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Methods and Principles of Music Therapy Intervention in Sleep Disorders

Xinnuan Gao

Xinhang Experimental Foreign Language School, Jinan, 250103, Shandong, China
gaoxinnuan@163.com

ABSTRACT

Nowadays, the problem of sleep disorders is becoming more and more obvious around the world, which has attracted widespread attention. At present, the main solution to this problem is drug therapy, however, there are still many adverse effects of drug treatment, and some people have proposed that non-drug therapies such as music therapy can improve sleep quality. In this work, it will summarize how music therapy treats sleep disorders, reveal its internal mechanism, and this article also compares the differences between Chinese and Western music therapy interventions for sleep disorders. Finally, it looks forward to future research to look for shortcomings.

KEYWORDS

Music therapy; Sleep quality; Five Elements Music Therapy; Sleep disturbances

1. INTRODUCTION

Sleep disorders refer to the physiological phenomenon of alternating rhythms between sleep and wakefulness in an individual [1]. Long-term sleep disturbances are a growing problem in many countries [2]. According to the latest sleep index report in China, about 31.2% of people have serious sleep problems, and 29% of respondents aged 18~29 self-report sleep disorders [3]. According to the survey, 66% of women and 34% of men in Europe suffer from insomnia of varying severity, of which 39% are severe [4]. Sleep disorders can affect the efficiency of an individual's daily study and work, as well as affect the individual's physical and mental health, such as causing depression, irritability, etc., and in severe cases, it can also induce a variety of diseases [5]. Sleep disorders arise in part from individual physiological causes, and long-term insomnia may be directly caused by sleep/wake regulation dysfunction or indirectly due to comorbidities of behavioral, neurological, immune, or endocrine disorders [6]. For example, both male and female patients with coronary artery disease often report sleep problems [7]; Many patients with lung cancer report poor sleep quality and long sleep latency [8]. In addition to physiological causes, psychological factors are also the main reasons for researchers' concerns. Short-term insomnia occurs when the body turns on its own defenses but fails to maintain balance while trying to adapt to changes in its surroundings (e.g., disability) [9]. Therefore, how to carry out comprehensive intervention from the physiological and psychological aspects is very important to solve sleep disorders.

This article will summarize the music therapy for the treatment of sleep disorders, and summarize the ways of music therapy to intervene in sleep disorders from three aspects: the types of music therapy, the choice of music materials and the cultural differences of music therapy, reveal its internal application mechanism, and improve the theoretical system of music therapy. Finally, according to the shortcomings of the existing research, the future research direction is prospected.

2. MUSIC THERAPY

Music therapy, also known as music therapy, is the use of the physiological, psychological, and social functions of music in the treatment of patients' physiological functions and psychological adjustment, and can play an important role in the treatment of a variety of physical and mental diseases and negative psychological problems [10]. Music therapy is an emerging research field with certain academic value in recent years [11]. On the one hand, it is considered a reliable and low-cost treatment that is widely adopted by the public health system [12], and has unique advantages over traditional psychotherapy. As a non-pharmacological therapy, music therapy avoids possible adverse effects of drugs [12]. As an individualized intervention, which is often person-centered, music therapy is often easy to practice in clinical practice [13].

Getting enough sleep is one way to benefit one's health and well-being [14]. A number of clinical music medical studies and meta-analyses have evaluated the efficacy of using music to improve sleep quality [15]. de Niet et et al. and Wang et al. found statistically significant positive efficacy in listening to music and sleep quality and recommended music therapy as a non-pharmacological intervention for sleep disorders. The study by Mehtap Kavurmaci et al. used a pre-test and post-test control group design to examine 110 nursing students using Hejaz tunes as auditory stimuli and ultimately demonstrated that music therapy improved the students' sleep quality [16]. Wang et al. evaluated the efficacy of music for sleep disorders through a meta-analysis of a prospective cohort study that showed that music could help improve sleep quality in a broad population [17].

3. WAYS IN WHICH MUSIC THERAPY INTERVENES IN SLEEP DISORDERS

3.1. Types of Music Therapy

There are two main forms of music therapy, active and passive [18], with the active form requiring the patient to participate in the treatment process, and the passive form in which the patient only listens to music during the treatment process. In general, passive forms are chosen when intervening in sleep disorders. There are three commonly used methods: receptive music therapy, reconstructive music therapy, and improvisational music therapy [18]. In addition to the usual modalities, there are several special types of music therapy, such as ambient music therapy and somatosensory music therapy, which can also play a role in intervening in sleep disorders.

3.1.1. Receptive music therapy for sleep disorders

Receptive music therapy refers to patients listening to specific music in a quiet environment, with the help of music's rhythm, melody, harmony, timbre and other elements to adjust emotions, relieve stress, reduce pain, etc. The therapist chooses the appropriate music according to the patient's needs, as well as controls the volume and playback time of the music [19]. Music acts on the right temporal lobe and limbic system of the cerebral cortex through the auditory conduction system, strengthens the transmission of information between regions, produces different brain wave activities, and promotes the formation of regular sleep cycles. It has been reported that people can use receptive music interventions at home to help them sleep better [20]. Tao Zhenzhen's study found that receptive music intervention therapy had a significant effect on the sleep quality of college students, which was consistent with the results of previous studies [21].

3.1.2. Environmental music therapy (EMT) for sleep disorders

Ambient music therapy (EMT) was originally defined as an intervention for immediate live music aimed at modulating the experience of perceived noise [22]. EMT is an improvisational process that values the therapist's agility and sensitivity, and the need to incorporate existing elements of ambient sound into a purposeful soundtrack [23]. Recurrence of stress responses caused by ambient noise can

all directly affect sleep, and Chang-Lit et al. found that EMT improves employees' ability to be agile and reduce their ability to remain calm during care, and in this way, addresses secondary stressors that may cause unit noise in workers and thus improves sleep [24].

3.1.3. Somatosensory music therapy for sleep disorders

Vibroacoustic therapy (VAT) refers to the conversion of the low-frequency part of music into physical vibrations through somatosensory sound equipment, so that people can feel the sound vibrations of music while listening to music, so as to improve the effect of music therapy [25]. Zhang et al. used meta-analysis to demonstrate that somatosensory music therapy can reduce PSQI and SCL-90 scores and improve sleep quality in patients with sleep disorders [26].

3.2. Selection of Musical Materials

3.2.1. Culture, religion, and music intervene in sleep disorders

In many studies, researchers used culturally charged music or religious music that matched the participants' backgrounds to resonate with the participants' beliefs to help them sleep better. Sharma & Sharma used flute playing to treat healthy Indian adults and found significant improvements in sleep quality compared to before and after the intervention [27]. Altan Sarikaya & Oguz and Lafçi &Öztunç intervened with different tones of Turkey music to help older people in Turkey, respectively and breast cancer patients improved sleep problems [28, 29].

3.2.2. Sedative music for sleep disorders

Musical materials such as brain music, lullabies, etc., which have the characteristics of relaxing and reducing tension, are classified as calming music. The clinical manifestations are a decrease in blood pressure, slow breathing, and an increase in R waves in the EEG response, which affect the secretion of endorphins in the brain, and eventually achieve sedative and hypnotic effects [30]. Several clinical studies have shown that calming music can have a positive effect on sleep by relaxing muscles and distracting [31]. For example, Good et al. found that sedative music can reduce sympathetic nervous system activity, reduce heart rate and respiratory rate, and make it easier for people to fall into a smooth sleep [32]. In addition, sedative music has a great effect on reducing norepinephrine in blood circulation [33], and stabilizing the norepinephrine cycle is beneficial for regulating sleep.

Brain music is a special class of sedative music materials, which is a kind of electronic music generated by the electroencephalogram signals of brain waves. Levin found that this "brain music" may be applied to the treatment of insomnia, so he studied "brain music" as a new type of non-drug treatment. A special law of transformation is proposed [34]. Finally, by comparing the clinical scale results and EEG results of the subjects before and after the trial, it was found that the subjective and objective sleep quality of the subjects were improved.

In addition, lullabies, as one of the sedative music, are a specific genre that is often composed to induce sleep [35]. For example, Loewy et al. improved the sleep quality of preterm infants by playing lullabies to babies before bedtime, suggesting that lullabies can be effective in helping babies fall asleep.

3.2.3. Other types of music materials intervene in sleep disorders

Other musical materials such as white noise combined with pink noise. For example, the sound of steam in a humidifier, the hum of a fan, etc. Pink noise encompasses all frequencies that can be heard by the human ear, but the intensity of the sound is inversely proportional to the frequency [36]. For example, the rustle of leaves, the sound of rain, etc. Combining white noise with pink noise intervenes in sleep disorders, inducing sleep by promoting muscle relaxation and distracting attention from other sounds.

In addition, there are things like live music and recorded music. Most studies of music therapy will use recorded music, and Garunkstiene et al. and Loewy et al. let music was used as an intervention, and the clinical participants in both studies were preterm infants [35, 37]. Loewy et al. reported that intervention with live music therapy for sleep disturbances had a significant effect on the improvement of sleep patterns in preterm infants. Garunkstiene et al. compared the effects of live and recorded music on sleep quality in preterm infants, by using the same cradle from different cultures. Eventually, live music was found to be more successful in improving the quality of the baby's sleep, and the baby's sleep quality was much improved compared to before the intervention.

3.3. Cultural Differences between China and the West in the Treatment of Sleep Disorders with Music Therapy

The origins of music therapy in the West can be traced back to the early 20th century, when some hospitals in the United States began to use music to treat soldiers' wounds and illnesses during World War I [38]. Later, the rapid development and widespread application of music therapy began in the 40s of the 20th centuries, and music therapy emerged as a formal profession and professional discipline [18]. In the 50s and 60s of the 20th century, music therapy in the West was more widely developed, and the profession of music therapy began to involve the field of mental health and medical treatment, and different theoretical frameworks and treatment methods began to emerge [20]. By the 70s of the 20th centuries, music therapy began to develop a variety of different schools, such as humanistic music therapy, behaviorist music therapy, psychodynamic music therapy, etc.

The main music therapy in China is the Five Elements Music Therapy. Based on the theory that the five tones correspond to the five organs; the Five Elements Music Therapy regulates the function of the internal organs through the five tones and plays a role in nourishing the mind and calming the nerves [39]. Its history can be traced back to ancient times, and there is a record of music therapy in the "Yellow Emperor's Neijing", in which the five tones of "heaven has five tones, and people have five organs" include palace, business, horn, sign, and feather. Traditional Chinese medicine believes that sleep disorders are mainly caused by the imbalance of yin and yang in the camp and health, and it is necessary to relieve depression by soothing the liver to achieve the effect of calming the nerves. Long-term sleep disturbances can affect the patient's energy and physical recovery, leading to neurological imbalances [40]. According to the theory of the five elements, the five elements, the five organs, and the five tones are combined, and the meridians and then affect the internal organs, qi and blood to achieve the tone The purpose of the festival sentiment. Different key music can be used to arouse patients' emotional resonance and regulate their psychological state, and uterine tone can help improve the sleep quality and quality of life of patients in gastric cancer hospice care [41]. Studies have found that lung corresponding music can effectively reduce anxiety, depression, and improve sleep quality in lung cancer patients [42]. The rhythm of the horn tune music is comfortable and smooth, and it has the effect of clearing the liver and soothing the liver, regulating qi and blood, and regulating emotions thereby alleviating the problem of sleep disorders [43]. Meridian massage under the guidance of meridian flow injection combined with music and meridian flow has a good effect on the insomnia caused by heart and spleen deficiency [44]. Feather music can be combined with auricular pressure to effectively improve sleep quality [45]. The traditional Chinese theory of five-tone therapy has both a theoretical system and a practical psychological science method, involving the ideas of physiology, medicine, philosophy and other disciplines, and if it can be fully explored and practiced, it will have great prospects for development [46].

4. CONCLUSIONS

This article illustrates how music therapy intervenes in sleep disorders from three aspects: the types of music therapy, the selection of music materials, and the cultural differences of music therapy, and reveals its internal application mechanism while demonstrating its effect. Studies have shown that

music therapy interventions can benefit a variety of clinical populations with poor sleep quality or sleep disorders.

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