Sedative Ragas can Relieve Addiction to Sleeping Pills
A Case Study from the Music Medicine Unit, MGMCRI

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Mrs. Y, aged 35, was referred to the Music Medicine Unit to get some relief from addiction to the sleeping pill Zolpidem (a non benzodiazepine sedative-hypnotic drug with similar effects as the benzodiazepines). This drug was prescribed for her insomnia resulting from marital discord. She had become both physically and psychologically dependent upon this medication. Whenever she tried to stop these sleeping pills, she not only had to battle a mental compulsion, but also had to go through physical withdrawal symptoms. The main danger associated with the abuse of Zolpidem is increased tolerance. The individual will feel compelled to take higher doses of the drug. This means that there is the risk of overdose. This type of drug abuse can lead to depression, and associated with it is an increased risk of suicide. There will be an obsession with ensuring a regular supply of the drug, along with a reduction in the individual's ability to meet his/her personal and social responsibilities. Inability to reduce the sleeping pill dosage is also commonly observed.

The bad sleeper convinces him/herself gradually that he/she is unable to sleep without the help of a drug. That feeling of helplessness and distrust (which can be acquired from the childhood on) is in the heart of the mechanisms of insomnia.

Disadvantages of sedative pills:

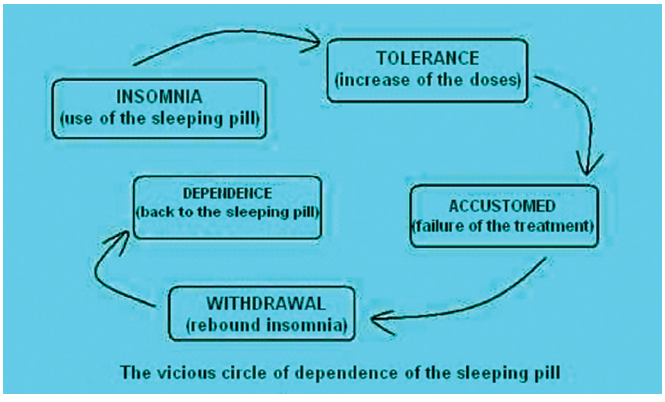
1.They conceal the natural signals of sleep and, thereby, aggravate the handicap of someone who "no longer knows what it is to feel sleepy in the evening";

2.The increase of the sleep duration is carried out at the expense of its quality (with the disappearance of slow wave sleep);

3.The sleeping pills lose their efficiency very quickly even if they are not used every night;

4.They cause side effects during the night (sleepwalking, confusion ...) and during the day (sleepiness, tiredness, dry mouth, dizzy spells ...);

5.They are responsible for memory and attention disorders;



The vicious circle of dependence of the sleeping pill

Mrs. Y had all these symptoms of addiction to the sleeping pill. She could not get sleep even after 5mg of Zolpidem, and has to exercise vigorously so that she could become fatigued and then get some sleep. She was asked to listen to 4 night ragas which were endowed with sedative-hypnotic characteristics (Jaijaiwanti, Pooriya, Kapi, Neelambari, in the same sequence regularly for a duration of 1hr per day for a one month period) before going to bed. The music had an easy flowing melody, and a tempo similar to the resting heart beat. It was not dissonant, pleasing to the ear, with no major changes in pitch, dynamics, or rhythm, supporting its listeners without making any demands on them. After one month of continuous listening to the music prescribed for her, she was able to cut down the dose of Zolpidem to 2.5 mg per day. Before she was exposed to music therapy, 2.5 mg/day was not sufficient for her- she used to wake up at 3am in the mornings, lying down completely awake. She was also able to overcome the feelings of hopelessness, and expressed more self confidence in her ability to deal with issues.

According to a study conducted by the Baya Karve Women's study centre in Pune, India, such an addiction

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is common among educated women with marital discord, pertaining to the 31 to 40 age group. The study says that high levels of stress coupled with a sense of loneliness, and a failure to open up and release pent-up emotions are the contributing factors for sleeping pill addiction among women. Sometimes, old prescriptions of sleeping pills are used repeatedly without consulting the physician who initially recommended it. Extra-marital affairs and a sense of loneliness are found to be the prime emotional factors that have landed some in the red zone of addiction with an overriding feeling of self-pity.

Signs that a person is having problems with sleeping medication include: difficulty falling asleep, an inability to fall asleep without the pills after months of taking them, daytime sleepiness, feeling poorly rested despite sleeping, headaches, etc. In fact, anything that makes one feel chained to the medication should set off warning bells into full swing.

One should be aware that as he/she comes off sleeping pills, his suppressed REM returns and his dreams will be more vivid than usual. This will calm over time but may cause some disturbance initially.

How does music therapy help in cases with insomnia ?

For insomnia, music therapy is one of the most promising natural remedies, which has been proved to help people defeat sleepless nights. A new research carried out by the Gail C Mornhinweg, PhD has shown that music therapy is scientifically sound as it can help you to sleep better and deeper. In the study, a group of adults suffering from insomnia has been followed by the researcher for about 6 months. In the group, no one was taking medications or sleeping pills to help them sleep or trying other therapies for insomnia. All the adults involved in the study were only listening to relaxing music before going to bed. All the participants in the study excluding one have reported getting asleep faster and sleeping better and longer than normal when they listened to soothing and relaxing music previous to going to bed. Others, who were not exposed to music, reported that sleeplessness returned on the nights. The study found that approximately 80 percent of people had a positive response to music therapy which was shown to significantly boost melatonin levels.

Music therapy or listening to soothing music can help you to concentrate on the sounds you hear in place of the thoughts in your mind.

Sergio Castillo-Perez et. al (2010) from Mexico preformed a controlled experiment comparing music therapy treatment to psychotherapy. In the experiment a total of 79 participants were tested to have low to medium level depression according to the Zung Depression Scale. 41 of these patients were assigned to music therapy treatment, while 38 patients were assigned to psychotherapy. Participants taking part in musical therapy treatment were asked to listen to selections of classical and baroque music for 50 minutes at home every day, as well as an additional group session at the hospital every week. Participants taking part in the psychotherapy treatment attended personalized, one on one sessions with a trained expert psychologist for 30 minutes every week. In both groups, evaluations measuring depressive symptoms were conducted weekly as well. The results after 8 total sessions were in favor of musical therapy. Out of the original 41 participants undergoing musical therapy treatment, 29 reported improvement, 4 reported no improvement, and 8 had abandoned the study. Out of the original 38 participants undergoing psychotherapy treatment, 12 reported improvement, 16 reported no improvement, and 10 abandoned the study(4). This experiment provides more evidence supporting music therapy as a legitimate treatment option for depression.

The neuro-scientific basis of music therapy- a “heuristic working factor model for music therapy”:
Five factors which contribute to the effects of music therapy-
These modulating factors are attention, emotion, cognition, behavior, and communication.

1) Attention modulation: Music can automatically capture attention and thus distract attention from stimuli prone to evoke negative experiences (such as pain, anxiety, worry, sadness, etc.). This factor appears to account, at least partly, for anxiety-, and pain-reducing effects of music listening during medical procedures (Nelson et.al.,2008; Klassen et.al.,2008).

2) Emotion modulation: Studies using functional neuroimaging have shown that music can modulate activity of all major limbic- and paralimbic brain structures, that is, of structures crucially involved in the initiation, generation, maintenance, termination, and modulation of emotions. These findings have implications for music-therapeutic approaches for the treatment of affective disorders, such as depression, pathologic anxiety, and post-traumatic stress disorder (PTSD) because these disorders are partly related to dysfunction of limbic structures, such as the amygdala,

and paralimbic structures, such as the orbito-frontal cortex. This factor is also closely linked to peripheral physiological effects. Emotions always have effects on the vegetative (or autonomic) nervous system, the hormonal (endocrine) system, and the immune system. Systematic knowledge of the effects that music listening and music making have on these systems is still lacking, but because of the power of music to evoke and modulate emotions, it is conceivable that music therapy can be used for the treatment of disorders related to dysfunctions and dysbalances within these systems (Thaut MH et.al.,2009).

(3) Cognition modulation: This factor includes memory processes related to music (such as encoding, storage, and decoding of musical information, and of events associated with musical experiences), as well as processes related to the analysis of musical syntax and musical meaning. This factor might contribute to the effects of music therapy on the facilitation of Alzheimer's patients' adaptation to residing in long term care centers (Gerdner and Swanson,1993).

(4) Behavior modulation: This factor accounts for the evocation and conditioning of behavior

(such as movement patterns involved in walking, speaking, grasping, etc.) with music.

Modulation of behaviors and actions is likely to affect cognitive processes, and therefore cognitive processes can be modulated by the learning of different or new behavioral and action patterns. A similar relation presumably exists between actions and emotions (Gottfried Schlaug et al. and Eckart Altenm¨uller et al).

(5) Communication modulation: The numerous effects of music on activity in a large variety of brain structures accounts for what is referred to as cognitization. Such "cognitization" induced by music listening could be responsible for the effects of music on the recovery of stroke patients (Forsblom et.al.,2009)

Let us review some effects that are usually evoked when listening to music, and which play important roles in the emergence of beneficial effects during music therapy. These effects originate from three domains: emotion, perception-action mediation, and social cognition.

Emotion: With regards to emotional processing, previous functional neuro- imaging studies have shown that listening to music can have effects on the activity of all limbic and para limbic structures (that is, of core structures of emotional processing) in both musicians and in non musicians.

In a PET experiment, Blood and Zatorre used naturalistic music to induce extremely pleasurable experiences during music listening, such as "chills" or "shivers down the spine. Activity changes were observed in central structures of the limbic system (amygdala and hippocampus). The finding that music modulates amygdala activity is important for two reasons: First, it provides evidence for the assumption that music can induce "real" emotions (because the activity of core structures of emotion processing is modulated by music). Second, it strengthens the empirical basis for music-therapeutic approaches for the treatment of affective disorders, such as depression and pathologic anxiety, because these disorders are partly related to dysfunction of the amygdala. The network comprising amygdala, hippocampus, parahippocampal gyrus, and temporal poles has been observed in several studies investigating emotions induced by music. This suggests that these structures play a consistent role in the emotional processing of music. The activity changes in the (anterior) hippocampal formation evoked by listening to music are relevant for music therapy because patients with depression or Post Traumatic Stress Disorder show a volume reduction of the hippocampal formation (associated with a loss of hippocampal neurons, and blockage of neurogenesis in the hippocampus), and individuals with reduced tender, positive emotionality show reduced activity changes in the hippocampus in response to music. It is plausible that music therapy can help to reanimate activity in the hippocampus, prevent the death of hippocampal neurons, and lift the blockage of hippocampal neurogenesis (Sammler et.al.,2007). The hippocampus (perhaps particularly the anterior hippocampal formation) plays an important role for the generation of tender, positive emotions and happiness, and, according to several authors, one of the great powers of music is to evoke hippocampal activity related to happiness.

Activity in the nucleus accumbens(or NAc innervated by dopaminergic brain stem neurons located mainly in the ventral tegmental area of the midbrain) has been shown to correlate with self-reported positive emotion elicited by a reward cue. It has been suggested that, in humans, NAc activity corresponds to experiences of "fun" (which should be differentiated from experiences of "happiness"). Music therapy can make use of such experiences, for example to elevate the mood in individuals with mood disorders (Koelsch et.al.,2006). It is important to add that emotional processes always have effects on the vegetative nervous system, as well as on the hormonal system, which, in turn, modulates immune system activity. All these effects are potentially relevant for music-therapeutic applications because they open the possibility for using music to achieve beneficial effect in patients with autonomic, endocrine, or (auto)immune disorders.

Perception-action mediation: The premotor cortex is a critical structure for perception-action mediation. Premotor

activity during listening to music is modulated by the emotional valence of the music, suggesting that perception-action mediation is modulated by emotional processes (Haslinger et.al.,2005) . Music perception evokes a number of action-related processes. Perception-action ("mirror") mechanisms are relevant for music therapy, because these mechanisms serve the learning of actions, the understanding of actions, and the prediction of actions of others. Activation and training of perception-action mechanisms can be used in patients with neurologic disorders: for example, melodic intonation therapy can help patients with Broca's aphasia to regain language production, and music can be used in various ways for the recovery of fine and gross motor skills in stroke patients (Eckart Altenm¨uller et. al). The premotor cortex is also involved in a number of cognitive functions. The rehearsal of verbal information relies in part on premotor activity. Other cognitive functions in which the premotor cortex is involved comprise the analysis, recognition, and prediction of sequential auditory information, and—perhaps related to this—the processing of musical structure (or musical syntax).

Social cognition and music: Listening to music automatically engages areas dedicated to mental state attribution (in the attempt to understand the composer's intentions). Studies have shown that the meaning of music may be derived in part from the understanding that every note reflects an intentional act, which signals personal relevance to the artist representing a communication between the creator and the perceiver of the music. A study on the therapeutic effects of music making for individuals with impulsive aggression or moderate intermittent explosive disorder has revealed that music and music therapy has beneficial effects on the psychological and physiological health of individuals (Koelsch et.al.,2008).Since music listening activates a multitude of brain structures involved in cognitive, sensori-motor, and emotional processing, we can understand that it can easily modulate and induce changes in the activity of the neuronal networks involved in sleeping pill, alcohol and other addictions. Indian ragas endowed with sedative characteristics are capable of harmonizing the activity in these neuronal structures by modulating the dysfunctions arising out of addiction and drug abuse.

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