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The analysis of major depressive disorder

Jingtu Zhang

Stamford American International School, 357684, Singapore

jingtuz@proton.me

Abstract. Major Depressive Disorder (MDD), commonly referred to as depression, is a pervasive mental health condition impacting millions globally. It is one of the leading causes of disability worldwide, affecting individuals across various age groups and cultural backgrounds. The causes of MDD include genetic predisposition, biochemical imbalances in neurotransmitters like serotonin, norepinephrine, and dopamine, early-life stress and trauma, chronic medical conditions, and environmental factors such as social isolation. This paper employs the literature review method to explore the symptoms, causes, treatments, and recent research findings related to MDD. The study aims to enhance the understanding of MDD to aid in developing effective interventions. The paper finds that a comprehensive approach integrating psychological therapies, medications, and social support is crucial for managing MDD. The significance of this research lies in its potential to inform clinical practice and improve outcomes for individuals suffering from MDD.

Keywords: Major Depressive Disorder, Treatment, Symptoms, Causes.

1. Introduction

Major Depressive Disorder (MDD), commonly known as depression, is a complex and multifaceted mental health condition that significantly impacts individuals' emotional, psychological, and physical well-being [1]. Recent advances in neurobiological research have shed light on the underlying mechanisms of MDD, including genetic, biochemical, and environmental factors. Studies have shown that imbalances in neurotransmitters such as serotonin, norepinephrine, and dopamine play a critical role in the onset and progression of depression [2]. Additionally, early-life stress and trauma, along with chronic medical conditions, have been identified as significant risk factors contributing to the development of MDD [3].This essay aims to provide a comprehensive introduction to MDD, covering its symptoms, causes, treatments, and recent research findings. Understanding MDD is crucial for developing effective interventions and supporting those affected by this debilitating disorder [4]. The significance of this research lies in its potential to inform clinical practice and improve outcomes for individuals suffering from MDD. By providing a comprehensive overview of existing literature, this paper offers a theoretical foundation that can guide future studies and clinical applications. Moreover, it underscores the importance of a holistic approach to treatment, integrating psychological therapies, medications, and social support to address the multifaceted nature of MDD.

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2. Symptoms of Major Depressive Disorder

Major Depressive Disorder manifests with a varied symptomatic representation, which may be quite different from one individual to another. Common symptoms are a constant feeling of sadness, gloom, or the impression that one is empty and hopeless; loss of interest in or enjoyment of most activities, hobbies, social interaction, or sources of enjoyment [1]. Occasionally, thoughts of mortality and contemplation of suicide may manifest as repetitive patterns, leading to multiple suicide attempts. These features lead to significant impairment in all aspects of life, whether work, personal relations, or occupational functioning. At times, MDD has atypical features. For instance, some affected persons have morning depressions, which show that symptoms are markedly worse in the morning but lift as the day goes by. In addition, some individuals with MDD may demonstrate mood reactivity—a temporary improvement in mood following positive events. Other atypical symptoms will include psychomotor retardation. All this symptom heterogeneity indicates a high complexity of MDD and requires a personalized approach to diagnosis and treatment [4].

3. Causes of Major Depressive Disorder

Major Depressive Disorder is a multifactorial disorder, including genetic, biological, environmental, and psychological factors. A significant risk factor would be the existence of first-degree relatives with the same condition. Studies show that individuals whose parent or sibling has significant depression are at two to three times greater risk of developing the disorder themselves. The increased risk confirms the hereditary component of the illness [2].

Besides psychosocial factors, biological determinants are also of extreme importance. Chemical imbalance in the brain, particularly with neurotransmitters like serotonin, norepinephrine, and dopamine, is strongly linked with depression. Inflammatory markers such as C-reactive proteins can translocate across the blood-brain barrier and lead to disturbances in these neurotransmitter levels, resulting in more chances of depressive symptoms [2].Moreover, changes in the level of the hormones, most markedly during the post-partum period, or chronic illnesses such as fibromyalgia or arthritis are related to mood swings and depression [3].

Early-life stress and trauma are also potent contributors to the onset of MDD. Adverse experiences, such as abuse, neglect, or significant loss experienced in early childhood, have effects on gene expression that result in lasting changes through epigenetic modifications. These types of changes can increase an individual's vulnerability to depression by altering gene expression in ways that affect the individual's ability to process and respond to stress and emotions.Social isolation is also considered one of the primary causes of exacerbation of depression, as it decreases oxytocin release and increases stress hormones such as cortisol, adversely impacting brain regions responsible for the regulation of mood and social behavior [3].

Understanding the subtypes of depression is central to getting the correct diagnosis and treatment. An imbalance in brain chemistry, genetic factors, and stress due to the loss of a loved one can trigger an episode of Major Depressive Disorder (MDD) [5]. Chronic medical conditions, including diabetes and chronic pain, as well as some medications, can provoke MDD [5].

Persistent Depressive Disorder (PDD), also known as dysthymia, involves the presence of depressive symptoms over the long term: two years or more [6-7]. While similar to MDD, PDD is more chronic and often less severe. Some causes of PDD include chronic stress, unresolved trauma, and genetic factors; hence, the disease calls for long-term management strategies [6].

Bipolar Disorder involves periods of alternate depression with episodes of mania. Genetic predisposition to the disorder, disturbances in brain structure and function, and exposure to stressful life events all may contribute to the onset of this disorder. Similarly, Postpartum Depression (PaPD) arises from hormonal changes due to childbirth, together with stress, lack of support, and complications during childbirth.

Premenstrual Dysphoric Disorder (PMDD) stems from hormonal fluctuations associated with the menstrual cycle and underlying mood disorders. Seasonal Affective Disorder (SAD) occurs due to

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weather changes, with reduced exposure to sunlight, and in response, the body clock may lead to depression. It also affects serotonin levels and melatonin production.

4. Treatment of Major Depressive Disorder

4.1. Traditional treatment

A combination of all aspects—education, lifestyle changes, psychological therapies, medical treatments, and social support—is what makes treatment effective for major depressive disorder (MDD). The best cornerstone would be education and lifestyle changes with regular physical activity and learning about depression, which may significantly improve outcomes [1]. Various psychological therapies fit individual needs. The two most common ones are Cognitive Therapy, which focuses on changing the negative way of thinking to achieve a better mood, and Behavioral Therapy, which focuses on modifying behavior to get the desired emotion [8]. Cognitive Behavioral Therapy (CBT) is a structured, short-term approach combining cognitive and behavioral techniques. Dialectical Behavioral Therapy (DBT), based on CBT principles, emphasizes techniques of acceptance of negative thoughts and includes mindfulness practices [8]. Psychodynamic Therapy focuses on eliciting unconscious conflicts of the past for recognizing and learning to deal with current emotions. In contrast, Interpersonal Therapy (IPT) suggests that addressing interpersonal issues and social roles can lead to improved relationships and support. [1].

Many medical treatments are necessary in the management of MDD. Antidepressant medications comprise Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs), Tricyclic Antidepressants (TCAs), and Monoamine Oxidase Inhibitors (MAOIs) [9]. SSRIs exert their effects by inhibiting the reuptake back into the neurons, thereby increasing the availability of such to facilitate sound transmission of messages between the neurons. SNRIs work by inhibiting the presynaptic neuronal uptake of serotonin and norepinephrine, thereby accumulating the effects of these monoamines in a synaptic cleft within the CNS and stimulating postsynaptic activation and neuronal activity [9]. TCAs are very effective; however, they also block histaminic, cholinergic, and alpha1-adrenergic receptor sites, thereby causing unwanted side effects such as weight gain, dry mouth, constipation, drowsiness, and dizziness. MAOIs work by inhibiting monoamine oxidase, an enzyme that would otherwise break down neurotransmitters such as serotonin, norepinephrine, and dopamine in the synaptic cleft; thus, the inhibiting action has the net effect of raising the levels of the neurotransmitter. Common side effects of MAOIs include dizziness, sleep disturbances, weight gain, and sexual dysfunction. Social support remains the most critical management tool for MDD. Care from family and friends and health professionals serves to provide a network of care that can assist individuals in coping with the challenges of depression. Other community resources are connected to the provision of local mental health services and the facilitation of support groups. [1]

4.2. Emerging Treatments

New essential findings of the research also point to depression-related changes in the amygdala and gray matter abnormalities, which also signal potential therapeutic targets for this condition [10-11]. The dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and its association with stress-related depression, combined with the utilization of cerebrospinal fluid biomarkers, holds great promise for precision treatment approaches. A promising modality for treatment-resistant depression (TRD) is Deep Brain Stimulation (DBS). Studies indicate a 64.3% response rate over 3-6 years and significant symptom reduction in the subgenual cingulate cortex [12-13]. Although generally safe, DBS carries risks such as hemorrhage and psychiatric complications [14]. Various brain targets show differing efficacy, with the subcallosal cingulate gyrus showing significant improvements [15].Multi-center trials confirm its efficacy, but still, some randomized-controlled studies demonstrate a somewhat controversial result and require additional study [15-16]. One more innovative treatment is ketamine, which modifies brain network connectivity and signaling mechanisms to induce fast-acting antidepressant effects [17]. Acute and chronic administration might change the mood by acting on NMDAR and GABAergic signaling.

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This makes ketamine of value to MDD patients who are resistant to conventional treatment, providing quicker results over traditional treatments. In all, DBS and ketamine therapy hold compelling promise for the treatment of MDD. Although they are effective and safe, there is also a need to carry out more trials to make their use optimal so that better therapeutic approaches may be proposed in severe and treatment-resistant depressions.

5. Conclusion

This paper has explored the complex nature of Major Depressive Disorder (MDD), covering its symptoms, causes, and treatments. MDD can present with a range of symptoms, such as chronic periods of depressed mood and loss of interest in usual activities along with changes in appetite or sleep habits and suicidal ideation. Symptoms like these make it impossible for a person to perform daily life tasks which illustrates the disabling effect of this disorder. MDD is thought to occur due to a combination of genetic, biological, environmental and psychological risk factors. However, genetic predisposition also plays a significant role in this phenomenon—those with a family history of depression are at a higher risk of developing depressive disorders. Depressed patients exhibit imbalances in levels of neurotransmitters including serotonin, norepinephrine, and dopamine that are believed to play a role in the development and progression of the disorder. We found that early-life stress, trauma and chronic medical conditions like diabetes or heart disease have large roles to play before MDD ever enters the picture. Environmental triggers, like being isolated or experiencing distressing life events only make the matter worse. The multi-faceted nature of depression also suggests that a complex, well-rounded treatment approach combining psychological therapies with antidepressant medications and social support is likely to be effective in treating MDD. Effective treatment of MDD requires a comprehensive approach that integrates psychological therapies, medications, and social support. Cognitive Behavioral Therapy (CBT), Interpersonal Therapy (IPT), and other psychotherapies have proven effective in helping individuals manage their symptoms. Pharmacological treatments, including Selective Serotonin Reuptake Inhibitors (SSRIs) and other antidepressants, are crucial in restoring neurotransmitter balance. Emerging treatments such as Deep Brain Stimulation (DBS) and ketamine therapy offer promising results for treatment-resistant depression. Social support from family, friends, and community resources remains vital in providing a network of care for those affected by MDD. Despite extensive advancement in understanding and managing MDD, a number of knowledge gaps remain to be addressed particularly with regards to the specific mechanisms underlying this pathology, as well as personalized strategies for treatment. These areas should be targeted in future work to optimize treatment efficacy and clinical outcomes among those with MDD. This paper comprehensively examines the current literature to inform clinical practice and contribute towards improving mental health care for those with MDD in the future.

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