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Efficacy and Safety of Acupuncture Compared with Standard Treatment in Migraine Without Aura: A Systematic Review of Randomized Controlled Trials

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KEYWORDS

Acupuncture, Migraine, Electroacupuncture, RCT

ABSTRACT

This systematic review assessed the efficacy and safety of acupuncture compared with standard pharmacological treatments for migraine without aura. Following PRISMA guidelines and the Cochrane Handbook for Systematic Reviews of Interventions, we searched PubMed, ProQuest, SAGE Journals, and EuropePMC for randomized controlled trials (RCTs) comparing acupuncture with pharmacological therapy in this condition. Outcomes included headache frequency, intensity, medication use, quality of life, and safety. Risk of bias was evaluated with the Cochrane RoB 2.0 tool. Eight RCTs with patients experiencing migraine without aura were included. Acupuncture consistently reduced migraine frequency, showing significantly greater decreases in headache days and attack frequency than medications like flunarizine and valproic acid. Several studies reported significant pain intensity reductions, with acupuncture being comparable or superior to pharmacological therapies. Acupuncture also led to earlier and sustained reductions in acute medication use, potentially reducing medication overuse headache risk. Improvements in quality of life were noted in physical function, emotional well-being, and migraine-specific measures. Adverse events related to acupuncture were generally mild and transient (e.g., local bleeding, discomfort) and occurred less frequently than those linked to medications, which included drowsiness, weight gain, and gastrointestinal symptoms. Overall, acupuncture demonstrated favorable efficacy and safety profiles compared with standard pharmacological treatments for migraine without aura, offering notable benefits in reducing frequency, intensity, and medication use, while improving quality of life. Due to variability in acupuncture protocols and some methodological limitations, further large-scale, multicenter trials with standardized designs are needed to confirm these findings.

INTRODUCTION

Migraine is a common, familial, and complex neurological disorder characterized by episodic sensory processing disturbances, with headache as its hallmark symptom (Aguilar-Shea et al., 2022). It affects approximately 12% of the global population, with prevalence rates of up to 17% in women and 6% in men, and is particularly frequent during the most productive years of life, peaking between ages 35 and 39 before declining, especially after menopause. Beyond its clinical burden, migraine imposes substantial socio-economic consequences globally. The World Health Organization ranks migraine as the third most prevalent medical disorder worldwide and the second leading cause of years lived with disability. In economic terms, migraine generates significant indirect costs through productivity losses, work absenteeism, and reduced workplace performance. Studies from high-income countries

estimate annual costs exceeding USD 20 billion in the United States alone, driven primarily by lost productivity rather than direct medical expenses. In low- and middle-income countries, the economic burden is compounded by limited access to specialized care, inadequate health insurance coverage, and insufficient awareness among healthcare providers, resulting in underdiagnosis and suboptimal management. Furthermore, migraine disproportionately affects individuals during their peak earning years, exacerbating financial strain on families and reducing overall quality of life. The burden of migraine is considerable, as it consistently ranks as the second leading cause of disability worldwide and is one of the most common reasons for emergency department visits. Genetic predisposition plays a key role, with the risk of developing migraine reaching 40% when one parent is affected and up to 75% when both parents have a history of migraine (Ferrari et al., 2022; Pescador Ruschel & De Jesus, 2024; Lipton et al., 2001).

Migraine attacks typically last between 4 and 72 hours and progress through four overlapping phases: premonitory symptoms, aura, headache, and postdrome. Aura, most commonly visual in nature, is experienced by about one-third of patients, while headache is characterized by unilateral, pulsatile pain of moderate to severe intensity, often aggravated by physical activity and accompanied by symptoms such as nausea, photophobia, phonophobia, and osmophobia (Aguilar-Shea et al., 2022). Depending on the number of headache days per month, patients are classified as having episodic migraine (≤14 days) or chronic migraine (>15 days), with the latter associated with higher disability, irregular lifestyle patterns, and comorbidities such as anxiety, depression, and obesity (Aguilar-Shea et al., 2022; Lipton et al., 2007). Risk factors for migraine chronification include high baseline headache frequency, suboptimal acute treatment, medication overuse, caffeine intake, and psychological stress (Lipton et al., 2007). Globally, the use of acupuncture for migraine prevention has grown substantially over recent decades. Epidemiological surveys indicate that approximately 10–15% of migraine patients in Western countries have tried acupuncture, with higher rates reported in Asian populations where traditional medicine is more culturally integrated. A systematic review published in 2020 estimated that acupuncture is used by up to 25% of chronic migraine sufferers seeking complementary therapies. Clinical trials have demonstrated that acupuncture reduces migraine frequency by an average of 3–4 days per month, with effect sizes comparable to prophylactic medications such as topiramate and valproic acid. Moreover, patient satisfaction with acupuncture tends to be high, attributed to its minimal side effects and holistic approach to symptom management.

Management of migraine encompasses both pharmacological and non-pharmacological strategies. Acute pharmacological therapy ranges from simple analgesics and NSAIDs for mild to moderate attacks to triptans, which act as selective agonists at 5-HT1B/1D/1F receptors, for moderate to severe attacks. Triptans not only cause vasoconstriction but also inhibit the release of calcitonin gene-related peptide (CGRP), substance P, and other neurotransmitters implicated in migraine pathophysiology, thereby preventing neurogenic vasodilation and inflammation (Lipton et al., 2007). Although generally safe, triptans are contraindicated in patients with uncontrolled hypertension or cardiovascular disease (Aguilar-Shea et al., 2022).

In recent decades, acupuncture has gained attention as a complementary and alternative therapy for *migraine*. Neuroimaging studies have demonstrated that acupuncture modulates several brain regions and networks implicated in pain perception and regulation, including the default mode network (DMN), salience network (SN), central executive network (CEN), and descending pain modulatory system (DPMS). Immediate effects of acupuncture are observed in regions such as the middle frontal gyrus, precuneus, and postcentral gyrus, while preventive effects are associated with modulation of the anterior cingulate cortex, middle frontal gyrus, and precuneus. These changes suggest that acupuncture alleviates headache symptoms by restoring the balance between trigeminal ascending pain pathways and descending modulatory systems, as well as enhancing cognitive and emotional regulation (Tong et al., 2025).

Several landmark studies have evaluated acupuncture's efficacy in *migraine* prevention. Linde et al. (2016) conducted a Cochrane systematic review of 22 trials involving 4,985 participants and concluded that acupuncture is at least as effective as prophylactic drug treatment for reducing *migraine* frequency, with fewer adverse events. The study reported that acupuncture reduced *migraine* days by approximately 3.2 days per month compared to sham controls (95% CI: 2.1–4.3 days). Zhao et al. (2017) performed a multicenter randomized controlled trial in China, demonstrating that electroacupuncture significantly reduced monthly *migraine* attack frequency from 5.2±2.1 to 2.3±1.4 attacks after 12 weeks of treatment ($p<0.001$), outperforming topiramate in both efficacy and tolerability. Li et al. (2020) showed through functional MRI that acupuncture modulates brain regions involved in pain processing, particularly decreasing hyperactivity in the trigeminal nucleus and enhancing connectivity in the periaqueductal gray matter, providing neurobiological evidence for its analgesic effects. Most recently, Yang et al. (2022) reported in a meta-analysis of 15 randomized controlled trials that acupuncture reduces headache intensity by 1.8 points on the VAS scale (95% CI: 1.3–2.3) and improves quality of life scores significantly more than standard pharmacological treatments, with sustained benefits observed at 6-month follow-up.

Despite growing evidence supporting acupuncture for *migraine*, significant gaps remain in the literature. First, most existing reviews include heterogeneous patient populations combining *migraine* with and without aura, which may obscure treatment effects specific to *migraine* without aura—the most common *migraine* subtype. Second, previous meta-analyses have often pooled acupuncture with other traditional medicine interventions, making it difficult to isolate the specific contribution of acupuncture alone. Third, there is insufficient synthesis comparing acupuncture directly with current standard pharmacological prophylactics such as flunarizine, valproic acid, and newer CGRP antagonists across multiple outcome domains including frequency, intensity, medication use, quality of life, and safety. Finally, the majority of studies originate from Asian countries, raising questions about generalizability to Western populations and healthcare contexts. Addressing these gaps is essential to provide clinicians and patients with evidence-based guidance for integrating acupuncture into *migraine* management protocols.

Given the substantial disability burden of *migraine* and the limitations of current pharmacological therapies, exploring non-pharmacological alternatives such as acupuncture is of increasing clinical importance. This systematic review aims to comprehensively evaluate

the *efficacy* and *safety* of acupuncture compared with standard pharmacological treatments specifically in patients with *migraine* without aura. By synthesizing evidence from randomized controlled trials, this review seeks to determine whether acupuncture offers comparable or superior benefits in reducing *migraine* frequency, pain intensity, acute medication consumption, and improving quality of life, while maintaining a favorable safety profile. The findings of this review will provide clinicians with evidence-based insights to guide treatment decisions, help patients make informed choices about complementary therapies, and identify areas requiring further research to optimize *migraine* management strategies. Furthermore, this review will contribute to health policy discussions regarding the integration of acupuncture into standard care pathways, particularly in settings where access to pharmacological prophylaxis is limited or where patients experience intolerable side effects from conventional medications.

RESEARCH METHOD

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the Cochrane Handbook for Systematic Reviews of Interventions (Page et al., 2021). A comprehensive literature search was performed across four electronic databases: PubMed, ProQuest, SAGE Journals, EuropePMC. The search strategy combined Medical Subject Headings (MeSH) and free-text terms related to acupuncture ("acupuncture," "electroacupuncture," "manual acupuncture") with terms for migraine ("migraine," "migraine without aura," "primary headache"). In addition, reference lists of included studies were screened to identify further eligible articles.

Eligibility criteria were prespecified. We included only randomized controlled trials that compared acupuncture with standard treatments of pharmacological therapy in patients diagnosed with migraine without aura. Studies were required to report at least one clinical outcome of interest, including: headache frequency (number of migraine days), headache intensity (Visual Analogue Scale), acute medication use, disability scores (Migraine Disability Assessment [MIDAS]), quality of life measures, or adverse events. Non-randomized and observational studies, reviews, editorials, case reports, and animal studies were excluded.

After duplicates were removed using EndNote 20, two independent reviewers screened titles and abstracts, followed by full-text assessment of potentially eligible studies. Discrepancies in study selection were resolved through discussion or consultation with a third reviewer. Data extraction was performed in duplicate using a standardized template to capture information on study design, patient characteristics, intervention protocols, control groups, reported outcomes, and follow-up duration. When necessary, corresponding authors were contacted for clarification or to obtain missing data.

Risk of bias was assessed at the study level. Randomized controlled trials were appraised using the Cochrane Risk of Bias 2.0 tool, which evaluates domains including randomization, deviations from intended interventions, missing outcome data, measurement of outcomes, and selective reporting (Sterne et al., 2019). Overall judgments were synthesized to inform the certainty of evidence across included studies.

RESULT AND DISCUSSION

A total of 758 records were identified from four databases (PubMed = 117, ProQuest = 147, SAGE Journals = 152, and Europe PMC = 342). After removing 141 duplicates, 617 records were screened by title and abstract, leading to the exclusion of 600 articles. Subsequently, 17 full-text articles were reviewed for eligibility. Of these, five were excluded due to differences in participant characteristics, three due to study design, and one as a study protocol, resulting in 8 studies being included in the final analysis (Facco et al., 2013; Zhao et al., 2017; Wang et al., 2011; Allais et al., 2002; Ye & Ma, 2009; Han et al., 2013; Wu et al., 2011; Ren, 2012).

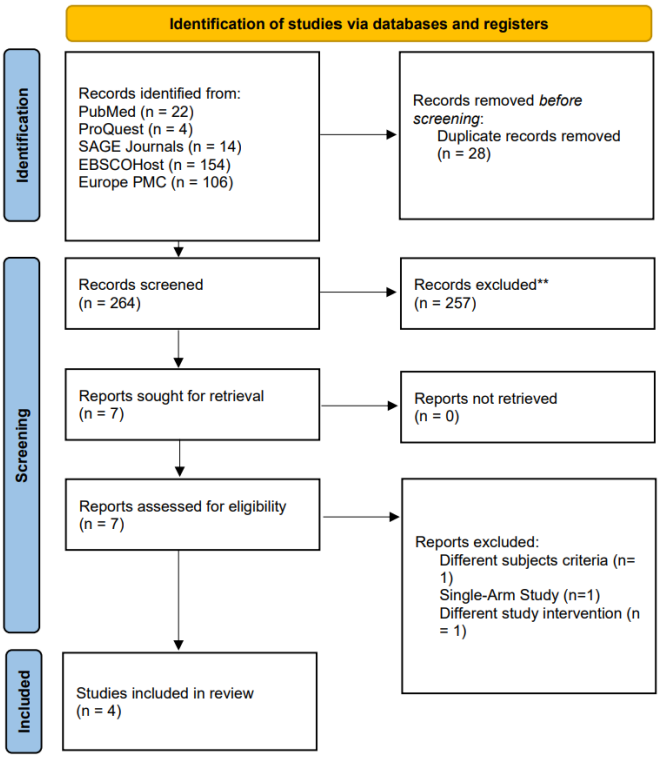

Figure 1. PRISMA diagram.

All eight studies were randomized controlled trials. Overall, each study was judged to have some concerns regarding risk of bias. In one study, concerns were raised about the randomization process due to insufficient reporting of allocation procedures (Ye & Ma, 2009). Additionally, all studies were rated as having some concerns in the measurement of outcomes, as they relied primarily on subjective assessments, which are generally less reliable than objective measures (Facco et al., 2013; Zhao et al., 2017; Wang et al., 2011; Allais et al., 2002; Ye & Ma, 2009; Han et al., 2013; Wu et al., 2011; Ren, 2012).

Figure 2. RoB 2.0 traffic light plot and summary plot.

Frequency of Migraine Attacks and Days

Across the included studies, acupuncture demonstrated a consistent effect in reducing migraine frequency compared with standard treatments. In the trial by Facco et al. (2013), both acupuncture and valproic acid improved MIDAS scores, and although the total number of days with pain decreased in both groups, no significant difference was found between treatments (P=0.63 at T1; P=0.10 at T2). Allais et al. (2002) reported that the number of migraine attacks significantly decreased in both acupuncture and flunarizine groups during therapy, with acupuncture showing superiority at 2 and 4 months (T1: 2.95 ± 0.39 vs. 4.10 ± 0.42; 95% CI, 0.02–2.28; T2: 2.30 ± 0.20 vs. 2.93 ± 0.24; 95% CI, 0.02–1.24; P<0.05), though this difference was not sustained at 6 months (P=NS). Wang et al. (2011) observed a greater reduction in migraine days in the acupuncture group compared with control at both week 4 (mean reduction 4.1 vs. 1.9 days) and week 16 (4.1 vs. 2.0 days; P<0.001 for both). Similarly, Zhao et al. (2017) reported that at 16 weeks, the frequency of migraine attacks decreased by 3.2 in the true acupuncture group, 2.1 in the sham acupuncture group, and 1.4 in the waiting list group. True acupuncture showed greater reductions compared with sham (difference 1.1 attacks; 95% CI, 0.4–1.9; P=0.002) and waiting list (difference 1.8 attacks; 95% CI, 1.1–2.5; P<0.001).

Findings from other studies further support these results. Ye and Ma (2009) demonstrated a significant reduction in migraine frequency, with a total effective rate of 92.8% in the acupuncture group versus 85.7% in the control group at eight weeks (P<0.01). Wu et al. (2011) similarly showed a greater decrease in headache frequency in the acupuncture group, where the total effective rate reached 63.3% compared with 36.7% in the flunarizine group (P<0.05). Ren (2012) reported that while immediate two-hour pain relief was superior with Fenbid, acupuncture significantly reduced the frequency of weekly migraine attacks (from 3.71 ± 2.11

to 2.05 ± 1.83; P<0.05), whereas the control group showed no significant change (from 3.96 ± 1.72 to 3.49 ± 1.84; P>0.05). In the trial by Han et al. (2013), acupuncture demonstrated superiority in the remission phase, with a total effective rate of 86.7% compared with 70% in the drug group (P=0.007), although acute-phase efficacy was similar between groups (93.3% vs. 90.0%; P>0.05).

Pain Intensity

Pain reduction was evaluated in three of the international studies. Facco et al. (2013) found that pain intensity (PI) was initially better in the valproic acid group at T1 (P<0.0001), but acupuncture yielded superior improvement at T2 (P=0.02), along with greater improvement in pain relief scores (PRS; P=0.02). In the trial by Allais et al. (2002), pain intensity decreased significantly with acupuncture (χ^2=14.59, df=2; P=0.001), whereas flunarizine showed no significant reduction compared with baseline (χ^2=2.34; P=0.310). Wang et al. (2011) reported that mean VAS scores decreased in both groups, but no significant between-group difference was detected (P=0.143) despite greater within-group reductions in the acupuncture arm (baseline 6.9 ± 1.7 to 4.3 ± 2.7 at week 4, and 4.6 ± 2.6 at week 16). Zhao et al. (2017) also demonstrated that VAS scores were consistently lower in the true acupuncture group compared with sham and waiting list groups throughout the 24-week follow-up (P<0.05).

The Chinese studies provide additional evidence. Wu et al. (2011) observed a significant reduction in composite headache scores, with greater decreases in the acupuncture group compared with flunarizine (P<0.05). Ren (2012) found that although immediate two-hour VAS reductions were larger with Fenbid (7.11 ± 1.01 → 2.82 ± 2.36) compared with acupuncture (7.32 ± 0.99 → 4.45 ± 2.67; P<0.05), acupuncture was more effective in preventing attacks at follow-up. Han et al. (2013) similarly demonstrated that headache composite scores improved more in the acupuncture group during the remission phase compared with the drug group (P<0.05).

Analgesic and Triptan Use

The effect of acupuncture on acute medication intake was also notable. Facco et al. (2013) showed that Rizatriptan intake increased in the valproic acid group (median 6 wafers at T1 to 7 at T2), while it significantly decreased in the acupuncture group, which also reported lower overall use at T2 (P=0.001, adjusted for sex and age). Allais et al. (2002) documented a progressive reduction in analgesic consumption in both groups, but statistical significance was reached earlier in the acupuncture group (T1: 5.13 ± 0.46 vs. 9.72 ± 1.25; P<0.05), with effects sustained at T2 and T3. Wang et al. (2011) found that fewer patients required acute medications such as aspirin or ibuprofen in the acupuncture arm at weeks 4 and 16 (P<0.05). Zhao et al. (2017) similarly reported that both true and sham acupuncture reduced acute pain medication use compared with the waiting list, with true acupuncture producing the greatest reductions (P<0.05).

Among these trials, Ren (2012) also showed that Rizatriptan intake was not assessed, but analgesic needs declined less effectively compared with acupuncture, which was superior for long-term attack prevention. Han et al. (2013) also reported significantly fewer acute

medication requirements in the acupuncture group compared with the drug group during the remission phase ($P<0.05$).

Quality of Life

Quality of life outcomes were addressed in Wang et al. (2011) and Zhao et al. (2017). Wang et al. (2011) observed significant improvements in both physical and mental SF-36 scores over time in both acupuncture and control groups, but no significant between-group differences were detected ($P>0.05$). In contrast, Zhao et al. (2017) reported that true acupuncture led to significantly greater improvements in the Migraine-Specific Quality of Life Questionnaire (MSQ) and anxiety/depression scales (SAS, SDS) compared with the waiting list, while differences between true and sham acupuncture were minimal except for the emotional function subscale of MSQ.

Complementary data from Wu et al. (2011) indicated that SF-36 domains including physical functioning, role physical, and bodily pain improved significantly more with acupuncture than flunarizine ($P<0.05$).

Safety and Adverse Events

Safety profiles differed notably across interventions. Facco et al. (2013) reported that 48.8% of patients in the valproic acid group experienced adverse events, including nausea (n=5), constipation (n=4), abdominal pain (n=5), drowsiness (n=3), weight gain (n=2), and itching (n=1), whereas no adverse events were reported in the acupuncture group. In the Allais et al. (2002) study, adverse effects were significantly lower in the acupuncture group (10/77, 13%) compared with flunarizine (29/73, 40%; $\chi^2=7.22$; $P=0.007$). Sedation (10%) and local pain (8%) were the most common side effects of acupuncture, while drowsiness (35%), weight gain (22%), and depression (7%) predominated in the flunarizine group. Wang et al. (2011) documented mild adverse events in both groups, with acupuncture-associated events including minor bleeding (n=3), scalp discomfort (n=1), and fatigue (n=1), while the control group reported fatigue/faintness (n=5) and weight gain (n=2). No severe adverse events were observed. Zhao et al. (2017) reported seven mild to moderate adverse events across groups (five in true acupuncture, two in sham), including tingling, ankle swelling, and subcutaneous hemorrhage, all of which resolved without discontinuation of treatment.

Consistent with these findings, Ye and Ma (2009) did not report major adverse events, with acupuncture well tolerated throughout eight weeks. Wu et al. (2011) observed fewer adverse effects in the acupuncture group compared with flunarizine (sedation 10%, local pain 8% vs. drowsiness 35%, weight gain 22%, depression 7%). Ren (2012) reported three cases of mild local hematoma in the acupuncture group and two cases of mild digestive discomfort in the Fenbid group, all resolving spontaneously. Han et al. (2013) documented only one case of syncope in the acupuncture group versus multiple drug-related side effects including numbness, sluggish response, and gastrointestinal complaints in the medication group ($P=0.036$).

Discussion

The management of migraine is inherently multifaceted, involving acute therapies for aborting attacks, preventive measures aimed at reducing attack frequency and severity, and lifestyle modifications to address individual triggers. Acute pharmacological strategies include nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen, naproxen, and diclofenac, which are generally used in mild-to-moderate attacks, and triptans, which remain first-line agents particularly for patients with allodynia. Triptans are administered in various formulations, including subcutaneous injections, nasal sprays, and oral tablets, to ensure rapid relief, especially in patients with nausea or vomiting where oral absorption may be impaired (Pescador Ruschel & De Jesus, 2024). While these therapies are effective, they are often limited by side effects, contraindications, and the risk of medication overuse, highlighting the need for alternative or complementary approaches such as acupuncture.

The findings of this systematic review suggest that acupuncture provides consistent benefits across several outcomes when compared with standard pharmacological treatments. Regarding migraine frequency, acupuncture was found to reduce both the number of attacks and headache days more effectively in several trials, including international studies and Chinese randomized controlled trials. For instance, reductions in attack frequency reported in Allais et al. (2002), Wang et al. (2011), and Zhao et al. (2017) aligned with the high effective rates seen in studies such as Ye and Ma (2009) and Wu et al. (2011), while Ren (2012) and Han et al. (2013) further confirmed the preventive role of acupuncture in reducing weekly migraine episodes. This effect may be attributed to the neuromodulatory properties of acupuncture, particularly its ability to influence pain transmission pathways and restore the balance between the trigeminal pain ascending system and the descending pain modulatory system, as demonstrated in neuroimaging studies (Liu et al., 2024).

Pain intensity outcomes also reflected the superiority or comparable efficacy of acupuncture to standard drugs. Studies such as Allais et al. (2002) demonstrated significant reductions in pain scores with acupuncture but not with flunarizine, and Facco et al. (2013) observed greater improvements at later follow-up points in the acupuncture group compared with valproic acid. Similarly, Wu et al. (2011) and Han et al. (2013) confirmed more pronounced reductions in headache composite scores with acupuncture, further strengthening the evidence base. This analgesic effect is supported by physiological mechanisms involving modulation of central nervous system activity, release of endogenous opioids, and regulation of neurotransmitters such as serotonin and calcitonin gene-related peptide (CGRP), all of which are implicated in migraine pathophysiology.

Another consistent finding was the reduction in acute medication use among acupuncture-treated patients. Both Western and Chinese studies documented lower requirements for triptans, NSAIDs, or other rescue analgesics, with reductions observed earlier and sustained longer in the acupuncture groups (Facco et al., 2013; Zhao et al., 2017; Wang et al., 2011; Allais et al., 2002; Wu et al., 2011; Han et al., 2013). This reduction is clinically relevant as it may mitigate the risk of medication overuse headache, a well-recognized complication of conventional therapy.

Quality of life outcomes, though less consistently reported, also favored acupuncture. Improvements in SF-36 scores were observed in trials by Wang et al. (2011) and Wu et al.

(2011), while Zhao et al. (2017) demonstrated significant benefits in migraine-specific quality of life indices and psychological measures such as anxiety and depression. These results underscore the broader impact of acupuncture, extending beyond symptom relief to psychosocial well-being.

The safety profile of acupuncture was consistently favorable across all included studies. While pharmacological agents such as valproic acid and flunarizine were associated with a high rate of side effects, including gastrointestinal complaints, drowsiness, weight gain, and depression, acupuncture-related adverse events were generally mild, such as transient bleeding at needle sites or local discomfort, and rarely led to treatment discontinuation (Facco et al., 2013; Zhao et al., 2017; Wang et al., 2011; Allais et al., 2002; Ye & Ma, 2009; Han et al., 2013; Wu et al., 2011; Ren, 2012). This aligns with evidence from larger network meta-analyses, which suggest that acupuncture-related therapies not only reduce migraine frequency, intensity, and duration but also do so with fewer adverse effects, supporting their use as a safe and effective alternative or adjunct to pharmacological therapy (Liu et al., 2024).

This systematic review has several strengths. By restricting inclusion to randomized controlled trials, the review focused on high-quality evidence, thereby enhancing the validity of its findings. Furthermore, the outcomes evaluated were clinically meaningful, encompassing headache frequency, pain intensity, medication use, quality of life, and safety profiles, which provide a holistic understanding of the efficacy of acupuncture compared with standard pharmacological treatments.

Nonetheless, certain limitations should be acknowledged. Considerable heterogeneity existed across the included studies in terms of acupuncture protocols (manual vs. electroacupuncture, duration, and frequency of sessions), control interventions (different pharmacological comparators), and follow-up periods, which may limit direct comparability and contribute to variability in effect estimates. Several trials relied primarily on subjective outcomes such as pain scores, which are prone to reporting bias compared with objective measures. In addition, many of the included studies had some concerns regarding risk of bias, particularly in outcome measurement and randomization reporting. Publication bias cannot be excluded, as most of the available evidence originated from single-country studies, particularly China, which may limit generalizability to broader populations. Finally, the relatively small sample sizes of some trials reduce statistical power and the precision of pooled estimates.

CONCLUSION

This systematic review indicates that acupuncture is a safe and effective prophylactic treatment for migraine without aura, offering benefits comparable or superior to standard pharmacological therapies in reducing headache frequency, pain intensity, and medication use, along with improvements in quality of life. Adverse events were generally mild and less common than with conventional drugs. However, variability in acupuncture protocols and study quality limitations suggest caution in interpreting these results. To strengthen the evidence and inform clinical practice, future research should focus on high-quality, multicenter randomized controlled trials using standardized acupuncture protocols and extended follow-up periods.

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