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Application of Cognitive Behavior Therapy on the Nightmares of a Patient having Coronary Artery Disease

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This study has assessed the impact of Cognitive Behavior Therapy (CBT) on the Nightmares of a patient having Coronary Artery Disease (CAD). This is a Single case experimental design of an adult male. Anxiety, depression, stress and locus of control have been studied as mediating factors in the index patient. Hospital anxiety and depression scale, Perceived stress scale, Rotter's Locus of control scale measured the psychological aspects baseline condition, post-intervention and post follow-up along with Type A/B Behavior Pattern Scale. The intervention focused on disentangling the patient's dream content in order to understand his psychological distress and its impact on the occurrence of coronary artery disease. The frequency of cardiac events decreased in the patient with decrease in frequency of nightmares accompanied by reduction in anxiety, depression and stress. Psychodynamic-informed CBT is effective in intervening upon the psychological distress of patients having Coronary Artery Disease.

Keywords: Nightmares, Coronary Artery Disease, Cognitive Behavior Therapy, Single-Case Experimental Design

Disruptions in sleep patterns are defined as nonorganic sleep disorders. These include sleep walking, night terror, insomnia and hypersomnia. Nightmares, in which a person wakes from sleep and remembers frightening dreams that typically involve imagery related to significant threats to survival, security, or self-esteem, is one such nonorganic sleep disorder. My client, A. K., is a 45-year-old male Hindi speaker and Hindu, who experienced severe nightmares. The index patient comes out of REM sleep and is completely alert and aware of his surroundings immediately, which is in sharp contrast to the usual grogginess experienced during waking up from sleep. Most of his nocturnal dreams comprise scenarios where he and his near and dear ones are succumbing to a deadly disease or a terrible accident. It also includes his family suffering because his firm is losing money. But he finds his actual circumstances to be very different from his dreams when he wakes up. He does, however, feel anxious because while currently being awake, he is able to vividly recall the dreams. With time, this further increases his distress, which causes even greater cortisol release, thereby maintaining stability of cardiac events.

Objectives

- To assess the anxiety, stress, depression, locus of control, type of personality of a patient having Coronary Artery Disease
- To understand how nightmares can be related with the occurrence of cardiac events
- Intervening the psychological distress and its impact on the occurrence of nightmares and cardiac events in a patient

Method

Purposive sampling was used to recruit the present case from a cardiac clinic in Ranchi and a single-case experimental design was employed in the study.

Tools used for baseline and post-intervention assessment are as follows:

Depression and Anxiety

Hospital Anxiety and Depression Scale (HADS): The HADS (Zigmond and Snaith, 1983) measures symptoms of anxiety and depression in patients currently admitted in the hospital. Its validity ranges from 0.73 to 0.77. There are 7 items measuring anxiety and 7 items measuring depression in this scale. It is a 4 point Likert scale.

Stress

Perceived Stress Scale: The Perceived Stress Scale (Cohen, Kamarck, Mermelstein, 2016) assessed how much the patients perceived daily life circumstances to be stressful and in what ways did such events cause the stress so that the researcher can find out the specific ways to help them cope with it.

Personality measure

Type A/B Behavior Pattern Scale: This scale is used to measure if the participant has charateristics of Type A and Type B personality. It is presented in the form of a 5-point scale. The scale has two parts-Form A and Form B out of which Form A is used to measure Type A. The reliability coefficient of Form A is 54. The validity for both the forms which have to be 73 (Dhar & Jain, 2001).

Locus of Control

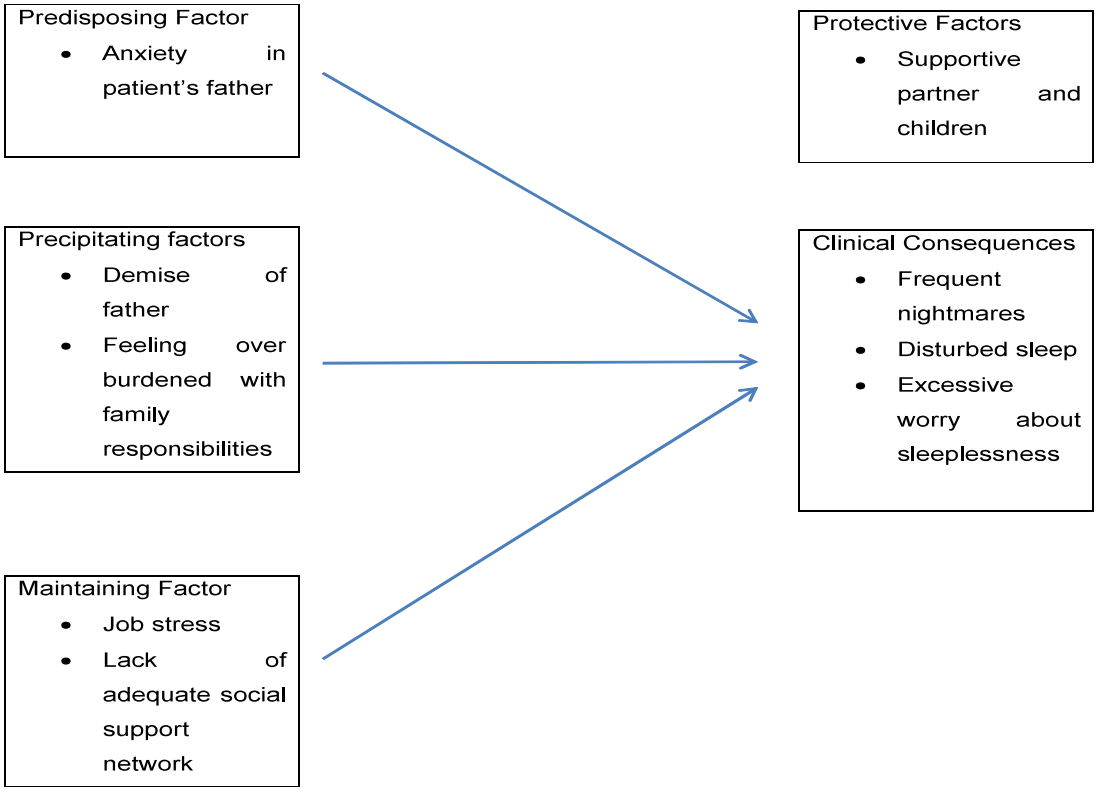
The Locus of Control Scale (LCS): The Locus of Control Scale (Rotter, 1966) is a 29-item inventory that measures the degree to which the individual interprets events as being a result of internal or external loci. This scale was used in a one year follow-up Indian study where non-pharmacological intervention was done on patients having alcohol dependence syndrome (Kumar and Thomas, 2007).

The Psychopathology

In the initial session, a history related to the details of the patient's dreams was taken. History related to the patient's physiological and psychological mechanisms during the instances when he remembers the dream during his wakeful state was focused upon. It was found that whenever the memories of the dreams come in the patient, he starts hyperventilating as his breathing rate increases along with palpitations. It was reported that the index patient started having such imageries during his period of wakefulness since June, 2021 after his father's demise. Initially he did not worry about it as he considered the nightmares to be rare incidents and expected them to decrease over time. However, when the nightmares continued to happen and the imageries came to the patient at a steady rate of about twice in a day, then he started becoming anxious about what if such mishaps happen in reality to his family and to himself. Eventually, the excessive worry affected his sleep patterns. He had difficulty falling asleep during the night and often woke up for multiple times during sleep. During the morning, he woke up during the usual time and did not feel rested. He also reported to the clinician that he could only sleep for around three to four hours in the night without interruptions. This is because the vivid dreams during the night indicated increased cognitive activity in the patient. According to the Type A/B Behavior Pattern Scale (Dhar and Jain, 2001), the patient had a Type A personality. As a result, when he experienced anxiety, his stress level increased, which in turn decreased the potassium channel-dependent regulation of action potential firing. A decrease in K+ channel inhibition actually increases the excitability of the lateral

amygdala because K+ channels typically have an inhibitory impact that causes the neuronal membrane to become hyperpolarized following an action potential. These intriguing findings suggest that, at least in part, long-term stress increases emotional reactivity, including fear and anxiety reactions, through localized effects on the excitability of amygdala neurons mediated by K+ channel function. The efficiency with which other, fear-inhibiting regions, such as the hippocampus and medial prefrontal cortex, regulate amygdala output would be diminished by these local effects inside the amygdala, which would probably form an overactive circuit with regard to fear and anxiety. (Ressler, 2010). In other words, during periods of extreme fear, the patient's amygdala becomes overly active, thereby reducing the effectiveness of prefrontal cortex. Hence, whenever the index patient has thoughts of impending danger to himself and his family, his ego is unable to tolerate the anxiety, as a result of which he represses such thoughts into the unconscious which therefore occurs in his dreams, resulting in nightmares. This is why the patient only had the imageries of danger during his sleep but never had such worries during his wakefulness except only remembering the content of his dreams, leading to extreme stress and anxiety. which increased his chances of cardiac arrests. Eventually, due to his recurrent cardiac events, the patient became afraid of going to work and his family members became overly cautious about allowing him to take on stressful work for long, as it was found that whenever the patient was in stress for a few hours at a stretch or indulged into worry and overthinking, he had a sensation of pain in his chest.

Case Conceptualization



The CBT Module Used

Intervening Anxiety: Following techniques were used to target reduction of anxiety in index patients:

1. Interrelationship between anxiety and increased cardiovascular event
2. Somatic Hyperawareness
3. Reducing existential fear associated with dying and passing away due to unexpected cardiac events
4. Differentiating among panic attack, normal anxious reactions
5. Using Mindfulness – Here and Now

Intervening Depression

In intervening depression in cardiovascular patients, the following difficulties are to be addressed:

1. Intervening negative affectivity by identifying the negative emotion and managing it,
2. Modifying social inhibition by intervening social anxiety in such patients
3. Focusing on improving the quality of interpersonal relationship and improving social support network
4. Intervening on
   - Self-criticism and perfectionism;
   - unrealistic need for praise from nearly everyone in the vicinity;
   - unrealistic categorization of forceful and aggressive behavior
   - Criticism of oneself and other people
5. Intervening depressive mood state when the patient remembers the dreams during wakeful state
6. Content of dreams were discussed with the patient - focusing on their relatedness with his daily life concerns
6. Discussing about the perceived fatality of cardiovascular disease

Intervening Stress

1. Respiratory Biofeedback
2. EMG Biofeedback
3. Mindfulness Based Stress reduction (MBSR) technique

Intervening Locus of control

1. Shifting from external towards internal locus of control
2. Helping to regain a sense of control over the patient's outcomes of treatment
3. Using the patient's healthy locus of control to improve his health outcomes

The Treatment Process and Outcome

Initially the patient experienced a loss in his business. As a result of this worry, he had depressed mood, low appetite and disturbed sleep reported after having the nightmares. In order to determine the patient's locus of control and degree of felt stress, the Rotter's Locus of Control Scale (Rotter, 1966), the Perceived Stress Scale (Cohen and Williamson, 1988), and the HADS (Zigmond and Snaith, 1983) were both used. It was found that the patient had external locus of control. The score in depression came as 9 indicating mild depression and score in anxiety was 17 indicating presence of significant anxiety. In Perceived stress scale, the score was found to be 30 during baseline assessment which indicates severe level of perceived stress. Upon administration of Type A/B Behavior Pattern scale, it was found that the index patient had Type A (anxious) personality.

Hence, a cognitive behavioral therapeutic module addressing the anxiety, depression, stress and locus of control was planned to be done on the index patient. At first, the treatment focused on stress reduction using MBSR. Thereby patient's muscle tension was

assessed using Electromyographic Biofeedback and he was trained to relax the muscles using mindfulness on respiratory biofeedback training so that he learns to self-induce relaxation by controlling his breathing rate. Once the patient was able to relax for a certain time period, the focus was kept on building sense of autonomy in order to reduce the perceived loss of control. This included behavior activation whereby the patient engaged in doing household chores as well as finishing small targets daily of his business work within the designated time period. The family members also provided him with verbal reinforcement, on completion of such tasks. Once the patient did this for a few weeks, it helped him build improved interpersonal relationship with his family members thereby improving his interpersonal social support network. Thereafter he reported having improved self-efficacy and therefore decreased level of depression due to gaining efficiency in his work and therefore his environment. Once he was able to understand that the choices and decisions of his life are within his control, it reduced his anxiety which was earlier raised due to perceived sense of loss of control. The patient also had difficulty in communicating his emotions to other people around him as he felt that others do not consider him to be worthy enough as an individual due to his poor productivity at work. Hence, Cognitive behavior therapy (CBT) was done on him to in order to target the cognitive errors which connected his sense of self-worth to his productivity. As a result, his negative affectivity also improved thereby decreasing the level of depression. After an intervention of about six months, it was found that the levels of anxiety, depression and perceived stress in the patient have decreased to sub-clinical levels. The depression score came down to be 5 and anxiety score came down to be 9 which indicate that the anxiety has decreased from clinical level to borderline level. However, after follow-up of about one year, his scores in anxiety further came down to be 4 and depression score was at 5 which indicate that he did not have clinically significant depression and anxiety post follow-up. The locus of control was found to be more towards internal during follow-up as his sense of control over his surroundings improved due to improved coping.His frequency of nightmares also decreased to around twice in a month and after a one year follow-up, he reported that the nightmares have stopped occurring. It was also observed that he had a decrease in cardiac event as he reported having pain in the chest in around once in six months that is having it at a much lesser frequency than before. Hence, it could be said that the CBT Module has been an effective treatment method for this patient.

Discussion

The primary function of dreams is to facilitate the emotional processing of one's thoughts so that it can decrease the emotional reactivity in the patient. Dreams also help to articulate and blend the thoughts and anxieties together in a way that helps one to solve problems. The amygdala and hippocampus are areas of the brain that have been shown to have increased activity when we dream. However, dreaming facilitates creative problem solving which can be concluded from the said effect on how people experience such brain events when sleeping which eventually facilitates and scientific understanding of how such events are experienced. The psychoanalysis theorizes that dreams represent cross-sectional images of a person's mental phenomenon and anxieties relating to this such that the contents of dreams would directly relate to everyday activities, concerns, and interests of an individual. It becomes clear that dreams may not have clear meanings but rather be neural signals with subjective interpretation when the synthesis hypothesis is activated. This hypothesis was put forth by J. Alan

Hobson in his Activation-synthesis hypothesis (Hobson, 2010), which postulates that dreams occur when random neurons in the brain fire during REM sleep and the mind tries to make sense of this firing. Dreams therefore helps in the processing of emotions, and in that sense, it becomes a 'safe space' for the mind to resolve emotions and traumas that remain unresolved. From a psychodynamic perspective, it may be conceptualized that the index patient harbors worries about his business failing and his wife and son suffering. Due to the Type A personality of the patient, he often remained anxious about daily life matters like interactions with colleagues and wife and also had minor conflicts with his children at times. He reported that his business started incurring losses since last two years. However he did not have significant worry over the matter except for the instances of nightmare in his dreams. This could indicate that the index patient repressed such worries as his it was beyond his ego strength to tolerate the anxiety due to the Type A personality. Due to repression, such thoughts which did not get processed adequately earlier, resulted in nightmares during sleep. Hence the imageries appeared only in the dreams as nightmares as the process of repression prohibits it from appearing in the patient's conscious thought process during the wakeful state. Hence, in therapy, his dreams about the business was brought in for discussion in the sessions. The dream's thematic material is unique to the dreamer. Therefore, the dreamer's emotive reactions to the dreams are comparable to their affective reactions in real life. The patient ought to make an effort to summarize the dream and make a sense of its significance in his life. Thus, when it comes to reducing the frequency of nightmares, nightmare-focused cognitive behavioral therapy (such as exposure or systematic desensitization, cognitive restructuring, or imagery rehearsal therapy) appears to be more effective than indirect CBT (Carona and Fonseca, 2022). In the present case, the index patient's dreams as brought into discussion and analyzed in session in order to understand the sources of his anxiety and the same was intervened upon in the session which indicates that the current intervention utilized nightmare-focused cognitive restructuring to bring about a reduction in nightmares and frequency of cardiac events. A web-based cognitive behavioral therapy for insomnia (wCBT-I) demonstrated feasibility and resulted in a clinically meaningful improvement in the severity of insomnia in an older patient group with a high prevalence of CAD (Javaheri, Reid, Drerup et. al, 2019). Hyperlipidemia, a risk factor for coronary artery disease, may be linked to recurrent nightmares in older persons (Lee, Park, Kim et. al., 2024). CAD is linked to the frequency and intensity of nightmares experienced by veterans. According to study results, nightmares can be a stand-alone risk factor for Coronary Artery Disease (Campbell, Taylor, Augustine et. al., 2023).

It was found that whenever the patient actively discussed about the matters of business for a prolonged duration, he experienced pain in the chest. Hence, he repressed such emotions into the unconscious. However, studies show that masking and repressing emotions may trigger physiological responses to stress. Stress arises from the social condemnation and punishment of open expression of emotions that lead to repression which is itself intimidating and stressful. According to Cote (2005), persistent repression causes stress in people, which can have negative impacts on an individual's productivity. These effects include elevated heart rate, anxiety, low commitment, and other issues. That might be the reason why when the index patient had heightened stress due to Type A personality characteristics, he was unproductive at his work, thereby serving to

increase his stress further. Over time, the level of stress increases so much that it exceeds the capacity of his ego-strength. Then, the conscious mind or the ego represses it into the unconscious, hence the index patient was not aware of feeling of stress actively in his daily life but nevertheless dreamt about the same. When under stress, people with CAD experience chest pain because of the condition's impact on heart blood flow and the body's reaction to stress. Additionally, stress can trigger the release of hormones like cortisol and adrenaline, which raise blood pressure and heart rate and make breathing harder. Chest pain may also result from these impacts. Stress can also cause rupture in plaque, forming a blood clot blocking blood flow and causing a heart attack in individuals with Coronary artery disease. However this psychotherapeutic module proved to be effective for such a patient as it helped to bring out the repressed material on the surface of consciousness and deal with it in session in order to bring about decreased stress, anxiety and therefore improve coping and mood state.

Conclusion

Thus, it is determined that the incidence and severity of coronary artery disease can be significantly impacted by dreams. Nightmares are an expression of the repressed distress in the patient, which in turn further leads to increased stress thereby increasing the level of cortisol in the blood, serving to cause and maintain coronary artery disease. Therefore, understanding the content of dreams in nightmares and intervening upon them serves to decrease the level of anxiety in the patient, thereby reducing his stress level, leading to further reduction in frequency and intensity of the cardiac event. Hence, the implication of the current case study is to consider conceptualizing psychological distress in patient having cardiac disease from a psychodynamic perspective as well so that it helps to intervene upon the deep-seated distress that serves to cause and maintain coronary artery disease.

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