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PSYCHOSIS: PATHOPHYSIOLOGY, CLINICAL MANIFESTATIONS, AND CONTEMPORARY TREATMENT STRATEGIES

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ABSTRACT

A distorted view of reality is the hallmark of psychosis, a severe mental illness that frequently manifests as hallucinations, delusions, disordered thinking, and diminished insight. It might be secondary to mood disorders, substance abuse, neurological diseases, or physical ailments, or it can manifest as a main psychiatric disorder, such as schizophrenia or schizoaffective disorder. Its pathogenesis is largely caused by dysregulation of neurotransmitter systems, specifically dopamine, glutamate, and serotonin. Since postponed treatment is linked to worse clinical outcomes and functional deterioration, early detection and precise diagnosis are essential. A multimodal strategy is needed to manage psychosis, combining psychosocial therapies like cognitive behavioral therapy, family interventions, and rehabilitation programs with pharmaceutical measures like antipsychotic drugs. A substantial disturbance in perception, cognition, emotional control, and behavior characterizes psychosis, a complicated and incapacitating mental health illness that impairs one's capacity to discriminate between subjective experiences and reality. Hallucinations, delusions, disordered speech and behavior, diminished insight, and cognitive impairments are among the fundamental clinical characteristics. Psychosis can occur as a side effect of mood disorders, substance abuse, neurological illnesses, metabolic disorders, infections, and negative drug effects, or it can manifest as a major psychiatric disorder such schizophrenia, schizoaffective disorder, and short psychotic disorder. The pathophysiology of psychosis is complex and includes genetic predisposition, structural and functional abnormalities of the brain, neuroinflammation, dysregulation of dopaminergic, glutamatergic, and serotonergic neurotransmission, and environmental stressors like trauma, urbanization, and psychosocial adversity.

KEYWORDS: Psychosis; Schizophrenia; Hallucinations; Delusions; Neurotransmitter Dysregulation; Dopamine Hypothesis; Diagnosis; Antipsychotic Drugs.

INTRODUCTION

A serious mental illness known as psychosis is typified by a basic disruption in a person's reality perception, which influences behavior, emotions, and thought processes. It is most frequently characterized by symptoms that seriously impede social, professional, and personal functioning, such as hallucinations, delusions, disordered thinking, and diminished insight. Psychosis is a clinical state that can arise in a variety of psychiatric, neurological, medical, and substance-related illnesses; it is not a diagnostic in and of itself.[1,2] Because psychosis is characterized by disordered mental functioning, the name comes from the Greek words psyche (mind) and osis (abnormal condition).

Clinically, psychotic symptoms can be broadly classified as cognitive deficits (impaired attention, memory, and executive functioning), negative symptoms (affective flatness, avolition, anhedonia, and alogia), and positive symptoms (hallucinations, delusions, and thought disorder). The burden of disease and long-term consequences are influenced differently by these symptom domains.[3,4] Though it can also occur in mood disorders including bipolar disorder and major depressive disorder with psychotic aspects, psychosis is most commonly linked to schizophrenia spectrum diseases. Furthermore, neurodegenerative diseases, infections of the central nervous system, metabolic disorders, autoimmune encephalitis, brain tumors, epilepsy, and the use of psychoactive substances such as cannabis, amphetamines, and hallucinogens

can all result in psychotic symptoms.[5,6] This variation emphasizes how crucial a thorough clinical assessment is in determining the underlying causes.

According to epidemiological research, the lifetime prevalence of psychotic diseases is between 1% and 3% worldwide, and the onset of psychosis usually happens in late adolescence or early adulthood. Higher levels of disability, a higher chance of relapse, and worse functional results are all linked to early onset. Early detection and intervention measures are crucial since delays in treatment beginning, also known as the duration of untreated psychosis (DUP), have been repeatedly associated with worse clinical and cognitive results.[7,8] Psychosis is a complicated and multifaceted etiology that includes interactions between environmental stresses, neurodevelopmental anomalies, hereditary susceptibility, and neurochemical dysregulation. While glutamatergic, serotonergic, and GABAergic systems are increasingly acknowledged as contributors to negative and cognitive symptoms, dopaminergic hyperactivity in mesolimbic pathways has long been linked to the development of positive symptoms. A neurological basis for psychosis is supported by structural and functional neuroimaging studies that also show abnormalities in cortical and subcortical brain regions.[9,10]

Because of its protracted course, high relapse rate, and significant social and economic burden, psychosis is a serious public health concern. Increased morbidity, a shorter life expectancy, stigma, and a lower quality of life are all experienced by those with psychotic disorders. Therefore, enhancing diagnostic precision, treatment strategies, and long-term results requires an awareness of the clinical characteristics, underlying mechanisms, and wider ramifications of psychosis.[11,12]

Causes

A complex interplay of biological, psychological, and environmental elements results in psychosis, a multifactorial clinical illness. Psychosis is the last common pathway of various etiological processes influencing brain development, neurochemistry, and cognitive integration rather than a single causal mechanism. Genetic and neurodevelopmental factors, neurochemical abnormalities, psychiatric illnesses, neurological and medical diseases, substance-related causes, and psychosocial and environmental stressors are the main categories into which psychosis can be divided.[13,14]

1. Neurodevelopmental and Genetic Factors

A major contributing factor to the development of psychosis is genetic susceptibility. Research on adoption, twins, and families shows that first-degree relatives of those who are affected have a markedly higher risk of developing psychotic disorders. Schizophrenia is the quintessential psychotic condition, with heritability estimates ranging from 60% to 80%.[15]

Numerous risk loci involving genes linked to immunological regulation, neurodevelopment, neurotransmission, and synaptic plasticity, such as DISC1, COMT, and major histocompatibility complex (MHC) regions, have been found by genome-wide association studies (GWAS).[16]

Psychosis risk is also increased by neurodevelopmental disorders that occur during pregnancy and the first few months after delivery. Changes in brain development and heightened susceptibility to psychosis later in life have been linked to obstetric difficulties, maternal infections, malnourishment, hypoxia, and prenatal stress. Long-term cognitive and perceptual abnormalities may result from these early shocks' disruption of brain connections and synaptic pruning.[17,18]

2. Abnormalities in Neurochemistry and Neurobiology

One important molecular explanation behind psychosis is the dysregulation of neurotransmitter systems. The most prominent paradigm is still the dopamine hypothesis, which postulates that positive psychotic symptoms are caused by hyperactivity of dopamine transmission in mesolimbic pathways and negative and cognitive symptoms are caused by hypoactivity in mesocortical pathways.[19]

In addition to dopamine, the pathophysiology of psychosis has been linked to anomalies in glutamatergic neurotransmission, namely the hypofunction of N-methyl-D-aspartate (NMDA) receptors. The psychotomimetic effects of NMDA receptor antagonists like ketamine and phencyclidine lend credence to this theory. Emotional dysregulation and perceptual abnormalities are also influenced by changes in the serotonergic and GABAergic systems.[20,21]

Structural and functional neuroimaging studies have demonstrated reductions in gray matter volume, ventricular enlargement, and abnormal connectivity in frontal, temporal, and limbic regions, reinforcing the neurobiological basis of psychosis.[22]

3. Psychiatric Disorders

Psychosis commonly occurs as a core feature or complication of several psychiatric illnesses.

Schizophrenia spectrum disorders, including schizophrenia, schizoaffective disorder, and schizophreniform disorder, are the most frequent causes of chronic psychosis. Mood disorders, such as bipolar disorder and major depressive disorder with psychotic features, can also present with hallucinations and delusions, often congruent with mood state.[23] Sometimes, especially in situations of high stress, temporary psychotic symptoms can be an i ndication of severe anxiety disorders, personality problems, or post-traumatic stress disorder (PTSD).

These talks draw attention to the connection between psychotic episodes and affective dysregulati on.[24]

4. Causes in Medicine and Neurology

Secondary psychosis can be caused by a variety of neurological and medical problems. Well- known causes include illnesses of the central nervous system, including multiple sclerosis, traumat ic brain injury, stroke, brain tumors, epilepsy (particularly temporal lobe epilepsy), and neurodege nerative diseases.[25] Psychotic symptoms can be brought on by endocrine and metabolic disorders such as hyperthyroidism, hypothyroidism, Cushing's syndrome, adrenal insufficiency, vitamin B12 deficiency, and hepatic or renal failure. HIV, neurosyphilis, systemic lupus erythematosus, and autoimmune encephalitis (including anti-NMDA receptor encephalitis) are among the infectious and autoimmune diseases that are becoming more widely acknowledged as significant and perhaps curable causes of psychosis.[26,27]

5. Psychosis Induced by Substances

One of the main and possibly avoidable causes of psychosis is substance abuse. Psychotic symptoms can be brought on by the acute or long-term use of psychoactive substances such cocaine, amphetamines, cannabis, hallucinogens, and synthetic cannabinoids. Particularly in those who are genetically predisposed, cannabis use—especially high-potency and early-onset use—has been closely linked to a higher chance of developing chronic psychotic illnesses.[28,29] Psychosis can also be brought on by prescription drugs, such as corticosteroids, dopaminergic medicines, anticholinergics, and some anticonvulsants, especially when used in excess or by those who are already at risk.[30]

6. Environmental and Psychosocial Aspects

Psychosis is frequently brought on by psychosocial pressures, especially in those who are biologically vulnerable. Psychotic disorders are more likely to occur in those who have experienced childhood trauma, physical or sexual abuse, neglect, migration, urban living, social isolation, and socioeconomic deprivation. The hypothalamic–pituitary–adrenal (HPA) axis may be dysregulated by prolonged stress, resulting in neurobiological alterations that heighten vulnerability to psychosis.[31,32]

According to the stress-vulnerability model, which incorporates these findings, psychosis develops when external stressors surpass a person's ability to handle them given their genetic and neurological makeup.[33]

Sign and Symptoms

A wide range of clinical symptoms that indicate a significant disturbance in perception, thought, emotion, and behavior are indicative of psychosis. Depending on the underlying cause, these symptoms can be episodic or chronic, and they can vary in intensity and duration. Positive, negative, cognitive, emotional, and behavioral and functional deficits are the main categories into which the clinical signs and symptoms of psychosis are divided.[34,35]

1. Positive Signs

The most distinguishing characteristics of psychosis are positive symptoms, which indicate an excess or distortion of normal psychological activities.

Perceptual events that take place without an outside trigger are known as hallucinations. The most prevalent kind of hallucinations in psychosis are auditory ones, often hearing voices talking or making comments. Hallucinations that are visual, tactile, olfactory, or gustatory can also happen, particularly in organic or substance-induced psychoses.[36]

Fixed, false ideas that are steadfastly maintained in the face of blatantly contradicting information and that deviate from social or cultural norms are known as delusions. Grandiosity, somatic delusions, nihilistic delusions, delusions of reference, and persecutory delusions are common varieties. Impaired reality testing and changed meaning attribution are common indicators of delusional thinking.[37]

Loose associations, tangentiality, circumstantiality, flight of ideas, neologisms, and incoherence are signs of disorganized speech and thought. These disruptions are a major factor in poor communication and are indicative of underlying thinking disorders.[38]

2. Adverse Signs

Poor functional results are significantly linked to negative symptoms, which are defined as a decline or loss of normal emotional and motivational functions.

Reduced vocal modulation, limited facial reactivity, and diminished emotional expressiveness are the hallmarks of affective flattening, also known as muted affect. The term "avolition" describes a significant decline in motivation and goal-directed conduct, which can result in poor personal cleanliness, social disengagement, and decreased functioning at work.

Reduced verbal output and mental impoverishment are signs of alogia, whereas anhedonia is the lowered capacity for enjoyment. Even when positive symptoms are managed, these symptoms frequently continue.[39,40]

3. Modifications in Behavior and Function

Significant behavioral abnormalities and functional deterioration are frequently seen in psychosis.

Social disengagement, poor self-care, strange or inappropriate conduct, anger, suspicion, or violence are some of the symptoms that affected people may display. Treatment non-adherence is often caused by

anosognosia, or a lack of understanding of one's ailment. A decline in interpersonal, professional, and academic performance may occur before overt psychotic symptoms and is frequently an early indicator of developing psychosis.[41,42]

4. Prodromal symptoms, or early warning indicators

Weeks to years before the first psychotic episode, the prodromal phase of psychosis is marked by mild and vague symptoms. Sleep issues, diminished focus, social isolation, anxiety, depressed symptoms, strange beliefs, suspicion, and perceptual abnormalities are some of these early warning indicators. Since prompt management has been demonstrated to enhance outcomes and lessen the severity of sickness, early detection of these symptoms is essential.[43,44]

Complications

Numerous issues that impact social functioning, mental and physical health, and general quality of life are linked to psychosis. These issues could be brought about by the disease itself, coexisting disorders, postponed treatment, or unfavorable therapy outcomes. Beyond the severity of symptoms, psychosis has a substantial socioeconomic impact and increases disability and premature mortality.[45,46]

1. Social and Functional Issues

Functional impairment is one of psychosis's most serious side effects. People frequently struggle to retain connections with others, their jobs, and their academic standing. Isolation and a lack of social support are exacerbated by social disengagement, poor social cognition, and communication difficulties. Social isolation is made worse by stigma and discrimination, which further restrict access to healthcare, housing, and education.[47,48]

2. Cognitive Impairment and Unfavorable Workplace Results

Psychosis-related cognitive impairment can deteriorate with time, especially in chronic or untreated instances. Independent life and professional functioning are negatively impacted by attention, memory, and executive functioning deficiencies. Even when positive symptoms are sufficiently managed, these deficits are a significant predictor of long-term disability and decreased quality of life.[49]

3. Chronicity and Relapse

Psychosis frequently has a chronic or relapsing-remitting course. Relapse risk is greatly increased by substance abuse, poor medication adherence, and psychosocial stressors. Long-term management is made more difficult by recurrent psychotic episodes, which are linked to treatment resistance, elevated hospitalization rates, and gradual functional impairment.[50,51]

4. Co-occurring Mental Health Conditions

Comorbid mental illnesses, such as depression, anxiety disorders, post-traumatic stress disorder, and substance use disorders, are common in people with psychosis. These comorbidities make treatment more difficult, worsen the prognosis, and intensify symptoms. Particularly, substance abuse is linked to poor treatment adherence, a higher chance of relapse, and an increased risk of homelessness and violence.[52,53]

5. Issues with Physical Health

Poor physical health outcomes and higher prevalence of medical comorbidities are closely linked to psychosis. Psychotic disorders are more likely to be associated with cardiovascular disease, metabolic syndrome, obesity, type 2 diabetes mellitus, and respiratory problems. Sedentary lifestyles, poor diets, smoking, lack of access to healthcare, and the negative metabolic effects of antipsychotic drugs are also contributing factors.[54,55]

6. Self-harm and suicide

One of the most dangerous side effects of psychosis is suicide. Suicidal ideation, suicide attempts, and actual suicide are significantly more common among people with psychosis, especially in the early phases of the illness and after being released from the hospital. Depression, knowledge of illness, substance abuse, and prior suicide attempts are risk factors.[56]

Diagnosis

A rigorous evaluation is necessary to confirm the existence of psychotic symptoms, ascertain their intensity and duration, pinpoint underlying reasons, and rule out medical or drug- induced illnesses. Psychosis is generally diagnosed clinically. Since delayed therapy is linked to worse clinical, cognitive, and functional results, early and precise diagnosis is crucial.[57,58]

1. Medical Evaluation

The foundation of diagnosis is a thorough psychiatric history. This entails a thorough assessment of any presenting symptoms, including delusions, hallucinations, disordered thought patterns, aberrant conduct, and diminished insight. It is important to carefully evaluate the onset, duration, progression, and contextual variables of symptoms as well as how they affect functioning.[59]

To assess appearance, behavior, speech, mood, affect, thought form, thought content, perception, cognition, and insight, a mental state examination (MSE) is necessary. The diagnosis of psychosis is supported by the observation of delusional ideation, formal thought disorder, and perceptual abnormalities.[60] Family members' or caregivers' collateral history is extremely helpful, particularly in cases when insight is compromised or symptom reporting is untrustworthy.

2. Classification and Diagnostic Standards

Standardized classification methods like the International Classification of Diseases, 11th Revision (ICD-11) and the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) are used to diagnose psychosis. Schizophrenia, schizoaffective disorder, short psychotic illness, delusional disorder, and mood disorders with psychotic symptoms are among the psychotic disorders for which these systems offer operational criteria.[61,62]

Delusions, hallucinations, disorganized thought, or egregiously chaotic conduct are the minimum number of basic psychotic symptoms that must be present for the diagnosis to be made. Other etiologies, such as substance abuse or sickness, must also be ruled out.

3. Distinguishing Diagnoses

A crucial part of evaluating psychosis is differential diagnosis. It's important to differentiate psychotic symptoms from illnesses including delirium, dementia, severe mood disorders, personality disorders, autism spectrum disorders, and culturally accepted views. Rather than basic psychosis, delirium is suggested by acute confusional episodes and variable awareness.[63]

It is important to take into account secondary psychoses that have neurological, endocrine, metabolic, viral, or immunological origins, especially when they present atypically, start late, or worsen quickly.[64]

4. Laboratory tests and physical examinations

To find symptoms of neurological or systemic disease, a comprehensive physical and neurological evaluation is necessary. Complete blood counts, electrolytes, liver and kidney function tests, thyroid function tests, vitamin B12 and folate levels, fasting glucose, lipid profiles, and inflammatory markers are all examples of routine laboratory testing.[65] It is advised to undergo toxicology test in order to identify substance-induced psychosis. Based on clinical suspicion, other tests such metabolic testing, autoimmune panels, and infectious disease screening might be recommended.[66]

Treatment

The goals of the multimodal therapy of psychosis are to lessen acute symptoms, avoid relapse, regain functional ability, and enhance quality of life. An customized, stage-specific, multidisciplinary strategy that incorporates supportive care, psychosocial therapies, and pharmaceutical treatment is necessary for optimal management. Since timely therapy has been demonstrated to improve long-term clinical and functional results, early intervention is essential.[67,68]

1. Immediate Care

Urgent management is frequently required for acute psychosis, especially when symptoms are severe or linked to agitation, violence, or danger of damage. The goals of initial management are to quickly reduce psychotic symptoms, build a therapeutic alliance, and ensure patient and public safety.

The cornerstone of acute treatment is antipsychotic medication. Antipsychotics of the first (typical) and second (atypical) generations are both successful in managing positive symptoms such delusions and hallucinations. Despite having a higher risk of metabolic problems, second- generation medicines are typically chosen because they are less likely to cause extrapyramidal side effects.[69,70]

For extreme agitation, anxiety, or insomnia, benzodiazepines may be used for a brief period of time.

Severe psychosis, suicidality, or incapacity to take care of oneself may necessitate hospitalization.[71]

2. DRUG THERAPY

2.1 Drugs That Are Antipsychotic

The main way that antipsychotics work is by partially agonizing or antagonizing dopamine D_2 receptors. Risperidone, olanzapine, quetiapine, aripiprazole, and clozapine are examples of second-generation antipsychotics that are often used. Comorbid diseases, patient preference, side-effect burden, and symptom profile all influence medication choice.[72]

The preferred medication for treatment-resistant psychosis is clozapine, which has shown exceptional effectiveness in lowering suicidal thoughts and actions as well as enduring symptoms. However, because of the possibility of agranulocytosis, its usage necessitates routine hematological monitoring.[73]

Antipsychotics that are long-acting injectable (LAI) have been shown to improve drug adherence and lower relapse rates, especially in patients who have a history of non-adherence.[74]

2.2 Handling Adverse Reactions

An essential part of treatment is tracking and controlling side effects. Regular evaluation is necessary for cardiovascular problems, metabolic syndrome, hyperprolactinemia, tardive dyskinesia, and extrapyramidal symptoms. To reduce these risks, pharmaceutical methods and lifestyle changes can be necessary.[75]

3. INTERVENTIONS IN PSYCHOSOCIAL DOMAINS

It is advised to use psychosocial therapies in addition to medication since they are essential to the overall care of psychosis.

It has been demonstrated that cognitive behavioral therapy for psychosis (CBTp) improves insight, strengthens coping mechanisms, and lessens the intensity of symptoms. Family interventions enhance communication and problem-solving abilities, which

lowers relapse rates and caregiver stress. Psychoeducation, supported employment, and social skills training all aid in social reintegration and functional recovery.[76,77]

4. SERVICES FOR EARLY INTERVENTION

Low-dose antipsychotic therapy, psychological support, and vocational rehabilitation are the main focuses of early intervention in first-episode psychosis. Relapse rates, hospital stays, and long-term disability have all been shown to decrease with specialized early psychosis treatments, underscoring the significance of early detection and all-encompassing care.[78,79]

5. HANDLING COMORBID AND SECONDARY CONDITIONS

It is crucial to identify and treat any underlying medical, neurological, or drug-related problems. Stopping the offending agent and receiving the proper addiction therapy are necessary for substance-induced psychosis. To improve overall prognosis, comorbid depression, anxiety, and drug use disorders should be effectively addressed.[80,81]

6. RELAPSE PREVENTION AND MAINTENANCE THERAPY

For most people, maintenance antipsychotic treatment is advised after remission in order to avoid relapse. The number of episodes, diagnosis, and personal risk factors all affect how long a treatment takes. Important elements of relapse prevention include psychosocial therapies, adherence support, and routine follow-up.[82]

Patient Counselling

A key element of the all-encompassing treatment of psychosis is patient counseling. Good counseling lowers relapse rates, increases insight, improves treatment adherence, and fosters functional recovery. Counseling should be customized, culturally aware, and provided in a therapeutic alliance involving patients, families, and multidisciplinary healthcare teams because psychotic diseases are chronic and recurrent.[83,84]

1. Forming a Therapeutic Partnership

Effective counseling in psychosis is based on developing a solid therapeutic alliance. Given that patients may lack awareness and mistrust as a result of paranoid ideation, clinicians should take a nonjudgmental, sympathetic, and cooperative approach. Trust and participation in treatment are promoted by open communication, acknowledging emotional experiences, and respecting patient autonomy.[85]

2. Education in psychology

One important counseling tactic is psychoeducation, which aims to increase patients' and caregivers' comprehension of psychosis. This contains details regarding the illness's characteristics, typical symptoms, causes, available treatments, and prognosis. It has been demonstrated that teaching patients about the significance of treatment adherence and early warning indicators of relapse lowers hospitalization rates and enhances long-term results.[86,87]

3. Adherence support and medication counseling

The main goals of medication counseling are to explain the function of antipsychotic medications, their anticipated advantages, possible drawbacks, and the significance of consistent administration. Improving adherence requires addressing issues with side effects, stigma, and long-term prescription use. For individuals with recurrent non-adherence, long-acting injectable antuipsychotics and shared decision-making may be explored.[88,89]

4. Symptom Management and Coping Mechanisms

Through counseling, individuals might learn coping mechanisms to control their psychotic symptoms. Strategies include stress management, sleep hygiene, diversion and grounding strategies for hallucinations, and reality testing for delusions. Patients can reframe maladaptive thinking and lessen the suffering that comes with psychotic symptoms by using cognitive- behavioral techniques.[90]

5. Counseling for Families and Caregivers

Involving the family is crucial while managing psychosis. Family counseling reduces the strain on caregivers, fosters better communication, and strengthens problem-solving abilities. Patient outcomes are improved and expressed emotion, a known risk factor for relapse, is decreased when relatives are educated on illness course, relapse prevention, and crisis management.[91,92]

6. Counseling for Social and Functional Rehabilitation

Reintegration into society and the restoration of functioning roles are other areas of concentration for counseling.

Social skills training, vocational training, assisted employment, and educational possibilities are all included in this. Recovery-oriented care must address interpersonal challenges, self-esteem, and stigma.[93]

7. Relapse Prevention and Crisis Intervention

Counseling should be given to patients on how to spot early indicators of relapse, such as disturbed sleep, social disengagement, or growing suspicion. Patients and caregivers can avoid symptom worsening and seek timely assistance by creating customized crisis response plans and relapse prevention plans.[94]

8. Counseling for Physical and Lifestyle Health

Individuals who suffer from psychosis are more likely to experience cardiovascular and metabolic issues. It is crucial to receive counseling on maintaining a good diet, getting regular exercise, quitting smoking, and abstaining from drugs. Premature mortality is decreased and general well-being is enhanced when physical health promotion

is incorporated into mental health counseling.[95,96]

CONCLUSION

A severe, multifaceted, and complicated mental illness, psychosis is marked by substantial disruptions in perception, thought, emotion, and behavior that significantly impede functioning and lower quality of life. A variety of psychiatric, neurological, medical, substance-related, and environmental factors might contribute to this clinical condition, which is not a singular disorder. The condition's variability has been emphasize by advances in neuroscience research, which have brought attention to the role of environmental stressors, neurodevelopmental disorders, neurotransmitter dysregulation, and genetic predisposition in its pathophysiology.

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