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MINDFULNESS INTERVENTIONS AND SLEEP DISTURBANCE: A MINI REVIEW

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Abstract:-

Background: Sleep disturbance is a growing medical and public health concern with insomnia increasing worldwide. In addition to exacerbating health problems, insomnia may increase psychological vulnerability and proneness to accidents this is a mini narrative review as to the evidence regarding the efficacy of mindfulness-based interventions in the treatment of sleep disturbances such as insomnia in clinical populations.

Method: A search of medical, health, and psychological databases was conducted for mindfulnessbased therapies and intervention variants thereof in the treatment of terms that included: mindfulness-based interventions, mindfulness-based stress reduction (MBSR), mindfulness therapies or treatments AND sleep disturbance, insomnia, poor sleep quality, or sleep disorder.

Results: Standard protocol mindfulness-based stress reduction (MBSR) interventions and the specific mindfulness-based therapy for insomnia (MBT-I) have been investigated as potential nonpharmacologic treatments for insomnia and sleep disturbance in clinical populations. Additionally, randomized controlled clinical trials have been conducted in this area to determine efficacy of such mindfulness treatment strategies.

Conclusion: Accumulating data indicate that mindfulness treatment protocols produce significant sleep outcome benefits with long-term follow-up duration.

Keywords: *Mindfulness, MBSR, MBT-I, insomnia, sleep disturbance*

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INTRODUCTION

Sleep is a natural resource and sleep disturbance is a growing medical and public health concern. In addition to exacerbating health problems, insomnia may increase psychological vulnerability and proneness to accidents. An estimated 20% of people around the world are sleep deprived and studies suggest that up to 50% of the world's population may suffer from insomnia. In the United States, around 60 million Americans are affected by insomnia, nearly
25 percent experience acute insomnia each year, and nearly one in four Americans will develop insomnia annually [1-2]. Traditional treatments for insomnia include medications, which, in addition to side effects, may lead to dependence or an increased risk of mortality [3]. Mindfulness practices are recognized internationally as effective complementary therapies for a myriad of conditions, from stress systems, anxiety and depression to cancer, chronic pain, and heart disease [4-9]. A brief narrative review follows as to mindfulness programs for impoverished sleep or insomnia.

MINDFULNESS BACKGROUND

In the late 1970s, Kabat-Zinn at the University of Massachusetts Medical Center developed a stress reduction and relaxation program that later became known as the eight-week mindfulness-based stress reduction program (MBSR) [10]. As with the original program, the multiple offspring programs focus on cultivating awareness of the present moment and one's experiences with non-judging acceptance. More specifically, mindfulness involves a disciplined practice that fosters detached, nonjudgmental witnessing of thoughts, perceptions, sensations, and emotions, which provides a means of self-regulating one's arousal and awareness. Rumination and catastrophizing, for example, are the opposite of mindfulness, which exemplifies an intentional focus on the present moment where an individual accepts each moment non-judgmentally rather than worrying about the past or the future. Several mindfulness techniques taught in the MBSR program include: breath as an anchor of attention, yoga, sitting meditation, mindful eating and walking meditation. Mindfulness is a mind-body intervention increasingly used as a therapy for insomnia [11].

Standard Mindfulness Intervention and Disturbed Sleep

Research with cancer patients may have been the earliest investigations as to the MBSR's effects on sleep in a health population [12]. Fatigue and disturbed sleep are common among cancer populations, and perhaps, is the most disruptive as well as longest lasting symptom due to treatment [13]**.** Significant results by Carlson and Garland nearly fifteen years ago suggested positive effects of the MBSR program on the sleep quality of cancer patients [12, 14]. Mindfulness programs also have been found to improve sleep quality in longitudinal studies of patients with psychiatric illnesses as well as organ transplant recipients [11, 15]. For example, significant improvement on the Pittsburgh Sleep Quality Index (PSQI) scores were reported after completing a MBSR program. A dose-response relationship between home meditation practice and sleep quality was found; more practice was associated with improved PSQI [15-16].

MINDFULNESS AND COGNITIVE BEHAVIORAL INTERVENTIONS

Mindfulness has been included as a component of multi-component interventions. For example, the MBSR was included in a multi-component intervention to improve sleep and reduce substance abuse recidivism among adolescents, where improvements in several sleep parameters as measured by diary, were reported [17]. Studies of Mindfulness-based Cognitive Therapy (MBCT)---a depression-relapse prevention program modeled after MBSR with the mindfulness techniques---documented improved sleep outcomes for patients with mood and anxiety disorders (i.e., [18]. Indeed, cognitive-behavioral therapy for insomnia (CBT-I) is a highly effective nonpharmacological intervention that is considered by some as the first-line treatment for chronic insomnia (e.g., [19]. Evidence indicates that CBT-I and hypnotic medications are equally effective short-term, yet benefits from CBT-I are significantly maintained over time better than to medication therapies; unfortunately, CBT involves highly trained professionals and is limited primarily to major cities and academic medical centers, thus program access and availability is reduced [20-22].

Mindfulness-Based Therapy for Insomnia (MBT-I)

In 2008, Ong and colleagues developed an adapted MBSR program specifically for insomnia (MBT-I), combined with CBT and sleep medicine science [23]. The final MBT-I program is delivered in an eight-week format and consists of the following: training in mindfulness meditation practices (breathing meditation, body scan, walking meditation, eating meditation), psychoeducational discussions, and daily monitoring of sleep/wakeful activities. Participants are instructed to practice the mindfulness meditation for at least 30 minutes daily, five days/week. The goal is to increase awareness of physical and mental states that occur with chronic insomnia. Specifically, the goal is for participants to learn to differentiate between fatigue and sleepiness, and accordingly, to respond with mindfulness strategies---rather than automatically react by trying to force rest. By combining sleep-related behavioral changes with mindfulness meditation, participants are taught to make significant changes in the way they approach sleep and waking stress.

Findings from the pilot, albeit a small sample of 30 participants with primary insomnia, results were beneficial. Specifically, half of the participants experienced a 50% or greater reduction in total wake time, with significant reductions in pre-sleep arousal, sleep effort, and dysfunctional sleep-related cognitions. Moreover, a significant negative correlation was found between the number of meditation sessions and hyperarousal, that is, more meditation practice was related to greater decrease in arousal. Follow-up at 12 months showed that 61% of participants had no relapse of insomnia, providing support for long-term benefits of the intervention [24]. Thus, increasing mindfulness or present moment awareness appeared to enhance discerning internal

cues or differences between physical and emotional states as to reduce unwanted wakefulness at night and effectively manage emotional reactions to sleep disturbance and daytime fatigue [23]. In a review as to the efficacy of the MBSR on sleep disturbance, while some evidence provided support that mindfulness strategies were associated with improved sleep, data from clinically controlled trials were lacking [11].

RANDOMIZED CLINICAL TRIALS: MINDFULNESS AND INSOMNIA

In 2011, a randomized controlled clinical trial was conducted to investigate the efficacy of the standard MBSR as an intervention for insomnia [25]. Specifically, 30 adults diagnosed with chronic insomnia were randomly assigned to either an eight-week MBSR or a medicine protocol nightly at bedtime. Post-intervention, sleep onset latency (SOL) or the time it takes to fall asleep (transition from awake to sleep state) had decreased by almost nine minutes in the MBSR group. At five-month follow-up, SOL had been reduced by more than 20 minutes with increased total sleep time. The medication group had similar findings but reported adverse events and lower treatment satisfaction scores. While not statistically significant, it was noted that the rates of recovery from poor sleep, as measured by the PSQI) were higher in the MBSR group than the medication group at both 8-weeks and at 5-months. Black et al. conducted a randomized clinical trial in older adults (mean age = 66 years) with insomnia; participants were randomized to a sixweek MBSR program or an educational group [26]. Data showed significant improvements for the MBSR group on sleep measures compared to the educational group. Similarly, in 2015, a randomized, controlled single-blind clinical trial in another older sample with chronic insomnia investigated the MBSR versus usual care in participants aged 75-years or older [27]. Results showed significant improvement on the PSQI for the MBSR group in comparison to the usual care group.

Andersen and colleagues investigated the effects of the MBSR program on sleep quality (not primary outcome) in a randomized control trial in 336 patients with breast cancer. The mean sleep problem scores were significantly lower in the MBSR group than in controls after the intervention, however, there was no significant between-group effect at 12-month follow-up [28]. It was revealed that the baseline level of sleep problems was low to start with, thus it was recommended that future participants be restricted to only those with significant disordered sleep. Garland et al. randomized cancer patients with insomnia to either an MBSR group or a CBT-I group only (i.e., no control group) [29]. Results showed that those in the CBT-I group had greater improvements in sleep measures than those in the MBSR group; thus, CBT-I was recommended as the treatment for cancer patients with insomnia. Another trial investigated the effects of the MBSR on disturbed sleep in 79 breast cancer survivors randomly assigned to a six-week MBSR or a usual care (control) group. Results after 12 weeks showed significant improvements on sleep measures for the MBSR group compared to the control group [30].

Ong and colleagues conducted a randomized controlled trial involving fifty-four participants who were randomized to either a mindfulness-based stress reduction (MBSR) program, mindfulness-based therapy for insomnia (MBT-I) group, or an eight-week selfmonitoring (SM) condition [21]. Findings revealed evidence of treatment efficacy for meditationbased treatments to reduce patient-reported TWT in bed and sleep-related arousal along with clinically significant changes in treatment response and remission. Participants who received either MBSR or MBT-I reported a reduction in TWT from baseline to post-treatment as well as from baseline to 6-month follow-up. Also, the large within-group effects for both MBSR and MBT-I compared to the small effects for SM suggested that mindfulness is superior in decreasing sleeprelated arousal. No significant differences were found between the MBSR and MBTI programs on TWT or PSAS, but long-term patterns indicated the effectiveness of the MBTI program in reducing sleep-related arousal.

A 2018 randomized controlled trial examined potential effects of the MBT-I program on daytime symptoms and cognitive-emotional arousal aspects of insomnia [31]. Adult participants with chronic insomnia were randomized to the MBSR program, the (MBT-I), or a delayedtreatment control consisting of sleep diary self-monitoring (SM) followed by behavior therapy (BT). Results indicated the MBTI is effective at reducing arousal, while the standard MBSR protocol can increase positive affect at a level similar to behavioral treatment for insomnia. Finally, in 2019 Goldstein and colleagues examined sleep EEG patterns in a randomized controlled trial involving the MBSR and the MBT-I [32]. Specifically, sleep EEG spectral analysis was conducted on 36 participants with chronic insomnia who were randomized to an eight-week MBSR, MBTI, or self-monitoring control (SM). Overnight polysomnography with 6-channel EEG was conducted at baseline, post-treatment, and 6-month follow-up. Data supported effects of mindfulness strategies on sleep as measured via EEG; the results demonstrated increased highfrequency sleep EEG power associated with mindfulness-based training.

CONCLUSION

A 2019 systematic review and meta-analysis were conducted of four mind-body therapies for insomnia that consisted of the identifying 49 studies with 4,506 participants from 2004 to 2018 [33]. One of the therapies was meditation that consisted of the MBSR and its variant offspring interventions. The researchers concluded that [mindfulness] meditation could be viewed as an effective alternative method of treatment to improve sleep quality and treat insomnia compared to traditional pharmacological or CBT-I methods, both of which, have drawbacks to use as previously discussed. Another meta-analysis (2019) specifically of mindfulness-based therapies for insomnia and sleep disturbance, concluded that such therapies are efficacious in reducing symptoms of insomnia and poor sleep quality in adults compared with psychological placebos and waitlist control conditions. However, future research needs to evaluate mediators and moderators of intervention effects so as to identify empirically supported processes of change that link mindfulness practices and sleep outcomes [34].

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