



MINDFULNESS AND COGNITIVE BEHAVIORAL THERAPIES IN SCHIZOPHRENIA

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Abstract:

Schizophrenia is a psychiatric disorder affecting 1% of the population, characterized by a split mind disorder affecting emotions, thoughts, reasoning, and behaviour. It is a genetically influenced neurodevelopmental illness, with symptoms appearing after a 1-3% latency period. The disorder is characterized by delusions, hallucinations, illogical conclusions, and withdrawal from social interactions. The term "schizophrenia" was coined in 1908 by Swedish psychiatrist Eugen Bleuler, and its symptoms were first documented in Haslam and Pinel's 1809 publication.

Mindfulness is a meta-cognitive exercise that involves focusing on the present moment while reducing emotional and cognitive reactivity. It originated from Buddhist vipassana meditation and has been applied to various health issues, particularly those with psychopathological profiles and somatic disorders.

Mindfulness-based interventions (MBIs) have been shown to be effective in treating various mental health disorders. MBIs have shown moderate to strong effect sizes on depression and anxiety, and have been found to be beneficial during pregnancy. However, the benefits of mindfulness practices as stand-alone interventions are unclear. MBIs have also been found to improve insomnia and sleep quality, with effects lasting 3 months postintervention. They have also been found to have a positive effect on eating disorders, addiction, psychosis, post-traumatic stress disorder, and autism spectrum disorders.

MBIs have also been shown to improve physical health outcomes for cancer patients, particularly in reducing cancer-related fatigue (CRF) scores. Furthermore, contemplative movement has been suggested to improve lung function and physical activity in COPD patients.

Key Words:

Schizophrenia, Mindfulness-based interventions, addiction, psychosis, post-traumatic stress disorder, and autism spectrum disorders

Introduction:

Schizophrenia is a psychiatric disorder that affects about 1% of population, which is a disorder of thinking called as split mind; in which emotions, thoughts, reasoning and behavior are seriously altered. It has a strong hereditary tendency that starts at an early age and is highly incapacitating. Delusions, hallucinations, illogical conclusions, interpretations, and withdrawal from social interactions are the primary characteristics of schizophrenia.

Schizophrenia is mostly recognized as a genetically influenced neurodevelopmental illness. The neurodevelopmental theory of schizophrenia proposes that etiologic and pathogenic factors that occur long before the formal onset of the illness (probably during gestation) disrupt the course of normal neural development, resulting in subtle alterations of specific neurons and circuits that confer vulnerability and may eventually lead to malfunction. [Bloom 1993; Lewis and Lieberman 2000; Murray and Lewis 1987; Weinberger 1987]

However, unlike other neurodevelopmental disorders such as autism, fragile X, or Down's syndrome, the repercussions of these neurodevelopmental aberrations do not immediately generate clinical manifestations in schizophrenia. Rather, symptoms often appear after a 1–3-decade latency period. Simultaneously, high-risk and longitudinal birth cohort studies have shown social, motor, and cognitive dysfunctions, as well as mild physical anomalies, in children and adolescents prior to the start of illness. [Jones 1997]

In 1908, Swedish psychiatrist Eugen Bleuler coined the word "schizophrenia." Greek terms that signify "splitting of the mind" were used to compose it. Haslam and Pinel's 1809 publication contain the first documented medical description of the symptoms of schizophrenia. [Heinrichs 2003]

Symptoms:

Symptoms are classified as positive, negative and cognitive symptoms. Positive and negative symptoms were first identified in the 19th century; however, Tim Crow introduced a classification system based on these distinctions in the 1980s. [Crow 1985] Delusions, hallucinations, and mental illnesses are considered positive symptoms. Patients with Parkinson's disease, Alzheimer's disease, or severe depression are among the other neurodegenerative disorders that may present with negative symptoms. Ineffective focus, social disengagement, bad communication, and a lack of motivation and enthusiasm are examples of negative symptoms. [Makinen, Miettunen, Isohanni and Koponen 2008]

Patients with schizophrenia frequently have cognitive dysfunctions. Memory (working memory, long-term, verbal declarative, and short-term memory), attention, and learning are all examples of cognitive deficits. According to studies, patients with schizophrenia do not exhibit the "Pollyanna" effect and remember painful, neutral, or positive words with equal frequency, whereas healthy people remember more positive ones. [Kurtz, Moberg, Gur RC, Gur RE 2001]

Delusions

Hallucinations

Mental illnesses

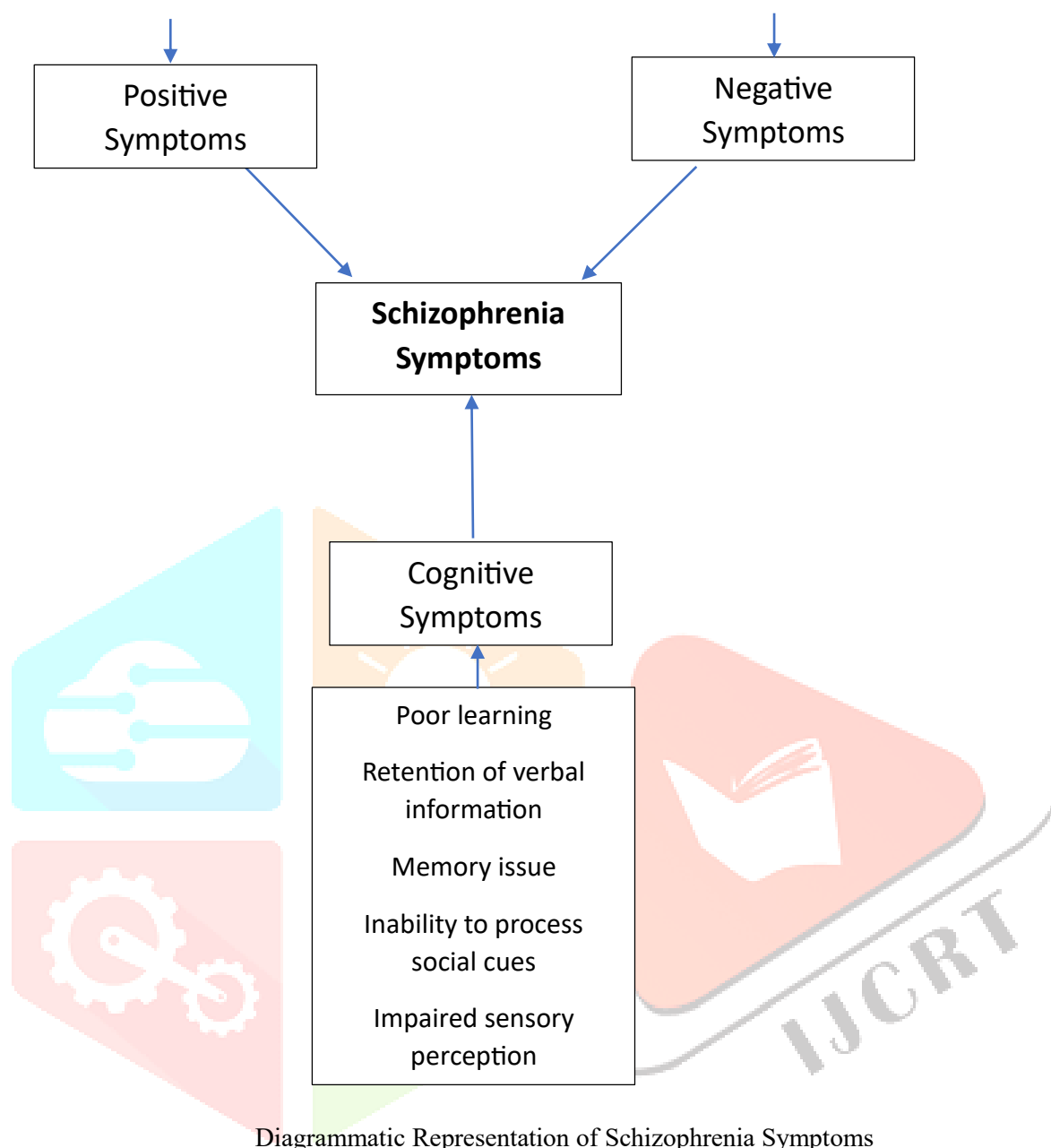
Hyperactivity

Ineffective focus

Social disengagement

Bad communication

Lack of motivation



Diagrammatic Representation of Schizophrenia Symptoms

Schizophrenia's Clinical Progression:

The beginning of formal symptoms of schizophrenia is usually preceded by a prodromal phase. Attenuated positive symptoms (i.e., illusions, ideas of reference, magical thinking, superstitiousness), mood symptoms (i.e., anxiety, dysphoria, irritability), cognitive symptoms (i.e., distractibility, concentration difficulties), social withdrawal, or obsessive behaviours, to name a few. [McGlashan TH 1996] Because many of these prodromal phenomena overlap with the range of mental experiences and behaviours of people at risk who do not acquire schizophrenia, prodromal symptoms cannot be deemed diagnostic. Their nonspecificity and low predictive validity limit their utility for early intervention. [Gottesman and Erlenmeyer-Kimling 2001; Schaffner and McGorry 2001] The formal commencement of first-episode schizophrenia is marked by the emergence of frank psychotic symptoms, however this is usually not identified for some time until the patient seeks or is brought to medical attention. Indeed, the typical duration of psychotic symptoms before diagnosis and treatment is around a year, and if the time from the onset of prodromal symptoms is considered, the average duration is about three years. [McGlashan 1996] Despite this, most people recover symptomatically from the first episode; however, the majority of patients go on to have one or more subsequent episodes in the form of psychotic relapses, from which some people do not recover to the same extent as they did during their first or previous episode. [Lieberman et al 1993,

1996; Robinson et al 1999b] This cycle of psychotic relapses, treatment failure, and incomplete recovery leaves many patients with a chronic disease with persistent abnormalities and deficits in perceptions, thought processes, and cognition. [Lieberman 1999; McGlashan 1988] As a result, individuals amass morbidity in the form of residual or persistent symptoms and functional declines from their premorbid level. The process of accumulating morbidity in the setting of exacerbations and (relative) remissions has been attributed to sickness progression and referred to as "clinical deterioration." [Kraepelin 1919; Bleuler 1980]



Table 1: Schizophrenia Clinical and Pathologic Stages [J.A. Lieberman et al 2001]

Stage of illness	Developmental stage	Clinical features	Pathophysiological process	Treatment
Premorbid	Pregnancy, early childhood, teenage years and early adolescence	modest physical irregularities, poor motor coordination, modest cognitive abnormalities, and social weaknesses	Neurodevelopmental: induction, patterning, and synaptogenetic abnormalities	None established; possibility for gene therapy
Prodromal	Early adolescence and adulthood	Nonspecific mood symptoms include anxiety, sorrow, lability, and irritability; sleep disruptions; and cognitive dysfunction in attention and focus. Mild psychotic symptoms include delusions, doubtfulness, and fascinating thinking; behavioural alterations include dependence on drugs, social disengagement, and preoccupations.	Maturational events (post pubertal hormone impacts, myelination, and synaptic regression) interact with developmental anomalies to reveal neuroplastic dysfunction vulnerability.	None established, and nevertheless, there is potential for supportive and stress-reduction therapy, as well as the use of GABA agonists, NMDA allosteric modulators, antioxidants, and atypical antipsychotics.
Onset/deteriorative	Early adolescence and adulthood	Psychosis, cognitive dysfunction, unpleasant symptoms, and social deficiencies	Dopamine and glutamate mediate endogenous neurochemical sensitization via mesolimbic-cortical striatal pathways.	Antipsychotic medications with demonstrated efficacy; possible application of neuroprotective substances
Chronic/residual	Adulthood, middle age, and elderly years	Side effects, cognitive dysfunction, social difficulties, and psychosis	Neuroprogression with minimal neurotoxicity, cell process loss, and potential induction of death in cortical limbic striatal neurons	Antipsychotics have been demonstrated to be effective, but their efficacy is limited; the possibility of using investigational medicines as adjuncts exists.

Pathophysiology of Schizophrenia:

Neurotransmission abnormalities have served as the foundation for beliefs on the aetiology of schizophrenia. The majority of these hypotheses revolve around an excess or lack of neurotransmitters such as dopamine, serotonin, and glutamate. Other ideas link aspartate, glycine, and gamma-aminobutyric acid (GABA) to schizophrenia's neurochemical imbalance. [Lavretsky H 2008] Many of the symptoms of schizophrenia are thought to be connected with abnormal activation at dopamine receptor sites (particularly D2). There are four dopaminergic pathways that have been implicated. [Schwartz JH, Javitch JA. 2013; Stahl SM. 2000] The nigrostriatal route runs from the substantia nigra to the caudate nucleus. Low dopamine levels in this route are hypothesised to have an impact on the extrapyramidal system, resulting in motor symptoms. In the presence of excess dopamine, the mesolimbic pathway, which extends from the ventral tegmental area (VTA) to limbic areas, may have a role in the positive symptoms of schizophrenia. The mesocortical circuit connects the VTA to the cortex. Low mesocortical dopamine levels are hypothesised to induce negative feelings and cognitive difficulties in schizophrenia. From the hypothalamus to the pituitary gland, the tuberoinfundibular route leads. Reduced or blocked tuberoinfundibular dopamine levels cause galactorrhoea, amenorrhea, and decreased libido. The finding that lysergic acid diethylamide (LSD) amplified the effects of serotonin in the brain led to the establishment of the serotonin hypothesis for the genesis of schizophrenia. Following study, pharmacological molecules that blocked both dopamine and serotonin receptors were developed, as opposed to prior drugs that solely targeted dopamine receptors. The newer chemicals were discovered to be useful in reducing both positive and negative symptoms of schizophrenia. [Lavretsky H 2008] Another idea for schizophrenia symptoms includes glutamate activity, the brain's main excitatory neurotransmitter. This notion arose in reaction to the discovery that phencyclidine and ketamine, two noncompetitive NMDA/glutamate antagonists, cause schizophrenia-like symptoms. [Jentsch JD, Roth RH 1999] This, in turn, suggested that NMDA receptors are inactive in the normal regulation of mesocortical dopamine neurons, and proposed a possible explanation for why people with schizophrenia experience negative, emotional, and cognitive symptoms. [Stahl, Morrissette, Citrome 2013] In schizophrenic patients, the brain tissue itself appears to undergo noticeable physical alterations. Individuals at high risk of a schizophrenia episode, for example, have a smaller medial temporal lobe, in addition to an increase in the size of the third and lateral ventricles. [Crismon, Argo, Buckley 2014]

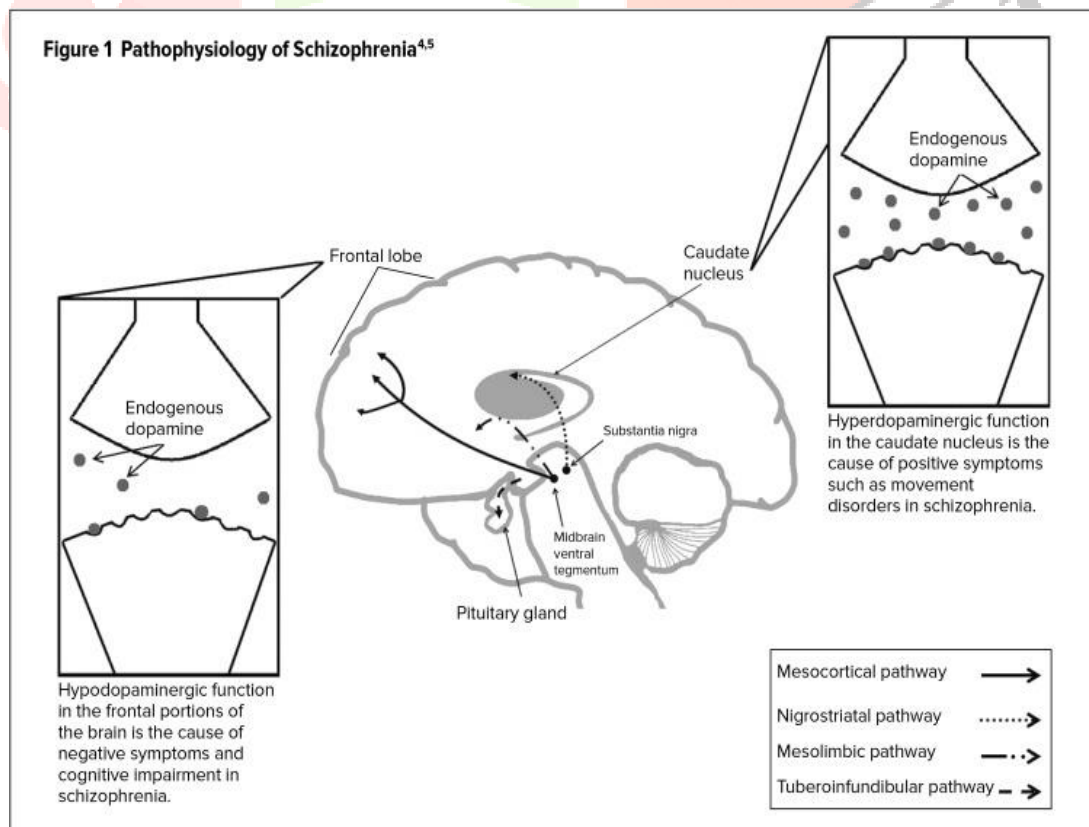


Figure 1: Pathophysiology of Schizophrenia [Schwartz JH, Javitch JA. 2013; Stahl SM. 2000]

Neurobiological mechanisms:

Neurobiological mechanisms of working memory in depression have been extensively studied with the experimental n-back task. The n-back task involves multiple difficulty levels that are parametrically adjusted for memory demand. At any level, participants view a series of items displayed on a screen one at a time and report if the item displayed was the same as the item shown nth item back (e.g., 1-back, 2-back, 3-back). The task is sensitive to the working memory process of updating a mental set of information and can easily be administered concurrently of imaging and electrophysiological measurement.

Depressed individuals demonstrate significantly lower accuracy on the n-back than their healthy counterparts. Medication-naïve and euthymic MDD participants demonstrate hyperactivation in the front limbic circuit (left dorsolateral cortex and ACC) as a function of memory load compared to healthy comparison subjects. Similarly, large and prolonged negative event-related potential activity was observed during working memory processing of the N-back task, suggesting depressed participants recruited more cognitive resources to achieve normal performance accuracy.

On the other hand, symptomatic MDD participants appear to show hypoactivation of prefrontal and cingulate networks compared to healthy controls. Future work could explore whether attenuated cortical activity reflects persistent systematic changes in neuronal networks at different points in the course of MDD or if it might reflect an illness onset or relapse marker.

Neurobiological findings related to mindfulness and CBT effects in individuals with schizophrenia:

Research shows that mindfulness and Cognitive Behavioral Therapy (CBT) may undoubtedly effect people with schizophrenia at a neurobiological stage. Mindfulness practices, inclusive of meditation, have been associated with adjustments in brain structure, especially in regions associated with attention and emotional law. CBT, alternatively, has established effectiveness in editing cognitive methods.

Neuroimaging research suggest that mindfulness interventions may additionally cause structural changes in the prefrontal cortex and hippocampus, regions important for cognitive features and emotion regulation. Additionally, mindfulness has been connected to changes inside the default mode community, doubtlessly influencing self-referential thinking frequently discovered in schizophrenia.

CBT, regarded for concentrated on distorted notion styles, has proven neurobiological outcomes on neural circuits associated with cognitive techniques. Functional MRI research propose that CBT can modulate activity inside the amygdala, reducing hyperactivity associated with emotional responses in individuals with schizophrenia.

Combining mindfulness and CBT may provide a comprehensive technique, probably fostering neurobiological variations that enhance cognitive functioning and emotional law in individuals with schizophrenia. However, in addition studies is wanted to fully apprehend the specific mechanisms and lengthy-term results of those therapeutic tactics.

Potential neural changes associated with symptom improvement:

Symptom development in diverse intellectual fitness situations, including schizophrenia, may be related to neural adjustments. Neurobiological diversifications connected to symptom amelioration can involve changes in mind structure, connectivity, and neurotransmitter structures.

1. Structural Changes:

- Studies endorse that symptom improvement is connected to structural adjustments in the mind, such as extended grey count quantity in areas related to emotional regulation and cognitive manage.

- Neuroplasticity, the brain's ability to reorganize itself, may also contribute to structural adjustments, possibly motivated via therapeutic interventions like mindfulness and CBT.

2. Neurotransmitter Modulation:

- Medications typically prescribed for schizophrenia, which includes antipsychotics, goal neurotransmitter imbalances. Symptom improvement may additionally coincide with a restoration of dopamine and other neurotransmitter degrees in specific brain areas.

- Neurotransmitter modulation is complex and varies primarily based on the precise signs and symptoms being addressed, but rebalancing these chemical compounds can make a contribution to clinical improvement.

3. Functional Connectivity:

- Advances in practical neuroimaging techniques have discovered changes in neural connectivity related to symptom improvement. For example, better connectivity among the prefrontal cortex and limbic system may additionally make a contribution to better emotional law.

- Cognitive interventions like CBT may impact practical connectivity patterns by way of enhancing neural circuits associated with precise cognitive methods, main to symptom comfort.

4. Neuroinflammation and Oxidative Stress:

- Inflammation and oxidative strain had been implicated in schizophrenia. Symptom improvement may be associated with decreased neuroinflammation and oxidative strain markers.

- Lifestyle factors, which includes food plan and exercising, can impact those techniques and potentially make contributions to neural changes related to symptom remedy.

5. Neurogenesis:

- Some studies suggests that symptom improvement is associated with increased neurogenesis, the formation of new neurons. This process may arise in specific brain areas, contributing to improved cognitive feature and emotional law.

Mindfulness based interventions:

The term mindfulness refers to at least two distinct concepts: (a) a meta-cognitive exercise that involves bringing sustained and intentional attention to experiencing the present moment while diminishing the emotional and cognitive reactivity generated by the experience, or (b) a state of consciousness characterized by the detached observation of one's thoughts and feelings. [Santed and Segovia 2018] Mindfulness derives primarily from Buddhist tradition's vipassana meditation and plays a vital role within the framework of a conceptual and applied system whose ultimate goal is the complete elimination of suffering. [Hanh and Kornfield] However, it was presented in the Western world with a secular perspective, independent of any religious or cultural heritage, as a practice aimed at improving the quality of life of persons with high stress levels connected with physical chronic conditions. [Kabat-Zinn 1982] Mindfulness has been extended for therapeutic reasons to different health issues over the years, owing to its favorable influence on persons with psychopathological profiles and somatic disorders. [Santed and Segovia 2018] This growth has occurred as a result of the introduction of many intervention protocols grouped under the umbrella term mindfulness-based interventions (MBIs). There are two seminal protocols among the MBIs: Mindfulness-Based Stress Reduction (MBSR) [Kabat-Zinn 1982] and Mindfulness-Based Cognitive Therapy (MBCT). [Segal, Mark and John 2012] There is also a diverse range of protocols derived from MBSR and MBCT procedures for various therapeutic reasons. Such protocols typically introduce MBSR and MBCT changes in areas such as programme structure and instructional content. However, the systematic training in meditation techniques for the development of mindfulness, which is at the heart of the intervention, is shared by all MBIs. [Kabat-Zinn 2003] Another distinguishing feature of MBIs is the manner in which they are administered: Typically, this is done in a group setting with one or more teachers who are not necessarily therapists or mental health professionals. [Crane, R.S. 2017] These characteristics distinguish MBIs from other therapies, such as acceptance-based approaches, in which mindfulness is employed as a tool to improve psychological acceptance but no systematic use of meditation techniques is made. [Carmody, J. 2014] This is the case with Acceptance and Commitment Therapy (ACT) or Dialectic Behavioural Therapy (DBT), in which mindfulness is largely taught through brief exercises and informal practices consisting of ordinary activities with a focus on the present moment. [Hayes, Strosahl, Wilson 1999; Linehan 1993]

Over the last 30 years, the popularity of MBIs has grown tremendously, as has the volume of research on their efficacy in the treatment of various psychological problems. [Goldberg 2017] Nonetheless, evidence for their use in schizophrenia is lacking. This could be attributed, in part, to a cautious reaction to a few early research studies that discovered a link between meditation practice and the appearance of psychotic-type symptoms. [Epstein 1981; Walsh, R. 1979]

Mindfulness representations in Theravāda Buddhist canon:

"Mindfulness" is a translation of the Pali term *sati* (Sanskrit *smṛti*), which has various interpretations in Buddhist scriptures, including memory, remembrance, recognition, mindfulness, wakefulness, and alertness. *Sati*, or contemplative awareness, is a Buddhist soteriological objective that requires ethical and meditation training.

The Theravāda Buddhist approach emphasises cultivating mental traits and faculties alongside mindfulness to achieve escape from suffering (*nibbana*). "Right mindfulness" (*samma sati*) is a crucial component of Buddhist teachings' four truths, which include:

- (1) Discuss the unsatisfactory aspect of existence (*dukkha*) as a result of ignorance about the impermanence and lack of essential self;
- (2) Suffering is caused by yearning (*tanha*), which is defined as a longing for pleasure and freedom from unpleasant experiences;
- (3) Accept the possibility of complete elimination of pain (*nibbana*); and
- (4) The eightfold route to freedom from suffering involves ethical instruction, meditation, and wisdom cultivation.

In English, the Buddhist term mindfulness (*sati*) is commonly referred to as "attention" or "awareness," particularly in secular interpretations. In Buddhism, the two concepts have distinct meanings. The term "attention" is derived from the Pali term "*manasikara*," which refers to a cognitive component or concomitant that focuses attention to an item before it is recognised and conceptualised. According to the Theravada *Abhidhamma*, attention (*manasikara*) is present at all times throughout cognition, regardless of mental state, but mindfulness (*sati*) is only present in wholesome or skillful states (*kusala*). [Bodhi 1993] According to the Pali canon, mindfulness practice involves cultivating "wise attention" (*yoniso manasikara*) alongside mindfulness (*sati*) and clear comprehension (*sampajañña*). According to Buddhism, attention (*manasikara*) and mindfulness (*sati*) are distinct components of cognitive processes. Attention is always present, whereas mindfulness is only associated with positive mental states. When both occur simultaneously, attention is referred to as "wise attention" (*yoniso manasikara*), which, when combined with other wholesome components, promotes wisdom cultivation.

Application of mindfulness in modern therapeutic contexts:

The introduction of "Mindfulness-Based Stress Reduction" (MBSR) in the late 1970s was a significant step towards secularizing mindfulness. MBSR include weekly meditation workshops, a one-day retreat, and daily home practice. Mindfulness meditation, based on modern Burmese methods created by Mahasi Sayadaw and U Ba Khin, includes formal sitting meditation, "body scan," yoga poses, and mindfulness in daily activities. The MBSR method has been included into many psychotherapies, including "Mindfulness Based Cognitive Therapy" (MBCT), which aims to avoid depressive relapses. [Segal, Williams and Teasdale 2002] Mindfulness is used in various therapies, including dialectical behaviour therapy (DBT) and acceptance and commitment therapy (ACT), to treat anxiety, depression, pain management, eating disorders, substance abuse, and relationship issues. [Lineham 1993; Hayes, Strosahl, and Wilson 1999] Mindfulness is being used in several settings, including the corporate sector, schools, prisons, military, and wellness industries, to improve workplace wellbeing. [Follette, Palm, and Pearson 2006; Germer 2016] This strategy is commonly touted as a self-help or attention-enhancing tool, promising higher productivity, decision-making, and acceptance of events.

Effects of MBIs on Mental Health:

MBIs have been demonstrated to be effective in treating some common mental health disorders. [Aghaie E, Roshan R, Mohamadkhani P 2018]

Depression and Anxiety:

MBIs' efficacy in treating depression and anxiety has been sufficiently supported by meta-analyses, which show moderate to strong effect sizes for the two conditions. [Khoury, Sharma 2015; Khoury, Lecomte 2013] The results were also applicable during pregnancy, as a systematic review found that MBIs helped reduce

moderate to severe perinatal anxiety; however, the effects were less consistent in terms of reducing perinatal depression. [Shi ZR, MacBeth A. 2017] The popular web-based mindfulness programmes have also proven efficacy in lowering despair and anxiety in patients with anxiety disorders. [Sevilla-Llewellyn-Jones J 2018] However, it is unclear whether the benefits of mindfulness practices as a stand-alone intervention continue to exist, as it is difficult to separate the effects of social interaction and psychoeducation, which are other components integrated in many MBIs (e.g., group MBCT), from standalone mindfulness practices. As a result, a recent meta-analysis of 18 relevant research looked into the gap and found that mindfulness practice itself (e.g., breathing space, body scan, sitting meditation, soundscan) showed small to medium impacts on both anxiety and depression. [Blanck, Perleth 2018]

Stress:

Overall, current data supports MBIs having a moderate effect on stress reduction; however, additional strong research are required to draw clear conclusions across populations. A meta-analysis of five randomised control trials examined the effects of MBIs on cortisol levels, a stress-related hormone, and discovered that they may have a favourable effect on healthy adults. [Sanada 2016] Another meta-analysis found that meditation interventions had a substantial, medium effect on cortisol levels, but only for at-risk groups, such as individuals in stressful life situations.

Insomnia:

The available research suggests that MBIs may improve insomnia and sleep disruption.

A meta-analysis found that MBIs have medium to large effects ($g=0.67$, 95% confidence interval [CI]=0.30-1.05) on improving insomnia and sleep quality, with effects lasting 3 months postintervention ($g=1.06$, 95% CI=0.48-1.64). [Rash 2019] Several meta-analyses indicated considerable improvement in insomnia and sleep quality, as measured by the Pittsburgh Sleep Quality Index. [Wang 2020; Chen 2020]

Eating disorders:

A systematic review and meta-analysis found that MBIs have a positive effect on ED symptoms, emotional eating, negative affect, body dissatisfaction, and body mass index (BMI) in anorectic and bulimic participants, compared to pre-assessment levels. [Turgon 2019] A systematic review and meta-analysis suggest that MBIs can reduce body image concerns and negative affect while improving body appreciation. [Beccia 2018] The authors agreed that more research is needed to confirm the effectiveness of MBIs in treating EDs. [Turgon 2019; Beccia 2018]

Addiction:

Research indicates that MBIs are effective in treating drug and behavioural addictions. A study of 54 randomised controlled studies indicated that MBIs effectively reduce addiction symptoms, increase mood, and regulate emotions. [Sancho 2018] Meta-analytic results indicate that MBIs can effectively reduce perceived craving, stress, substance misuse, anxiety, depression, negative affect, and post-traumatic symptoms for substance abuse treatment. More study is needed, particularly on longer follow-up examinations and different groups, to confirm the usefulness of this approach. [Li, Howard 2017; Cavicchioli 2018]

Psychosis:

MBIs may aid individuals with psychosis, although further study is needed to confirm this. [Louise 2018] A meta-analysis of 434 patients with psychosis found that MBIs had short-term moderate effects on total psychotic symptoms, positive symptoms, hospitalisation rates, duration of hospitalisation, and mindfulness, as well as long-term effects on total psychotic symptoms and hospitalisation duration. [Cramer 2016] A systematic study found that MBIs are feasible for persons with psychosis and offer significant improvements over standard care, including improved negative symptoms and functioning. [Aust 2017] Large trials with randomization are recommended to better understand the long-term usefulness of MBIs for persons with psychosis.

Post Traumatic Stress Disorder:

MBIs among participants with PTSD were less conclusive. A systematic review and meta-analysis of 10 meditation therapies found favourable but not statistically significant effects on PTSD. The analyses were limited due to the diverse forms of meditation interventions, short follow-up intervals, and low study quality. [Hilton 2017] Several systematic reviews found that mindfulness, yoga, and relaxation techniques may be

effective for treating PTSD, however many trials had methodological flaws or lacked rigour. [Niles 2018; Banks 2015]

Autism spectrum disorders:

The literature on MBIs for individuals with autism spectrum disorders (ASD) and their carers is scarce. A 2017 systematic analysis of 16 research found no conclusive recommendations on the impact of MBIs on individuals with ASD or their carers. This research covered a wide range of age groups, outcome measures, and subjective well-being for individuals with ASD and their parents. [Hourston 2017] MBIs may have benefits for individuals with ASD, such as lowering anxiety, thinking difficulties, rumination, aggression, parental stress, and boosting subjective and parental well-being.

Effects of MBIs on Physical Health:

MBIs have been shown to improve physical health and reduce psychological symptoms in those with chronic conditions.

Pain:

MBIs have been shown to reduce pain across many demographics. In 2017, a systematic review and meta-analysis of 30 randomised controlled trials on chronic pain found that mindfulness meditation improved pain management. Intervention patients experienced a substantially larger percent change in pain (-0.19% (SD, 0.91; min, -0.48; max, 0.010)) compared to control groups (-0.08% (SD, 0.74; min, -0.35; max, 0.11)). A network metaanalysis indicated that MBSR is beneficial for chronic pain and does not differ significantly from CBT. However, further research is needed to validate this. [Hilton 2017; Khoo 2019]

Weight control and obesity:

Obesity poses a considerable health risk and contributes to a high illness burden through associated comorbidities. [Guh, Zhang 2009] Mindful eating is an effective technique for weight control, particularly for individuals with binge or emotional eating habits. Mindful eating may have longer-term impacts than traditional diets that limit caloric intake and food choices. It is more sustainable and addresses emotional issues that may contribute to bad eating habits. [Lyzwinski 2018; Katterman 2014]

Diabetes:

The evidence for the impact of MBIs on diabetes outcomes is equivocal. A comprehensive review reported inconsistent results on the effectiveness of MBIs for physiological outcomes, including glycaemic management and blood pressure, in both type 1 and type 2 diabetic patients. [Noordali 2017] A systematic review and meta-analysis indicated that meditation improves glycaemic management in T2DM patients, including fasting blood glucose, HbA1c, and postprandial blood glucose levels. The limited sample size, short duration, and different administration modalities in published research make determining the effectiveness of MBIs challenging. [Xia, Yang 2020] Systematic studies have shown improvements in psychological symptoms, including anxiety, distress, sadness, and quality of life, in addition to glycaemic control. More research is needed to determine the effectiveness of MBIs in treating diabetes.

Cancer:

MBIs may improve physical health outcomes for cancer patients, including fatigue and pain, in addition to psychological advantages. [Ngamkham 2019; He, Hou, Qi 2020] A comprehensive review and meta-analysis indicated that MBIs significantly reduced cancer-related fatigue (CRF) scores among cancer patients (SMD=-0.51, 95% CI [-0.81-0.20]), particularly among lung cancer patients. [He, Hou, Qi 2020; Xie, Dong, Wang 2020] In addition to CRF, a systematic review and meta-analysis revealed benefits in sleep problems, pain, anxiety, depression, and fear of cancer recurrence. [Cillessen 2019] While MBIs were found to be useful in lowering CRF and other symptoms, additional high-quality research are needed to corroborate the findings.

Respiratory health (COPD, asthma, etc.):

The impact of MBIs on respiratory health remains unknown. A meta-analysis of 16 research suggests that contemplative movement can improve lung function and physical activity in COPD patients. [Wu, Lin, wend 2018] Additional high-quality trials are needed to validate the effectiveness of MBIs on COPD and asthma, according to several systematic reviews and meta-analyses. [Paudyal 2018; Clari 2020]

Conclusion:

Schizophrenia is a severe psychiatric condition caused by disruptions in brain development, which can be inherited or environmental.

Mindfulness-based interventions (MBIs) have been shown to be effective in treating various mental health disorders. Meta-analyses show moderate to strong effect sizes for depression and anxiety, and have been applied during pregnancy. However, the benefits of mindfulness practices as stand-alone interventions are unclear. MBIs have been found to have a moderate effect on stress reduction, but more research is needed to draw clear conclusions across populations. They may also improve insomnia and sleep quality, and may reduce body image concerns and negative affect while improving body appreciation. MBIs are effective in treating drug and behavioural addictions, and may aid individuals with psychosis. People might keep feeling better even after they finish the therapy. We still need to learn more about how these therapies work best and how we can use them to help more people with schizophrenia.

Mindfulness-based interventions (MBIs) have been proven to improve physical health and reduce psychological symptoms in individuals with chronic conditions. In 2017, a systematic review and meta-analysis found that mindfulness meditation improved pain management, weight control, and obesity. MBIs have also been shown to improve physical health outcomes for cancer patients, particularly in reducing cancer-related fatigue (CRF) scores. Further research is needed to validate the effectiveness of MBIs in treating COPD and asthma. Further research is needed to validate these findings.

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