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Meditation-Based Treatment Yielding Immediate Relief for Meditation-Naïve Migraineurs

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Abstract

Meditation is gaining popularity as an effective means of managing and attenuating pain and has been particularly effective for migraines. Meditation additionally addresses the negative emotional states known to exist with migraines. The purpose of this study was to evaluate the effectiveness of meditation as an immediate intervention for reducing migraine pain as well as alleviating emotional tension, examined herein as a negative affect hypothesized to be correlated with pain. Twenty-seven migraineurs, with two to ten migraines per month, reported migraine-related pain and emotional tension ratings on a Likert scale (ranging from 0 to 10) before and after exposure to a brief meditation-based treatment. All participants were meditation-naïve, and attended one 20-minute guided meditation session based on the Buddhist “loving kindness” approach. After the session, participants reported a 33% decrease in pain and a 43% decrease in emotional tension. The data suggest that a single exposure to a brief meditative technique can significantly reduce pain and tension, as well as offer several clinical implications. It can be concluded that single exposure to a meditative technique can significantly reduce pain and tension. The effectiveness and immediacy of this intervention offers several implications for nurses.

Migraines, a neurovascular condition experienced as a throbbing, recurring, and often debilitating headache, typically accompanied by nausea, vomiting, and certain sensory sensitivities, affect ~18.2% of women and ~6.5% of men in the United States (Goadsby, Lipton, & Ferrari, 2002; Lipton, Stewart, Diamond, Diamond, & Reed, 2001). As a common, but often only acute treatment option, drug therapy has been found to be used by the majority of frequent migraineurs, where over-the-counter pharmaceuticals are used by almost one-half of migraine sufferers and 20% of migraine patients turn, after migraine onset, to prescription medication for relief (Diamond et al., 2007). Although some migraineurs choose to take the pharmaceutical route, medications prescribed for migraines, typically ergots and triptans, are not effective for everyone (Goadsby et al., 2002). Along with their limited efficacy, these medications are also associated with the continuing controversy surrounding prescription overuse and dependency, which introduces a demand for an alternative migraine intervention (Radat et al., 2008).

As both a preventative and acute treatment option, meditation has received a lot of attention as a means of aiding chronic pain sufferers in modulating their level of emotional reactivity to pain and ultimately providing them with the tools to control how intensely they experience their pain (Carson, Keefe, Lynch, Carson, Goli, Fras, & Thorp, 2005). Past research discovered that migraineurs who practiced spiritual meditation reported less frequent occurrences of migraine episodes and an increased tolerance of their pain (Wachholtz & Pargament, 2008). An important feature of meditation in relation to pain management is that it directly addresses the negative affective states which are typical with chronic pain. Research has found that frequent migraines are significantly associated with increased negative affect (e.g., anxiety, worry, and irritation), where these emotional states also serve as antecedents of a migraine episode (Lanteri-Minet, Auray, El Hasnaoui, Dartigues, Duru, Henry, ... Gaudin, 2003).

Buddhist Loving Kindness is a self-regulatory meditation practice that addresses emotionality and allows individuals to obtain the skills necessary for directing kind thoughts and feelings toward the self and others. This type of compassion meditation has offered chronic lower back pain sufferers some relief from their pain (Carson et al., 2005). The present study sought to explore the efficacy of this particular meditation format regarding its ability to quickly reduce both migraine headache-related symptoms and emotional tension, which was investigated as an associated negative affective state. Earlier research suggests that extended meditation-based interventions are effective at alleviating migraine-related pain, as well as decreasing levels of negative emotionality. We hypothesized that after a single brief session of guided meditation, meditation-naïve migraineurs would report an immediate decrease in levels of both pain and emotional tension.

Method

Participants

All procedures within this study were approved by the Institutional Review Board of the University of Massachusetts Medical School. Data were collected as part of a larger study on migraine headaches. Meditation-naïve participants ($n = 27$) aged 26-71 years (mean 45.5 y, SD 11.10 y; 68% female; 82% European, 4% Native American, 18% Asian) were recruited from the general population or referred by the physicians treating their migraine. In the sample, 37% had only a high school education, 52% completed some college/technical training, 15% had a bachelor degree, and 30% had a graduate degree. Although 29 participants were initially recruited, two were excluded for reporting no pre-meditation pain. Screening for enrollment eligibility was conducted over the telephone by either the research assistant or the research coordinator. Qualification for enrollment was verified through the completion of the 3-item Migraine Screener (Lipton, Dodick, Sadovsky, Kolodner, Endicott, Hettiarachchi, & Harrison, 2003). For inclusion to be considered, at least two of the three items had to elicit a 'yes' response. Eligibility criteria additionally required participants to have two to ten migraine episodes per month and a confirmed migraine diagnosis by their primary care provider.

Assessments

The assessment instruments were adapted from the 11-point Likert scale known as the Numeric Rating Scale (NRS-11), ranging from 0 (“no pain”) to 10 (“most intense pain”). The NRS is the most commonly used pain screening tool in clinical settings and is preferred by patients over other pain intensity assessment tools (Krebs, Carey, & Weinberger, 2007; Paice & Cohen, 1997). Paice and Cohen (1997) validated the NRS-11, and found a strong correlation between the NRS and the visual analog scale ($r = 0.847$; $p < .001$). The NRS-11 was used in its original form to assess pain; and it was altered to assess “emotional tension.” Higher scores indicate greater pain and emotional tension.

Procedure

Participants arrived at the lab and were individually consented into the study. The intervention was taught and practiced in cohorts of five. The study was a single-group, repeated-measures, pre/post design. As a group, participants completed a pre-intervention survey that included baseline ratings of migraine-related pain (mean 3.89, SD 2.407) and emotional tension (mean 3.96, SD 2.915). This survey was collected immediately before the intervention. Participants engaged in a group-based 20-minute guided meditation session, led by a master's-level clinician who was the meditation instructor. After this session, all migraineurs repeated the survey to record post-meditation ratings of their current levels of migraine-related pain and emotional tension. Bivariate correlations examined the relationship between pre-meditation levels of emotional tension and pain. Paired-sample t tests compared baseline and post-meditation ratings of pain and emotional tension.

Results

Correlation analyses yielded a strong association between baseline levels of pain and emotional tension ($R^2 = 0.34$; $p < .01$). After practicing 20 minutes of meditation, there was a significant decline from pre- to post-treatment in both reported pain ($t(26) = 5.23$; $p < .001$) and emotional tension ($t(26) = 5.47$; $p < .001$) ratings (Fig. 1). After meditation, both reported pain levels (mean 2.62, SD 1.713) and reported emotional tension levels (mean 2.27, SD 2.187) decreased. Thirty-seven percent of all participants reported post-meditation pain ratings of 1 ($n = 10$), and 55.6% reported post-meditation tension ratings of 1 ($n = 15$). Pre- to post-meditation data indicated a 32.7% decrease in pain and a 42.7% decrease in emotional tension.

Discussion

Based on the limited results, Buddhist Loving Kindness mediation offered effective immediate relief from migraine symptoms experienced by this group of frequent migraineurs. The intervention also yielded a significant decrease in levels of reported emotional tension, which the data suggest is moderately correlated with migraine-related pain, such that tension accounts for 34% of the variance in pain scores. In the present study, meditation-naïve migraine sufferers reported 33% less pain and 43% less tension immediately after one 20-minute intervention. Similarly, earlier research, also using self-report data, found that perceived intensity of induced pain was significantly reduced by

mindfulness meditation in healthy newly trained meditators (Zeidan, Martucci, Kraft, Gordon, McHaffie, & Coghill, 2011). Supplementary use of functional magnetic resonance imaging data in the same study also yielded significantly less activity in pain-related areas in the primary somatosensory cortex after meditation (Zeidan et al., 2011). These findings offer physiologic evidence in support of meditation's pain-reducing capacity. Another neuroimaging study highlighted the link between compassion meditation and increased activation of brain regions responsible for processing positive affect, which suggests a possible explanation of how meditation has been shown to be so effective (Engström & Söderfeldt, 2010). Negative mood is highly correlated with a lower tolerance for pain, as well as an increase in levels of subjectively reported pain, where the opposite is true for positive mood (Tang, Salkovskis, Hodges, Wright, Hanna, & Hester, 2008). Consequently, it is reasonable to theorize that meditation is effective at reducing symptoms of pain because it directly addresses affective states. Furthermore, negative affect, found in the present study to be strongly related to pain, typically co-occur with and have the potential to instigate the onset of a migraine attack (Lanteri-Minet et al., 2003). Therefore, it can be hypothesized that Buddhist Loving Kindness meditation, in its ability to reduce levels of emotional tension, can potentially serve as a preventative intervention for migraines.

Implications for Nurses

Along with its benefits for migraines, this technique may be helpful for managing other experiences of pain. Therefore, this technique has multiple clinical implications, especially for nurses who are often the first contact in a medical setting for patients in pain. This intervention can be implemented in inpatient and outpatient care units, during emergency room visits, as well as following trauma and various medical procedures. Meditation can be practiced in these contexts to provide meditation-naïve patients experiencing migraines or other symptoms of pain with a technique to quickly reduce their pain and emotional tension, as well as to promote self-efficacy over pain (Waters, Riordan, Keefe, & Lefebvre, 2008). As earlier research indicates, nurses are commonly faced with obstacles in their profession regarding a disproportionate patient-nurse ratio, as well as a lack of both time and sufficient tools to effectively help patients manage their pain (Elcigil, Maltepe, E refgil, & Mutafoğlu, 2011). Buddhist Loving Kindness meditation requires very little training to implement, can be administered to more than one patient at a time, and yields rapid results.

Study Limitations and Future Directions

Although this study offers some practical clinical implications for nurses and other health care professionals, there are some limitations to this study. The first apparent limitation to the research design is the omission of a comparison group. Because this was a clinical intervention-based study for patients actively experiencing pain, there was not a placebo intervention. Now that initial efficacy and effect sizes have been established, future research in this promising area will use a control group. Although the method of measurement used here is a clinically relevant means of assessing changes in pain levels (Krebs et al., 2007), the authors relied on subjective measures to assess levels of pain and emotional tension. Unfortunately, few objective measures exist to assess pain and emotional tension in the clinical setting, but the authors are excited about the possibility of exploring these areas further in future studies. Despite these limitations, the authors are very excited about these

findings. To the extent of the authors' awareness, there are no studies to date that have empirically studied brief non-pharmacologic pain interventions that could be used by nurses to offer pain sufferers quick relief from their pain. Additionally, because this is a novel study, we also open the door for future studies by identifying a statistical effect size for brief meditation to manage pain. This study can serve as a basis for determining power and sample size for future studies in this area. The authors are enthusiastic about expanding on this study by exploring the efficacy and effectiveness of this meditation-based intervention with the use of increasingly rigorous experimental designs.

Conclusion

Although this study had limited power with a small sample size, the large effect size resulted in identifiable changes and can serve as a basis for estimating effect sizes for future studies. Although the exact physiologic etiology of these changes is unknown, this study ultimately found what it sought out to explore: an effective, quick, and portable means of reducing pain and emotional tension. Not only can migraineurs use this technique in any setting, but they can use it as an alternative to pharmaceuticals or as an additive treatment while waiting for migraine medicine to take effect. With these implications, it is worthwhile to continue pursuing future research in this area.

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Figure 1.

- Ratings of pain and tension before and after meditation-based intervention. *** $p < .001$.