Short communication

Physical therapy reduces insomnia symptoms in postmenopausal women

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Objective: Regular exercise has been highly promoted and recognized as the best non-pharmacological treatment for postmenopausal problems. It may also increase total sleep time and decrease the latency of sleep onset. One study assessed the effects of exercise on sleep symptoms in postmenopausal women. Tworoger et al. [Tworoger SS, Yasui Y, Vitiello MV, et al. Effects of a Yarlong moderate–intensity exercise and stretching intervention on sleep quality in postmenopausal women. Sleep 2003;26(7):830–6] observed that increased fitness was associated with an improvement in sleep. No studies have been published describing the effects of physiotherapeutic treatments for insomnia in postmenopausal women. This study examines two cases of symptomatic postmenopausal patients with insomnia. The two patients took part in an individual physiotherapeutic treatment program that involved one and a half hour sessions twice a week for 6 consecutive months. The treatment consisted of segmental and global stretching exercises, strengthening exercises, massage therapy and relaxation techniques. Patient 1 experienced a significant increase in REM sleep and in total sleep efficiency. Patient 2 experienced a reduction in sleep latency and an increase in slow wave sleep, as shown in the polysomnograph. Both patients reported an overall improvement in their condition.

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1. Introduction

Poor sleep quality is a common problem among middle-aged and older adults and is associated with alterations in learning and memory, a reduction in immune function, depression, and cardiovascular and metabolic disorders [1,2].

Complaints of poor sleep, particularly with respect to frequent nocturnal awakenings, increase with age [2,3]. Elderly women suffer more from sleep problems and use more hypnotics than elderly men [2].

In their study, Muhlen et al. [4] examined symptoms after a natural menopause recounted by women aged 50–89 years, and they verified that 28% of the women suffered from insomnia.

The main findings in postmenopausal women complaining of insomnia were apnea and/or periodic limb movements [5]. Nearly 50% of postmenopausal women complaining of insomnia had apnea [6]. The main factors related to subjective sleep quality are anxiety and the number of hot flashes that occur in the first half of the night [5].

Insomnia has been treated with pharmacological interventions such as hypnotics and nonpharmacological interventions including relation-based treatment, stimulus control therapy, sleep restriction and a variety of cognitive and educational strategies [7].

Some studies have investigated the relationship between mood disturbances, depression, behavior disturbances and insomnia symptoms experienced by premenopausal and postmenopausal women. Kantola et al. described that for these cases, estrogen therapy is the first line of therapy, though in other cases, women can benefit from physical activity. Some studies have verified that physical activity increases the concentration of catecholamines [8,9] and beta-endorphin [10,11], leading to a decrease in depression [12].

Regular exercise has been highly promoted and recognized as a non-pharmacological treatment for postmenopausal problems [13]. This may increase total sleep time and decrease the latency of sleep onset [14].

Some randomized control studies have verified that physical activity improves sleep quality [15,16]. Singn et al. [16] observed an improvement in sleep quality and in depression parameters using resistance exercises. These results are in agreement with the results of Asbury et al. [17].

There is only one study that addresses the effects of exercise on sleep symptoms in postmenopausal women. Tworoger et al. [1] examined the effects of a moderate intensity exercise program or a stretching program in relation to fitness, body mass index and time spent outdoors on self-reported sleep quality, and also examined the relationship between the amount and timing of exercise and sleep quality in postmenopausal women with a
randomized, placebo-controlled, double-masked, cross-over study design. They randomly assigned 173 women, aged 50–75 years, who were sedentary, not taking hormone therapy and overweight or obese, to the treatment groups. This study assessed subjective sleep through scales and patients were assigned to either an aerobic exercise (n = 87) or a stretching program (n = 86). They concluded that increased fitness was associated with improvements in subjective sleep, however, the effect of moderate intensity exercise may depend on the amount of exercise and the time of day when it is performed. Patients in the stretching program were less likely to use sleep medication and to have more trouble falling asleep during the intervention period compared with baseline conditions.

Other studies have shown that relaxation therapy improved sleep complaints in postmenopausal women [18–21]. The most frequently used deep relaxation methods are autogenic training, meditation, and progressive muscle relaxation [7].

Therapeutic massage has been studied in the treatment of sleep complaints. Zhongguo et al. [22] concluded that therapeutic massage can improve sleep quality and decrease symptoms of depression and anxiety.

Physiotherapy, being a relatively new science, has seldom been used as a therapeutic treatment for treating sleep disorders or decreasing sleep complaints. In addition, no other study has evaluated the effect of physiotherapy on sleep in postmenopausal women pre-selected based on complaints of insomnia.

The aim of this study was to verify the effects of a physiotherapeutic treatment on climacteric symptoms and on polysomnography (PSG) parameters in postmenopausal women.

2. Case reports

This research project received prior approval by the local Ethics Committee and informed, written consent was obtained from the subjects after full explanation of the procedure (CEP#153/00) had been given.

Two patients (aged 56 and 62 years), completed a Kupperman Index and underwent polysomnography exams. Patient 1, ALF, had had insomnia for 2 years, had been in postmenopause for 5 years and took the following medications: premarin (0.3), higroton (25 mg/day), and glucoformim (850 mg/day). Her Kupperman Index was 17 [23]. She complained of sleep fragmentation and had difficulty maintaining sleep.

Patient 2, HSL, had had insomnia for about 20 years, and had been in postmenopause for 13 years. Her Kupperman Index was 5. She also had trouble maintaining sleep, and reported sleep fragmentation. Neither patient used any kind of hypnotic medication, nor did either patient have any other uncontrolled clinical disease.

For a period of 6 months, the patients took part in an individual physiotherapeutic treatment composed one and a half hour sessions of twice a week. The treatment consisted of segmental and global active and passive stretching exercises of the trapezius, deltoid, pectoralis major, and triceps sural muscles. In addition, the treatment included active strengthening exercises that prioritized the large muscular groups like the abdominal muscles, quadriceps, glutes, and pectoralis major, and relaxation treatments in the form of massage therapy of the back.

Patients underwent their first PSG recording before physical therapy. All night PSG recordings were performed using a Sleep Analyser Computer (SAC version 9.3, Oxford Instruments). Surface electrodes were used to record electroencephalogram (EEG), eletromyogram (EMG), electrooculogram (EOG), and electrocardiogram (ECG), pneumographic impedance for recording of thoracic-abdominal movements, thermal sensors for recording nasal and oral airflow, body position sensors and infra-red sensor for pulse oxymeter which was connected to the distal phalanx for recording oxymehoglobin saturation.

After 6 months (the treatment period), the patients were assessed again using a polysomnography exam and they again completed the Kupperman Index.

Upon completion of the exam, a trained sleep physician analyzed and staged the recordings according to the criteria established by Rechschaffen and Kales of the American Academy of Sleep Medicine Committee [24].

After treatment, both patients reported an improvement in sleep quality. The PSG results are shown in Table 1.

3. Results

In case 1, the patient experienced a reduction in REM latency, an increase in TST and in REM (%), and an improvement in sleep efficiency. An increase in AHI, which was not clinically significant, was also observed. The Kupperman Index was initially 17 and decreased to 5 after treatment.

In case 2, we observed a decrease in sleep latency, and an increase in REM latency. Although there was a decrease in sleep efficiency, there was also an increase in stages 3 and 4 sleep. The Kupperman Index was 5 initially and decreased to 4 after treatment.

4. Discussion

Ttworoger et al. [1] observed that postmenopausal women who performed stretching exercises were less likely to use sleep medication and to have trouble falling sleep during the intervention period compared with baseline conditions using subjective measurements. They concluded that both stretching and exercise interventions may improve sleep quality in sedentary overweight postmenopausal women. Increased fitness was also associated with improvements in sleep. However, the effect of moderate intensity exercise may depend on the amount of exercise and on the time of day it is performed.
Tworogate’s study has several limitations. First, although the stretching group was designed to be the control group for the primary study outcomes, it had to be considered as a separate intervention with respect to sleep quality because stretching programs may themselves affect sleep patterns. So, the study did not have a non-intervention control group [1]. Second, only subjective sleep outcomes were available.

No previous study has evaluated the effect of physiotherapy parameters in postmenopausal women who complain of insomnia.

Some studies, however, have shown that stretching intervention [1] as well as weight lifting exercise [16], massage therapy [25] or a related technique [7] can improve sleep quality.

Studies included in the meta analyses have shown that exercise increased total sleep time and delayed REM sleep onset (10 min), increased slow wave sleep (SWS) and reduced REM sleep (2–5 min) [26]. Youngstedt et al. [27] found that physical activity can increase stage 2 sleep, improve sleep stages 3 and 4 by 1.4 min, delay REM and REM latency and increase total sleep time. That study also showed that the greatest increases in total sleep time occurred in patients who performed exercises with a longer duration. In our study, we verified an increase in REM sleep, an increase in sleep efficiency and a decrease in REM latency in patient 1. However, the same results were not observed in patient 2. Patient 2 experienced a reduction in sleep latency and an increase in slow wave sleep (SWS).

The major difference between the two patients was the intensity of the IK values. While patient 1 had an initial IK of 17, patient 2 had an initial IK of 5. The initial PSG results, before the physiotherapeutic treatment, were also different.

The decrease in the IK values could have occurred as a result of the effects of the treatment. Some studies, such as Ueda [28], Li et al. [29], Eavsky and McAuley [30], verified that physical activity of the effects of the treatment. Some studies, such as Ueda [28], Li et al. [29], Eavsky and McAuley [30], found that physical activity can increase stage 2 sleep, improve sleep stages 3 and 4 by 1.4 min, delay REM and REM latency and increase total sleep time. That study also showed that the greatest increases in total sleep time occurred in patients who performed exercises with a longer duration. In our study, we verified an increase in REM sleep, an increase in sleep efficiency and a decrease in REM latency in patient 1. However, the same results were not observed in patient 2. Patient 2 experienced a reduction in sleep latency and an increase in slow wave sleep (SWS).

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Some studies have investigated the relationship between pain and insomnia. Chronic pain is associated with high rates of major depression disorder, and with symptoms including insomnia, fatigue, depression, anxiety and difficulty in concentrating [31].

Some studies have suggested that massage can promote improvements in sleep quality by decreasing pain. Hernandez-Reif et al. [32]analysed 24 adults (12 of which were women) with lower back pain. The women were randomly assigned to a massage therapy or a progressive muscle relaxation group. The participants who received massage therapy reported experiencing less pain, less depression and less anxiety and experienced improved sleep.

Vasomotor symptoms impaired subjective sleep quality [2]. In our study, patient 1 had vasomotor symptoms demonstrated by the IK. Physical activity could reduce the vasomotor symptoms and consequently the insomnia symptoms. These results agree with those of Mendito et al. [33]. It is also notable, the use of hormone therapy was not sufficient to control this patient’s symptoms.

Hammar et al. [34] showed that physical activity stabilizes the thermoregulatory center by increasing beta-endorphins. This mechanism is similar to the influence of estrogen on vasomotor symptoms, for there are studies that show that estrogen therapy improves the quality of subjective sleep in postmenopausal women [35].

The patients in our study experienced pain symptoms as well, such as artralgia and mialgy as assessed by the IK. According to the studies mentioned above, those symptoms could be affecting sleep quality.

The techniques used in this study were able to reduce IK indices and by the PSG results, particularly in patient 1. The choice of the particular quantity of techniques rather than the use of only one technique was made because each patient experienced specific symptoms such as pain, depression and sadness, and thus, the different techniques were used to address the different symptoms and consequently reduce the insomnia symptoms.

We suggest that other studies should be carried out with sample and control groups that are large enough to accurately represent the population and can therefore supply more meaningful results. It does seem, though, that physiotherapy could be an effective means of relieving insomnia in postmenopausal women when used in combination with climaistic assistance.

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**References**


