Management of migraine and tension-type headache: an algorithm for pharmacists

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Introduction

Headache is one of the most common reasons patients seek help from healthcare practitioners. According to the Global Burden of Disease (GBD) study, headache disorders are among the most prevalent and disabling conditions worldwide. Approximately one-half (52%) of the adult population worldwide is affected by a headache disorder, with the estimated global prevalence of migraine and tension-type headaches (TTH) being 14% and 26% respectively.[1,2] Globally, 86% of people claim to have experienced head pain (either TTH or migraine) at some point in their life, and each day, 15.8% of the world's population have headache.[2,3] Saudi Arabia, South Africa, USA, India, Philippines, Indonesia, and Kenya have the highest prevalence of regular (weekly) head pain (31% or higher).[3]

Pharmacists are in a unique position, as they play an important role in the prevention and management of migraines and TTH.[4] They are often the first healthcare professionals that patients encounter when seeking relief for their head pain, with as many as 57% of headache sufferers seeking pain relief with non-prescription medication.

Most headache diagnoses are based entirely on patient history, and rarely does physical examination provide clues to diagnosis.[1] Although sometimes painful and debilitating, the majority of headaches can be treated with non-prescription painkillers and will disappear after a few hours. This, added to the large numbers of patients presenting to pharmacies for headache relief, without previously seeking advice from a doctor, makes it necessary for pharmacists to provide appropriate guidance and information to patients around headache management and analgesia, as well as signpost patients to onward care as necessary.[3]

The International Classification of Headache Disorders (ICHD) uses a variety of diagnostic criteria to differentiate between the various types of headache. Headache can be divided into two main categories: primary or secondary. A primary headache has no known underlying cause, whilst a secondary headache is the result of another condition causing traction on or inflammation of pain-sensitive structures. The most common primary headaches include migraine and TTH, with medication-overuse headache (MOH) a common secondary headache seen in pharmacy.[5]

Migraine, TTH, and MOH are of public health importance since they are responsible for high levels of disability and ill-health in the population. This article looks at these common types of headaches, along with their causes, treatment, prevention, and when to refer to a doctor.

Migraine headache

Migraine is a primary neurological condition that is characterised by recurrent episodes of headache with other associated symptoms such as nausea, vomiting, and sensitivity to sensory stimuli. Migraines with and without an aura, as well as TTH, as defined by the International Headache Society, are very common diseases all over the world. The one-year prevalence of migraine in adults is 6% among men and 15–18% among women.[6]

It is believed that migraine headaches are dependent upon the activation and sensitisation of the central trigeminal system. Migraine pain begins with the activation of trigeminal nerve fibres surrounding blood vessels. This activation triggers the release of vasoactive and pro-inflammatory neuropeptides, contributing to increased blood flow and plasma extravasation, eventually causing perivascular inflammation. This inflammation sensitises the trigeminal nerve cells to nonspecific stimuli, increasing pain perception. This trigeminal hyper-excitability, known as central sensitisation, results in allodynia and the prolongation of a migraine attack.[4]

Migraine is typically described as a unilateral headache, associated with a wide range of other symptoms that may occur before, during, and after the headache. In the hours to days before the onset of migraine headaches, the majority of patients report symptoms that may include feelings of

Table I: ICHD-3 diagnostic criteria for migraine with and without aura[7]

	Migraine without aura	Migraine with aura
A	At least five attacks fulfilling criteria B–D	At least two attacks fulfilling criteria B and C
B	Headache attacks lasting 4–72 hours (untreated or unsuccessfully treated)	One or more of the following fully reversible aura symptoms: 1. Visual 2. Sensory 3. Speech/language 4. Motor 5. Brainstem 6. Retinal
C	Headache has at least two of the following four characteristics: 1. Unilateral location 2. Pulsating quality 3. Moderate or severe pain intensity 4. Aggravation by or causing avoidance of routine physical activity	At least two of the following four characteristics: 1. At least one aura symptom spreads gradually over ≥ 5 minutes 2. Two or more aura symptoms occur in succession 3. Each individual aura symptom lasts 5–60 minutes 4. At least one aura symptom is unilateral 5. At least one aura symptom is positive 6. The aura is accompanied, or followed within 60 minutes, by headache
D	During headache, at least one of the following: 1. Nausea/vomiting 2. Photophobia and phonophobia	

fatigue, anorexia or food cravings, restlessness, and mood changes.[5] The underlying neurochemical changes leading to these preceding symptoms are not well understood. The ICHD, 3rd edition (ICHD-3), can be used to help with the clinical presentation and diagnosis of migraine (Table I).

Tension-type headache

TTH is the most common type of headache and has the highest economic cost, but is the least studied.[5] TTH affects more than 40% of the adult population worldwide.[1] As many as 90% of adults have had TTH.[8] TTH are more common in females and occurs at any age.[1] TTH is less likely than migraine to cause severe pain and functional impairment.[8] While sufferers of migraines are more likely to miss work, more lost work days are attributable to TTH.[8]

The pathophysiology of TTH is poorly understood, and although there may be a genetic element in the development of TTH, environmental factors likely play a larger role than in migraine. Tenderness of pericranial muscles, co-existing mood disorders, and mechanical disorders of the spine and neck may be contributing factors.[5]

The ICHD-3 subdivides TTH into three major categories based on frequency: infrequent episodic, frequent episodic, and chronic (Table II).

The symptoms, diagnosis, and treatment of TTH significantly overlap with migraine. It is therefore important to differentiate between the two types of headaches.[9] TTH often manifests in response to stress, anxiety, depression, emotional conflicts, and other stimuli (whereas migraine headaches arise from a complex interaction of neuronal and vascular factors, e.g. fatigue, fasting, menses, vasoactive substances in food, etc.).[4,9] Table III lists characteristics that differentiate TTH from migraine headaches.

Dangerous headaches

Most headaches are rarely a sign of something more serious and most people can manage them efficiently with non-prescription analgesics. However, anyone who experiences severe, persistent, recurrent, or worsening headaches should consult a doctor.

Distinguishing dangerous headaches from benign or low-risk headaches is a significant challenge because the symptoms

Table II: ICHD-3 diagnostic criteria for TTH

	Infrequent[a] or frequent[b] TTH	Chronic TTH
A	At least 10 episodes of headache fulfilling criteria B–D	Headache occurring on ± 15 days per month on average for > 3 months (± 180 days per year), fulfilling criteria B–D
B	Lasting from 30 minutes to 7 days	Lasting hours to days, or unremitting
C	At least two of the following four characteristics: 1. Bilateral location 2. Pressing or tightening (non-pulsatile) quality 3. Mild or moderate pain intensity 4. Not aggravated by routine physical activity	At least two of the following four characteristics: 1. Bilateral location 2. Pressing or tightening (non-pulsatile) quality 3. Mild or moderate pain intensity 4. Not aggravated by routine physical activity
D	Both of the following: 1. No nausea/vomiting 2. Either photophobia or phonophobia	Both of the following: 1. Only photophobia, phonophobia, or mild nausea 2. Neither moderate or severe nausea nor vomiting

[a]Infrequent TTH – Defined as pain on < 1 day per month on average
[b]Frequent TTH – Defined as pain on 1–14 days per month on average for > 3 months

Table III: Characteristics differentiating TTH from migraine headache[10]

	TTH	Migraine headache
Location	• Bilateral • Over the top of head, extending to base of skull	• Usually, unilateral
Nature of pain	• Varies from diffuse to tight, pressing, constricting pain	• Throbbing/pulsating • May be preceded by aura • Aggravated by routine physical activity
Onset	• Gradual	• Sudden
Duration	• 30 minutes to 7 days	• 4–72 hours

Table IV: Red flag signs and symptoms for referral[1,5,11-13]

Red flags		
Emergent (Immediate referral)	**Urgent**	**Indicators of secondary headaches**
Thunderclap onset • Severe headache with onset of pain within 5 minutes	Elderly patient: new headache with cognitive change	New headache that has recently started in a person older than 50 years of age
Symptoms of acute narrow-angle glaucoma • Painful red eye, misty vision, haloes and semi-dilated pupil	Frequent headaches (≥ 10 per month), change in headache pattern and severity, headaches lasting more than 72 hours	Unexplained focal signs
Infection symptoms • Fever (especially with stiff neck and reduced consciousness)		Atypical headaches
Neurological (related to the brain) symptoms • Stiff neck • Reduced consciousness • Change in personality • Cognitive dysfunction that has recently started • Neurological dysfunction that has recently started		Unusual headache precipitants
Symptoms of stroke • Drooping face, paralysis on one side of body, slurred/ jumbled speech		Unusual aura symptoms
		Aggravation by neck movement

can overlap.[1] The characteristics of dangerous headaches and associated red-flag symptoms that should be referred to a physician are listed in Table IV.

General treatment approach to migraine and TTH management

Management aims to ease the severity of symptoms and reduce functional impairment, rather than achieve the complete cessation of pain. As for any complex condition, both non-pharmacological and pharmacological management are required.[9] Appropriate treatment should consider the patient's medical comorbidities, preferences and needs, symptoms, and their frequency, severity, and impact on quality of life.[10] Additionally, it is very important to educate patients on the importance of limiting the use of non-prescription analgesics to no more than two days per week, as overuse of analgesics can lead to MOH.[4]

Non-pharmacological strategies

The first step to the management of headaches should include lifestyle changes. Table V provides some examples of non-pharmacological strategies.

Pharmacological treatment: basic analgesia[5,8,10,11]

Basic analgesia, with non-prescription analgesics such as paracetamol or nonsteroidal anti-inflammatory drugs (NSAIDs), is recommended for mild to moderate pain associated with migraine and TTH (Table VI). Opioids like codeine should not be routinely recommended owing to the high risk of developing MOH and the risk of withdrawal symptoms on cessation. If a treatment is effective, there should be a significant response within two hours (e.g. significant reduction or complete relief of pain). If this is not the case, an alternative treatment or combination treatment should be considered. It is very important to educate patients on the importance of limiting the use of analgesics to no more than two days per week, as overuse of analgesics can lead to MOH.[4]

Pharmacological strategies for migraine and TTH management

Paracetamol[4,13-15]

Paracetamol is a well-established analgesic and is often recommended as first-line drug treatment in mild to moderate

Table V: Non-pharmacological strategies[7,9,10]

Lifestyle changes	Migraine	TTH
Pay attention to food and beverages as they can trigger migraine attacks	Possible triggers include red wine (sulphites), aged cheeses, and chocolate.	
Good sleeping and eating patterns	Keep a regular schedule of sleep, exercise, and good nutrition. Poor sleeping and eating patterns are triggers for headaches.	Getting enough sleep.
Rearrange work or study areas to avoid physical strain	For example, moving computer screens to eye level. Lowering chairs so that thighs are parallel to the floor, using a lumbar roll to maintain good sitting posture, and using a phone headset instead of cradling the phone on the neck.	Improving sitting and standing posture.
Stretching	Gentle stretching exercises and relaxation techniques to prevent neck pain. Heat and ice to relieve neck pain as well as gentle stretching to help loosen tension in the neck is recommended.	Regular exercise and stretching.
Eyesight/emotional wellbeing		Having an eye test. Management of stress, anxiety, or depression.
Limit caffeine intake	Limiting caffeine intake to no more than two cups a day to avoid caffeine withdrawal headaches.	
Limit pain medication intake	Limiting the use of non-prescription pain medicines, or decongestants (such as pseudoephedrine) to no more than two days a week for headaches, to avoid MOH.	

pain states, including headaches. It has a central analgesic effect that is mediated by the inhibition of prostaglandin (PG) synthesis; through the activation of descending serotonergic pathways and an active metabolite influencing cannabinoid receptors.

Randomised, double-blind, placebo-controlled studies have documented the superiority of paracetamol over placebo in patients with migraine and TTH.[14,15] Paracetamol can also be combined with muscle relaxants such as orphenadrine, and this can also be used as an option should paracetamol alone not offer relief, especially when there is tension in the back of the head and/or neck.

Aspirin

Aspirin has analgesic and anti-inflammatory properties and is an irreversible inhibitor of the enzyme cyclo-oxygenase, which results in the direct inhibition of the biosynthesis of PGs from arachidonic acid. Aspirin is used for the relief of mild to moderate pain and acute inflammation. High-dose aspirin (900–1000 mg) has been established as an effective treatment option for acute migraine and TTH.[15]

Nonsteroidal anti-inflammatory drugs[4,13,16]

NSAIDs are a group of drugs that possess anti-inflammatory and analgesic properties due to reversible inhibition of cyclo-oxygenase and thus PG synthesis. Common non-prescription NSAIDs include ibuprofen, diclofenac, and naproxen. NSAIDs in general are a good starting point for acute migraines and TTH. They represent the most used acute therapy for both migraine and TTH.[16] Several clinical studies have demonstrated the efficacy of ibuprofen in the management of migraine, with doses ranging from 200 mg to 1 200 mg. Both the 200 mg and 400 mg tablets have been proven to provide clinical benefit two hours post-administration.

Table VI: Common non-prescription medicines to manage migraine and TTH[10,21]

Migraine	TTH
• Ibuprofen 400 mg 8 hourly • ASA 1 000 mg 8 hourly • Naproxen sodium 500–550 mg 8–12 hourly • Paracetamol 1 000 mg 4–6 hourly (max 4 g per 24 hours) • Diclofenac 50 mg 8 hourly • Adjuvants, e.g. caffeine • Fixed-dose combination analgesics (with codeine if necessary, however not recommended for routine use) • Ergots, triptans, anti-nausea (e.g. cyclizine)	• Ibuprofen 400 mg 8 hourly • ASA 1 000 mg 8 hourly • Naproxen sodium 500–550 mg 8–12 hourly • Paracetamol 1 000 mg 4–6 hourly (max 4 g per 24 hours) • Diclofenac 50 mg 8 hourly • Adjuvants, e.g. caffeine, muscle relaxants • Fixed-dose combination analgesics (with codeine if necessary, however not recommended for routine use)

Caffeine as an adjuvant[17,18]

Caffeine has been added to formulations containing aspirin, paracetamol, and other NSAIDs for some time and the effects of caffeine in combination with aspirin (and other NSAIDs) and paracetamol have been examined in detail.[18] Compared with analgesic medication alone, combinations of caffeine with analgesic medications, including paracetamol, aspirin, and NSAIDs, showed significantly improved efficacy in the treatment of patients with migraine or TTH, with favourable tolerability in the vast majority of patients.[17]

Multimodal analgesia[19]

Multimodal analgesia is a pharmacological method of pain management which combines various groups of medications for pain relief. The scientific rationale behind multi-target combinations is the therapeutic benefit that could not be achieved by the individual constituents and that the single substances of the combinations act together additively or even multiplicatively. As an example, the fixed-dose combination of acetylsalicylic acid (ASA), paracetamol, and caffeine provide more rapid and superior pain relief compared to ibuprofen. The major advantage of using such a fixed combination is that the active ingredients act on different but distinct molecular targets and thus can act on more signalling cascades involved in pain than most single analgesics without adding more side effects to the therapy. Common non-prescription combination analgesics contain combinations of paracetamol, aspirin, NSAIDs, caffeine, and codeine. There is sub-stantial clinical evidence that such a multi-component therapy is more effective than mono-component therapies. This broadens the array of therapeutic options and enables the completeness of the therapeutic

Table VII: Assessment and management of MOH[20]

Assess	Manage
• Taking prescription medicines for ≥ 10 days per month (e.g. ergots, triptans, combination analgesics, or codeine or other opioids); OR • Taking OTC analgesics for ≥ 15 days per month (e.g. paracetamol, NSAIDS, aspirin) • Occurs daily or nearly daily • Often the worst first thing • in the morning – after waking up • Tends to get worse when medicine is stopped	• Educate patient • Consider prophylactic medication • Provide an effective acute medication for severe attacks with limitations on frequency of use • Gradual withdrawal of combination analgesics with opioids • Abrupt (or gradual) withdrawal of paracetamol, NSAIDs, or triptans

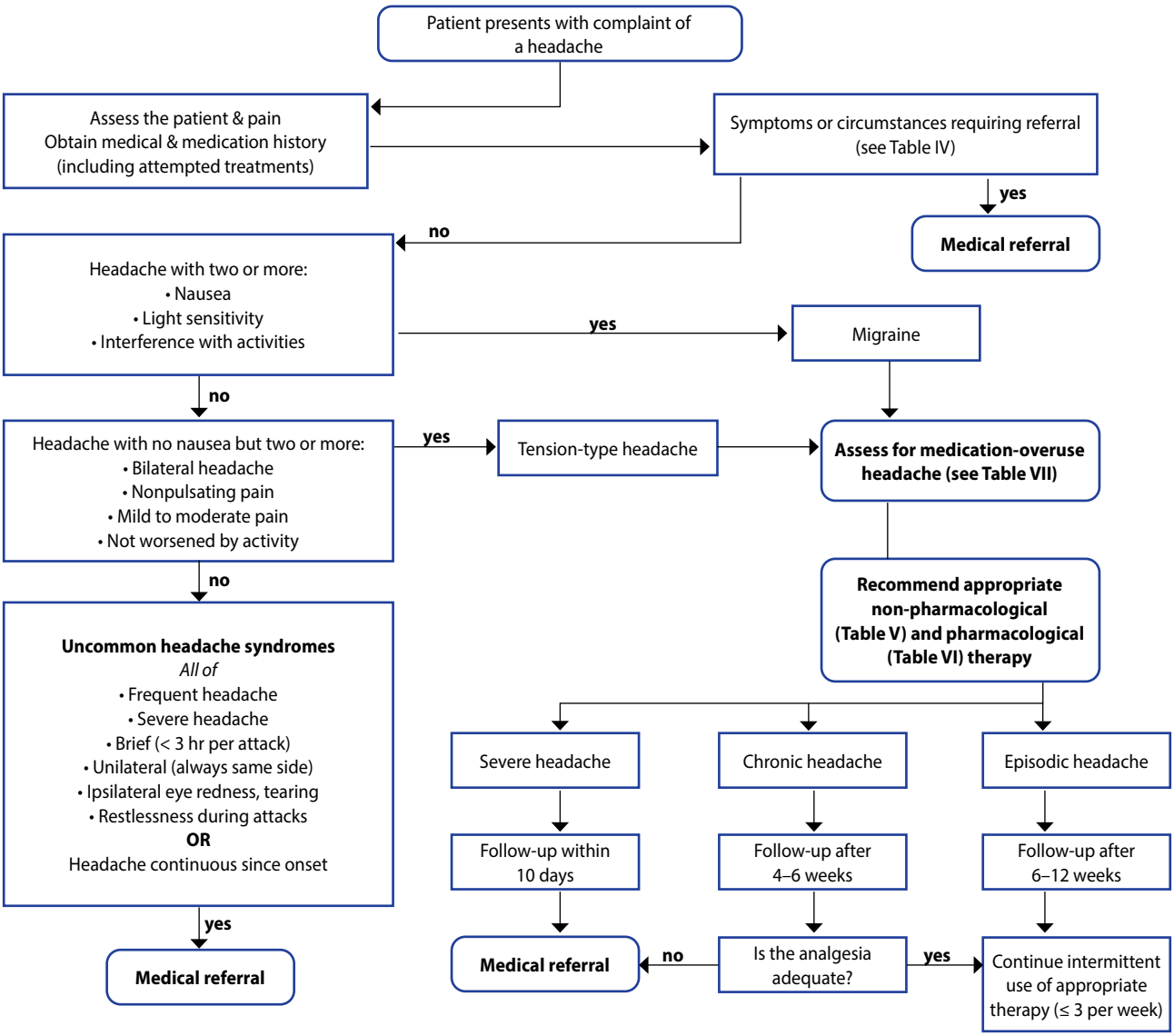

Figure 1: Point-of-care approach to migraine and TTH management
Adapted from Becker et al.[13] and Berardi et al.[21]

effect. It also allows pharmacists to customise treatment to the patient's specific needs and is an opioid-sparing strategy.[19]

Medication-overuse headache[20]

An unintended consequence of the management of patients with established primary headache disorders like migraine or TTH is MOH. Patients with migraine or TTH overuse medication for their acute headaches and inadvertently increase the frequency and intensity of their headaches. As this vicious cycle of further drug consumption and increased headache frequency develops, it transforms the treatment for their headache into the actual cause of their disease (MOH). The diagnosis of MOH is related to the frequency of a headache (not quality or intensity) and the management approach includes patient education, effective prophylaxis, discontinuation of the overused analgesic, and follow-up to prevent a recurrence (Table VII).[20]

Point-of-care management

In the pharmacy setting, the successful management of patients with migraine or TTH depends on adequate assessment, pharmacological management, as well as identifying headache sufferers that require referral. Figure 1 summarises a point-of-care approach to migraine or TTH management.

Conclusion

Headache severity and associated features, such as nausea, vomiting, or previous treatment responses, can guide the selection of medication for acute treatment. Simple analgesics or NSAIDs, with or without antiemetics, are usually the first-line treatment and are effective in treating migraine and TTH. Multi-component therapy represents second-line therapies and allows the pharmacist to customise treatment to the patient's specific needs, with the additive benefit of sparing the use of opioids.

References

1. Hainer BL, Matheson EM. Approach to acute headache in adults. Am Fam Physician. 2013;87(10):682-7. Available from: https://www.aafp.org/pubs/afp/issues/2013/0515/p682.html.
2. Stovner LJ, Hagen K, Linde M, Steiner TJ. The global prevalence of headache: an update, with analysis of the influence of methodological factors on prevalence estimates. J Headache Pain. 2022;23(1):34. https://doi.org/10.1186/s10194-022-01402-2.
3. GSK. GSK global pain index 2017: global research report. GSK; 2017. Available from: https://www.gsk.com/media/3814/global-pain-index-2017-report.pdf.
4. Ambizas EM, Ambizas AH. Nonprescription treatment options for migraine. US Pharm. 2016;41(1):31-34. Available from: https://www.uspharmacist.com/article/nonprescription-treatment-options-for-migraine.
5. Rizzoli P, Mullally WJ. Headache. Am J Med. 2018;131(1):17-24. https://doi.org/10.1016/j.amjmed.2017.09.005.
6. Diener HC, Pfaffenrath V, Pageler L, Peil H, Aicher B. The fixed combination of acetylsalicylic acid, paracetamol and caffeine is more effective than single substances and dual combination for the treatment of headache: a multicentre, randomized, double-blind, single-dose, placebo-controlled parallel group study. Cephalalgia. 2005;25(10):776-87. https://doi.org/10.1111/j.1468-2982.2005.00948.x.
7. Ha H, Gonzalez A. Migraine headache prophylaxis. Am Fam Physician. 2019;99(1):17-24. Available from: https://pubmed.ncbi.nlm.nih.gov/30600979/.
8. Center for Integrated Healthcare. Headache: types, tips & treatment suggestions. VA Healthcare; 2013:1-4. Available from: https://www.mirecc.va.gov/cih-visn2/documents/patient_education_handouts/headaches_information_for_patients_version_3.pdf.
9. University Health Services. Headaches. Berkeley: University of California; 2014:1-9. Available from: https://uhs.berkeley.edu/sites/default/files/HeadachesMigraines.pdf.
10. Kaiser Permanente. Migraine and tension headache guideline. 2018 [Updated May 2021]. Available from: https://wa.kaiserpermanente.org/static/pdf/public/guidelines/headache.pdf.
11. Mayans L, Walling A. Acute migraine headache: treatment strategies. Am Fam Physician. 2018;97(4):243-51. Available from: https://www.aafp.org/pubs/afp/issues/2018/0215/p243.html.
12. Gill S. What different types of headaches are there? [Internet]. Medical News Today; 2020 [Updated 3 Jan 2023]. Available from: https://www.medicalnewstoday.com/articles/320767.
13. Becker WJ, Findlay T, Moga C, et al. Guideline for primary care management of headache in adults. Can Fam Physician. 2015;61(8):670-9.
14. Lipton RB, Baggish JS, Stewart WF, Codispoti JR, Fu M. Efficacy and safety of acetaminophen in the treatment of migraine: results of a randomized, double-blind, placebo-controlled, population-based study. Arch Intern Med. 2000;160(22):3486-92. https://doi.org/10.1001/archinte.160.22.3486.
15. Steiner TJ, Lange R, Voelker M. Aspirin in episodic tension-type headache: placebo-controlled dose-ranging comparison with paracetamol. Cephalalgia. 2003;23(1):59-66. https://doi.org/10.1046/j.1468-2982.2003.00470.x.
16. Martelletti P, Farinelli I, Coloprisco G, Patacchioli FR. Role of NSAIDs in acute treatment of headache. Drug Dev Res. 2007;68(6):276-81. https://doi.org/10.1002/ddr.20191.
17. Lipton RB, Diener HC, Robbins MS, Garas SY, Patel K. Caffeine in the management of patients with headache. J Headache Pain. 2017;18(1):107. https://doi.org/10.1186/s10194-017-0806-2.
18. Sawynok J. Caffeine and pain. Pain. 2011;152(4):726-9. https://doi.org/10.1016/j.pain.2010.10.011.
19. Straube A, Aicher B, Fiebich BL, Haag G. Combined analgesics in (headache) pain therapy: shotgun approach or precise multi-target therapeutics? BMC Neurology. 2011;11(1):1. https://doi.org/10.1186/1471-2377-11-43.
20. Vandenbussche N, Laterza D, Lisicki M, et al. Medication-overuse headache: a widely recognized entity amidst ongoing debate. J Headache Pain. 2018;19(1):50. https://doi.org/10.1186/s10194-018-0875-x.
21. Berardi RR, Ferreri SP, Hume AL, Kroon LA, Newton GD. Handbook of nonprescription drugs: an interactive approach to self-care. 16th ed. American Pharmacists Association; 2009. p. 65-83.