4	0.84
15–29 days	2.5	0.7–8.5	0.13
Daily	1.4	0.4–4.9	0.57

* Statistically significant (p value < 0.05)

Table 4 Univariable logistic regression analysis for inappropriate migraine diagnosis (Clinical Characteristics)

Clinical Feature	uOR	95% CI	*p*-value
Localization of headache			
Frontal	1.6	0.6–4.4	0.36
Temporal	0.6	0.2–1.8	0.40
Occipital	0.6	0.3–1.5	0.30
Orbital	1.2	0.5–2.7	0.72
Others	2.6	1.1–6.1	0.03*
Lateralization			
Bilateral	2.6	1.0–6.9	< 0.05*
Both sides alternately	1.3	0.3–6.5	0.73
Character			
Heaviness	1.2	0.5–2.7	0.74
Band-like	0.9	0.4–2.2	0.92
Stabbing	0.8	0.3–2.0	0.70
Burning	0.8	0.2–3.3	0.82
Cervical pain	1.9	0.8–4.4	0.14
Associated features			
Aura	0.7	0.3–1.8	0.48
Nausea	1.3	0.5–2.9	0.61
Vomiting	0.9	0.4–2.4	0.95
Photophobia	0.8	0.3–1.9	0.61
Phonophobia	0.8	0.4–2.0	0.70
No worsening with activity	2.9	1.2–6.9	0.02*
Vertigo/dizziness	1.6	0.7–4.0	0.27
Autonomic symptoms	1.9	0.8–4.5	0.14
Medication overuse headache	1.6	0.7–4.0	0.24

* Statistically significant (p value < 0.05)

Table 5 Multivariable logistic regression analysis for inaccurate diagnosis

Factor	Adjusted OR (95% CI)	*p*-value
Male sex	7.77 (1.07–56.50)	< 0.05*
Non-neurologist as first physician	7.92 (2.63–23.88)	< 0.001*
Bilateral headache	3.90 (1.25–12.13)	0.02*
No worsening by physical activity	5.09 (1.54–16.89)	< 0.01*
Vertigo/dizziness	4.39 (1.22–15.83)	0.02*

* Statistically significant (p value < 0.05)

physician was strongly associated with diagnostic inaccuracy (uOR 8.5, 95% CI 1.8–39.5, $p = 0.007$), while those initially evaluated by a neurologist had markedly lower odds (uOR 0.1, 95% CI 0.0–0.6, $p = 0.007$). Longer duration of illness demonstrated a trend toward significance ($p = 0.092$), whereas age, education level, family history of migraine, comorbidity, and headache frequency were not significantly associated with diagnostic accuracy.

Regarding clinical features (Table 4), bilateral headache was significantly associated with inappropriate diagnosis (uOR 2.6, 95% CI 1.0–6.9, $p = 0.048$), as was pain in atypical or "other" locations (uOR 2.6, 95% CI 1.1–6.1, $p = 0.030$). Patients whose headaches were not aggravated by physical activity had higher odds of misdiagnosis (uOR 2.9, 95% CI 1.2–6.9, $p = 0.015$). Other headache characteristics—including pain quality (throbbing, heaviness, band-like, stabbing, or burning) and associated symptoms such as nausea, photophobia, phonophobia, aura, and medication overuse—did not show statistically significant associations with diagnostic accuracy.

In the multivariable logistic regression model, five independent factors remained significantly associated with an inaccurate migraine diagnosis. Male was associated with a markedly higher likelihood of misdiagnosis (adjusted OR 7.77, 95% CI 1.07–56.50, $p = 0.043$). Patients whose headaches did not worsen with physical activity were also more likely to be inaccurately diagnosed (adjusted OR 5.09, 95% CI 1.54–16.89, $p = 0.008$). Having a non-neurologist as the first attending physician was a strong predictor of diagnostic inaccuracy (adjusted OR 7.92, 95% CI 2.63–23.88, $p < 0.001$). In addition, patients presenting with bilateral headache (adjusted OR 3.90, 95% CI 1.25–12.13, $p = 0.019$) and those reporting vertigo or dizziness (adjusted OR 4.39, 95% CI 1.22–15.83, $p = 0.024$) were significantly more likely to have received an inappropriate initial diagnosis as shown in Table 5.

Discussion

Our study investigated clinical and system-level factors associated with inaccurate migraine diagnosis in a tertiary hospital setting in Southern Thailand. We found that nearly half of the patients (43.3%) had been previously misdiagnosed or remained undiagnosed before receiving a definitive migraine diagnosis by neurologists.

Factors contributing to inappropriate diagnosis included male sex, bilateral headache, absence of worsening with physical activity, and the presence of vertigo or dizziness. Moreover, patients with inappropriate diagnoses were more likely to have been initially evaluated by a non-neurologist, highlighting the impact of both patient characteristics and healthcare system factors on diagnostic accuracy.

Inaccurate migraine diagnosis is relatively common. Our findings are consistent with previous studies from both Asian and Western contexts, which reported misdiagnosis rates ranging from 30% to 60% among migraine patients [13–15]. These results underscore that diagnostic inaccuracy remains a major barrier to optimal headache care, even within tertiary-level healthcare systems. Several factors contribute to inappropriate diagnosis, including insufficient headache education. According to a survey by the American Headache Society (AHS), medical students receive, on average, only one hour of preclinical instruction and two hours of clinical instruction related to headache medicine, which may be inadequate for managing a highly prevalent condition such as migraine [16]. Other contributing factors include limited awareness of migraine among healthcare providers and delays in referral, as in Thailand, patients may wait at least 1.5 months to see a neurologist [17]. In addition, limited time spent on outpatient migraine care may contribute to diagnostic challenges. According to the American Migraine Communication Study, physicians spend an average of only 12 min per visit, which may be insufficient for comprehensive management [18].

One healthcare system–related factor contributing to inappropriate migraine diagnosis is initial evaluation by a non-neurologist. Non-neurologists may have limited awareness and training in headache medicine [19, 20]. Furthermore, in low- and middle-income countries, the number of neurologists may be insufficient to meet the demand for specialized headache care. In Southeast Asian countries, for example, there are only 0.07 to 2.33 neurologists per 100,000 population [21]. Therefore, addressing this issue may require increasing opportunities for formalized headache education for healthcare workers at all levels [6].

Clinical headache characteristics also played an important role in diagnostic accuracy. Bilateral headache, absence of worsening with physical activity, and associated vertigo or dizziness were all significantly associated with misdiagnosis. These atypical features may have led clinicians to classify cases as tension-type headache, cervicogenic headache, or vestibular disorders rather than migraine. Importantly, such atypical features are also relatively common in Asia, especially in Thailand. In a previous study by Phanthumchinda et al., bilateral headache was observed in 37.6% of patients, while vertigo was reported in 12.7% of cases [7]. Another study by Wang et al. in several Asian countries, including Taiwan, South Korea, and Thailand, reported that only 52.7% of migraine patients experienced aggravation of headache by physical activity, while dizziness was present in 55.3% of patients [22]. Therefore, migraine presentation in Asian populations, including Thailand, may frequently exhibit atypical features [23].

Interestingly, male sex was independently associated with diagnostic inaccuracy, suggesting potential gender bias in clinical assessment. Although male migraine patients exhibit headache characteristics similar to those of females, they may less frequently present with unilateral pain, pulsating quality, or aggravation by movement, and their headache severity may be lower. Additionally, accompanying symptoms such as nausea, vomiting, photophobia, and phonophobia—which are core criteria of a migraine attack—may be less prominent in men. This atypical presentation in male patients may be partly attributable to the antinociceptive effects of testosterone, which could influence symptom expression and contribute to diagnostic challenges in men with migraine [24, 25].

Limitations and future direction

This study has several limitations. First, as a single-center study conducted in a tertiary hospital, the findings may not be generalizable to all healthcare settings, particularly rural or community-based clinics. Second, due to the cross-sectional design, causal relationships between clinical characteristics and diagnostic inaccuracy cannot be inferred. Third, data regarding initial misdiagnoses were based partly on patient recall and medical records, introducing potential recall and documentation bias. Fourth, the relatively small sample size may have limited the statistical power to detect associations with less common variables, such as aura or cranial autonomic symptoms. Additionally, our cohort was newly established and did not yet include other specialists, such as psychiatrists or neuro-otologists. Therefore, psychiatric comorbidities may have been underestimated, as systematic screening was not performed and diagnoses were based solely on medical records. Similarly, patients presenting with vertigo or dizziness were not comprehensively evaluated, which may have affected the accuracy of these diagnoses. Finally, this study did not assess factors contributing to misdiagnosis or undiagnosis due to the relatively small sample size. However, in the future, we plan to collect additional data to allow for a more comprehensive evaluation of factors influencing misdiagnosis or undiagnosis in patients with migraine.

To build upon the findings of this study, which identified multiple factors contributing to inaccurate migraine diagnosis, certain headache characteristics—such as

male sex, bilateral headache, absence of worsening with physical activity, and accompanying vertigo—should be regarded as features warranting particular diagnostic attention in Thailand. The implementation of structured headache education programs, standardized clinical flowcharts, and integrated referral pathways for patients presenting with these characteristics may facilitate earlier recognition and timely management of migraine, ultimately improving patient outcomes. In addition, the incorporation of a multidisciplinary care model, including specialists such as neuro-otologists and psychiatrists, may further enhance diagnostic accuracy and optimize the comprehensive management of patients with migraine.

Conclusion

Inaccurate migraine diagnosis remains a substantial challenge in tertiary hospital practice in Southern Thailand, affecting nearly half of patients prior to neurologist consultation. Factors independently associated with misdiagnosis included male sex, bilateral headache, lack of activity-related worsening, vertigo or dizziness, and initial evaluation by a non-neurologist. These findings highlight the need for improved clinician education, standardized headache diagnostic protocols, and enhanced collaboration between general practitioners and neurologists. Strengthening diagnostic accuracy will facilitate timely management and improve the overall quality of migraine care across all levels of the healthcare system.

Abbreviations

ICHD-3	International Classification of Headache Disorders 3rd edition
MOH	Medication overuse headache
YLDs	Years lived with disability

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Author contributions

KS contributed to the study concept, study design, data analysis and data interpretation KS and PA drafted the first manuscript. All authors contributed to the study concept, study design, data interpretation, revising the article, and gave final approval of the version to be published and agreed to be accountable for all aspects of the work.

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Data availability

The original data was kept with the first author (KS). Data could be shared upon request.

Declarations

Ethics approval and consent to participate

Approval was obtained from the ethics committee of the institutional review board of Songkhla Hospital (SKH IRB2024-Md-In3-1084). The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Competing interests

The authors declare no competing interests.

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