Psychosis: Understanding the Mind’s Break from Reality

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Psychosis (from the Greek ψυχ? "psyche", for mind/soul, and -ωσις "-osis", for abnormal condition) means abnormal condition of the mind, and is a generic psychiatric term for a mental state often described as involving a "loss of contact with reality". People suffering from psychosis are described as psychotic. Psychosis is given to the more severe forms of psychiatric disorder, during which hallucinations and delusions and impaired insight may occur. Some professionals say that the term psychosis is not sufficient as some illnesses grouped under the term "psychosis" have nothing in common (Gelder, Mayou & Geddes 2005).

People experiencing psychosis may report hallucinations or delusional beliefs, and may exhibit personality changes and thought disorder. Depending on its severity, this may be accompanied by unusual or bizarre behavior, as well as difficulty with social interaction and impairment in carrying out the daily life activities.

A wide variety of central nervous system diseases, from both external poisons and internal physiologic illness, can produce symptoms of psychosis.

Signs and symptoms

People with psychosis may have one or more of the following: hallucinations, delusions, or a thought disorder, as described below.

Hallucinations

A hallucination is defined as sensory perception in the absence of external stimuli. Hallucinations are different from illusions, or perceptual distortions, which are the misperception of external stimuli. Hallucinations may occur in any of the five senses and take on almost any form, which may include simple sensations (such as lights, colors, tastes, and smells) to more meaningful experiences such as seeing and interacting with fully formed animals and people, hearing voices, and having complex tactile sensations.

Auditory hallucinations, particularly experiences of hearing voices, are a common and often prominent feature of psychosis. Hallucinated voices may talk about, or to, the person, and may involve several speakers with distinct personas. Auditory hallucinations tend to be particularly distressing when they are derogatory, commanding or preoccupying. However, the experience of hearing voices need not always be a negative one. One research study has shown that the majority of people who hear voices are not in need of psychiatric help. The Hearing Voices Movement has subsequently been created to support voice hearers, regardless of whether they are considered to have a mental illness or not.

Delusions

Psychosis may involve delusional beliefs, some of which are paranoid in nature. Karl Jaspers has classified psychotic delusions into primary and secondary types. Primary delusions are defined as arising suddenly and not being comprehensible in terms of normal mental processes, whereas secondary delusions may be understood as being influenced by the person's background or current situation (e.g., ethnic or sexual orientation, religious beliefs, superstitious belief).

Thought disorder

Thought disorder describes an underlying disturbance to conscious thought and is classified largely by its effects on speech and writing. Affected persons show loosening of associations, that is, a disconnection and disorganization of the semantic content of speech and writing. In the severe form speech becomes incomprehensible and it is known as "word-salad".

Causes

Causes of symptoms of mental illness were customarily classified as "organic" or "functional". Organic disorders were those held to be caused by physical illness affecting the brain (that is, psychiatric disorders secondary to other conditions), while functional disorders were considered to be disorders of the functioning of the mind in the absence of physical disorders (that is, primary psychological or psychiatric disorders). The materialistic view of the mind-body problem holds that mental disorders arise from physical processes; in this view, the distinction between brain and mind, and therefore between organic and functional disease, is an artificial one. Subtle physical abnormalities have been found in illnesses traditionally considered functional, such as schizophrenia. The DSM-IV-TR avoids the functional/organic distinction, and instead lists traditional psychotic illnesses, psychosis due to general medical conditions, and substance-induced psychosis.

Psychiatric disorders

Primary psychiatric causes of psychosis include the following:

schizophrenia and schizophreniform disorder
affective (mood) disorders, including severe depression, and severe depression or mania in bipolar disorder (manic depression). People experiencing a psychotic episode in the context of depression may experience persecutory or self-blaming delusions or hallucinations, while people experiencing a psychotic episode in the context of mania may form grandiose delusions.
schizoaffective disorder, involving symptoms of both schizophrenia and mood disorders
brief psychotic disorder, or acute/transient psychotic disorder
delusional disorder (persistent delusional disorder)

chronic hallucinatory psychosis

Psychotic symptoms may also be seen in

schizotypal disorder
certain personality disorders at times of stress (including paranoid personality disorder, schizoid personality disorder, and borderline personality disorder)
induced delusional disorder
and occasionally in obsessive-compulsive disorder

Stress is known to contribute to and trigger psychotic states. A history of psychologically traumatic events, and the recent experience of a stressful event, can both contribute to the development of psychosis. Short-lived psychosis triggered by stress is known as brief reactive psychosis, and patients may spontaneously recover normal functioning within two weeks. In some rare cases, individuals may remain in a state of full-blown psychosis for many years, or perhaps have attenuated psychotic symptoms (such as low intensity hallucinations) present at most times.

Normal states

Brief hallucinations are not uncommon in those without any psychiatric disease. Causes or triggers include

falling asleep and waking: hypnagogic and hypnopompic hallucinations, which are entirely normal
bereavement, in which hallucinations of a deceased loved one are common
severe sleep deprivation
sensory deprivation and sensory impairment

Medical conditions

A very large number of medical conditions can cause psychosis, sometimes called secondary psychosis. Examples include:

disorders causing delirium (toxic psychosis), in which consciousness is disturbed
neurodevelopmental disorders and chromosomal abnormalities, including velocardiofacial syndrome
neurodegenerative disorders, such as Alzheimer's disease, dementia with Lewy bodies, and Parkinson's disease
focal neurological disease, such as stroke, brain tumors, multiple sclerosis, and some forms of epilepsy
malignancy (typically via masses in the brain, paraneoplastic syndromes, or drugs used to treat cancer)

infectious and postinfectious syndromes, including infections causing delirium, viral encephalitis, HIV, malaria, Lyme disease, syphilis
endocrine disease, such as hypothyroidism, hyperthyroidism, adrenal failure, Cushing's syndrome, hypoparathyroidism and hyperparathyroidism; sex hormones also affect psychotic symptoms and sometimes childbirth can provoke psychosis, termed puerperal psychosis
inborn errors of metabolism, such as porphyria and metachromatic leukodystrophy
nutritional deficiency, such as vitamin B12 deficiency
other acquired metabolic disorders, including electrolyte disturbances such as hypocalcemia, hypernatremia, hyponatremia, hypokalemia, hypomagnesemia, hypermagnesemia, hypercalcemia, and hypophosphatemia, but also hypoglycemia, hypoxia, and failure of the liver or kidneys
autoimmune and related disorders, such as systemic lupus erythematosus (lupus, SLE), sarcoidosis, Hashimoto's encephalopathy, and anti-NMDA-receptor encephalitis
poisoning, by therapeutic drugs (see below), recreational drugs (see below), and a range of plants, fungi, metals, organic compounds, and a few animal toxins
some sleep disorders, including hallucinations in narcolepsy (in which REM sleep intrudes into wakefulness)

Psychosis can even be caused by familiar ailments such as flu or mumps.

Recreational drugs

Various psychoactive substances (both legal and illegal) have been implicated in causing, exacerbating, and/or precipitating psychotic states and/or disorders in users. This may be upon intoxication, for a more prolonged period after use, or upon withdrawal. Drugs that can induce psychotic symptoms include amphetamine, caffeine (which can worsen psychotic symptoms in schizophrenia and produce olfactory hallucinations at very high doses in normal volunteers), cannabis, cocaine, desoxypipradrol, dimethyltryptamine, alcohol (ethanol), inhalants, gammahydroxybutyric acid (and its precursors gammabutyrolactone and 1,4-butanediol), ketamine, LSD, mephedrone and methcathinone, mescaline and other phenethylamine hallucinogens, methamphetamine, MDMA (very rarely), opiates such as heroin, phencyclidine, piperazine-based drugs, psilocybin, and anabolic steroids at high doses.

Frequent users of cannabis have twice the likelihood of developing both psychosis and schizophrenia. Older studies indicate that certain strains containing large proportions of tetrahydrocannabinol and low proportions of cannabidiol merely lowers the threshold for psychosis, and thus helps to trigger full-blown psychosis in some people. On the other hand, cannabis use has increased dramatically over the past few decades but declined in the last decade, whereas the rate of psychosis has not increased. This suggests that a direct causal link is unlikely for all users.

Medication

Administration, or sometimes withdrawal, of a large number of medications may provoke psychotic symptoms. Drugs that can induce psychosis experimentally and/or in a significant proportion of patients include amphetamine and other sympathomimetics, dopamine agonists, ketamine, corticosteroids (often with mood changes in addition), and some anticonvulsants such as vigabatrin.

Pathophysiology

The first brain image of an individual with psychosis was completed as far back as 1935 using a technique called pneumoencephalography (a painful and now obsolete procedure where cerebrospinal fluid is drained from around the brain and replaced with air to allow the structure of the brain to show up more clearly on an X-ray picture).

The purpose of the brain is to collect information from the body (pain, hunger, etc.), and from the outside world, interpret it to a coherent world view, and produce a meaningful response. The information from the senses enter the brain in the primary sensory areas. They process the information and send it to the secondary areas where the information is interpreted. Spontaneous activity in the primary sensory areas may produce hallucinations which are misinterpreted by the secondary areas as information from the real world.

For example, a PET or fMRI scan of a person who claims to be hearing voices may show activation in the primary auditory cortex, or parts of the brain involved in the perception and understanding of speech.

Tertiary brain cortex collects the interpretations from the secondary cortexes and creates a coherent world view of it. A study investigating structural changes in the brains of people with psychosis showed there was significant grey matter reduction in the right medial temporal, lateral temporal, and inferior frontal gyrus, and in the cingulate cortex bilaterally of people before and after they became psychotic. Findings such as these have led to debate about whether psychosis itself causes excitotoxic brain damage and whether potentially damaging changes to the brain are related to the length of psychotic episode. Recent research has suggested that this is not the case although further investigation is still ongoing.

Studies with sensory deprivation have shown that the brain is dependent on signals from the outer world to function properly. If the spontaneous activity in the brain is not counterbalanced with information from the senses, loss from reality and psychosis may occur after some hours. A similar phenomenon is paranoia in the elderly when poor eyesight, hearing and memory causes the person to be abnormally suspicious of the environment.

On the other hand, loss from reality may also occur if the spontaneous cortical activity is increased so that it is no longer counterbalanced with information from the senses. The 5-HT2A receptor seems to be important for this, since drugs which activate them produce hallucinations.

However, the main feature of psychosis is not hallucinations, but the inability to distinguish between internal and external stimuli. Close relatives to psychotic patients may hear voices, but since they are aware that they are unreal they can ignore them, so that the hallucinations do not affect their reality perception. Hence they are not considered to be psychotic.

Psychosis has been traditionally linked to the neurotransmitter dopamine. In particular, the dopamine hypothesis of psychosis has been influential and states that psychosis results from an overactivity of dopamine function in the brain, particularly in the mesolimbic pathway. The two major sources of evidence given to support this theory are that dopamine receptor D2 blocking drugs (i.e., antipsychotics) tend to reduce the intensity of psychotic symptoms, and that drugs which boost dopamine activity (such as amphetamines and cocaine) can trigger psychosis in some people (see amphetamine psychosis). However, increasing evidence in recent times has pointed to a possible dysfunction of the excitory neurotransmitter glutamate, in particular, with the activity of the NMDA receptor. This theory is reinforced by the fact that dissociative NMDA receptor antagonists such as ketamine, PCP and dextromethorphan/dextrorphan (at large overdoses) induce a psychotic state more readily than dopinergic stimulants, even at "normal" recreational doses. The symptoms of dissociative intoxication are also considered to mirror the symptoms of schizophrenia, including negative psychotic symptoms, more closely than amphetamine psychosis. Dissociative induced psychosis happens on a more reliable and predictable basis than amphetamine psychosis, which usually only occurs in cases of overdose, prolonged use or with sleep deprivation, which can independently produce psychosis. New antipsychotic drugs which act on glutamate and its receptors are currently undergoing clinical trials.

The connection between dopamine and psychosis is generally believed to be complex. While dopamine receptor D2 suppresses adenylate cyclase activity, the D1 receptor increases it. If D2-blocking drugs are administered the blocked dopamine spills over to the D1 receptors. The increased adenylate cyclase activity affects genetic expression in the nerve cell, a process which takes time. Hence antipsychotic drugs take a week or two to reduce the symptoms of psychosis. Moreover, newer and equally effective antipsychotic drugs actually block slightly less dopamine in the brain than older drugs whilst also blocking 5-HT2A receptors, suggesting the 'dopamine hypothesis' may be oversimplified. Soyka and colleagues found no evidence of dopaminergic dysfunction in people with alcohol-induced psychosis and Zoldan et al. reported moderately successful use of ondansetron, a 5-HT3 receptor antagonist, in the treatment of levodopa psychosis in Parkinson's disease patients.

Psychiatrist David Healy has criticised pharmaceutical companies for promoting simplified

biological theories of mental illness that seem to imply the primacy of pharmaceutical treatments while ignoring social and developmental factors which are known to be important influences in the aetiology of psychosis.

Some theories regard many psychotic symptoms to be a problem with the perception of ownership of internally generated thoughts and experiences. For example, the experience of hearing voices may arise from internally generated speech that is mislabeled by the psychotic person as coming from an external source.

It has been suggested that persons with bipolar disorder may have increased activity of the left hemisphere compared to the right hemisphere of the brain, while persons with schizophrenia have increased activity in the right hemisphere.

Increased level of right hemisphere activation has also been found in people who have high levels of paranormal beliefs and in people who report mystical experiences. It also seems to be the case that people who are more creative are also more likely to show a similar pattern of brain activation. Some researchers have been quick to point out that this in no way suggests that paranormal, mystical or creative experiences are in any way by themselves a symptom of mental illness, as it is still not clear what makes some such experiences beneficial and others distressing.

Diagnosis

Diagnosing the presence and/or extent of psychosis may be distinguished from diagnosing the cause of psychosis.

The presence of psychosis is typically diagnosed by clinical interview, incorporating mental state examination. Its extent may be established by formal rating scales. The Brief Psychiatric Rating Scale (BPRS) assesses the level of 18 symptom constructs of psychosis such as hostility, suspicion, hallucination, and grandiosity. It is based on the clinician's interview with the patient and observations of the patient's behavior over the previous 2-3 days. The patient's family can also provide the behavior report. During the initial assessment and the follow-up, both positive and negative symptoms of psychosis can be assessed using the 30 item Positive and Negative Symptom Scale (PANSS).

Establishing the cause of psychosis requires clinical examination, and sometimes special investigations, to diagnose or exclude secondary causes of psychosis; if these are excluded, a primary psychiatric diagnosis can be established.

Treatment

The treatment of psychosis depends on the cause or diagnosis or diagnoses (such as

schizophrenia, bipolar disorder and/ or substance intoxication). The first line treatment for many psychotic disorders is antipsychotic medication (oral or intramuscular injection), and sometimes hospitalization is needed. There is growing evidence that cognitive behavior therapy and family therapy can be effective in managing psychotic symptoms. When other treatments for psychosis are ineffective, electroconvulsive therapy or ECT (also known as shock treatment) is sometimes applied to relieve the underlying symptoms of psychosis due to depression. There is also increasing research suggesting that animal-assisted therapy can contribute to the improvement in general well-being of people with schizophrenia.

Early intervention

Early intervention in psychosis is a relatively new concept based on the observation that identifying and treating someone in the early stages of a psychosis can significantly improve their longer term outcome. This approach advocates the use of an intensive multi-disciplinary approach during what is known as the critical period, where intervention is the most effective, and prevents the long term morbidity associated with chronic psychotic illness.

Newer research into the effectiveness of cognitive behavioural therapy during the early pre-cursory stages of psychosis (also known as the "prodrome" or "at risk mental state") suggests that such input can prevent or delay the onset of psychosis.

History

The word psychosis was first used by Ernst von Feuchtersleben in 1845 as an alternative to insanity and mania and stems from the Greek ψ?χωσις (psychosis), "a giving soul or life to, animating, quickening" and that from ψυχ? (psyche), "soul" and the suffix -ωσις (-osis), in this case "abnormal condition". The word was used to distinguish disorders which were thought to be disorders of the mind, as opposed to "neurosis", which was thought to stem from a disorder of the nervous system. The psychoses thus became the modern equivalent of the old notion of madness, and hence there was much debate on whether there was only one (unitary) or many forms of the new disease.

The division of the major psychoses into manic depressive illness (now called bipolar disorder) and dementia praecox (now called schizophrenia) was made by Emil Kraepelin, who attempted to create a synthesis of the various mental disorders identified by 19th century psychiatrists, by grouping diseases together based on classification of common symptoms. Kraepelin used the term 'manic depressive insanity' to describe the whole spectrum of mood disorders, in a far wider sense than it is usually used today. In Kraepelin's classification this would include 'unipolar' clinical depression, as well as bipolar disorder and other mood disorders such as cyclothymia. These are characterised by problems with mood control and the psychotic episodes appear associated with

disturbances in mood, and patients will often have periods of normal functioning between psychotic episodes even without medication. Schizophrenia is characterized by psychotic episodes which appear to be unrelated to disturbances in mood, and most non-medicated patients will show signs of disturbance between psychotic episodes.

During the 1960s and 1970s, psychosis was of particular interest to counterculture critics of mainstream psychiatric practice, who argued that it may simply be another way of constructing reality and is not necessarily a sign of illness. For example, R. D. Laing argued that psychosis is a symbolic way of expressing concerns in situations where such views may be unwelcome or uncomfortable to the recipients. He went on to say that psychosis could be also seen as a transcendental experience with healing and spiritual aspects. Arthur J. Deikman suggested use of the term "mystical psychosis" to characterize first-person accounts of psychotic experiences that are similar to reports of mystical experiences. Thomas Szasz focused on the social implications of labeling people as psychotic, a label he argues unjustly medicalises different views of reality so such unorthodox people can be controlled by society. Psychoanalysis has a detailed account of psychosis which differs markedly from that of psychiatry. Freud and Lacan outlined their perspective on the structure of psychosis in a number of works.

Since the 1970s, the introduction of a recovery approach to mental health, which has been driven mainly by people who have experienced psychosis (or whatever name is used to describe their experiences), has led to a greater awareness that mental illness is not a lifelong disability, and that there is an expectation that recovery is possible, and probable with effective support.