▪ Headache Medicine 2025, 16(1): 14-22 ▪ p-ISSN 2178-7468, e-ISSN 2763-6178

Headache Medicine

▪ DOI: 10.48208/HeadacheMed.2025.3

Review

Migraine and brain tumors: a bibliometric analysis and narrative review

Heba Ramadan

Pharmacy Department, Agamy Medical District, Ministry of Health and Population, Agamy, Alexandria, Egypt

Heba Ramadan
hebaramadan_24884@yahoo.com

Edited by:
Raimundo Pereira Silva-Néto

Introduction
The relationship between migraine and brain tumors remains an area of active research, with mixed findings across studies. Understanding this connection is crucial for improving clinical diagnoses and patient management.

Objective
This study aims to conduct a bibliometric analysis and narrative review to explore the trends, key contributors, and findings on the association between migraine and brain tumors.

Methodology
A total of 740 studies were retrieved from the Scopus database using search terms "migraine" AND "brain tumor" for the period January 2015 to December 2024. These studies were analyzed using VOSviewer. The review employed a combination of bibliometric techniques and narrative analysis to identify key publications, authors, institutions, and frequently discussed terms.

Results
The United States was the largest contributor, followed by Italy and the United Kingdom. BMJ Case Reports published the most documents on the topic, with Harvard Medical School being the leading institution. Key terms included migraine, headache, brain tumor, neuroimaging, and brain neoplasms. Studies presented varying findings: some suggested an increased risk of brain tumors in migraine patients, while others found no significant association. Notable studies highlighted the role of specific tumor types, such as pituitary adenomas and meningiomas, in causing headache symptoms.

Conclusions
The association between migraine and brain tumors remains complex and inconsistent. While some studies indicate a potential risk, others fail to confirm a significant relationship. Further large-scale, prospective studies are needed to clarify this association and inform clinical practices.

Keywords:
Migraine
Brain tumors
Bibliometric analysis
Headache
Neuroimaging

Submitted: January 18, 2025
Accepted: March 17, 2025
Publish online: March 30, 2025

© Copyright 2025

Introduction

Migraine is a common neurological disorder that affects a significant portion of the global population. It is typically characterized by recurrent, intense headaches often accompanied by symptoms like nausea, vomiting, and sensitivity to light and sound. While generally considered a primary condition, migraines can significantly impact individual quality of life, work productivity, and daily functioning. Despite extensive research into the pathophysiology of migraines, which involves complex interactions between genetic, environmental, and neurovascular factors, the exact causes and mechanisms remain incompletely understood (1–5).

On the other hand, brain tumors, though much rare than migraines, are a serious medical condition that can lead to significant neurological impairment and even death. Symptoms of brain tumors often overlap with those of migraines, such as persistent headaches, nausea, and vomiting. This overlap has led to the question of whether individuals suffering from migraines may be at an increased risk of developing brain tumors. Several studies have explored this potential link, but the findings have been inconsistent. Some research has suggested that migraine may be associated with an elevated risk of certain types of brain tumors, while others have found no such correlation, highlighting the need for further investigation (6–8).

In this combined review, bibliometric analysis was used to analyze citation patterns and trends in relevant publications, helping to identify key studies and provides an overview of the state of knowledge. A narrative review of the 10 most relevant studies was conducted to offer a clearer understanding of the connection between migraines and brain tumors. The aim of this review was to synthesize the existing evidence, highlight areas where research is lacking, and offer insights that can guide future investigations into the association between migraine and brain tumors.

Methodology

Study design and data collection

This review employs a combined approach of bibliometric analysis and a narrative review to systematically map the literature on the relationship between migraine and brain tumors. A descriptive bibliometric analysis was conducted using VOSviewer software, with the Scopus database serving as the primary data source. Data extraction was performed on January 1, 2025. The search strategy focused on publications published between 2015 and 2024 and was conducted using the following query: TITLE-ABS-KEY (migraine AND brain AND tumors) AND PUBYEAR > 2014 AND PUBYEAR < 2025. The selected time frame of 2015 to 2024 aimed to capture the trends and patterns in research related to migraine and brain tumors, including annual publication growth, influential journals, keywords, prominent authors, their affiliated institutions, and patterns of co-authorship. These data were processed using Scopus and analyzed through VOSviewer.

Subsequently, 10 highly relevant studies were selected from this dataset for the narrative review. The review extracted detailed information from these studies, such as the first author name, publication year, country of origin, journal, study design, mean age of participants, sex distribution (including female percentage), study population characteristics, study setting (mono- or multicenter), follow-up duration, migraine and brain tumor types investigated, diagnostic methods used, and the key findings of each study.

Results

Annual publication growth pattern

From 2015 to 2024, a total of 740 publications related to the connection between migraine and brain tumors were retrieved from the Scopus database. The distribution of publications over the years is as follows: 2015 (n= 57), 2016 (n= 51), 2017 (n= 61), 2018 (n= 56), 2019 (n= 58), 2020 (n= 83), 2021 (n= 107), 2022 (n= 84), 2023 (n= 99), and 2024 (n= 84).

This data shows a steady increase in publications, particularly a noticeable rise in 2021, indicating growing interest and research in the relationship between migraine and brain tumors in recent years (Figure 1).

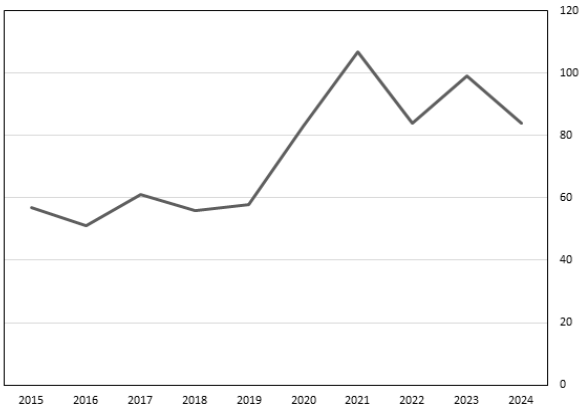

Figure 1. Annual growth of publications on migraine and brain tumors (2015-2024).

Journals

The top 10 journals in this field have published a significant number of relevant articles. BMJ Case Reports leads with 18 studies, followed by the Journal of Headache and Pain

with 17 publications. Frontiers in Neurology contributed 15 publications, while Headache published 14. Neurology featured 12 studies, and World Neurosurgery released 11. Other top journals include Cephalalgia with 10 publications, Current Pain and Headache Reports with 9, International Journal of Molecular Sciences with 8, and American Journal of Neuroradiology with 7 (Figure 2). Figure 3 illustrates the publication trends over the past decade (2015-2024) for the top 5 journals. These journals- BMJ Case Reports, Journal of Headache and Pain, Frontiers in Neurology, Headache, and Neurology- show varying patterns in their publication volumes, reflecting the evolving focus and research activity in these areas.

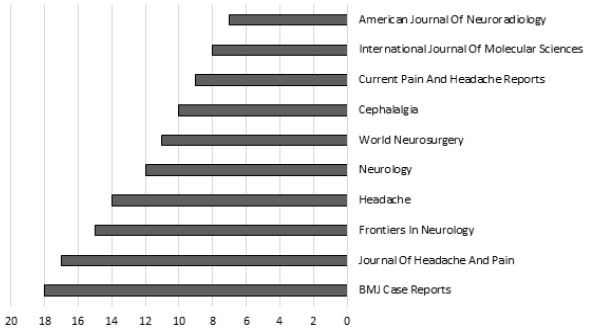

Figure 2. Top 10 journals in migraine and brain tumors research by publication count

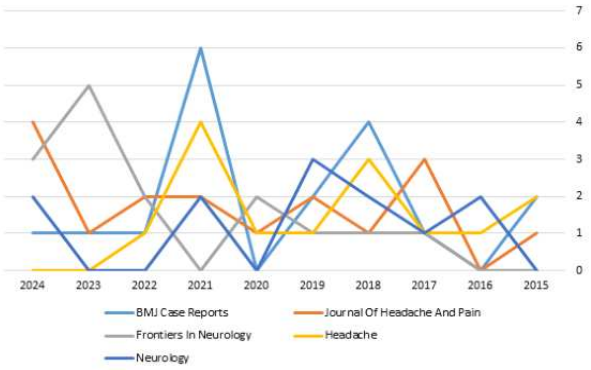

Figure 3. Publication trends of top 5 journals in migraine and brain tumors research (2015-2024)

Authors

Figure 4 displays the publication contributions on the leading authors in migraine and brain tumors research. Parisi, P. and Raucci, U. each have 7 studies, while Edvinsson, L. follows with 5. Several other authors, including Cordelli, D.M., Demartini, C., Esposito, E., Greco, R., Lanza, M., Martelletti, P., and Paterniti, I., each contributed 4 publications.

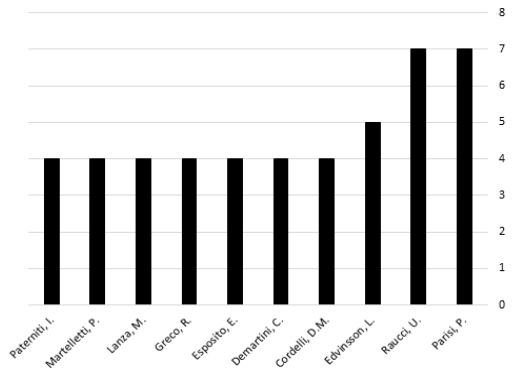

Figure 4. Publication contributions of leading authors in migraine and brain tumors research.

Affiliations

The publication output of various institutions in the field of migraine and brain tumors research was presented (Figure 5). Harvard Medical School leads with 24 studies, followed closely by Sapienza Università di Roma with 22. Other prominent institutions include Massachusetts General Hospital with 17 publications, Inserm with 14, and Mayo Clinic with 13. Additionally, University of California, San Francisco has 12 studies, while Rigshospitalet and Azienda Ospedaliero-Universitaria Sant'Andrea both contributed 11. Brigham and Women's Hospital and Ludwig-Maximilians-Universität München each published 10 studies.

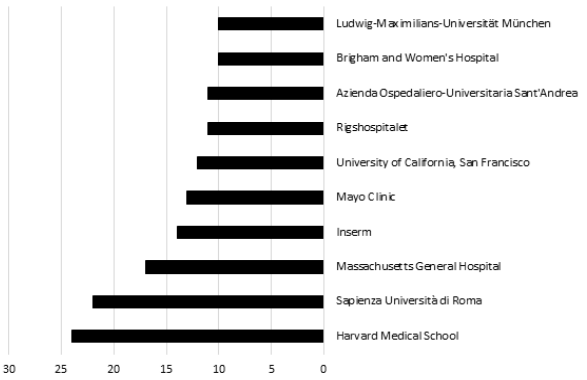

Figure 5. Top research affiliations in migraine and brain tumors studies.

Document type

The distribution of document types in migraine and brain tumors research reveals that articles make up the largest portion, accounting for 60% of the total documents (444 out of 740). Reviews follow with 30.5% (226 documents).

Other document types include Book Chapters at 3.5% (26 documents), Letters at 1.9% (14 documents), and Notes at 1.6% (12 documents). Smaller contributions come from Editorials (1.2%, 9 documents), Short Surveys (0.7%, 5 documents), Conference Papers (0.4%, 3 documents), and Erratum (0.1%, 1 document) (Figure 6).

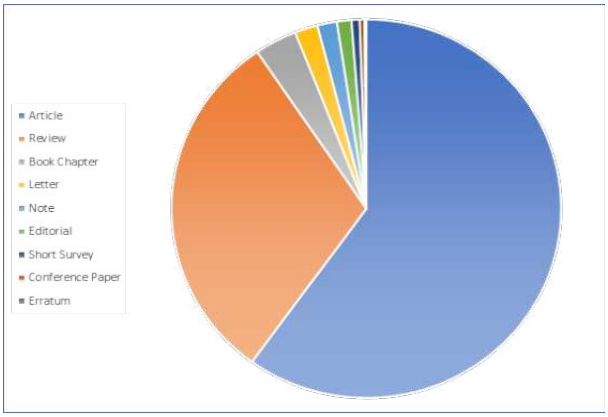

Figure 6. Distribution of document types in migraine and brain tumors research

Countries

The distribution of documents on migraine and brain tumors research across countries shows that the United States has the highest contribution with 265 publications. Italy follows with 87 documents, while the United Kingdom has 59 and China 56. Other notable contributors include Germany (43 documents), India (36 documents), and France (34 documents). Canada has 28 publications, and Spain and Switzerland contributed 27 and 26, respectively (Figure 7). This reflects a strong global interest in the topic. The density visualization map provides a visual representation of the intensity and concentration of research efforts across different countries (Figure 8).

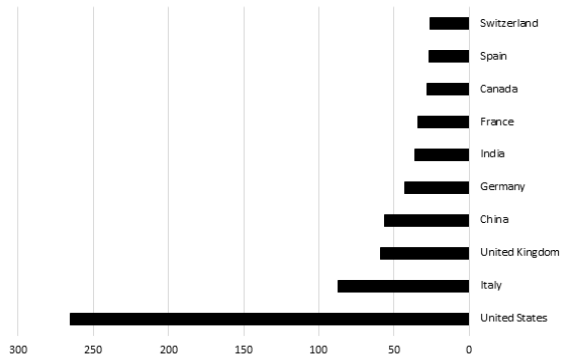

Figure 7. Global contributions to migraine and brain tumors research by country.

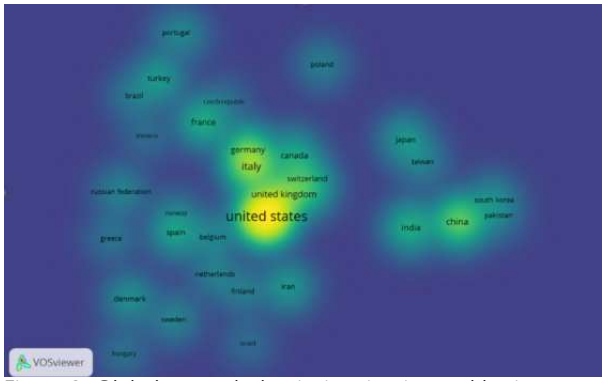

Figure 8. Global research density in migraine and brain tumors studies.

Country co-authorship

Research on migraine and brain tumors involves significant international collaboration, with contribution from 35 countries, which can be categorized into five distinct clusters (Figure 9). Cluster 1, consisting of eight countries, includes China, India, Japan, Pakistan, Saudi Arabia, South Korea, Taiwan, and the United Kingdom, representing both Asian and Western research hubs. Cluster 2 features seven European countries: Austria, Czech Republic, Germany, Italy, Poland, Portugal, and Turkey, reflecting strong ties within Europe. Cluster 3, which includes Australia, Brazil, Canada, France, Mexico, Norway, and Switzerland, represents a diverse range of nations across different countries. In Cluster 4, Finland, Iran, Israel, Netherlands, Spain, and the United States form a collaborative network. Finally, Cluster 5, with Belgium, Denmark, Greece, Hungary, Russian Federation, and Sweden, highlights European involvement alongside Russia significant contributions. This global network of co-authorship demonstrates the widespread international engagement in the research on migraine and brain tumors.

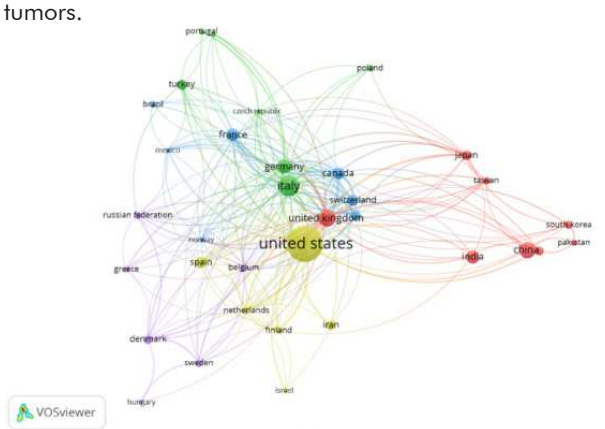

Figure 9. International Co-authorship network in migraine and brain tumors studies.

Keywords

The research on migraine and brain tumors is closely associated with a set of prominent keywords, reflecting the primary themes and methodologies in the field (Figures 10, 11). "migraine" leads the list with 575 occurrences, followed by "headache" with 313, indicating a strong focus on these neurological conditions. "nuclear magnetic resonance imaging" (296) and "magnetic resonance imaging" (109) are frequently mentioned, underscoring the importance of advanced imaging techniques in both diagnosing and studying these disorders. "brain tumor" (279) and "brain neoplasms" (95) also appear prominently, pointing to the central role of brain tumors in this research. Other notable keywords include "neuroimaging" (177), which highlights the growing significance of imaging technologies in neuroscience, as well as terms like "migraine disorders" (120) and "neurologic disease" (100), further emphasizing the clinical and pathological focus on the research.

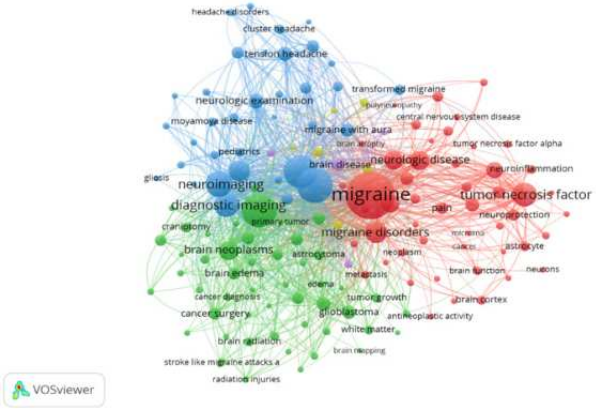

Figure 10. Keyword co-occurrence network in migraine and brain tumors research.

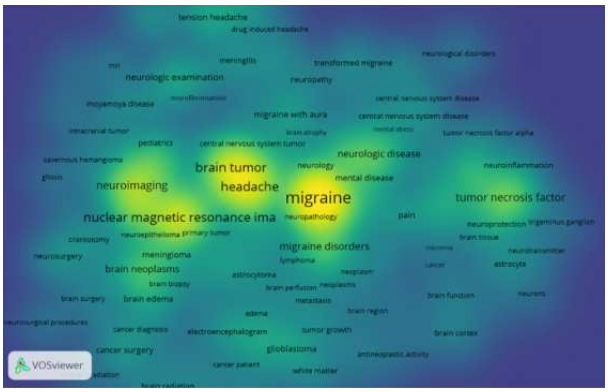

Figure 11. Density visualization of key terms in migraine and brain tumors literature.

Ten highly relevant studies (1,7–15) were selected from this dataset for inclusion in the narrative review (Table 1). The studies included in this review involved diverse populations, varying by age, sex, and brain tumor types. Two studies (study 1, 2) focused specifically on children, with one study examining individuals under the age of 18, and the other involving children under 20. In these studies, the percentage of female participants was relatively high, with one study reporting 66.8% female participants.

Most of the other studies involved adult populations, with median age ranging from 36.1 years for females and 31.1 years for males to an average of 58 years. The female percentage varied across studies with some studies reporting higher proportion of females, such as 70.7%, while others had lower female percentages, such as 40%. Interestingly, one study (study 10) focused entirely on females, with a study population consisting of 100% female participants. The study examined the relationship between migraine and brain tumors in an exclusively female cohort, which provided a unique perspective on the association.

The brain tumor types studied were diverse, including conditions such as gliomas, meningiomas, pituitary adenomas, and astrocytoma. In some studies, the tumors were located in specific areas, such as posterior thalamus, while others involved intracranial tumors in general. Diagnostic methods primarily included MRI for brain tumors, and migraine diagnoses were based on the International Classification of Headache Disorders (ICHD) criteria.

The results from these studies revealed a complex relationship between migraine and brain tumors. While some studies found an increased risk of brain tumors in patients with migraine, particularly in certain tumor types, other found no significant association. Additionally, while headache is a common symptom in patients with brain tumors, it does not necessarily indicate the presence of a tumor, and migraine alone does not appear to be a strong predictor of brain tumor development.

Table 1 Overview of selected studies for the narrative review

Study ID	First author	Year	Country	Journal	Study design	Mean age	Sex (female %)	Study setting
1	Rabia Tütüncü Toker	2023	Turkey	BMC Pediatrics	Retrospective cohort	Under the age of 18 (children)	66.8%	monocenter
2	Olafur B. Davidsson	2022	Denmark	Cancer Epidemiology	Cohort	less than 20 (children)	44%	multicenter
3	Holly Elser	2021	Denmark	Headache	Cohort	For females, median 36.1 years, IQR 24.5–47.2 and for males 31.1 years, IQR: 14.3–45.3	70.7%	multicenter
4	Franziska Guenther	2019	Germany	Cephalalgia	Prospective cohort	The median age 58 (range 34–82)	68%	monocenter
5	Domenico Chirchiglia	2019	Italy	Romanian Journal of Neurology	Retrospective cohort	51.5	47.4%	monocenter
6	Bodil Karoline Ravn Munkvold	2018	Norway	World Neurosurgery	Prospective cohort	54.5 (18-88) for headache group	62% for headache group	monocenter
7	Chao-Hung Chen	2018	Taiwan	The Journal of Headache and Pain	Case control	57.1 (16.8) for tumor group	47.3% for tumor group	multicenter
8	Marco Russo	2018	Italy	Cephalalgia	Cross sectional	52.7 (16.9)	40%	monocenter
9	Gøril Bruvik Gravdahl	2018	Norway	World Neurosurgery	Cohort	Mean age was 61 [±15] years in males and 50 [±15] years in females	55%	monocenter
10	Tobias Kurth	2015	USA	The Journal of Headache and Pain	Prospective cohort	Aged 45 years or older	100%	multicenter

Table 1 Overview of selected studies for the narrative review (continued)

Study ID	Follow-up period or study period	Migraine type	Brain tumor type	Method for brain tumor and migraine diagnosis	Results
1	At least 2 years	Migraine or tension-type headaches	Tumor located in the unilateral posterior thalamus	MRI for brain,The International Classification of Headache Disorders criteria	No abnormal MRI reports for tumors in migraine patients, and only one abnormal MRI report was observed in tension-type headache but 51 migraine patients, 58 with normal-tension headache have red flags symptoms. 3 of migraine patients and 1 with normal-tension headache had abnormal neurological examination but a confirmed diagnosis was not made. 6 children was suspected to having pituitary adenoma.
2	Study period, Jan. 1st, 1978 to Dec 31st, 2017	Not specified	Not specified	Not specified	Individuals exposed to childhood cancer were at increased risk of antimigraine initiation (SIR of 1.24, 95% CI: 1.11–1.38). Although this study does not cover all types of cancer but the proportion of CNS cancers was 20.2%. SIR for CNS 1.18, 95% CI: 0.91-1.5).
3	Study period 1995 to 2017	With aura, without aura and other types	Not specified	Not specified	There is an increased risk of neurological origin cancer in patients with migraine, SIR 1.57, 95% CI: 1.40–1.76, brain cancer 1.52 (1.28–1.79).
4	One year after surgery	Headache	Meningioma	MRI for brain tumor	Headache prevalence decreased after the surgery of removing the cancer.
5	Not specified	Migraine with aura	Low-grade astrocytoma, glioblastoma, meningioma, metastases.	Brain CT-MRI for brain tumor	There was a correlation between migraine aura-like headache and occipital lobe brain tumor.
6	One month and 6 months after surgery, study period September 2011 to November 2015	Headache	Intracranial tumor	For brain tumor: classified according to WHO classifications of tumors of the central nervous system	Headache is a common symptom in patients with intracranial tumors, especially in younger and female patients. Many patients experience improvement after surgery, and younger age, female sex, occipital tumor location, and functional dependence were identified as factors associated with early postoperative headache relief.
7	Study period between January 1, 2006 and December 31, 2013.	Not specified	Not specified	Not specified	Among patients with and those without brain tumors, 554 (4.89%) and 235 (2.08%) individuals, respectively, were identified as having a prior migraine diagnosis. Compared to unaffected controls, patients with brain tumors experienced an independent 2.45-fold increased risk of having a prior migraine diagnosis. The risks were even higher among men (odds ratio (OR) = 3.04, 95% confidence interval (CI) = 2.29- 4.04)
8	Study period between 2010 and 2015	Tension-type-like headache (TTH), migraine-like headache, worsening of a pre-existing headache (WPH) and classic brain tumor headache (BTH).	Glioma	Histological examination following biopsy or tumor resection	12.5% (n=66) of patients with glioma indicated headache as a presenting symptom of their disease. Of these, 31 patients (47%) had TTH, while BTH and WPH were reported by 28 (42%) and seven (11%) patients, respectively. We did not find any case of migraine-like headache
9	Study period, January 2003 through December 2013	Non-acute headache	Pituitary adenoma	Not specified	The prevalence of headaches among patients have both treated and untreated pituitary adenomas is surprisingly low compared to the general population.
10	A mean follow-up 15.8 years	Migraine and non-migraine headache	Glioma, glioblastoma, astrocytoma, meningiomas, oligodendroglioma, other neoplasms.	Not specified for brain tumors, assessed questionnaire for migraine diagnosis	No evidence approved that headache in general or migraine in particular are associated with the occurrence of brain tumors.

Discussions

A total of 740 documents were analyzed with the data spanning from 2015 to 2024. The review identified an increasing number of publications focusing on the relationship between migraine and brain tumors. The United States emerged as the largest contributor, with 265 publications, followed by Italy (87) and the United Kingdom (59). The journal BMJ Case Reports published the most documents on the topic, totaling 18 documents. Harvard Medical School was the institution with the highest number of published papers, contributing 24 articles. The most prolific authors were Parisi, P. and Raucci, U., each with seven publications. Key terms frequently mentioned across the studies included migraine, headache, nuclear magnetic resonance imaging, magnetic resonance imaging, brain tumor, brain neoplasms, neuroimaging, migraine disorders, and neurologic disease. The connection between migraine and brain tumors has been widely studies, with research producing varying findings. The ten studies reviewed explored different methodologies, patient groups, and tumor types, offering significant insights into this intricate relationship.

In a study conducted by Rabia Tütüncü Toker (7) in Turkey, it was found that among children diagnosed with migraine or tension-type headaches, no significant abnormal MRI reports for brain tumors were observed. However, a small subset of patients exhibited red flag symptoms and abnormal neurological findings, but these did not result in confirmed brain tumor diagnoses. Interestingly, six children were suspected of having pituitary adenoma, which warrants further investigation given the potential overlap between headache symptoms and pituitary lesions. This study suggests that while headaches may be a symptom in some cases of brain tumors, the likelihood of a brain tumor diagnosis in children with migraine or tension-type headaches appears to be low.

Similarly, Olafur B. Davidsson's cohort study (9) in Denmark revealed that individuals who has been exposed to childhood cancer had an increased risk of receiving antimigraine treatment, with central nervous system (CNS) cancers accounting for 20.2% of the cases. Although this does not directly establish a causative relationship between migraine and brain tumors, it underscores the need for careful clinical evaluation in individuals with a history of CNS cancer. The findings emphasize the importance of recognizing the potential risk of migraine in cancer survivors, especially those with CNS tumors.

In contrast, a cohort study by Holly Elser (10) in Denmark reported a significantly increased risk of brain cancer in patients with migraine, with a standard incidence ratio (SIR) of 1.57. The study found that individuals with a history of migraine were at a higher risk for neurological origin cancers, including brain tumors. These findings suggest that while the absolute risk remains relatively low, clinicians should be vigilant in assessing migraine patients for neurological conditions, particularly those with unexplained or worsening headache patterns.

The prospective cohort study by Franziska Guenther (11) in Germany, which followed patients after meningioma surgery, provides insights into the post-surgical course of headaches. The study demonstrated that the prevalence of headache significantly decreased following surgery to remove the tumor, highlighting the role of meningiomas in provoking headache symptoms. This finding aligns with the notion that certain types of brain tumors, particularly meningiomas, may cause headaches that improve after surgical intervention.

Further supporting the association between brain tumors and headaches, Domenico Chirchiglia's retrospective cohort study (12) in Italy found a correlation between migraine aura-like symptoms and occipital lobe brain tumors, including low-grade astrocytoma and glioblastomas. This study strengthens the hypothesis that specific types of brain tumors, particularly those located in the occipital region, may trigger migraine-like symptoms, potentially aiding in the diagnostic process for these tumors.

On the other hand, a prospective cohort study by Bodil Karoline Ravn Munkvold (13) in Norway revealed that headache was a common symptoms in patients with intracranial tumors, especially among younger and female patients. Many of these patients experienced headache relief following surgery. The study also identified factors such as younger age, female sex, occipital tumor location, and functional dependence as predictors of early postoperative headache relief, which could inform clinical decisions when assessing patients presenting with headache and suspected brain tumors.

Chao-Hung Chen's case-control study (8) in Taiwan identified a 2.45-fold increased risk of a prior migraine diagnosis in patients with brain tumors. The study reported a higher odds ratio for men, which may suggest a sex-specific relationship between migraine and brain tumors. Although the study did not specify tumor types, the significant association found between migraine history and brain tumor diagnosis warrants further exploration in large and more targeted studies.

Marco Russo (14) in Italy found that headache was a presenting symptom in 12.5% of glioma patients, but migraines were not specifically identified among these cases. This suggests that while various headache types, including tension-type headaches (TTH) and brain tumor headaches (BTH), were common, migraine-like headaches were not prevalent among glioma patients. This may indicate that migraine as a presenting symptom of brain tumors is relatively rare.

In a cohort study by Gøril Bruvik Gravdahl (15) in Norway,

the prevalence of headaches among patients with pituitary adenomas was surprisingly low compared to the general population. This finding suggests that pituitary adenomas, despite their potential to cause headache symptoms, are less likely to be associated with the development of chronic headaches or migraines. This finding contrasts with other studies that indicate headaches are common in patients with brain tumors.

Finally, Tobias Kurth's large multicenter prospective cohort study (1) in the USA did not find evidence supporting a link between migraine or other types of headaches and the development of brain tumors. Despite extensive follow-up, the study failed to establish a relationship, suggesting that migraine may not be a significant risk factor for the development of brain tumors.

Overall, the studies included in this review provide mixed evidence regarding the relationship between migraine and brain tumors. While some studies indicate a potential increased risk of brain tumors in patients with migraines, others fail to establish a significant association. These findings underscore the complexity of the relationship between headache disorders and brain tumors, and suggest that while headaches, including migraines, can be a symptom of brain tumors, the presence of a headache alone is not sufficient to diagnose a brain tumor. Further large-scale, prospective studies are needed to clarify the nature of this association and improve clinical management strategies for patients presenting with headache and neurological symptoms.

Conclusions

The association between migraine and brain tumors remains complex and inconsistent. While some studies indicate a potential risk, others fail to confirm a significant relationship. Further large-scale, prospective studies are needed to clarify this association and inform clinical practices.

References

1. Kurth T, Buring JE, Rist PM. Headache, migraine and risk of brain tumors in women: prospective cohort study. J Headache Pain 2015;16:17. Doi:10.1186/s10194-015-0501-0.
2. Ravisankar P, Hundia A, Sindhura J, Rani BS, Anvith PS, Pragna P. Migraine-A comprehensive review. Journal of Pharmaceutical Research 2015;5.
3. Pleș H, Florian I-A, Timis T-L, Covache-Busuioc R-A, Glavan L-A, Dumitrascu D-I, et al. Migraine: Advances in the Pathogenesis and Treatment. Neurol Int 2023;15:1052–105. Doi:10.3390/neurolint15030067.
4. Ramadan H. Hypertension and Migraine: A Bibliometric Analysis. Headache Medicine 2024;15:2–6. Doi:10.48208/HeadacheMed.2024.2.
5. Ramadan H. The association between diabetes and migraine: a systematic review and meta-analysis. Headache Medicine 2024;15:225–49. Doi:10.48208/HeadacheMed.2024.42.
6. Rasheed S, Rehman K, Akash MSH. An insight into the risk factors of brain tumors and their therapeutic interventions. Biomedicine & Pharmacotherapy 2021;143:112119. Doi:10.1016/j.biopha.2021.112119.
7. Toker RT, Mutlucan IO, Tanrıverdi C, Demir AB. MRI findings in children with migraine or tension-type headache. BMC Pediatr 2023;23:435. Doi:10.1186/s12887-023-04264-y.
8. Chen C-H, Sheu J-J, Lin Y-C, Lin H-C. Association of migraines with brain tumors: a nationwide population-based study. J Headache Pain 2018;19:111. Doi:10.1186/s10194-018-0944-1.
9. Davidsson OB, Rostgaard K, Hjalgrim LL, Chalmer MA, Olofsson IA, Søegaard SH, et al. Childhood cancer confers increased risk of migraine – A Danish nationwide register study. Cancer Epidemiol 2022;81:102278. Doi:10.1016/j.canep.2022.102278.
10. Elser H, Skajaa N, Ehrenstein V, Fuglsang CH, Farkas DK, Sørensen HT. Cancer risk in patients with migraine: A population-based cohort study in Denmark. Headache: The Journal of Head and Face Pain 2022;62:57–64. Doi:10.1111/head.14251.
11. Guenther F, Swozil F, Heber S, Buchfelder M, Messlinger K, Fischer MJ. Pre- and postoperative headache in patients with meningioma. Cephalalgia 2019;39:533–43. Doi:10.1177/0333102418793636.
12. Chirchiglia D, Chirchiglia P, Marotta R. Migraine aura-like headache in occipital lobe brain tumors. Romanian Journal of Neurology 2019;18:174–6. Doi:10.37897/RJN.2019.4.3.
13. Ravn Munkvold BK, Sagberg LM, Jakola AS, Solheim O. Preoperative and Postoperative Headache in Patients with Intracranial Tumors. World Neurosurg 2018;115:e322–30. Doi:10.1016/j.wneu.2018.04.044.
14. Russo M, Villani V, Taga A, Genovese A, Terrenato I, Manzoni GC, et al. Headache as a presenting symptom of glioma: A cross-sectional study. Cephalalgia 2018;38:730–5. Doi:10.1177/0333102417710020.
15. Gravdahl GB, Tronvik EA, Fougner SL, Solheim O. Pituitary Adenoma and Non-acute Headache: Is There an Association, and Does Treatment Help? World Neurosurg 2016;92:284–91. Doi:10.1016/j.wneu.2016.04.071.

Heba Ramadan
https://orcid.org/0000-0002-8417-2509

Authors contribution: This is a single-author review
Conflict of interest: No conflict of interest
Funding: No funding was received