

Research Article

# General Practitioners' Knowledge in the Management of Headaches on First Contact Health Centres in Abidjan, Ivory Coast

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## Abstract

**Background:** Headaches can be detrimental to patients if they are inadequately managed. **Objective:** Our aim was to study the diagnostic and therapeutic knowledge of General Practitioners (GPs) in relation to headache. **Methods:** We conducted a cross-sectional, descriptive, questionnaire-based study of general practitioners from 1 January to 28 February 2022 in Abidjan. The questionnaire focused on the type of headache patients present to the clinic and GPs' diagnostic and therapeutic pattern with regard to headache. **Results:** 200 GPs were surveyed. In terms of diagnostic habits, GPs had poor habits regarding the characteristics of headaches, apart from the site, type and duration, which were 'always' sought in 79.5%, 74.5% and 70% of cases respectively. They were also not very familiar with the patient's history, apart from high blood pressure, which was 'always' sought in 78.5% of cases. Regarding headache disability, the habit was poor, as it was assessed 'always' and 'often' in 2.5% and 48% of cases respectively. GPs were also unaccustomed to physical examination for neurological signs, with motor deficit and meningeal syndrome 'always' sought by 10.5% and 11% of GPs respectively. Indications for prescribing brain imaging were followed by GPs in 38.1% of cases. As for treatment habits, WHO level 1 analgesics were 'always' prescribed in 70% of cases, and level II analgesics 'often' prescribed in 68% of cases. Level 3 analgesics and Co analgesics were 'never' prescribed in 44% and 87.5% of cases respectively. Headache patients were mainly referred to neurologists (96%). **Conclusion:** This study highlighted a lack of diagnostic and therapeutic knowledge. This suggests that GPs should be given more training to improve headache management.

## Keywords

Diagnostic Knowledge, General Practitioner, Headache, Management

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## 1. Introduction

Headache is one of the most common and debilitating conditions in every country and region of the world. Global prevalence is estimated at 52.0%, with 15.8% of the world's population suffering from headache every day [1]. The most common types of headache are primary headaches, where the results of the neurological examination are generally normal and additional tests are not useful for diagnosis. These primary headaches are known as benign and are dominated by tension headache (26%) and migraine (14%) [1]. On the other hand, secondary headaches (caused by another condition) are the least frequent (18%) and are characterised by alarm signals or red flags that can threaten the vital prognosis [2].

GPs' knowledge or habits regarding headache vary according to geographical location and study. In Brazil, 63.5% of GPs reported prescribing routine opioids for migraine, and 32.7% confused curative drugs with those used for prophylaxis [3]. In Poland, 10% of GPs had a good knowledge of the diagnostic criteria for migraine [4]. In Egypt, only 4.2% of GPs had a good knowledge of migraine symptoms and management; around 45% of GPs referred their migraine patients to non-neurologists, and only 21% were aware of classic and new treatments [5]. In Cameroon, 85.7% of healthcare providers were unaware of the signs of headache severity (warning signs), and knowledge of primary headaches was scarce [6]. In Burkina-Faso, 80% of GPs had a good knowledge of migraine diagnostic criteria [7].

The quality of headache management therefore depends on GPs' knowledge of the diagnostic criteria for primary and secondary headaches [8]. Ignorance of these criteria can have a detrimental effect on patient morbidity and mortality.

In clinical practice, the GP must quickly rule out a secondary headache by looking for signs in favour. This necessarily involves, on the one hand, a thorough questioning to ascertain the characteristics of the headache and the patient's history, and on the other, a physical examination, especially a neurological one [9].

According to the Ivorian health pyramid, General Practitioners (GPs) are the first line of contact for patients suffering from headaches. The aim of this study was therefore to investigate their diagnostic and therapeutic habits with regard to patients suffering from headaches, in order to help improve their management.

## 2. Patients and Methods

### 2.1. Setting, Period and Place of the Study

The study was cross-sectional and descriptive, based on a questionnaire sent to GPs in first-contact urban health centres in the communes of Abobo (East and West) and Anyama in Abidjan. These were community-based health units, community-based urban health centres and medical-social centres. Abobo (130,000 inhabitants in 2021) is the second most

populous commune in Abidjan after Yopougon (1571,000 inhabitants in 2021). The commune of Anyama included 389,600 inhabitants in 2021. This study took place over a period of two months, from May to June 2022.

### 2.2. Inclusion Criteria

Only GPs present at the time of the survey in the health facilities concerned and who had given their informed consent were included.

### 2.3. Data Collection Method

A self-developed questionnaire, based on the practical recommendations for headache management, was used [10-12]. The questionnaire consisted of three parts: the first part concerned the characteristics of the GPs; the second and third parts described, respectively, the GPs' diagnostic and therapeutic practices.

Hard copies of the questionnaire were submitted directly to all eligible doctors in the centres concerned. Prior to this, however, they were sent an explanatory letter informing them that the aim of the survey was to identify their headache management habits. Each participant was given 30 minutes to complete the questionnaire, without the aid of any documents, before being collected on the spot.

### 2.4. Sampling

This was a probabilistic sampling based on the Cochrane formula. However, the level of knowledge (proportion) of GPs regarding headaches is not known in the scientific literature, and the majority of studies have focused on migraine. We therefore drew on three studies carried out in Burkina-Faso, Poland and Egypt. These studies reported good levels of knowledge of the diagnostic criteria for migraine without aura in 80.2%, 10% and 4.2% of cases respectively [4, 5, 7]. With these different levels of knowledge, and choosing a margin of error of 5% and a confidence level of 95%, our sample size varies between 62 and 245 GPs.

### 2.5. Variables Studied

The variables studied included

#### 2.5.1. Characteristics of Gps and Headache Patients Usually Seen in Consultation

Characteristics of Gps

- 1) Age Range
- 2) Gender
- 3) Number of years practicing medicine

Characteristics of Headache Patients Usually Seen in Consultation

- 1) Age Range
- 2) Gender
- 3) Average Number of Headache Patients Seen Per Consultation
- 4) Chronicity
- 5) Severity

### 2.5.2. Recommended Diagnostic Practices

1. Distinction between primary and secondary headaches in the face of a headache consultation.
2. Components of the interview
  - 1) Headache characteristics (location, duration, radiation, intensity, length of time, whether or not it is habitual, type, triggers, course, sedating factors), associated signs (visual disturbances, nausea and/or vomiting, fever).
  - 2) History (hypertension, diabetes, family history of headaches, signs of HIV immunodepression, head trauma).
3. Assessment of disability in terms of activities of daily living
3. Components of the physical examination
  - 1) Vital signs (blood pressure, pulse, temperature, weight)
  - 2) Minimum brief neurological examination in a GP consultation (to look for motor deficit and meningeal syndrome)
4. Reasons for prescribing brain imaging (brain CT scan, brain MRI)

### 2.5.3. Recommended Therapeutic Practices

1. Prescription drugs (WHO levels I, II, III and co-analgesics)
2. The appropriate medical speciality to which headache patients should be referred if necessary (neurology).

## 2.6. Outcome Criteria

Recommended diagnostic or therapeutic habits were rated as:

Good, if  $\geq 70\%$  of GPs complied with these habits.

Insufficient, if between 50% and 70% of GPs complied with these practices.

Poor, if  $< 50\%$  of GPs complied with these practices.

## 2.7. Statistical Analysis

The data were analysed using IBM SPSS version 26 statistical software. Qualitative data were presented as numbers and percentages, while quantitative data were expressed as averages. In some cases we calculated the average of the proportions.

## 2.8. Ethics

The survey forms were anonymous. We also obtained the authorisation of the senior managers of the various health

facilities concerned before carrying out the study. Written informed consent was obtained from participants and confidentiality of responses was ensured. The protocol was reviewed by the committee in charge of protocols at the Faculty of Medical Sciences in Abidjan.

## 3. Results

### 3.1. Characteristics of GPs and Patients Usually Seen in Consultation

This study included 200 GPs, 147 of whom were registered in the commune of Abobo and 53 in the commune of Anyama. Of the 200 GPs, 133 (66.5%) were male. The average age was 48.5 years (27-64). The most frequent number of years of practice for GPs was between 1 and 10 years (58.5%). The majority of GPs (71.5%) saw an average of more than 5 headache patients per consultation. These patients were generally aged between 25 and 44 (73%) and were predominantly women (73%). According to the GPs, 95.5% of the patients had been suffering from headaches for less than 3 months, and the majority (97%) were benign. Table 1 describes the socio-demographic characteristics of GPs and the profile of headache cases received by GPs.

### 3.2. Headache Diagnostic Habits

During consultations with headache patients, 88.5% of GPs stated that they were aware of the distinction between primary and secondary headaches.

The headache characteristics that were 'always' sought by GPs were predominantly location (79.5%), type (74.5%) and duration (70%). Associated signs included fever (82.5%). In terms of antecedents, hypertension was the most sought-after (78.5%). The disability caused by headaches was 'often' assessed by GPs in 48% of cases. Table 2 describes the questioning habits of GPs regarding headaches.

On physical examination, the components that were 'always' less frequently sought by GPs were predominantly neurological signs with motor deficit (10.5%) and meningeal syndrome (11%), Table 3. As for the reasons for prescribing brain imaging, the majority of GPs prescribed it in the presence of headache in an HIV immunosuppressed patient (81.8%), inaugural headache after the age of 50 (73.3%) and headache associated with a neurological sign (70.6%), Table 3.

### 3.3. Headache Treatment Habits

Level 1 analgesics were 'always' prescribed in 70% of cases; level 2 analgesics were 'often' prescribed in 68% of cases. On the other hand, level 3 analgesics and co-analgesics were 'never' prescribed in 87.5% and 44% of cases respectively (Figure 1). Furthermore, when necessary, headache

sufferers were referred to neurologists (96%), neurosurgeons (32.5%), psychiatrists (2%) and paediatricians (1.5%).

**Table 1.** Socio-demographic characteristics of GPs and profile of headache cases received by GPs.

	Number of GPs	Percentage
Socio-demographic characteristics of GPs		
Age ranges		
< 30	33	16.5
30-50	165	82.5
> 50	2	1
Gender		
Female	67	33.5
Male	133	66.5
Number of years practicing medicine		
[1, 11]	117	58.5
[11, 21]	46	23.0
[21, > ]	37	18.5
Profile of headache cases seen by GPs		
Average number of cases per consultation		
1	10	5
2	22	11
3	7	3.5
4	18	9
5	143	71.5
Age ranges		
< 25 years old	20	10
25 - 44 years old	146	73
> 44	34	17
Gender		
Male	54	27
Female	146	73
Chronicity		
< 3 months	191	95.5
> 3 months	9	4.5
Severity		
Benign	194	97
Severe	6	3

**Table 2.** Distribution of GPs' habits according to the components of questioning to look for in the presence of a headache (n = 200).

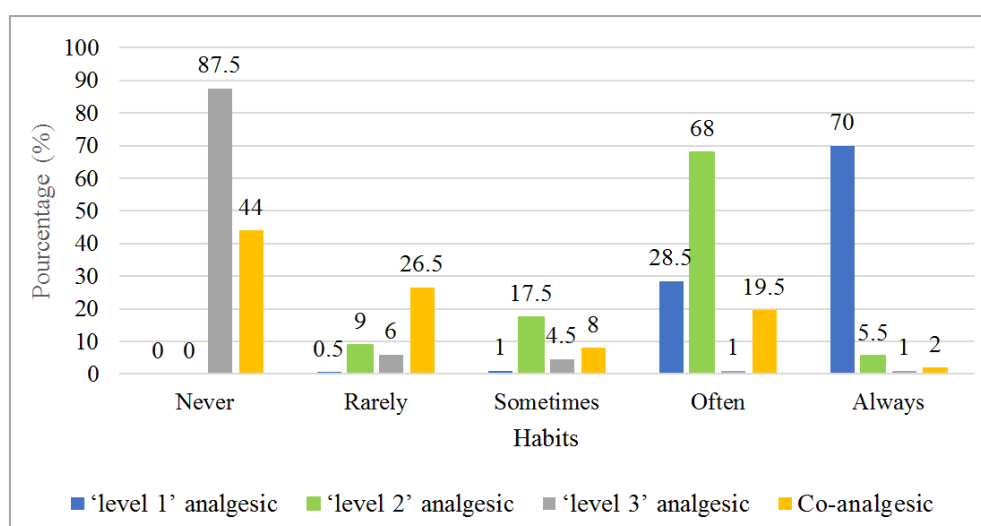
Components of questioning	Habit (%)				
	Never	Rarely	Sometimes	Often	Always
Characteristics of headaches					
Age	0	0	1	29	70
Whether usual or not	0.5	6	9	53.5	31
Mode on onset	0	1.5	3.5	40	55
Subsequent course	0	8.5	10.3	50	31.5
Location	0.5	0	1.5	18.5	79.5
Irradiation	0	11.5	5.5	56.5	26.5
Type	0	3.5	3	19	74.5
Triggering factors/sedation	0	4	6.5	54.5	35
Severity	1	9	12	63	15
Associated signs					
Nausea ± vomiting	0	3.5	3.5	73	20
Visual disturbances	0	43.5	12.5	32.5	11.5
Fever	0	1.5	1.5	14.5	82.5
Disability assessment	8.5	16	25	48	2.5
History					
Hypertension	0	3	2.5	16	78.5
Diabetes	2.5	44.5	13	29.5	10.5
Familial headaches	7	37.5	18.5	33	4
Signs of immunosuppression	6	12	7.5	71	3.5
Trauma	4	35.5	22.5	30.5	7.5

**Table 3.** Distribution of GP habits according to the objective signs to look for in the presence of a headache.

Components of the physical examination	Habit (%)				
	Never	Rarely	Sometimes	Often	Always
Vitals					
Blood pressure	0	2	0.5	11	82.5
Pulse	0	1	2	17.5	75.5
Temperature	0	0.5	2	3.5	90
Neurological signs					
Motor deficit	0	35	12.5	33.5	10.5
Meningeal syndrome	0	32.5	17.5	35.5	11

**Table 4.** Distribution of GPs according to compliance with the reasons for prescribing brain imaging in the presence of headache.

Reasons	Expected answers	Number (n= 187)	Percentage
All patients with headaches	False	1	0.5
Inaugural headache after the age of 50	True	137	73.3
Recent or recently worsening (< 7 days) and unusual headaches	True	9	4.8
Unusual headache in a known headache sufferer	True	10	5.3
Headache + meningeal syndrome	True	90	48.1
Habitual chronic Headache	False	51	27.3
Headache + neurological sign	True	132	70.6
Headache + change in general condition	True	7	3.7
Post-partum headache	True	5	2.7
Headache in HIV immunocompromised patients	True	153	81.8
Average proportion of expected responses = 31,8%			

**Figure 1.** Breakdown of GPs' habits according to the therapeutic groups prescribed for headaches.

## 4. Discussion

The aim of this study was to investigate the diagnostic and therapeutic habits of GPs with regard to headache in order to contribute to the improvement of headache management.

Our study shows that the headaches observed by our GPs mainly affected women and were essentially benign, as reported by Frese et al. in Germany [13]. It also shows that the diagnostic and therapeutic habits of GPs when managing headache were generally poor. In fact, apart from a few headache characteristics such as location, type and length of time, GPs' habits were poor in all other respects. Their habit was also poor in terms of history, apart from taking history of hypertension. With regard to assessing the handicap disabilities

associated with headaches, GPs' experience was poor. Furthermore, when patients with headache present, GPs were not in the habit of performing a brief neurological examination to look for motor deficits and meningeal syndrome. On the other hand, they did have a good habit of taking vital signs. GPs also had a poor habit of keeping to the reasons for prescribing brain imaging.

With regard to the therapeutic management of headaches, GPs were used to prescribing level 1 and 2 analgesics. On the other hand, they were not very familiar with level 3 analgesics and co-analgesics. Furthermore, GPs used to refer headache patients to neurologists when necessary.

These habits show that the management of patients suffering from headaches is also poor, since these headaches are poorly diagnosed and poorly treated. There may be various



reasons for this, such as the lack of training in first-contact health centres as opposed to university hospital centres, and the neurophobia of these GPs since the pre-doctoral period. This suggests the need for a good policy for raising awareness and training our GPs in headache management.

#### 4.1. Diagnostic Habits

Diagnosis of the type of headache, primary or secondary, depends on good questioning history taking and a good physical examination [14-18]. When a case of headache presents, the GP must always distinguish between these two types of headache, so as not to overlook an underlying condition that could be life-threatening [19, 20]. In our study, GPs were familiar with this distinction. However, GPs had a poor knowledge of history taking and physical examination. This habit could be linked either to the short time reserved for each patient in the consultation, due to their very large number, or to a lack of knowledge in the diagnosis of headache. This may lead to errors or delays in diagnosing certain serious conditions such as meningitis or meningoencephalitis, meningeal haemorrhage, stroke or intracranial expansion [21]. GPs were also used to taking patients' vital signs. This can be attributed to the paramedical staff (nurses and healthcare assistants) who systematically took patients' vital signs.

As regards the reasons for prescribing brain imaging, GPs' habits were poor. The prejudice could be severe in terms of morbidity and mortality linked to a delay or absence of aetiology and inappropriate treatment, or in terms of economic loss linked to the prescription of imaging that was poorly motivated for patients. In contrast to our results, Norwegian general practitioners generally had good practice regarding the reasons for prescribing imaging in the presence of headache. Almost all GPs (99%) used imaging for headaches with focal neurological symptoms, and 84% used imaging if the headache was not responding to treatment. Sixty-two percent of GPs reported using imaging if the patient had concerns and anxiety about brain tumor or other intracranial pathology. Sixty-four percent of GPs reported using imaging if worsening of a pre-existent headache [22]. Cerebral imaging is essentially indicated in the presence of secondary headache evoked on the basis of alarm signals [21, 23, 24].

#### 4.2. Therapeutic Habits

The WHO recommends using analgesics in a crescendo (level 1, then level 2 and, if necessary, level 3) depending on the intensity of the pain [25, 26]. In our study, level I analgesics were 'always' prescribed with a frequency of 70%, and level II analgesics 'often' prescribed at 68%. These are painkillers to which GPs are well accustomed and which do not impose any obvious constraints. On the other hand, prescribing level III analgesics or strong opioids appears to be complex, as it is linked to more specific recommendations, and this is a source of some anxiety for GPs. Co-analgesics or

adjuvant analgesics are drugs usually used for purposes other than pain relief, but which also have analgesic properties [27]. The high frequency of non-prescription of these two therapeutic classes (Level 3 analgesics, 87.5% and co-analgesics, 44%), reflects ignorance of their use by GPs on the one hand, and poor patient management on the other. In addition, the management of the most frequent headaches, such as migraines and tension headaches, also includes co-analgesics, which are underused by GPs. This suggests a need for GP training in headache treatment. Kristoffersen et al have identified difficulties in the management of headaches by GPs. They therefore suggested that more structured headache training for GPs could have a direct impact on better clinical outcomes and reduced costs [22]. In their study, Fejes et al. reported a prescription frequency of 19% for opioids and 10.8% for co-analgesics. On the other hand, the prescription rate for level I analgesics was 100% [28]. Dorette et al. also observed in their study that 36.1% of patients were prescribed level I analgesics, compared with 0.3% for co-analgesics [29].

When necessary, the majority of GPs (96%) in our study referred patients to neurologists. This is therefore a good practice among GPs and is in line with recommendations in the literature [8, 19]. However, Mehrotra et al. reported that 5% of GPs referred migraine patients to neurologists for migraine treatment [30].

Our study was based on a questionnaire concerning GPs' headache management habits or practices. As such, it may have limitations due to the fact that the results obtained from these practices are not derived from patient records but from GP responses, and may not reflect reality.

### 5. Conclusion

Our study highlights GP practices in the management of headaches. It shows that these habits are generally poor. It suggests that GP training in headache management should be initiated and reinforced to improve patient care.

### Abbreviations

GPs      General Practitioners

### Author Contributions

**Kouamé Léonard Kouassi:** Conceptualization, Formal Analysis, Investigation, Methodology, Project administration, Validation, Writing – original draft, Writing – review & editing

**Kouassi Cyrille Konan:** Conceptualization, Investigation, Project administration, Validation, Writing – original draft, Writing – review & editing

**Yves Broh:** Data curation, Software, Supervision, Validation, Writing – review & editing

**Stéphane Abbé:** Investigation, Resources, Supervision, Validation

**Ahya Nancy Essoin:** Resources, Supervision, Validation, Visualization

**Roxane Beuseize:** Investigation, Resources

**Nawa Samuel Yeo:** Software, original draft

**Mariam Ouattara-Doumbia:** Supervision, Validation

## Conflicts of Interest

The authors declare no conflict of interest related to this study.

## References

- [1] Stovner LJ, Hagen K, Linde M et al. The global prevalence of headache: an update, with analysis of the influences of methodological factors on prevalence estimates. *The Journal of Headache and Pain* (2022) 23: 34. <https://doi.org/10.1186/s10194-022-01402-2>
- [2] Do TP, Remmers A, Schytz HW et al. Red and orange flags for secondary headaches in clinical practice SNNOOP10 list. *Neurology* 2019; 92 (3): 134-44. <https://doi.org/10.1212/WNL.0000000000006697>
- [3] Silva MM, Schultze ACB, Cavalheiro BP et al. Profile and generalist physician knowledge about neurology in emergency department: headache management. *Arq Neuropsiquiatr* 2020; 78(1): 44-49. <https://doi.org/10.1590/0004-282X20190198>
- [4] Domitrz I, Lipa A, Roźniecki J. Migraine diagnosis and treatment in Poland: survey of primary care practitioners. *Polish Journal of Neurology and Neurosurgery* 2021, Volume 55, no. 4 pages: 380–386. <https://doi.org/10.5603/PJNNS.a2021.0045>
- [5] Fathy M, Sadek AE, Farag S et al. Dilemma of migraine diagnosis and management among non-neurologists. *Egypt J Neurol Psychiatry Neurosurg* (2021) 57: 118. <https://doi.org/10.1186/s41983-021-00371-8>
- [6] Garc ía-Azor ín D, Molina-S ánchez M, Gómez-Iglesias P et al. Headache education and management in Cameroon: a healthcare provider study. *Acta Neurol Belg* 2022 Feb; 122(1): 75-81. <https://doi.org/10.1007/s13760-021-01620-6>
- [7] Dabilgou AA, Drav é A, Kyelem JMA. et al. Knowledge, Attitudes, and Management of General Practitioners of the Hospital Districts of Ouagadougou about Migraine (Burkina Faso. *Pain Research and Management* Volume 2021. <https://doi.org/10.1155/2021/9327363>
- [8] Kennis K, Kernick D, O'Flynn N. Diagnosis and management of headaches in young people and adults: NICE guideline. *Br J Gen Pract. Ao ùt* 2013; 63(613): 443-445. <https://doi.org/10.3399/bjgp13X670895>
- [9] Schytz HW, Amin FM, Jensen RH et al. Reference programme: diagnosis and treatment of headache disorders and facial pain. Danish Headache Society, 3rd edition, 2020. *The Journal of Headache and Pain* (2021) 22: 22. <https://doi.org/10.1186/s10194-021-01228-4>
- [10] Moisset X, Mawet J, Guegan-Massardier E et al. French guidelines for the emergency management of headaches. *Douleurs: Évaluation - Diagnostic - Traitement* 2018; 19, 14 - 6. <https://doi.org/10.1016/j.neurol.2016.06.005>
- [11] Viera AJ, Antono B. Acute Headache in Adults: A Diagnostic Approach. *Am Fam Physician.* 2022; 106(3): 260-268.
- [12] Coll ège des Enseignants de Neurologie. Céphalée inhabituelle aiguë et chronique chez l'adulte et l'enfant. <https://www.cen-neurologie.fr/second-cycle/cephalee-inhabituelle-aigue-et-chronique-chez-ladulte-et-lenfant>
- [13] Frese T, Druckrey H, Sandholzer H. Headache in General Practice: Frequency, Management, and Results of Encounter. *International Scholarly Research Notices* Volume 2014. <https://doi.org/10.1155/2014/169428>
- [14] Bautista C, Grossman S. Somatosensory function, pain, and headache. In: Grossman SC, Porth CM. *Porth's Pathophysiology: Concepts of Altered Health States*. 9th ed. Philadelphia, PA: Wolters Kluwer; 2014: 422-451.
- [15] Bajwa ZH, Wootton RJ. Evaluation of headache in adults. Up To Date. December 10, 2014. <http://www.uptodate.com/contents/evaluation-of-headache-in-adults>
- [16] Hale N, Paauw DS. Diagnosis and treatment of headache in the ambulatory setting: a review of classic presentations and new considerations in diagnosis and management. *Med Clin North Am.* 2014; 98(3): 505-527. <https://doi.org/10.1016/j.mcna.2014.01.006>
- [17] Hainer BL, Matheson EM. Approach to acute head - ache in adults. *Am Fam Physician.* 2013; 87(10): 682-687.
- [18] Rizzoli P, Mullally WJ. Headache. *The American Journal of Medicine* (2018) 131, 17–24. <https://doi.org/10.1016/j.amjmed.2017.09.005>
- [19] Lee VME, Ang LL, Soon DTL et al. The adult patient with headache. *Singapore Med J* 2018; 59(8): 399-406. <https://doi.org/10.11622/smedj.2018094>
- [20] Winland-Brown JE, Keller MB. Neurological problems. In: Dunphy LM, Winland-Brown JE, Porter BO, Thomas DJ. *Primary Care: Art and Science of Advanced Practice Nursing*. 4th ed. Philadelphia, PA: F. A. Davis; 2015: 77-148.
- [21] Silberstein SD. Approach to the patient with head - ache. *Merck Manual.* April 2014. <http://www.merckmanuals.com/professional/neurologic-disorders/headache/ approach-to-the-patient-with-headache>.
- [22] Kristoffersen ES, Faiz KW, Hansen JM. The management and clinical knowledge of headache disorders among general practitioners in Norway: a questionnaire survey. *The Journal of Headache and Pain* 2021; 22: 136. <https://doi.org/10.1186/s10194-021-01350-3>
- [23] Holle D, Obermann M. The role of neuroimaging in the diagnosis of headache disorders. *Ther Adv Neurol Disord.* 2013; 6(6): 369-374. <https://doi.org/10.1177/1756285613489765>



- [24] Eigenbrodt AK, Ashina H, Khan S et al. Diagnosis and management of migraine in ten steps. *Rév. Nat. Neurol* 2021; 17(8): 501-514. <https://doi.org/10.1038/s41582-021-00509-5>
- [25] Anekar AA, Hendrix JM, Cascella M. WHO Analgesic Ladder. [Updated 2023 Apr 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. <https://www.ncbi.nlm.nih.gov/books/NBK554435/>
- [26] Carlsen LN, Stefansen S, Ahnfeldt-Møllerup P et al. Diagnostics and management of headache in general practice. *Family Practice*, 2024, 41, 470–476 <https://doi.org/10.1093/fampra/cmz121>
- [27] Libert F, Adam F, Eschalier A et al. Les médicaments adjuvants (ou co-analgésiques). *Douleur et Analgésie* 2006; 19(4): 91-97.
- [28] Fejes E, Feher G, Gurdan Z et al. Characteristics of Patients Referred To A Specialized Headache Clinic. *Scientific Reports* | (2020) 10: 1146. <https://doi.org/10.1038/s41598-020-58234-w>
- [29] Doretti A, Shestarić I, Ungaro D, et al. Headaches in the emergency department – a survey of patients' characteristics, facts and needs. *The Journal of Headache and Pain* (2019) 20: 100. <https://doi.org/10.1186/s10194-019-1053-5>
- [30] Mehrotra CN, Kanodia N, Shankar P et al. Knowledge, attitude and practice of general physicians related to migraine. *World J Pharm Sci* 2015; 3(12): 2470-2471.