**Research article**
*Curr. Pers. MAPs, (2024); 7(2): 152-162*

**Current Perspectives on Medicinal and Aromatic Plants**

An International Journal
ISSN: 2619-9645 | e-ISSN: 2667-5722

# Use of Aromatherapy for Migraine Pain Relief

Yasmine ASKEUR*, Mohammed Adil SELKA, Mustapha Kamel DALI-YAHIA

Department of Pharmacy, Faculty of medical sciences , University Abou Bekr Belkaid, 13000, Tlemcen, Algeria

*Corresponding author : yasmine.askeur@univ-tlemcen.dz

https://doi.org/10.38093/cupmap.1588807

**Received:** 10/12/2024
**Accepted:** 31/12/2024

**Abstract**

Migraine is a debilitating disease with a complex pathophysiology and multiple risk factors. Due to the limited efficacy and tolerability of available pharmacologic treatments, patients often seek complementary and alternative therapies like aromatherapy, which has shown promising results in various clinical trials. This survey investigates the usage patterns of essential oils among migraine patients and their knowledge of proper usage methods and associated side effects.

A cross-sectional descriptive study was conducted over nine months (December 2022 to August 2023) among migraine patients using a semi-structured electronic questionnaire analyzed with Microsoft Excel. Most participants (83.44%) were aged 25 to 64, predominantly female (83%). Among them, 42.75% had suffered from migraines for 5 to 15 years, with 61.19% reporting significant life impact due to the condition. Over half opted for alternative treatments; aromatherapy was used by 61%, with essential oils such as *Mentha piperita*, *Lavandula angustifolia*, *Eucalyptus globulus*, *Cinnamomum camphora*, and *Nigella damascena* being most cited. Notably, 55% reported symptom improvement after use.

Aromatherapy shows potential as a complementary approach for managing migraine symptoms. However, the lack of awareness regarding proper usage and safety highlights the need for patient education and further clinical studies to establish its efficacy and ensure safe practices.

**Key Words:** Migraine, essential oils, aromatherapy, survey.

© CUPMAP. All rights reserved.

## 1. Introduction

Migraine stands as one of the three main primary headache disorders, alongside cluster headache and tension-type headache. It manifests as a recurring, predominantly one-sided throbbing pain, often intertwined with symptoms such as heightened sensitivity to light and sound and gastrointestinal disturbances like nausea and vomiting. Additionally, a notable subset of individuals may encounter prodromal sensory phenomena known as aura preceding the onset of the headache episode (IHS, 2018). This cluster of symptoms makes it a highly disabling disease. According to the 2019 Global Burden of Disease study, headache disorders accounted for 46.6 million Years Lived with Disability (YLDs) worldwide, with migraine taking up to 88.2% of this life burden (Vos et al., 2020). This translates to approximately 41.1 million

individuals experiencing the loss of one full year of healthy life due to migraine-related disability (Steiner et al., 2020). Migraine is a multifactorial disease with a complex pathophysiology that remains incompletely understood (Mungoven et al., 2021), which makes its management reliant on the control of several elements in the patient's life, such as stress, sleep schedule, hormonal cycle, food diet, and hydration, along with external triggers like colors, sounds, lights, and weather (Zobdeh et al., 2021). Conventional pharmacological treatments are often limited by their moderate efficacy, weak patient adherence, and various side effects and contraindications (Bentivegna et al., 2023). Due to that, patients prefer to opt for other complementary and alternative medical (CAM) options (Wells et al., 2017). One of these practices, aromatherapy, has shown efficiency over different symptoms related to migraine, such as pain, anxiety, nausea, and vomiting (Lakhan et al., 2016), (Tan et al., 2023), (Lua & Zakaria., 2012).

Different plant essential oils have been experimented with in numerous clinical trials for their efficiency as anti-migraine treatments (Murtey et al., 2023), and their mechanism of action has been widely reviewed (Yuan et al., 2020). However, few studies have investigated the usage patterns of these agents among the general population. Hence, this study aims to explore the tendency of migraine patients to use aromatherapy, their knowledge of proper application methods, and their awareness of associated side effects.

## 2. Material and Methods

### 2.1. Study's type and period

This was a descriptive cross-sectional study carried out on migraine patients for a period of 9 months, from December 2022 to August 2023. The objective was to collect comprehensive data on their experiences, preferences, and knowledge regarding the use of essential oils as a complementary treatment for migraine symptoms.

### 2.2. Study's population

#### 2.2.1. Inclusion criteria

- Individuals diagnosed with migraine (self-reported or clinically diagnosed).
- Participants aged 15 years and older.
- Participants who voluntarily consented to participate in the survey.

#### 2.2.2. Exclusion criteria

- Participants with unclear or incomplete survey responses.
- Individuals with other chronic headache disorders not identified as migraine.
- Participants who did not consent to complete the survey.

### 2.3. Data collection

Data was collected using a semi-structured questionnaire distributed online via Google Forms software. The questionnaire contained 20 closed-ended and open-ended questions in Arabic and French, divided into 3 sections: sociodemographic information (country, age, sex, and level of education), information about the history of the disease and its effect on the lives of the patients, and lastly the different essential oils used for treatment, along with the frequency and methods of use.

### 2.4. Ethical aspect

Participation in this study was entirely voluntary, and informed consent was obtained from all respondents prior to their involvement. The questionnaire was filled out anonymously, with no access to individual answers by unauthorized parties, ensuring the privacy of the participants.

### 2.5. Statistical analysis

The data collected from the survey was analyzed using Microsoft Excel. Descriptive statistics were employed to summarize the

demographic characteristics of the participants, including age, gender, duration of migraine history, and the impact of migraines on daily life.

**Table 1.** Sociodemographic parameters of the populations

| Sociodemographic parameter | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age distribution** | | |
| 15-24 years | 23 | 15,86 |
| 25-65 years | 121 | 83,44 |
| >65 years | 1 | 0,68 |
| **Sex** | | |
| Male | 24 | 16,55 |
| Female | 121 | 83,44 |
| **Educational level** | | |
| Illiterate | - | - |
| Primary | 2 | 1,37 |
| Secondary | 16 | 11,03 |
| University | 127 | 87,58 |

The frequencies and percentages were calculated for all variables to provide a comprehensive overview of the study population and their experiences with migraine and essential oil usage.

## 3. Results and Discussion

To our knowledge, this study represents a pioneering effort to investigate the use of essential oils for migraine patients. Given the lack of previous research addressing this topic, direct comparisons with similar studies are not possible. Consequently, our results were primarily compared with studies examining migraine patients with different objectives or with those investigating the use of essential oils for other health conditions.

### 3.1. Sociodemographic parameters of the population

A total of 145 migraine patients were interviewed in this study.
The sociodemographic characteristics of the population are represented in Table 1.

***3.1.1. Sex distribution:*** Our study results reveal a notable female predominance of 83% (Table 1), consistent with findings from other studies, such as those by Sadiq et al. (2021), Drescher et al. (2021), and Minen et al. (2020), which reported percentages of female patients at 86%, 82.7%, and 70.3%, respectively. This supports the well-documented higher prevalence of migraine among females, likely due to hormonal influences.

***3.1.2. Age distribution:*** Similarly, the results showcase that 83.44% of migraine patients were aged between 25 and 65 years (Table 1). This age distribution aligns with findings from Mamindla et al. (2020) and Lee et al. (2016), who reported that the highest prevalence of migraine occurs in adults within this age range. The concentration of migraine prevalence in this age group underscores the significant impact of this condition on individuals' professional and personal lives during their most productive years. Consequently, this demographic is particularly likely to seek alternative treatments, such as aromatherapy, to manage their symptoms and maintain their quality of life.

### 3.2. Disease history and impact

***3.2.1. Disease history:*** In our study, 42% of participants reported suffering from migraines for a duration of 5 to 15 years (Figure 1) This aligns with findings from Lee et al. (2016), which indicated that most participants (75%) experienced their first migraine symptoms more than 10 years ago, highlighting a long-term struggle with the condition. The chronic nature of migraines underscores the necessity for continuous and multifaceted approaches to treatment, especially considering that chronic migraine is characterized by headaches occurring on at least 15 days per month and can significantly impair an individual's quality of life and socioeconomic functioning. Additionally, the transition from episodic to chronic migraine is

often influenced by factors such as medication overuse and stress, emphasizing the importance of effective management strategies to prevent worsening symptoms and improve patient outcomes.

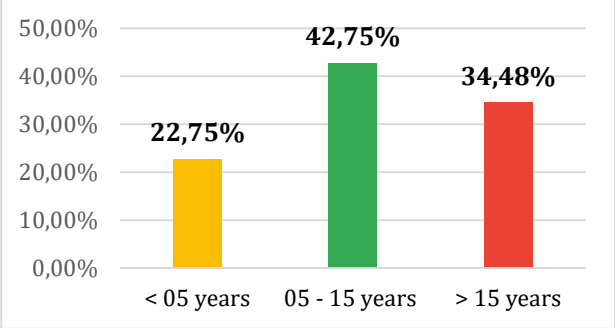


**Figure 1**. Migraine disease history

***3.2.2. Disease impact:*** More than half (61.19%) of the participants indicated that their lives were heavily burdened by this disease (Figure 2). This aligns with findings from the Global Burden of Disease Study (2016), which identified migraines as a leading cause of disability worldwide. The substantial impact on quality of life further justifies the need for effective and accessible treatments, which many patients seek through complementary and alternative therapies like essential oils.

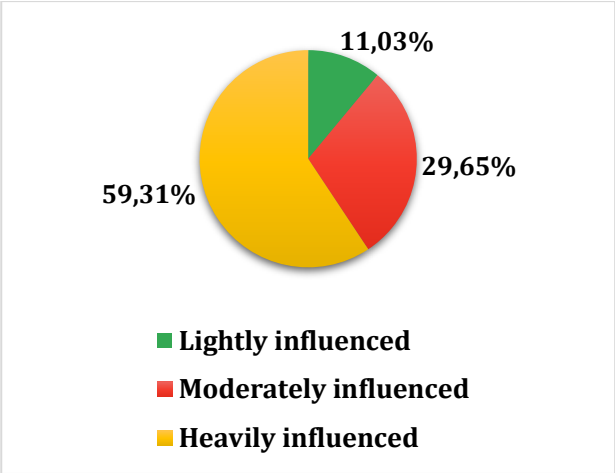


**Figure 2**. Impact of migraine on patient's life

### 3.3. Use of conventional and complementary alternative treatments

***3.3.1. Use and efficacy of conventional treatment:*** Our study revealed that conventional medications were used by 75.17% of patients (Figure 3); however, only 11,03% reported consistent symptom relief after each use (Figure 4). This highlights the limited efficacy of traditional pharmacological treatments for many migraine sufferers.

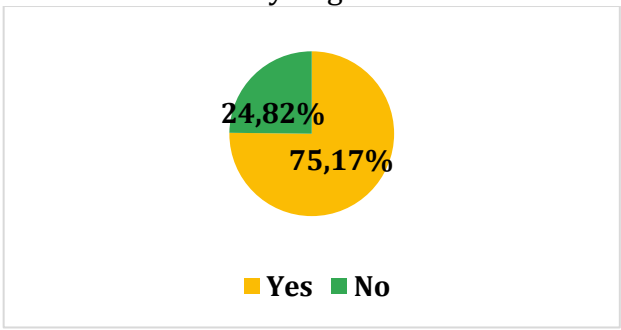


**Figure 3.** Use of conventional treatment

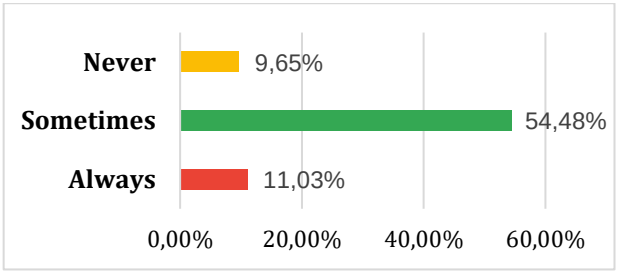


**Figure 4.** Symptoms improvement after use of conventional treatment

***3.3.2. Use of complementary and alternative treatment:*** In light of the limitations of conventional treatments, more than half of the participants (61%) opted for complementary and alternative medicines (CAM) to manage their migraines (Figure 4). This trend toward CAM usage is consistent with findings from other studies; for example, Sadiq et al. (2022) reported that 64% of migraine patients used CAM, while Lee et al. (2016) found an even higher usage rate of 86.9%.

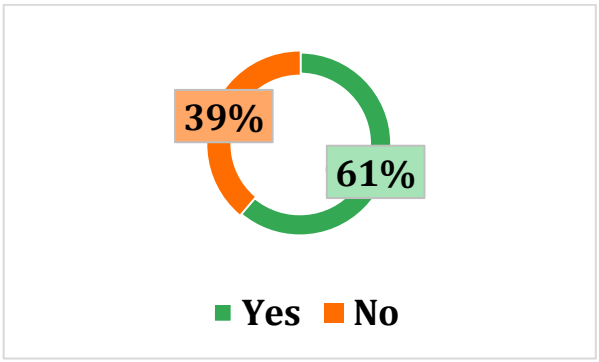


**Figure 4.** Prevalence of complementary and

alternative medication's use for Migraine

### 3.4. Use of essential oils

Among the complementary and alternative methods, essential oils were used by 61% of our participants (Figure 5). This significant adoption of aromatherapy highlights its growing popularity and acceptance as a viable option for migraine management among patients dissatisfied with conventional treatments.

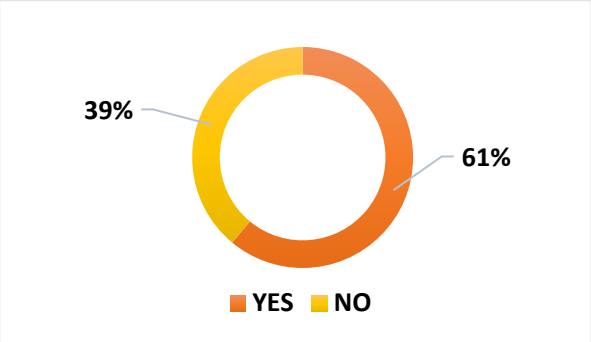


**Figure 5**. Prevalence of use of essential oils

Among the 39% of patients who have not used essential oils, several reasons were cited. Many reported that they had not heard of essential oils before or lacked sufficient information on how to use them. Others mentioned that these products are either too expensive or unavailable in the market. This underscores a significant gap in awareness and accessibility that must be addressed to make aromatherapy a more viable option for a broader patient population.

***3.4.1. Cited essential oils***: In the 61% of patients who used essential oils, 45 answers were selected for analysis: The essential oils of 15 species were cited by patients in this study; the one with the highest use frequency was peppermint oil, followed by lavender oil and eucalyptus, all presented in Table 2.

***3.4.2. Botanical families of cited essential oils:*** The most represented family in our study is the Lamiaceae family, which includes four species, followed by the Myrtaceae family with three species and the Pinaceae family with two species (Figure 6). This prevalence of the Lamiaceae family aligns with the findings of Abbaszadeh et al. (2019), who noted that most plants with anti-headache effects belong to this family. Similarly, Yogeesha et Krishnakumar (2022) found that the most represented plant families used for treating migraines were Fabaceae, Apocynaceae, and Lamiaceae, each with five species.

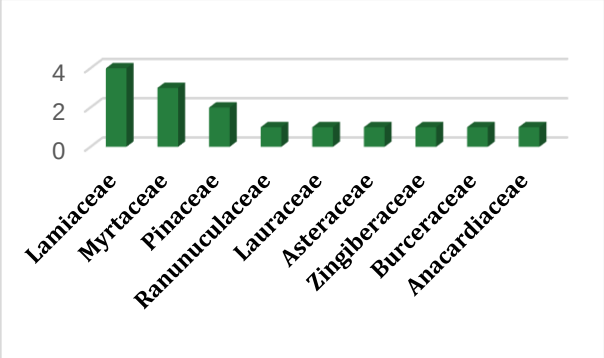


**Figure 6**. Distribution of botanical families of cited essential oils

The dominance of the Lamiaceae family in our research is significant because this family is known for its aromatic plants, which are commonly utilized in aromatherapy. These findings underscore the importance of exploring a diverse range of plant families in the search for effective migraine treatments and highlight the need for further research into the specific compounds and mechanisms through which these plants exert their effects.

***3.4.3. Methods of administration of essential oils:*** Regarding the methods of administering essential oils, the most common approach was through local massage of the head (Figure 7), using essential oils diluted in a carrier oil such as olive oil, black seed oil, or sesame oil. This method was preferred by the majority of participants, likely due to its ease of application and its ability to directly target the headache area. Inhalation was the second most popular method, which aligns with the well-known calming and anti-stress effects of essential oils when inhaled.

**Table2.** Cited essential oils

| Essential oil of the plant | Local name | Scientific name | Botanical family | Stated method of use | CF | RCF (%) |
|---|---|---|---|---|---|---|
| Peppermint oil | زيت النعناع | *Mentha piperita* L. | Lamiaceae | Massage, inhalation | 31 | 57 |
| Lavender oil | زيت الخزامى | *Lanvandula angustifolia* L. | Lamiaceae | Massage, inhalation | 11 | 20 |
| Eucalyptus oil | زيت الكاليتوس | *Eucalyptus globulus* L. | Myrtaceae | Massage, inhalation | 5 | 9 |
| Camphor oil | زيت الكافور | *Cinamomum camphora* L. | Lauraceae | Massage | 3 | 6 |
| Black seed essential oil | زيت حبة البركة | *Nigella damascene* L. | Ranunculaceae | Massage, inhalation | 4 | 7 |
| Clove oil | زيت القرنفل | *Sygyzium aromaticum* L. | Myrtaceae | inhalation | 2 | 4 |
| Ginger oil | زيت الزنجبيل | *Zingiber officinale* | Zingiberaceae | Head massage, inhalation | 1 | 2 |
| Thyme oil | زيت الزعتر | *Thymus vulgaris* L. | Lamiaceae | Head massage, inhalation | 2 | 4 |
| Pine oil | زيت الصنوبر | *Pinus halepensis* | Pinaceae | Inhalation | 1 | 2 |
| Chamomile oil | زيت البابونج | *Chamaemelum nobile L.* | Asteraceae | Inhalation | 1 | 2 |
| Fir needle oil | زيت ابرة التنوب | *Abies sibirica* | Pinaceae | Head massage, inhalation | 1 | 2 |
| Tea tree oil | زيت شجرة الشاي | *Melaleuca alternifolia* | Myrtaceae | Head massage, inhalation | 1 | 2 |
| Frankincense essential oil | زيت لبان الذكر | *Boswellia sp* | Burceraceae | Head massage | 1 | 2 |
| Marjoram oil | زيت البردقوش | *Origanum majoram* L. | Lamiaceae | Oral consumption after dilution in water | 1 | 2 |
| Mastic oil | زيت الضرو | *Pistacia lenticus* | Anacardiaceae | Head massage | 1 | 2 |

Notably, only a small percentage of participants (2%) reported consuming essential oils orally after dilution in water, indicating both the rarity and possible hesitation toward internal use, perhaps due to concerns about safety or unfamiliarity with this method.

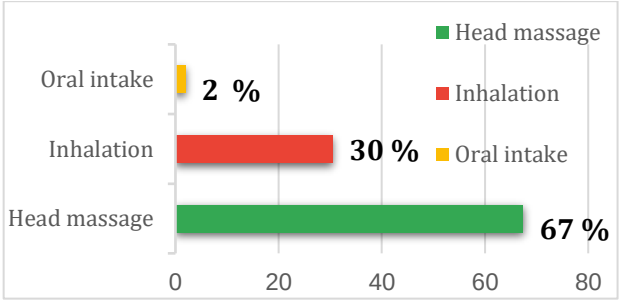


**Figure7**. Methods of administration of essential oils

These results highlight a clear preference for external and topical application methods, emphasizing practical and perceived safer approaches to using essential oils for migraine relief.

***3.4.4. Essential oils action on migraine:*** In our study, 52% of participants reported symptom improvement after using essential oils for migraine relief (Figure 8), while 5.55% experienced complete remission. These findings underscore the potential of essential oils as supportive therapies in migraine management, particularly due to their analgesic, anti-inflammatory, and muscle-relaxant properties. Aromatherapy may help reduce the intensity and frequency of migraines by alleviating tension and promoting relaxation. However, the fact that only a small percentage (5.55%) achieved complete remission suggests that essential oils may be more effective as adjuncts rather than standalone treatments.

Interestingly, 41% of participants reported no noticeable effect, indicating that essential oils may not work universally. This outcome could be attributed to variations in individual responses, oil quality, methods of application, or even the severity of the migraines being treated.

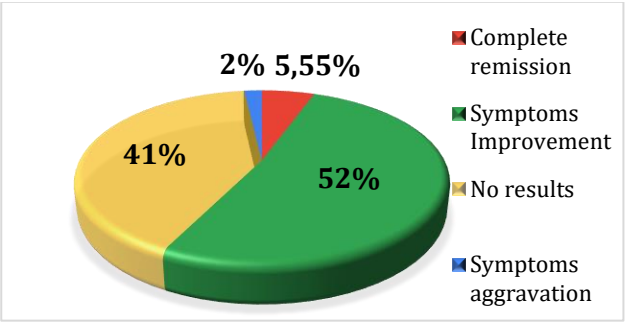


**Figure 8**. Essential oils action on migraine

Additionally, 2% of patients experienced symptom aggravation, which may be linked to a condition commonly reported among individuals with migraines known as osmophobia (Dashti et al., 2017) which is defined as an intolerance or aversion to strong odors, such as those found in essential oils. Patients with osmophobia often report higher levels of anxiety and depression, complicating their overall migraine experience. This suggests that the presence of this symptom may indicate a more severe clinical picture, potentially influencing how they respond to treatments like essential oils (Rocha-Filho et al., 2015).

Understanding the role of osmophobia in migraine management is crucial; it highlights the need for healthcare providers to consider individual sensitivities when recommending treatments. For patients affected with this condition, alternative methods such as topical applications or inhalation at lower concentrations may be more acceptable and effective.

***3.4.5. Sources of recommendation of essential oils:*** Our study shows that the internet is the most common source of recommendation for essential oils, cited by 46.15% of participants (figure 9). This is reflective of the growing influence of online platforms in shaping health-related decisions. While the internet provides vast information, it can sometimes lack accuracy or evidence-based guidance, which raises concerns about the reliability of these recommendations.

Interestingly, only 15.38% of participants reported receiving advice from pharmacists, which is significantly lower than expected given their role as healthcare professionals. Pharmacists are key sources of credible and safe recommendations for over-the-counter products like essential oils, and this finding suggests the need for greater involvement of pharmacists in patient education regarding complementary therapies.

Lastly, herbalists were the source of recommendations for only 7.69% of participants. This may be due to their traditional focus on selling whole plants rather than concentrated products like

essential oils, in order to minimize the risk of side effects and to allow patients to benefit from the full spectrum of plant constituents. Increasing awareness of the potential benefits and safe use of essential oils among herbalists and their clients could help bridge this gap and improve patient access to diverse therapeutic options.

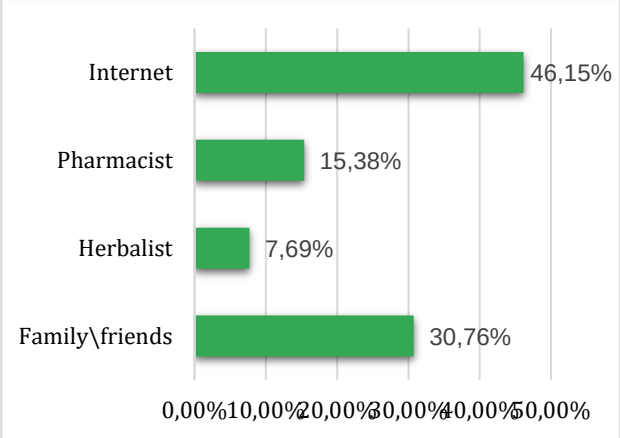


**Figure 9.** Sources of recommendation of essential oils

***3.4.6. Places of purchase of essential oils:*** The majority of participants (54.90%) reported purchasing essential oils from herb shops, reflecting their widespread availability in informal settings. Herb shops often serve as accessible and affordable sources for traditional remedies, but they may lack quality control measures, leading to potential safety concerns. Community pharmacies, chosen by 35.29% of participants, provide a more regulated environment where products are likely to meet quality and safety standards.

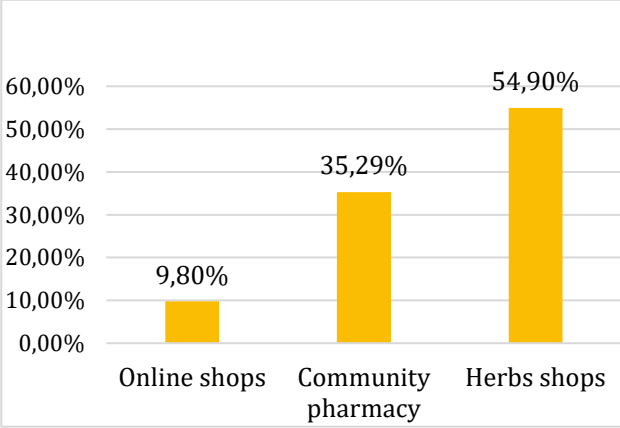


**Figure 10.** Places of purchase of essential oils

However, their relatively lower use may indicate limited availability or higher costs of essential oils in these settings.

Online shops accounted for only 9.8% of purchases, which may reflect limited internet access, lack of trust in online sources, or the preference for in-person consultations when purchasing therapeutic products. These findings underscore the need for public awareness and education on the importance of purchasing high-quality, authentic essential oils, particularly from regulated suppliers like pharmacies, to ensure their safe and effective use.

***3.4.7. Users knowledge of essential oils side effects and usage precautions:*** Our study reveals that a significant majority (77.64%) of participants lack knowledge about the side effects and usage precautions of essential oils, with only 22.35% being informed on this topic. This finding highlights a crucial gap in the safe use of essential oils, as insufficient knowledge can lead to improper application, potentially causing adverse effects such as skin irritation, allergic reactions, or even toxicity when used improperly.

Given the increasing popularity of essential oils as alternative treatments, this knowledge deficit is concerning. Essential oils, though natural, are potent substances that require careful handling, including proper dilution and awareness of contraindications.

The lack of understanding observed in our population suggests an urgent need for educational initiatives aimed at promoting the safe and informed use of these products. This could involve guidance from healthcare professionals, clearer labeling on products, or public awareness campaigns on the potential risks and proper practices when using essential oils.

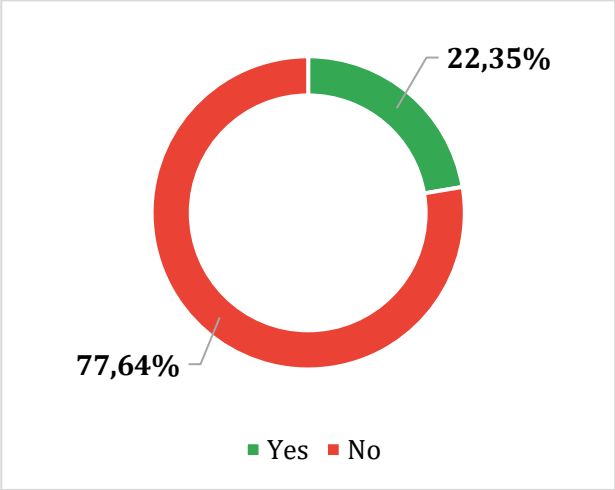


**Figure 11.** Patient's knowledge on essential oils side effects and usage precautions

## 4. Conclusion

Migraine is a debilitating neurological disorder, with a complex pathophysiology. Despite advancements in understanding its mechanisms, many patients continue to experience suboptimal relief from conventional therapies, leading to a pressing need for alternative approaches. This study investigates the potential of aromatherapy as a complementary treatment modality that may enhance symptom management for migraine patients.

The results of our study highlights the long-term struggle of migraine patients, prompting a shift toward complementary and alternative medicines (CAM) due to the limitations of conventional treatments. Notably, a considerable portion of participants turned to essential oils, reflecting their growing acceptance as a promising option for migraine management.

The Lamiaceae family emerged prominently in the research, renowned for its aromatic plants commonly used in aromatherapy. While many participants experienced symptom improvement after using essential oils, a small group reported symptom aggravation, possibly linked to osmophobia- a common sensitivity to strong odors among migraine sufferers.

Alarmingly, a large majority of participants lacked awareness about the side effects and usage precautions of essential oils, underscoring the urgent need for better education on safe practices in aromatherapy. Pharmacists, as accessible healthcare professionals, are uniquely positioned to fill this knowledge gap by advising patients on the appropriate use of essential oils, ensuring safety, and promoting informed decision-making.

Further research on a larger scale is essential to validate the effectiveness and safety of essential oils for migraine management. While this study focused primarily on usage patterns and patient knowledge, expanding the study population could enhance our understanding and improve treatment strategies. Additionally, there remains a need for investigations into the chemical composition, pharmacological properties, and mechanisms of action of essential oils used for migraines. Such comprehensive studies could confirm their safety and efficacy, supporting their integration into clinical practice as complementary therapies.

## Acknowledgements

We thank all the patients who participated in this study, and all the pharmacy students and pharmacognosy residents who assisted in distributing the survey.

## Author Contribution

The study was conceptualized by AY, Data were collected and analyzed by AY. The first draft of the manuscript was written by AY. All authors reviewed and approved the final version.

## Conflicts of Interest

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

## References


1. Abbaszadeh, S., Karami, N., Bahmani, F., Abbasi, N., & Atefi, E. (2019). Headache and herbal medicine : An ethnobotanical study of Shahrekord, Southwest of Iran. Plant Biotechnology Persa, 1(1), 4-9. https://doi.org/10.29252/pbp.1.1.4
2. Bentivegna, E., Galastri, S., Onan, D., & Martelletti, P. (2023). Unmet Needs in the Acute Treatment of Migraine. Advances In Therapy, 41(1), 1-13. https://doi.org/10.1007/s12325-023-02650-7
3. Dashti, M., Chitsaz, A., Ghorbani, A., Khosravi, M., & Kianmehr, M. (2017). The Prevalence of Osmophobia in Migranous and Episodic Tension Type Headaches. Advanced Biomedical Research, 6(1), 44. https://doi.org/10.4103/2277-9175.204587
4. Drescher, J., Amann, T. K., Gaul, C., Kropp, P., Siebenhaar, Y., & Scheidt, J. (2021). Results of a web-based questionnaire : A gender-based study of migraine with and without aura and possible differences in pain perception and drug effectiveness. Cephalalgia Reports, 4, 251581632110622. https://doi.org/10.1177/25158163211062257
5. Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. (2018a). Cephalalgia, 38(1), 1-211. https://doi.org/10.1177/0333102417738202
6. Lakhan, S. E., Sheafer, H., & Tepper, D. (2016). The Effectiveness of Aromatherapy in Reducing Pain : A Systematic Review and Meta-Analysis. Pain Research And Treatment, 2016, 1-13. https://doi.org/10.1155/2016/8158693
7. Lee, J., Bhowmick, A., & Wachholtz, A. (2016). Does complementary and alternative medicine (CAM) use reduce negative life impact of headaches for chronic migraineurs ? A national survey. SpringerPlus, 5(1). https://doi.org/10.1186/s40064-016-2362-7
8. Lua, P. L., & Zakaria, N. S. (2012). A Brief Review of Current Scientific Evidence Involving Aromatherapy Use for Nausea and Vomiting. The Journal Of Alternative And Complementary Medicine, 18(6), 534-540. https://doi.org/10.1089/acm.2010.0862
9. Minen, M. T., Jalloh, A., De Dhaem, O. B., & Seng, E. K. (2020). Behavioral Therapy Preferences in People With Migraine. Headache The Journal Of Head And Face Pain, 60(6), 1093-1102. https://doi.org/10.1111/head.13790
10. Mungoven, T. J., Henderson, L. A., & Meylakh, N. (2021). Chronic Migraine Pathophysiology and Treatment : A Review of Current Perspectives. Frontiers In Pain Research, 2. https://doi.org/10.3389/fpain.2021.705276
11. Murtey, P., Noor, N. M., Ishak, A., & Idris, N. S. (2023). Essential Oils as an Alternative Treatment for Migraine Headache : A Systematic Review and Meta-Analysis. Korean Journal Of Family Medicine, 45(1), 18-26. https://doi.org/10.4082/kjfm.23.0106
12. Rocha-Filho, P. A. S., Marques, K. S., Torres, R. C. S., & Leal, K. N. R. (2015). Migraine, Osmophobia, and Anxiety. Pain Medicine, pnv071. https://doi.org/10.1093/pm/pnv071
13. Sadiq, S., Singh, B., Kalsotra, M., Bhagat, V., & Choudhary, S. (2021). Complementary and alternative medicines use among adults with migraine in a tertiary care hospital : An observational study. National Journal Of Physiology Pharmacy And Pharmacology, 0, 1. https://doi.org/10.5455/njppp.2022.12.10357202113112021
14. Steiner, T. J., Stovner, L. J., Jensen, R., Uluduz, D., & Katsarava, Z. (2020). Migraine remains second among the world's causes of disability, and first among young women : findings from GBD2019. The Journal Of Headache And Pain, 21(1). https://doi.org/10.1186/s10194-020-01208-0
15. Tan, L., Liao, F., Long, L., Ma, X., Peng, Y., Lu, J., Qu, H., & Fu, C. (2023). Essential oils for treating anxiety: a systematic review of randomized controlled trials and network meta-analysis. Frontiers In Public Health, 11. https://doi.org/10.3389/fpubh.2023.1144404
16. Vos, T., Lim, S. S., Abbafati, C., Abbas, K. M., Abbasi, M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abdollahi, M., Abdollahpour, I., Abolhassani, H., Aboyans, V., Abrams, E. M., Abreu, L. G., Abrigo, M. R. M., Abu-Raddad, L. J., Abushouk, A. I.,. . . Murray, C. J. L. (2020b). Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019 : a systematic analysis for the Global Burden of Disease Study 2019. The Lancet, 396(10258), 1204-1222. https://doi.org/10.1016/s0140-6736(20)30925-9
17. Wells, R. E., Baute, V., & Wahbeh, H. (2017). Complementary and Integrative Medicine for Neurologic Conditions. Medical Clinics Of North America, 101(5), 881-893. https://doi.org/10.1016/j.mcna.2017.04.006

18. Yogeesha, A., & Krishnakumar, G. (2022). Ethnobotanical exploration of medicinal plants for the treatment of migraine in Dakshina Kannada district of Western Ghats, Karnataka, India. Plant Science Today. https://doi.org/10.14719/pst.1693
19. Yuan, R., Zhang, D., Yang, J., Wu, Z., Luo, C., Han, L., Yang, F., Lin, J., & Yang, M. (2020). Review of aromatherapy essential oils and their mechanism of action against migraines. Journal Of Ethnopharmacology, 265, 113326. https://doi.org/10.1016/j.jep.2020.113326
20. Zobdeh, F., Kraiem, A. B., Attwood, M. M., Chubarev, V. N., Tarasov, V. V., Schiöth, H. B., & Mwinyi, J. (2021). Pharmacological treatment of migraine: Drug classes, mechanisms of action, clinical trials and new treatments. British Journal Of Pharmacology, 178(23), 4588-4607. https://doi.org/10.1111/bph.15657