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Review Article

A narrative review on common psychopharmacological disorders

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Abstract

Objective: This narrative review aims to provide a comprehensive overview of pharmacological treatments, clinical manifestations, and underlying pathophysiological mechanisms associated with common psychopharmacological disorders.
Materials and Methods: A comprehensive literature search was conducted across databases including PubMed, Scopus, and Science Direct, with a focus on studies and review articles published within the past two decades.
Results: The review emphasizes critical neurobiological mechanisms, particularly the dysregulation of key neurotransmitters such as serotonin, dopamine, norepinephrine, and gamma-aminobutyric acid (GABA). It offers a comparative analysis of the therapeutic efficacy and adverse effect profiles of major classes of psychotropic medications, including antidepressants, antipsychotics, mood stabilizers, and anxiolytics. Additionally, it provides a critical discussion of major treatment challenges, including drug resistance, side effects, and poor patient adherence.
Conclusions: Future directions highlight the development of novel therapeutic agents, the implementation of personalized medicine strategies, and the integration of psychotherapeutic approaches. Ongoing research and innovation in psychiatric pharmacotherapy remain crucial for enhancing treatment efficacy and improving patient outcomes.

Keywords: Psychopharmacology, Psychiatric disorders, Psychopathology, Neurotransmitters, Pharmacological treatment, Psychotherapy etc.

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1. Introduction

Psychopharmacology is the study of how medications affect emotion, perception, thought, and conduct. Psychopharmacology can be used therapeutically to prevent or eliminate pathological emotional memory.[1] A psychological disorder is any deviation of an individual's normal patterns of thought, emotion, or behavior.[2] Most mental health services give priority to evidence-based psychological therapies as the most effective intervention for mental disorders.[3] The current system of health care is likely to produce an artificial separation of adult and child mental health services, although there is sound epidemiological evidence to justify internationally integrated models of early prevention and mental health promotion among vulnerable adolescents.[4] These conditions cause a lot of distress to the afflicted.[5] A study in 2019 estimated that approximately 970 million people worldwide approximately 1 in 8 people have a mental illness, of which anxiety is the most prevalent.[6] To address this, programs such as the World Health Organization's Mental Health Gap Action Programme (mhGAP) Intervention Guide 2.0 provide guidance for the assessment and management of mental disorders in non-specialized health settings.[7]These mental health programs have increasingly gained popularity among the youth.[8]

2. Neurotransmitters

The major neurotransmitters involved in mental health disorders include:

2.1. Serotonin (The mood modulator)

Serotonin is a pivotal neurotransmitter primarily involved in the regulation of mood, sleep, and appetite. Predominantly located in the brain, gastrointestinal tract, and blood platelets, it plays a fundamental role in emotional stability. Deficient serotonin levels are closely associated with depression, anxiety disorders, obsessive-compulsive disorder (OCD),

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post-traumatic stress disorder (PTSD), and panic disorder. Pharmacological interventions such as selective serotonin reuptake inhibitors (SSRIs) are commonly employed to elevate synaptic serotonin concentrations, thereby ameliorating mood disturbances and anxiety symptoms.

2.2. Dopamine (The neurochemical of reward and motivation)

Dopamine significantly influences the brain's reward circuitry, motivation, attention, and motor control. Hyperdopaminergic activity is implicated in the pathophysiology of schizophrenia, manifesting as hallucinations and disorganized thought processes. Conversely, hypodopaminergic states are linked to depression, Parkinson's disease, and anhedonia. Additionally, dysregulated dopamine transmission underlies substance use disorders. Therapeutic approaches include dopamine antagonists in schizophrenia and dopamine-enhancing agents like bupropion in depressive disorders characterized by low motivation and energy.

2.3. Norepinephrine (The mediator of arousal and stress)

Norepinephrine, or noradrenaline, orchestrates the body's stress response and modulates arousal, alertness, and energy expenditure. Dysregulation of norepinephrine levels is associated with affective disorders, including major depressive disorder (MDD), generalized anxiety disorder (GAD), and attention deficit hyperactivity disorder (ADHD). Low norepinephrine contributes to lethargy and poor concentration in depression, while excessive levels may induce anxiety and hyperactivity. Serotonin-norepinephrine reuptake inhibitors (SNRIs) such as venlafaxine and duloxetine are routinely utilized to restore neurotransmitter balance in mood and anxiety disorders.

2.4. GABA (The primary inhibitory neurotransmitter)

Gamma-aminobutyric acid (GABA) serves as the brain's principal inhibitory neurotransmitter, mitigating neuronal hyperactivity and promoting relaxation. GABAergic dysfunction is strongly associated with anxiety disorders, panic attacks, epilepsy, and sleep disturbances. Reduced GABA activity results in heightened neural excitability and psychological distress. Therapeutic agents such as benzodiazepines potentiate GABAergic transmission to exert anxiolytic effects, while certain anticonvulsants target GABA pathways to manage seizures.

2.5. Glutamate (The major excitatory neurotransmitter)

Glutamate plays a central role in excitatory neurotransmission, synaptic plasticity, learning, and memory. Aberrant glutamatergic activity contributes to neurodegenerative conditions such as Alzheimer's and Huntington's disease, as well as psychiatric disorders like schizophrenia and treatment-resistant depression. Excessive glutamate levels can lead to excitotoxicity and neuronal damage. Emerging treatments, including ketamine, target glutamatergic pathways and have demonstrated rapid antidepressant effects in individuals unresponsive to conventional therapies.

2.6. Acetylcholine (The cognitive enhancer)

Acetylcholine is critically involved in memory formation, attention, and learning, with significant roles in both the central and peripheral nervous systems. Reduced acetylcholine levels are a hallmark of Alzheimer's disease, often resulting in profound cognitive deficits. While not directly linked to mood disorders, cholinergic dysfunction may contribute to the cognitive impairments observed in schizophrenia and ADHD. Current therapeutic strategies aim to augment cholinergic transmission to support cognitive function in neurodegenerative and psychiatric disorders.[9]

3. Materials and Methods

This review employed a narrative methodology to synthesize and interpret findings from the existing body of literature on prevalent psychopharmacological disorders. A non-systematic literature search was conducted across multiple scientific databases including PubMed, Scopus, ScienceDirect, and Google Scholar targeting publications from 2000 to 2024.

4. Types of Psychological Disorders

Several psychological disorders exist, including anxiety, depression, epilepsy, Alzheimer's disease, and Parkinson's disease.

4.1. Anxiety disorders

Anxiety disorders are the most common mental health conditions.[10] Symptoms include excessive worry, fear in social situations, unexpected panic attacks, overanalysing situations, and avoidance behaviours.[11] These disorders often lead to difficulties with sleep, concentration, social interactions, and work performance.[12] Since laboratory tests are not a reliable way to diagnose anxiety,[13] current treatments primarily include serotonergic and norepinephrinergic antidepressants.[14]

4.2. Depression

Depression is more prevalent in women than in men. The Global Burden of Disease estimates that the prevalence of unipolar depression is 3.2% in females and 1.9% in males.[15]The World Health Organization predicts that, within the next decade, depression will be the second most common global health condition.[16] Depression significantly lowers the quality of life and is a leading cause of emotional distress, particularly in older adults.[17-18] Symptoms include persistent sadness, restlessness, irritability, fatigue despite adequate sleep, difficulty focusing, and trouble making decisions.[19] A clinical interview and mental health assessment are necessary for diagnosing severe depressive disorders.[20] Selective

serotonin reuptake inhibitors (SSRIs) are the most commonly prescribed medications for depression.[21]

4.3. Epilepsy

Epilepsy affects individuals of all ages[22] and is one of the most common and debilitating neurological conditions.[23] It is characterized by a persistent tendency to experience seizures, which can have neurological, cognitive, psychological, and social effects.[24-25] The symptoms vary depending on where the seizure begins in the brain, potentially affecting consciousness, sensory perception (such as hearing, vision, and taste), movement, and cognitive function.[26] The electroencephalogram (EEG) is the most important tool for diagnosing epilepsy, classifying seizures, and tracking treatment response.[27] The type of epilepsy and seizures determines the most appropriate antiepileptic treatment.[28]

4.4. Alzheimer's disease (AD)

Alzheimer's disease is one of the most prevalent neurodegenerative conditions, responsible for nearly 80% of dementia cases in older adults.[29] It is characterized by the accumulation of beta-amyloid plaques and tau-containing neurofibrillary tangles in the brain.[30] Symptoms commonly include memory loss, cognitive impairments, difficulty recognizing people, problems with spatial awareness, and challenges in speaking, reading, or writing, and behavioural or personality changes.[31] Current treatments for Alzheimer's include memantine, a dopamine agonist and non-competitive NMDA receptor antagonist, as well as cholinesterase inhibitors like donepezil, rivastigmine, and galantamine.[32] Diagnosis involves a detailed history from a reliable informant, neurological and physical examinations, routine lab tests (including thyroid function and vitamin B12 levels), optional tests (such as Lyme disease serology and lumbar puncture), and neuroimaging studies.[33]

4.5. Parkinson's disease

Parkinson's disease is a progressive neurological disorder that affects daily movement and motor function.[34] It is a chronic condition with both motor and non-motor symptoms.[35] The disease typically develops between the ages of 55 and 66.[36] Common symptoms include bradykinesia (slowness of movement), muscle stiffness, and resting tremors.[37] Other complications include speech and swallowing difficulties, cognitive decline, dementia, and balance problems.[38] Diagnosis is based on medical history and physical examination. Prodromal symptoms such as REM sleep disturbances, constipation, characteristic movement issues (e.g., tremors, slowness), and a reduced sense of smell may precede motor symptoms.[39] The primary treatment for Parkinson's symptoms is levodopa, a dopamine precursor.[40] Other therapeutic strategies focus on reducing protein build-up, limiting immunotherapy-induced clearance of alpha-synuclein (Epigallocatechin), increasing cerebrosidase activity (Ambroxol), and inhibiting Leucine-rich repeat kinase 2.[41]

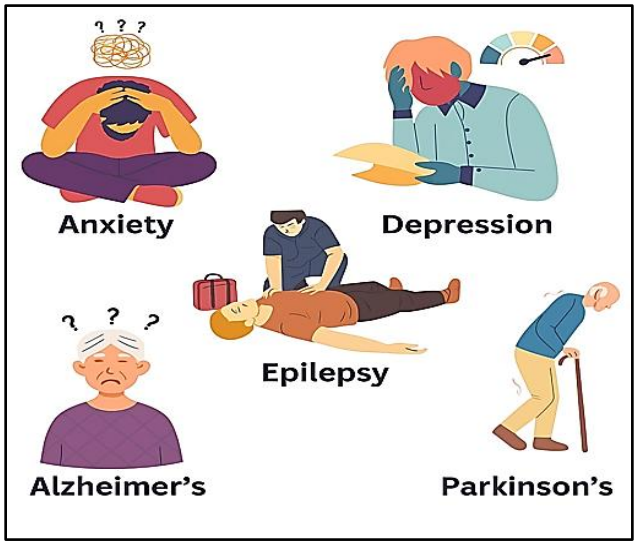

Figure 1: Types of psychopharmacological disorders

The field of psychology also displays a system of procedures and methods of psychological intervention with the purpose of preventing, curing, and rehabilitating pathological behavior and brain illnesses on the basis of such concepts, methods, and procedures.[42] Most international organizations, professional bodies, and other leading websites have definitions and descriptions of psychotherapy. For practical reasons, we utilize key overlaps to explain the major factors that decide psychotherapy.[43] Psychotherapy greatly impacts a person's belief system, mood, and behavior. As a result, it is usual to see structural and functional changes in the brain due to the treatment.[44] It is the most common and significant method of psychotherapy intervention. The most eminent and extensively studied form of psychological intervention was psychotherapy.[45]

5. Psychopathology

Psychopathology is the scientific study of abnormal mental states.[46] Psychiatrists can gain valuable insights into phenomena that deviate from typical expectations.[47-48] It is one of several approaches aimed at understanding and conceptualizing mental illnesses or exploring their causes.[49] Impulsive aggression and its concomitant illnesses may be linked in part to abnormal connections between the prefrontal cortex's serotonin and dopamine systems.[50]

6. Psychopharmacological Interventions

Medicine to address mental health issues is known as psychopharmacological intervention. Psychopharmacological treatments improve symptoms and functionality by changing the chemistry of the brain. Psychopharmacology uses a wide range of drugs, such as mood stabilisers, stimulants, anxiolytics, antidepressants, and antipsychotics. These drugs function by going after particular neurotransmitters or brain receptors, such serotonin, dopamine, or GABA. Depending on the particular needs of the patient, psychopharmacological interventions

are frequently combined with psychotherapy or other non-pharmacological treatments. A complete evaluation that includes a review of symptoms, a medical and mental history, and an assessment of general health is the basis for the decision to employ medication as a therapeutic option.[51]

7. Challenges in Treatment

Psychological treatment involves various therapies such as psychoanalysis, humanistic approaches, and cognitive behavioral therapy (CBT) to help individuals and families address emotional and behavioral issues. The biomedical approach uses medications and brain-based interventions like ECT, TMS, and psychosurgery to manage disorders such as schizophrenia, depression, and anxiety. The social approach focuses on altering the individual's environment through group, family, and community-based therapies, with an emphasis on both treatment and prevention of mental health issues.[52]

8. Conclusion and Future Directions

Psychological disorders significantly impact individuals' thoughts, emotions, and behaviors, often leading to distress and impairment in daily functioning. This review highlights various mental health conditions, including anxiety, depression, epilepsy, Alzheimer's disease, and Parkinson's disease, emphasizing their symptoms, diagnosis, and treatment approaches. Despite the prevalence of these disorders, evidence-based psychological therapies, such as psychotherapy, play a crucial role in their management. The field of psychology provides effective interventions aimed at prevention, treatment, and rehabilitation. However, challenges remain, including the artificial separation between adult and child mental health services and the need for globally integrated prevention strategies. Advancements in research and mental health initiatives, such as the WHO's Mental Health Gap Action Programme, continue to bridge gaps in care, improving accessibility and outcomes. Moving forward, a multidisciplinary approach that combines medical, psychological, and social interventions will be essential in addressing the complexities of psychological disorders and enhancing overall mental well-being. Promising developments in psychopharmacology could transform the way mental health is treated in the future. Innovative strategies to improve the effectiveness of psychiatric drugs and reduce their adverse effects are being investigated by researchers and pharmaceutical companies.

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10. Ethics Approval and Consent to Participate

This study involved the review on psychopharmacological disorders and did not require ethical approval from an institutional review board or ethics committee, as no human or animal subjects were involved.

11. Availability of Data and Material

All data generated or analyzed during this study are included in this published article [and its supplementary information files, if applicable]. Additional raw data supporting the findings of this study are available from the corresponding author upon reasonable request.

12. Credit Authorship Statement

1. Ashwin Singh Chouhan**:** Conceptualization, methodology, investigation, data collection, formal analysis, and writing original draft preparation.
2. Komal Sharma**:** Supervision, validation, review and editing of the manuscript, and overall project guidance. Both authors have read and approved the final version of the manuscript.

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14. Conflict of Interest

None.

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