Pediatric Neurology 103 (2020) 3–7

Contents lists available at ScienceDirect

Pediatric Neurology

journal homepage: www.elsevier.com/locate/pnu

Topical Review

Headache Hygiene in Pediatrics: Brushing Up on the Basics

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ARTICLE INFO

Article history:
Received 20 February 2019
Accepted 10 October 2019
Available online 1 November 2019

Keywords:
Migraine
Headache hygiene
Education
Nonpharmacologic treatment
Self-management

ABSTRACT

Headache hygiene refers to self-management behaviors and practices aimed at reducing headache-related disability and improving self-efficacy. Although self-management interventions have an established place in the management of a wide range of chronic conditions, there is still not a standardized approach to this in pediatric headache. In this article, we focus on headache hygiene approaches including education, lifestyle interventions, and psychologic interventions. We also present our center's resource compilation, made available to patients by quick response code technology, as an example of a structured approach to headache hygiene. Further work should explore a standardized approach to headache hygiene and strategies to support adherence, including the use of technology as an innovative health care delivery pathway.

Introduction

Migraine is the second leading cause of years lost to disability worldwide.[1] This condition is especially impactful during the productive years of childhood and adolescence, with the prevalence of migraine in children and adolescents estimated at nearly 8%.[2] Quality of life (QoL) measure studies have likened the impact of QoL in children with migraines to that in children with diabetes, arthritis, and cancer.[3] The psychosocial and economic burden of pediatric migraine lends urgency toward accurately identifying and promptly and effectively treating these patients.

There is growing understanding that patients with chronic conditions, including headache disorders, benefit from active engagement in their own care. Patients and their families feel more empowered and may have improved functional outcomes when they have the information, skills, and confidence to manage the physical, emotional, and psychosocial impact of their condition. This approach aims to equip the patient and family with the "tools" needed to succeed in time beyond the health care encounter. The health care system as a whole also benefits from this approach, as this mode of care delivery promotes a more effective and sustainable use of health care resources.[4,5]

Headache hygiene refers to self-management behaviors and practices aimed at reducing the frequency, duration, and severity of headaches and the overall associated disability, i.e., reducing the "headache burden."[6] These behaviors and practices include a variety of components that can be employed with or without adjunctive pharmacologic therapy. Many of these practices also help to encourage self-efficacy, the belief and confidence in one's own capacity to exert control over one's own motivation,

Conflict of interest: The authors declare that they have no conflict of interest.

Alternative spellings and truncations were included as appropriate. Backward citation tracking was used as a supplement. Only English-language publications were included.

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https://doi.org/10.1016/j.pediatrneurol.2019.10.002
0887-8994/

behaviour, and performance attainments. Improved self-efficacy increases coping behaviour and resiliency and has been shown to reduce long-term disability in children and adolescents with migraine and other chronic headache disorders.[7-9]

A continued difficulty, however, is the paucity of evidence-based and structured guidelines toward the management of pediatric headache. Self-management interventions have an established place in the management of a wide range of chronic diseases and other chronic pain conditions, but there is still not a standardized approach to this in pediatric headache. Although common practice at most headache centers includes reviewing headache hygiene, these recommendations may differ considerably in terms of both content and delivery.

In this article, we focus on headache hygiene approaches including (1) education, (2) lifestyle interventions ("healthy habits"), and (3) psychologic interventions. The use of vitamins and minerals in pediatric headache has been reviewed comprehensively elsewhere[10] and therefore is not included in this review. We also present our center's resource compilation, made available to patients by quick response code technology or online, as an example of a structured approach to headache hygiene (see Supplementary Material).

Education

Effective headache management begins with education about the diagnosis.[11] It is important that patients diagnosed with a primary headache disorder, such as migraine, are compassionately and effectually alleviated of any of their doubts or anxieties about a secondary etiology. In addition, patients and their families should be educated about the natural history of migraine. The pathophysiology of migraine should be reviewed appropriately, particularly as it relates to the importance of using acute therapy early at the onset of symptoms.[12]

Patients often report observations regarding environmental factors, known as triggers, that they feel increase their likelihood of experiencing a migraine attack. Emerging studies about the premonitory symptoms of migraine— such as food cravings or alterations in the sleep-wake cycle, which may precede the pain phase of a migraine attack by up to 72 hours— suggest that some of these premonitory symptoms may have been historically misinterpreted as migraine triggers.[13] Two recent studies evaluating commonly reported migraine triggers failed to show reliably clear causation.[14,15] The relationship between these environmental factors and migraine is complex and not yet fully elucidated. The type and extent of this relationship also varies substantially among individuals with migraine. Therefore, blanket recommendations from the practitioner about triggers to categorically avoid should be approached with caution, as this may perpetuate more harm than benefit by creating an overly restrictive lifestyle or assigning unnecessary guilt.[11] Individuals with episodic migraine should be encouraged to keep a headache diary and note any patterns for their individual headache attacks. Patients should focus on potentially modifiable factors, such as sleep routine, rather than on nonmodifiable factors, such as weather changes.

In the adult literature, several potentially modifiable risk factors for progression to chronic migraine have been identified including comorbid depression[16-18] and obesity,[16,19,20] high headache frequency,[16,21] ineffective acute migraine treatment,[22,23] and acute medication overuse.[21,24,25] Patients and their families should be counseled about modifiable risk factors for chronification at the time of initial diagnosis.

Education and counseling regarding modifiable risk factors also extends to discussion on lifestyle interventions and healthy habits as a means to modify risk. Guidance about healthy habits and adaptive coping strategies has been shown to improve outcomes for patients and is an essential component of a comprehensive self-management support plan.[4,26,27]

Lifestyle interventions

Association between higher migraine frequency and a variety of poor lifestyle practices has been shown in several large pediatric population studies.[28-31] These practices include obesity, smoking, high caffeine consumption, and low physical activity. Conversely, adolescents who maintain healthier lifestyle habits have been shown to have a reduced likelihood of developing chronic migraine.[32] Although there may be other confounding factors contributing to these associations, healthier lifestyle habits are reasonable to recommend owing to the evidence in favor of overall health benefit and the possible benefit for migraine.[33]

Exercise

Recurrent migraine and tension headache have been shown to be significantly more prevalent in adolescents with low levels of physical activity.[28,34] Although pediatric studies are lacking, adult data suggest that exercise may reduce migraine frequency with similar efficacy to topiramate[35] and may have an additive benefit when combined with amitriptyline.[36] School-aged youth are recommended to have daily participation in at least 60 minutes of moderate to vigorous physical activity that is enjoyable, developmentally appropriate, and involves a variety of activities including aerobics, bone strengthening, and muscle strengthening.[37]

Weight management

In the pediatric population, overweight is defined as a body mass index greater than or equal to the 85th percentile for age and sex and obesity as a body mass index greater than or equal to the 95th percentile for age and sex.[38] In available data on pediatric obesity and headache, there seems to be a positive association between the two disorders.[19,39] The risk of migraine may be up to 60% higher in those who are overweight or obese compared with those of normal weight.[28] Among obese and overweight children and adolescents with migraine, weight loss may reduce attack frequency and headache-related disability.[19,40] The association between obesity and headache is likely multifactorial, but emerging evidence suggests a possible role for inflammatory mediator release through adipose tissue.[41]

Diet

Fasting can provoke headache, even in the general population.[42] Those with migraine seem to be more sensitive to fasting and irregular meal schedules. In a recent cross-sectional adolescent study, headache was significantly more frequent in those who skipped breakfast.[43] There is insufficient evidence to support the use of any specialized diets such as low-fat diets, elimination diets, or ketogenic diets as therapeutic interventions for pediatric migraine.[44] In patients who suspect dietary triggers for migraine, it may be reasonable to suggest limiting or avoiding the food item in question for a short period of time with concurrent monitoring to determine if symptoms improve. In general, maintenance of a nonrestricted, balanced, and healthy diet with a regular meal schedule is recommended.

Hydration

In adult studies, increasing water intake is associated with reduced headache severity and improved health-related QoL measures.[45] Similar studies have not yet been reproduced in a pediatric population. However, as the prevalence of inadequate hydration in all children and adolescents is estimated to be up to 55%,[46] education regarding water hydration in this population is of overall medical benefit.[33]

Sleep

The importance of adequate and regular sleep for children and adolescents in the management of migraine cannot be overstated. Guidelines recommend that children should sleep for nine to 12 hours, and adolescents for eight to 10 hours.[47] However, most adolescents find it difficult to meet these targets, partly due to the conflict between the physiologic sleep phase delay in adolescents[48] and the early start times of most North American middle and high schools. Often, adolescents will compensate by sleeping in more on the weekends, which often leads to difficulty falling asleep Sunday night. This, combined with an early wake-up time on Monday, may contribute to Monday being the most common day for a migraine attack in adolescents.[49] Although many adolescents utilize daytime napping to make up for insufficient nighttime sleep, frequent napping may interfere with nighttime sleep quality and duration and have resultant implications on mental and physical health, including headache burden.[50]

Improving sleep hygiene in children and adolescents with migraine, including implementation of consistent bedtime and wake time, has been shown to be effective in reducing headache frequency and attack duration.[51] Sleep hygiene recommendations should also include provision for screen time. Specifically, children and adolescents should not sleep with devices in their bedrooms (including televisions, computers, and smartphones) and should avoid exposure to devices or screens for at least one hour before bedtime.[52] Interestingly, sleep disturbance may also have a role in migraine progression, as there are longitudinal data suggesting that insomnia may be associated with incident migraine later in life.[53]

Regularity of lifestyle behavior

Studies in adolescents have shown that having inconsistency in daily patterns is associated with increased frequency of migraine attacks.[54] One hypothesis is that those with migraine are more sensitive to disruptions in homeostatic balance in interconnected neural systems, which decreases the threshold to develop a migraine attack.[55] Maintenance of a healthy diet and adequate hydration, restorative sleep, and exercise have all been independently shown to be beneficial in the management of migraine. However, maintaining *regularity* of all three has an added benefit to further moderate migraine disability and protect against chronification.[32]

Psychologic interventions

The use of psychologic interventions as a first-line or multimodal treatment for migraine in children and adolescents is supported by several studies and reviews. The goal of psychologic interventions in the treatment of headache is to help patients better understand the mind-body connection and to modify maladaptive thoughts, emotions, and behavioral patterns by integrating the use of cognitive and relaxation skills. This, in turn, results in decreased disability and improved coping measures, resilience, improved self-management and self-efficacy, and overall better outcomes.[11]

Cognitive behavioral therapy

Cognitive behavioral therapy (CBT) is a therapeutic technique to alleviate distress by helping patients develop more adaptive cognitions and behaviors, identify negative automatic thoughts, build awareness of energizing and draining daily activities, and reduce experiential avoidance. CBT combined with amitriptyline was found to result in significantly greater benefit compared with controls receiving amitriptyline and routine headache education alone.[7] Those who received CBT were found to have decreased headache days and a greater reduction in their Pediatric Migraine Disability Score (decrease in headache days per month by 11.5 days versus 6.8 days; and decrease in Pediatric Migraine Disability Score by 52.7 points versus 38.6 points for the CBT group versus the headache education group, respectively). A recent Cochrane review also reported benefit in psychologic interventions for headache in children and adolescents compared with control groups.[56] Two recent meta-analyses of psychologic interventions with CBT components for pediatric chronic headaches added further support, finding that 70% of children receiving these psychologic interventions experienced a 50% or more reduction in headache.[57,58]

Biofeedback

Biofeedback is a technique employing operant conditioning to help patients become more aware of their body's physiologic responses. Biofeedback helps patients learn, through practice and feedback, how to regulate and control these physiologic responses to improve function and reduce symptoms. Biofeedback has been evaluated in a meta-analysis and was found to be seemingly effective for migraine prevention in children and adolescents, with an apparent lack of adverse events noted.[59] Despite the positive findings, the number of studies included was small and a series of methodologic issues hampered the analyses, therefore further studies are needed to increase confidence in this estimate.

Mindfulness

Mindfulness is a method of focusing one's awareness on the thoughts, feelings, and body sensations felt in the present moment; noticing when thoughts are pulled into the past or future; and developing an attitude of curiosity and kindness toward one's experiences. Mindfulness-based therapy is emerging as an additional psychologic intervention with possible benefit seen in adults. Limitations in existing systematic reviews include low number and small scale of studies included.[60,61] A recent study found that mindfulness-based cognitive therapy provided a reduction in headache-related disability in adults with migraine compared with treatment as usual. The study also found that patients who received the mindfulness-based cognitive therapy scored higher on resiliency measures following the treatment and reported an increased ability to engage in functional tasks even during a migraine episode.[62] In a small pediatric trial, improvements were noted in pain acceptance, and the authors concluded that mindfulness may be a feasible and acceptable intervention for adolescents with recurrent headaches.[63] A recent study suggested that mindfulness-based programs may be associated with changes in plasma levels of catecholamines (noradrenaline, epinephrine, and dopamine) similar to those observed in patients undergoing pharmacologic prophylaxis.[64] Further studies, particularly in children and adolescents, are warranted.

Technology as a headache hygiene delivery tool

Some of the main challenges in implementing self-management strategies in children and adolescents are barriers to accessing in-person psychologic interventions and poor overall adherence to lifestyle interventions. New and innovative technology is being explored as an avenue to target these challenges by allowing patients and their families to access resources and education remotely. A Cochrane review assessing the use of technology to deliver psychologic interventions to children and adolescents with chronic pain conditions including headache suggested that these remotely delivered interventions may confer benefit in reducing pain severity post-treatment. Five trials were reviewed, which investigated cognitive behavioural-based therapies in children and adolescents with headache, and two included both headache and nonheadache chronic pain conditions. Evaluating pain as a primary outcome, the review suggested that psychologic therapies delivered remotely in this population had a beneficial effect of achieving at least a 50% reduction in headache severity post-treatment (with a number needed to treat to benefit of 2.88); however, this effect was not maintained at follow-up.[65]

Our center has developed a method of delivering a headache hygiene and resource guide to patients and their families using a quick response code. This is a mobile tagging method that allows the patient or family during a clinic visit to scan a two-dimensional barcode on their smartphone mobile device using the device's camera, which then opens a link to the document on their mobile device. Our resource guide also includes the web links for several different educational websites and mobile apps that offer self-directed or remotely guided cognitive behavioural, relaxation, and mindfulness supports.

Discussion

Headache hygiene behaviors— encompassing education, lifestyle interventions, and psychologic interventions— empower patients and their families with adaptive skills and strategies that they can use throughout their lives to manage their condition. These behaviors also serve to improve self-efficacy, provide a sense of control, and help patients to actively identify challenges and solve problems associated with their condition. We often think of these skills and strategies as “tools” that patients keep in their “toolkit” of self-management. Self-management in the treatment of headache is imperative and should be incorporated into the treatment plan from the first health care visit, as prompt and effective headache treatment has been shown to substantially alter short- and long-term outcomes.[4,27] Headache hygiene should be further reinforced at each subsequent clinic visit. Children and adolescents with migraine may struggle with adherence,[66] therefore the provision of a written summary or resource guide can be valuable. Further work should explore a standardized approach to headache hygiene and strategies to support adherence, including the use of technology as an innovative model for adjunctive care delivery.

Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.pediatrneurol.2019.10.002.

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