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Beyond Pain: Innovative Approaches to Tension-Type Headache Management and Treatment

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Abstract

Introduction: Tension-type headache (TTH) is a common neurological disorder characterized by bilateral head pain and muscle tension, affecting up to 78% of the population. Despite its prevalence, TTH has historically received less attention than migraines. However, recent years have seen increased interest in understanding its pathophysiology and treatment options. This review comprehensively analyzes TTH management, covering non-pharmacological and pharmacological approaches to guide clinical practice and future research effectively.

State of Knowledge: TTHs manifest as bilateral, pressing, encircling head pain, profoundly affecting individuals' quality of life. Recent years have witnessed increased interest in TTH understanding and treatment. Non-pharmacological interventions, including behavioral modifications, exercise, dietary adjustments, sleep hygiene, physical therapy, psychotherapy, and pharmacological treatments like over-the-counter medications, prophylactic drugs, psychedelics, and botulinum toxin A, have shown promise in alleviating symptoms.

Conclusion: This review highlights the multifaceted management of TTH. Non-pharmacological interventions, including behavioral modifications and psychotherapy, offer symptom relief. Body awareness therapy, exercise, and psychotherapy benefit TTH symptoms and quality of life. Paracetamol, ibuprofen, and amitriptyline are standard treatments, with emerging options like psychedelics and botulinum toxin A. Personalizing treatment and understanding TTH mechanisms pose challenges. A multidisciplinary approach is essential for enhancing management and outcomes. More research is required to identify optimal treatments and long-term efficacy. Despite challenges, progress in TTH management brings hope for better patient care.

Keywords: tension-type headache, TTH, management, treatment, non-pharmacological interventions, pharmacological treatments, psychedelics, botulinum toxin A, caffeine

Introduction:

Tension-type headache (TTH) is one of the most common neurological disorders observed in the general population, with a lifetime prevalence ranging from 30 to 78%(1). It has been reported that 1 year prevalence of tension-type headache(26.8%) is higher than that of migraines (15.2%) in the general population(2).

TTHs are characterized by mild to moderate pain, which is encircling the head, like a tight band, often with accompanying shoulder and neck muscle tension. The pain is dull, bilateral, and usually lasts between 30 minutes and an hour. Known triggers for TTH are sleep disturbances and lack of sleep(2). Neurological symptoms are generally less pronounced than in migraines(3). Understanding the management and treatment of TTH is critical for alleviating individual suffering and for reducing the social and economic burden caused by the condition. Despite its prevalence, TTH has historically received less attention compared to other headache disorders such as migraine(4). However, recent years have seen a growing interest in improving our understanding of TTH pathophysiology and developing effective

management strategies(5). This literature review aims to analyse the management and treatment of tension-type headaches, providing a comprehensive overview of both non-pharmacological and pharmacological approaches(5-7).

The following sections will delve into the non-pharmacological interventions and pharmacological treatments. Through this comprehensive examination, our aim is to provide valuable information on the management and treatment of tension-type headaches, driving future research efforts, and guiding clinical practice.

Definition and Classification of TTH

Tension-type headaches (TTH) are defined as primary headaches characterized by bilateral, pressing or tightening pain, usually of mild to moderate intensity, without the characteristic features of migraine(1).

TTH can be further classified into episodic and chronic subtypes based on headache frequency, with episodic TTH occurring fewer than 15 days per month and chronic TTH occurring 15 days or more per month for at least 3 months(1).

Methods:

A comprehensive search strategy was used in multiple databases, including PubMed, Cochrane, and Google Scholar, to identify pertinent literature on tension-type headaches (TTH). Preference was given to articles published between 2014 and February 2024 to ensure relevance to contemporary practice. Priority was assigned to meta-analyses, systematic reviews, and randomized controlled trials (RCT) due to their high level of evidence. Key terms such as "Tension-type headache," "TTH," "TTH management," "TTH treatment," "Tension-type headache management," "Tension-type headache pharmacology," "Tension-type headache physiotherapy," "Tension-type headache psychotherapy," "Tension-type headache drug therapy," and "Tension-type headache caffeine" were utilized during the search process to optimize article retrieval. This comprehensive approach facilitated the identification of the most suitable and informative literature on TTH management and treatment. The exclusion criteria involved articles centred around paediatric populations.

Results

A thorough search yielded 82 articles for evaluation, out of which 29 were included in the systemic review. The selection criteria prioritized recent publications and those with robust evidence, including meta-analyses, systematic reviews, and RCTs. It is important to note that,

while most of the selected articles adhered to these criteria, not all publications met these standards.

Non-pharmacological Approaches to Management

Behavioural and lifestyle modifications

The efficacy of non-pharmacological self-management interventions for migraine and tension-type headache has been a subject of interest in recent years. A 2017 systemic review assessed the impact of non-pharmacological self-management interventions compared to standard care for individuals with migraine and/or tension-type headache(8). The interventions included educational or psychological strategies, excluding biofeedback and physical therapy. The analysis revealed that these interventions had a modest effect in reducing pain intensity, headache-related disability, and improving mood and quality of life compared to standard care. However, they did not significantly affect headache frequency. Further examination suggested that interventions incorporating explicit educational components, mindfulness, and cognitive-behavioural therapy (CBT), especially when delivered in group settings, showed greater effectiveness in reducing pain intensity and improving mood. These findings highlight the potential benefits of including specific components and delivery methods in self-management interventions for migraine and tension-type headache(8).

Complementary to these findings, studies exploring behavioral and lifestyle modifications have shown promising results in managing tension-type headache (TTH). Body awareness therapy and aerobic exercise showed a decrease in visual analogue scale (VAS), pain diary, pain disability index (PDI), and headache impact test (HIT) throughout the course of 3x60 minute sessions per week over a 6-week period(9). Similarly, patients with TTH that were subjected to strength training showed a moderate clinical effect on pain intensity and a decrease in frequency of headaches, thus indicating that exercise in the future might be considered clinically relevant in the treatment of TTH(6).

Moreover, it seems that dietary factors play a role in TTH as, as increased consumption of omega-6 fatty acids was linked to a higher incidence of headaches(10). Additionally, a separate observational study revealed that elevated intake of saturated fatty acids and omega-6 fatty acids correlated with more severe occurrences of TTH(11).

Furthermore, recent research indicates a growing link between tension-type headaches (TTH) and sleep disturbances, including insomnia, poor sleep quality, excessive daytime sleepiness,

inadequate sleep duration, and shift work(12). Numerous studies have shown a higher prevalence of sleep disturbances in individuals with TTH compared to those without headaches. Furthermore, the clinical manifestations of TTH tend to be more severe in people with sleep disturbances than in those without such disturbances(13). This association between TTH and sleep disturbances is particularly pronounced in people with chronic TTH compared to those with episodic TTH. Additionally, increasing evidence underscores the correlation between TTH and psychiatric comorbidities, which often coincide with sleep disturbances(13). The evolving understanding of the interaction between sleep and TTH holds promise for improving the diagnosis and management of both conditions.

Physical Therapy and Manual Techniques

Most physiotherapy interventions in TTH focus on the craniocervical mandibular region, resulting in a reduction in the intensity of pain and frequency of headache episodes over the short and medium term(14). Examples of such interventions include mobilization of the cervical and thoracic spine combined with a postural re-education program for the head and neck, traditional acupuncture targeting trigger points in the neck, masseter, and temporal regions, treatment of trigger points in the cranio-cervical-mandibular musculature, suboccipital inhibition, massage therapy focused on trigger points, electroacupuncture, manipulation of the upper cervical spine along with head and neck massage therapy, and protocols that integrate a combination of these techniques. It is worth mentioning, that one RCT found manual therapy to be a statistically significant form of treatment for TTH in patients who do not respond well to drug therapy(15).

Psychotherapy

In a study from 2015, Cognitive-Behavioural Treatment (CBT) was found to significantly reduce average headache intensity, frequency, and catastrophizing while enhancing coping strategies among patients with both migraine and tension-type headache. This underscores the potential of CBT to complement standard medical care, equipping patients with effective tools for managing headache pain(16).

Further support for the efficacy of psychological interventions in headache management comes from a comprehensive 2020 systemic review. This review highlighted improvements across various domains, including headache frequency, pain-related disability, and psychological symptoms like depression and stress(17). Expanding on these findings, a recent randomized controlled trial conducted in 2024 investigated intensive short-term dynamic

psychotherapy. The study revealed promising outcomes, including improved emotional regulation, reduced anxiety and anger levels, and significant relief from tension-type headache symptoms(18). Together, these results emphasize the holistic benefits of psychological interventions in alleviating tension-type headache symptoms.

Pharmacology

Usage of Nonsteroidal anti-inflammatory drugs

TTH is often treated with many over-the-counter drugs (OTC), most commonly paracetamol and ibuprofen(19, 20).

Paracetamol is often considered the first choice drug for headache and other bodily aches(21). However, a 2023 systemic review found that ibuprofen has better efficacy than paracetamol at the 2 hour mark, while paracetamol showed better efficacy at 1 hour mark(19). Surprisingly, ibuprofen was associated with a lower probability of the occurrence of gastrointestinal adverse events compared to placebo and paracetamol(19). However, it is still recommended to consider paracetamol over ibuprofen in people who are at a higher risk of adverse effects such as gastrointestinal bleeding or renal insufficiency(19).

A 2016 Cochrane review found that 1000 mg of paracetamol provides small benefit for being pain free at 2 hours, in patients with frequent TTH of moderate to severe intensity(22). Additionally, a study conducted in 2021, combining paracetamol and ibuprofen in a single dose may offer longer and more sustained pain relief while requiring a reduced amount of each painkiller(23).

The analgesic effect of using caffeine in headaches has long been researched, with studies suggesting that appropriate doses of caffeine significantly improve the therapeutic effect of common analgesics and NSAIDs in TTH(24). A 2008 RCT study demonstrated that the use of paracetamol 1000mg with 130mg caffeine is effective and well tolerated in TTH treatment(25). Similarly, a 2001 study supports the usage of ibuprofen and caffeine together, as it has shown greater analgesic activity compared to ibuprofen alone, caffeine alone, and placebo. Also aforementioned drug combination shown shorter time in alleviation of headache symptoms(26). Furthermore, a 2014 Metanalysis found that the combination of acetylsalicylic acid, paracetamol, and caffeine is effective and well-tolerated for episodic tension-type headaches. It outperforms acetaminophen alone in achieving pain relief within 2 hours, headache response within 2 hours, and facilitating the return to daily activities, even for those initially experiencing severe pain(27).

However, a 2016 Cochrane review found that ketoprofen 25 mg showed minimal efficacy compared to placebo in alleviating frequent episodic tension-type headaches, with no significant advantage over paracetamol 1000 mg. Furthermore, its use was associated with a higher incidence of adverse events. However, it showed a slight improvement in patients being pain-free at the 2-hour mark compared to placebo(28).

Usage of psychiatric drugs in TTH

Prophylactic treatment becomes necessary to manage frequent and/or difficult-to-treat attacks. Tricyclic antidepressants, notably amitriptyline, are the primary choice to prevent tension-type headaches, backed by evidence from numerous double-blind placebo-controlled studies. In addition, mirtazapine and venlafaxine have been shown to be effective among other antidepressants. Evidence supporting the efficacy of gabapentin, topiramate, and tizanidine is less robust(29).

A 2022 study offers real-world evidence suggesting the potential advantages of amitriptyline for people experiencing post-COVID-19 headaches, particularly among those with a prior history of tension-type headaches and without accompanying nausea(30).

In a Cochrane review from 2015, it was discovered that over a two-month treatment period, SSRIs or venlafaxine showed no superior effect compared to placebo or amitriptyline in decreasing headache frequency among patients with chronic tension-type headache(31). SSRIs seemed to exhibit less efficacy than tricyclic antidepressants concerning analgesic medication intake. Although tricyclic antidepressants were linked to more adverse events, this did not result in a higher rate of withdrawals.

Usage of Psychedelics

Recent studies have explored alternative therapeutic approaches, including the use of psychedelic substances such as psilocybin, LSD, and mescaline(32). These substances have attracted attention for their potential in mitigating headache symptoms and improving quality of life in people with chronic headache disorders. Evidence suggests that psychedelics may offer distinctive advantages in the management of tension-type headaches, with certain studies demonstrating significant symptom relief compared to traditional medications(33).

The survey conducted in 2024 revealed that the use of psychedelic substances (Psilocybin, LSD, mescaline) provided significant relief when administered in full doses compared to conventional medications. Furthermore, notable differences in relief were observed between full doses and microdoses, as well as between microdoses and conventional medication(34).

Usage of Melatonin

As elucidated in the previous sections of this review, the correlation between sleep patterns and headache pathology emerges as a pivotal aspect in understanding tension-type headaches (TTH). Consequently, an inquiry is raised as to whether the utilization of melatonin could offer therapeutic benefits in the management of patients with TTH.

The results of the research suggest that Melatonin represents a viable and secure option to address chronic tension-type headaches (TTH)(35). During the course of the study, notable reductions in monthly headache frequency, visual analogue scale (VAS) pain severity, Hamilton anxiety rating scale (HAM-A), Hamilton depression rating scale (HAM-D) and headache impact test-6 (HIT-6) scores were evident, along with improvements in sleep quality. Importantly, no incidences of treatment-related adverse events were documented.

Botulinum toxin A (BTX-A)

Botulinum toxin A (BTX-A) is known for its effectiveness in treating dystonias and spasticity by inducing robust relaxation of the skeletal muscles. Furthermore, BTX-A has been validated for the management of chronic migraines in numerous trials and meta-analyses(36). It also has potential to relax cervicofacial trigger points and reduce the activation of neurons of wide dynamic range in the dorsal grey horns, potentially inhibiting central sensitization(37).

A meta-analysis conducted in 2023 indicates the potential of BTX-A for chronic tension-type headache (CTTH) prophylaxis(37). This analysis also supports the utilization of botulinum toxin A in managing chronic tension-type headaches, demonstrating improvements in reducing headache intensity, frequency, and daily duration.

Conclusion

In conclusion, this comprehensive literature review sheds light on the multifaceted management and treatment landscape of tension-type headaches (TTH) in adults. TTH, despite its high prevalence, has historically received less attention than migraines. However, in recent years, we have seen a surge in interest aimed at better understanding its pathophysiology and optimizing therapeutic interventions.

Through an exhaustive search strategy and meticulous evaluation of relevant literature, this review synthesized evidence from a variety of non-pharmacological and pharmacological approaches for the management TTH. Non-pharmacological interventions, including behavioural modifications, exercise therapies, dietary adjustments, sleep hygiene practices, physical therapy, and psychotherapy, were explored for their efficacy in alleviating symptoms

of TTH. In addition, pharmacological treatments such as over-the-counter medications, prophylactic drugs, and emerging modalities such as psychedelics and botulinum toxin A were evaluated.

The findings of this review underscore the complexity of TTH management, with various interventions that demonstrate promise in reducing the frequency, severity, and associated disability of headaches. Notably, non-pharmacological approaches like body awareness therapy, exercise, and psychotherapy demonstrated beneficial effects on TTH symptoms and overall quality of life. While pharmacological interventions such as paracetamol, ibuprofen, their combinations with caffeine, and tricyclic antidepressants remain mainstays, emerging evidence suggests potential alternatives like psychedelics and botulinum toxin A.

Despite the strides made in TTH management, several challenges persist, including the need for personalized treatment approaches and the identification of optimal therapeutic combinations. Furthermore, the gaps in understanding the underlying mechanisms of TTH and the long-term efficacy of certain interventions warrant further investigation.

Moving forward, a multidisciplinary approach that integrates behavioural, pharmacological, and emerging therapeutic modalities holds promise for improving TTH management and improving patient outcomes. By continuing to advance our understanding of the pathophysiology and efficacy of TTH treatment, clinicians and researchers can better address the complex needs of individuals affected by this prevalent neurological disorder.

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