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Excessive Digital Content Consumption and Cognitive Decline: Current Review of the 'Brain Rot' Phenomenon

Aşırı Dijital İçerik Tüketimi ve Bilişsel Gerileme: 'Beyin Çürümesi' Olgusunun Güncel Bir İncelemesi

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ABSTRACT

The term "brain rot" is relatively new, but its use rose exponentially after being promoted as the Oxford word of the Year in 2024. "Brain rot" was simply used by people to mean cognitive deficits. However, the phrase now evokes mental and emotional health issues that arise from modern lifestyles. The article demonstrates brain rot as a phenomenon caused by the merger of psychiatry, neurology, and clinical psychology. It attempts to dissect the multi-dimensional causes of brain rot, which include, but are not limited to, heredity, the surrounding environment, lifestyle changes, and the emotional and cognitive deficits themselves. It also looks at the existing methods of brain rot prevention, treatment, and diagnosis. This phenomenon explains how specific habits like increased screen time, stress, and other cognitive aggravating factors will eventually worsen the decline. With substantial evidence available, mindfulness, cognitive behavioral therapy, and resiliency training seem to be much stronger candidates for preventing or treating brain rot. We have noted gaps in the literature, including the use of artificial intelligence for diagnosis through cross-disciplinary collaboration. The objective of the review is to increase comprehension of the term "brain rot" and multi-dimensionally prevention and treatment strategies through an individualized approach.

Keywords: Brain rot, cognitive decline, digital addiction, emotional dysregulation

ÖZ

"Beyin çürümesi" terimi, özellikle 2024 yılında Oxford tarafından yılın kelimesi seçilmesinin ardından büyük ilgi görmüş ve bilişsel gerilemeyi tanımlayan gündelik bir ifadeden, modern yaşam tarzlarının zihinsel ve duygusal sağlık üzerindeki kapsamlı etkilerini ifade eden bir kavrama dönüşmüştür. Bu derleme makalemizde, psikiyatri, nöroloji ve psikolojik danışmanlık perspektiflerini bir araya getirerek beyin çürümesinin varlığını tartışmakta ve bu olgunun genetik faktörler, çevresel etmenler, yaşam tarzı değişiklikleri ile bilişsel ve duygusal işlev kayıplarından nasıl etkilendiğini ele almaktadır. Ayrıca, beyin çürümesinin önlenmesi, teşhisi ve tedavisine yönelik mevcut yöntemler incelenerek, ekran süresinin artışı ve kronik stres gibi alışkanlıkların bilişsel gerilemeye nasıl katkıda bulunduğu açıklanmaktadır. Makale, bu sorunun yönetiminde daha etkili olabilecek kanıta dayalı yaklaşımlara odaklanarak farkındalık temelli müdahaleler, bilişsel-davranışçı terapi ve esneklik eğitimine vurgu yapmaktadır. Bunun yanı sıra, yapay zekâ destekli teşhis yöntemleri ve disiplinler arası iş birliğinin, beyin çürümesine yönelik daha bütüncül çözümler sunmada nasıl bir rol oynayabileceği tartışılmaktadır. Genel olarak bu çalışma, beyin çürümesi kavramını daha iyi anlamayı ve birey merkezli, çok boyutlu yaklaşımlar geliştirerek etkili önleme ve müdahale stratejileri sunmayı amaçlamaktadır.

Anahtar sözcükler: Beyin çürümesi, bilişsel gerileme, dijital bağımlılık, duygusal düzensizlik

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Introduction

The prevalence of electronic platforms and digital media consumption in our daily lives has led to widespread concerns regarding the impact of overusing digital technology on the psychological and cognitive functions of the brain in the current era of digital technology (Prensky 2001). Digital addiction, an obsessive use of digital technology that hinders daily life, has become a global problem. It has been consistently found to have a negative impact on executive functioning, attention control, and working memory (Hong et al. 2013, Boers et al. 2019, Li et al. 2020, Busch and McCarthy 2021, Áfra et al. 2024).

With 5.52 billion and 5.22 billion internet and social media users, respectively, as of October 2024 approximately, the extent of our reliance on the digital is evident worldwide (Kemp 2024, Tarannum et al. 2025). In this sense, "brain rot" is all over the public dialogue, a reflection of deepening anxiety about the cognitive effects of digital overuse. Colloquial as it is, "brain rot" was selected as the Word of the Year for 2024 by Oxford, in recognition of its echo of public concerns about the poor quality of digital output and associated mental fatigue (Oxford University Press 2024).

The word itself finds its way to Thoreau's Walden (where he criticizes modern complexity and intellectual rot, seeking simplicity and nature) (Thoreau 2022, Özpençe 2024). Today, the concept has been reinvigorated through its association with pathological screen use, including doomscrolling and addictive use of social media, which have been shown to be associated with shorter attention spans, impaired memory, and diminished decision-making (Swing et al. 2010, Boers et al. 2019, Lee et al. 2019, Twenge et al. 2020, Satıcı et al. 2023, Schwarz 2024).

"Brain rot" is indeed a colloquial term which is used to designate a wide range of cognitive or affective disturbances such as mild cognitive impairment, major depressive disorder, or generalized anxiety disorder in the clinical context (Livingston et al. 2020). Other lifestyle factors, including insufficient sleep, an inactive lifestyle, and excessive screen time, are linked to heightened susceptibility to cognitive decline and emotional dysregulation (Baumeister et al. 2007, Booth et al. 2012, Cain and Gradisar 2020, Twenge and Campbell 2018, Li et al. 2023, Cullen et al. 2024).

These effects can be lessened by different psychological treatments like cognitive-behavioural therapy (CBT) (Beck 2011), mindfulness-based stress reduction (Kabat-Zinn 1990), and resilience training (Southwick and Charney 2012) being recommended (Przybylski and Weinstein 2013, Korte 2020). Long-term digital overuse may even have a structural impact on the brain, including lower activity in the prefrontal cortex, atrophy of the hippocampus, and dysregulated amygdala functioning (Korte 2020, Verma et al. 2025).

These changes contribute to cognitive deficits by decreasing neuroplasticity and increasing neuroinflammation and oxidative stress. Recent studies on epigenetics reveal that some individuals are genetically predisposed and more susceptible to developing symptoms of "brain rot" (Przybylski and Weinstein 2013, Turkle 2021).

In addition, digital multitasking presents a major cognitive load by interfering with deep learning, memory retention, and complex cognition (Edwards and Shin 2017, Pennycook and Rand 2022, Siddarth et al. 2025). Zhong et al. (2024) have reported that these deficits impact education, occupation, and more global social and developmental functioning.

Moreover, brain rot influences do not affect all ages in the same way. Youth are especially at risk because the exposure to digital media during active neurodevelopment may itself contribute to mood variability and circulation in and out of their digital environments (Barry et al. 2017). In contrast, older adults could be at increased risk of cognitive dissonance and social isolation due to insecurity about digital literacy (Yao et al. 2017, Áfra et al. 2024). These age-specific risks call for age-specific intervention strategies (Lee et al. 2019).

The consequences of brain rot include long-term mental health problems, sleep-wake disorders, and higher chances of developing obesity and cardiovascular disorders (Áfra et al. 2024). Effective responses therefore must integrate preventive, therapeutic, and policy measures.

In light of its multifaceted impacts on cognitive science, psychiatry, and psychological counseling, this review synthesizes current research on the origins, mechanisms, and consequences of brain rot. The discussion is organized under the following key themes: (i) conceptual definitions, (ii) biological and psychological mechanisms, (iii) causes and risk factors, (iv) related mental health symptoms, (v) cognitive and behavioural outcomes, (vi) assessment and diagnostic approaches, and (vii) prevention and intervention strategies.

Definition of Brain Rot

The term brain rot is often used to characterize the cognitive decline and attentional problems associated with excessive digital consumption, notably from social media, fast-paced material, and extended screen exposure (Pariser 2021, Özpençe 2024, Yousef et al. 2025). While not a clinical diagnosis, brain rot refers to lower attention, memory difficulties, reduced critical thinking skills, and increased mental tiredness resulting from frequent digital involvement (Jourdren et al. 2023, Özpençe 2024, Yousef et al. 2025).

Oxford University Press (2024) describes brain rot as a condition of cognitive degeneration due to extended exposure to low-quality digital information, resulting in diminished attention span and mental stagnation. Neuroscientific research relates brain rot to dopamine-driven behavioural patterns, where continual digital stimulation affects reward circuits and hampers deep thinking (Firth et al. 2019, Montag and Diefenbach 2022). Psychologists characterize brain rot as a sort of digital weariness, where prolonged screen usage significantly affects cognitive flexibility, learning retention, and emotional control (Twenge 2023).

The major features of brain rot are: (1) Shortened attention span and difficulties concentrating for lengthy periods owing to regular digital multitasking (Yousef et al. 2025), (2) Memory impairment, a lower capacity to store and remember information, generally connected to over-reliance on external digital sources (Firth et al. 2019), (3) Decreased critical thinking and lesser involvement in deep contemplation and analysis, substituted by passive information intake (Gerlich 2025), (4) Emotional dysregulation, including heightened anxiety, worry, and frustration due to continual digital stimulation and comparison culture (Yousef et al. 2025), (5) Cognitive fatigue, or mental tiredness from excessive screen usage, leading to burnout and diminished motivation (Nakshine et al. 2022).

Brain rot depicts the detrimental cognitive repercussions of the digital era, highlighting the necessity for balanced digital intake, cognitive rest, and mindful media involvement. It raises concerns about the long-term repercussions of excessive screen exposure on brain function, learning, and mental well-being.

Neurobiological, Psychological, and Environmental Mechanisms

Neurobiology of Brain Rot. At the basis of the molecular processes behind brain rot are neuroinflammation and neurodegeneration. Research shows that excessive screen time and digital overload lead to an inflammatory response in the brain, which may impair cognitive performance. Neuroinflammation, the process by which the brain's immune system gets activated in response to damaging stimuli, is typically detected in neurodegenerative disorders such as Alzheimer’s disease and Parkinson’s disease (Chung et al. 2022, Lecca et al. 2022, Kim et al. 2024, Adamu et al. 2024). Chronic exposure to environmental stressors, including the constant barrage of information from digital media, has been shown to increase oxidative stress, disrupt blood-brain barrier integrity, and activate glial cells in the brain, all of which contribute to neuroinflammation. This inflammation inhibits neuroplasticity—the brain’s capacity to create and rearrange synaptic connections—resulting in long-term cognitive problems.

Neurodegeneration, a steady reduction in the structure and function of neurons, is another significant biological element in brain rot. Studies have found that parts of the brain critical for memory, emotion, and decision-making, such as the hippocampus and prefrontal cortex, are especially sensitive to the impacts of extended digital media usage (Park and Lee 2023, Liu et al. 2023, Khatoon et al. 2023). These areas are crucial in activities including learning, memory consolidation, and executive functioning, which are all affected when neurodegeneration begins. Neuroimaging studies have revealed that digital addiction may

lead to structural alterations in these regions, leading to cognitive impairment. Furthermore, prolonged digital use may accelerate the destructive processes of neurodegenerative illnesses, rendering people more vulnerable to ailments like dementia and other cognitive impairments in the long run.

Cognitive Decline in Brain Rot

Cognitive decline is a hallmark clinical feature of brain rot and manifests as a progressive deterioration in cognitive functions such as attention, memory, executive functioning, and processing speed (Ophir et al. 2009, Uncapher et al. 2016). This decline is often subtle at first, with individuals reporting mild difficulties with concentration, multitasking, or recalling information (Wingenfeld and Wolf 2014). As the condition progresses, these cognitive impairments become more pronounced, leading to significant difficulties in day-to-day functioning, particularly in academic, professional, and social contexts (Knopman et al. 2021).

The effects of digital overload on cognition have been well-documented, with studies showing that prolonged exposure to digital media can disrupt attention and memory (Hong et al. 2013, Sherman et al. 2018, Boers et al. 2019, Goddings et al. 2019, Auxier and Anderson 2021, Petro et al. 2025). The constant switching of tasks, commonly referred to as "multitasking," that occurs in digital environments has been shown to reduce the brain's ability to concentrate and retain information (Wingenfeld and Wolf 2014). Additionally, research has suggested that excessive screen time may lead to structural changes in the brain, particularly in areas such as the hippocampus and prefrontal cortex, which are critical for memory, learning, and decision-making (Goddings et al. 2019, Petro et al. 2025, Saad et al. 2025).

Furthermore, studies on neurodegeneration suggest that cognitive decline associated with brain rot may mirror that of other neurodegenerative disorders, such as Alzheimer's disease or early-onset dementia (Ryan et al. 2009). Long-term exposure to stressors, including digital addiction, is believed to exacerbate neuroinflammation and impair neuroplasticity, ultimately accelerating the progression of cognitive dysfunction. As the condition progresses, affected individuals may struggle with complex tasks requiring sustained attention or memory, often feeling overwhelmed by simple cognitive demands.

Sleep, Emotion, and Environmental Stress in Cognitive Decline

A key clinical feature of brain rot is sleeping disturbance, which is closely linked to cognitive decline and psychiatric comorbidities. Excessive digital media use, particularly late-night screen exposure, disrupts circadian rhythms and contributes to insomnia or poor sleep quality (Czeisler and Gooley 2007). This disruption exacerbates cognitive impairment and emotional dysregulation, creating a cycle that further deteriorates mental well-being. Sleep deprivation has been associated with increased irritability, reduced emotional resilience, and difficulties in stress management (Bacaro et al. 2024, Korkmaz et al. 2023). As sleep disturbances worsen, cognitive decline intensifies, forming a feedback loop that heightens psychiatric symptoms and cognitive dysfunction (Zawar et al. 2023).

Additionally, individuals experiencing brain rot often struggle with emotional dysregulation, manifesting as irritability, mood swings, or disproportionate emotional responses to everyday situations. The persistent state of cognitive overload, combined with an impaired ability to process information and regulate emotions, contributes to emotional instability and further compromises mental health and cognitive function (Wang et al. 2016). If left unchecked, emotional dysregulation may increase the risk of severe psychiatric conditions such as bipolar disorder or personality disorders in vulnerable individuals (De Prisco et al. 2023).

Environmental stressors, particularly poor sleep hygiene and a sedentary lifestyle, further contribute to the progression of brain rot. Digital media consumption before bedtime interferes with natural circadian rhythms and melatonin production, leading to sleep disturbances that impair cognitive processes, including attention, memory, and executive functioning (Silvani 2022). Chronic sleep deprivation has been linked to neurodegeneration, with long-term sleep disruption potentially contributing to conditions such as Alzheimer's disease (Alkadhi 2013). Similarly, a sedentary lifestyle, often associated with excessive screen time, has been shown to accelerate cognitive decline and brain atrophy (Nakshine et al. 2022).

Physical inactivity reduces cerebral blood flow, limiting the delivery of oxygen and essential nutrients necessary for optimal brain function. Moreover, a lack of physical exercise exacerbates risk factors such as obesity and cardiovascular disease, which further contribute to cognitive impairment (Booth et al. 2012, Santiago and Potashkin 2023). The aetiology of brain rot thus involves a complex interplay of biological, psychological, and environmental factors, with neuroinflammation and neurodegeneration at its core. Psychological stress, substance use, sleep disturbances, and physical inactivity serve as compounding variables that accelerate cognitive decline. Addressing brain rot requires a multidisciplinary approach that considers these interrelated factors and implements targeted interventions aimed at mitigating their collective impact.

Chronic Stress and Digital Addiction

Biological, psychological, and environmental variables play a crucial role in the initiation and progression of brain rot. Chronic stress, one of the key drivers of cognitive decline, has been demonstrated to alter brain function, especially in areas related to memory and emotional control (Wingenfeld and Wolf 2014, Yousef et al. 2025). When a person encounters prolonged stress, the body produces heightened quantities of cortisol, a hormone that, in high doses, may be hazardous to brain cells. The hippocampus, which is involved in memory formation and emotional regulation, is especially susceptible to cortisol, and continuous exposure to this hormone may impede neurogenesis—the creation of new neurons—leading to deficiencies in learning and memory (Wingenfeld and Wolf 2014).

The overstimulation from digital media exacerbates stress, as people are continually exposed to information overload, social comparison, and fear-inducing headlines, which may heighten anxiety and lead to a loop of cognitive overload and emotional suffering (Cytowic 2024). Excessive digital involvement may further aggravate cognitive impairment by encouraging maladaptive behaviours that impair attention, memory, and emotional control. Digital surroundings, especially social media platforms, generate circumstances for continual stimulation, diminishing the brain's capacity to concentrate, absorb information efficiently, and engage in deep thought (Kostyrka-Allchorne et al. 2017, Clemente-Suárez et al. 2024). This constant cognitive strain, along with the psychosocial effect of extended screen exposure, adds to a feedback loop that promotes cognitive decline and emotional instability. As a consequence, digital addiction plays a significant role in the continuation of brain rot, promoting obsessive behaviours, diminishing cognitive flexibility, and increasing sensitivity to stress-related deficits (Przybylski and Weinstein 2013).

Lack of Motivation

A lack of motivation is a critical factor contributing to cognitive decline and the phenomenon often described as brain rot. Motivation is closely linked to the brain's reward system, particularly the dopaminergic pathways, which play a fundamental role in goal-directed behavior, learning, and emotional well-being (Aron et al. 2005, Schultz 2016, Council on Communications and Media 2016, Kringelbach and Berridge 2010, Sherman et al. 2018). When individuals experience prolonged periods of disengagement, apathy, or reduced intrinsic motivation, their cognitive functions—such as attention, memory, and problem-solving—deteriorate over time.

One of the primary causes of diminished motivation is the overstimulation from digital environments, which provide constant but shallow rewards, leading to a decrease in effortful, meaningful engagement with real-world tasks (Carr 2010, Alter 2017, Paulus et al. 2019, Siddarth et al. 2025). Excessive digital consumption, particularly passive activities such as endless scrolling on social media or binge-watching, conditions the brain to seek instant gratification, reducing the ability to engage in sustained, deep-focus tasks. Furthermore, chronic stress and anxiety, exacerbated by digital overstimulation, can lead to decision fatigue and learned helplessness, further suppressing motivation levels (Sandi 2013). To counteract this decline, individuals must cultivate habits that promote intrinsic motivation, such as setting meaningful goals, engaging in creative problem-solving, and fostering real-world social connections. Strategies like structured digital detoxes, mindfulness practices, and regular physical activity have been

shown to restore motivation by enhancing dopaminergic function and improving cognitive resilience (Davidson and McEwen 2012).

Depression and Anxiety in Brain Rot

Individuals suffering from brain rot often experience psychiatric comorbidities such as depression and anxiety disorders. These mood disorders may arise as a consequence of cognitive impairments, but they can also exacerbate the symptoms of brain rot, creating a vicious cycle that further impairs brain function. Depression, in particular, is highly prevalent among individuals experiencing chronic digital overload and stress (Rutkowska et al. 2022, Padır et al. 2025).

Research has shown that excessive digital consumption can alter brain chemistry, disrupting the balance of neurotransmitters such as serotonin and dopamine, which are critical for regulating mood (Dresp-Langley and Hutt 2022), leading to stress, impaired executive function, and reduced attentional control (Wang et al. 2023).

Digital addiction and the resulting mood disorders are frequently intertwined, as the constant exposure to social media and digital interactions may induce feelings of inadequacy, isolation, and comparison (Kuss and Griffiths 2017). Studies have found that individuals who spend excessive time on social media platforms tend to have higher rates of depressive symptoms, as they are exposed to curated content that often highlights idealized versions of others' lives (Cytowic 2024). The social comparison theory suggests that individuals who engage in frequent online interactions may develop negative self-perceptions, leading to feelings of sadness, loneliness, and despair (Andrade et al. 2023). These negative emotional states, in turn, exacerbate the cognitive decline observed in brain rot, as depression and anxiety further impair attention, memory, and problem-solving skills.

Anxiety is another common comorbidity in individuals suffering from brain rot. The chronic stress associated with digital overload—such as the pressure to remain constantly connected, the anxiety induced by online interactions, or the constant influx of notifications—can trigger or worsen generalized anxiety disorder or social anxiety (Li et al. 2023). Research has indicated that individuals with high levels of screen time report elevated anxiety levels, particularly due to the compulsive need to check emails, social media accounts, and other digital content. These anxiety-related behaviours contribute to the sense of cognitive overload, further exacerbating the symptoms of brain rot and creating a cycle of negative reinforcement (Korkmaz et al. 2023).

Impact on Social Functioning in Brain Rot

As brain rot progresses, it often leads to significant impairments in social functioning. Affected individuals may experience social withdrawal, reduced capacity to engage in social activities, or difficulties in maintaining relationships due to cognitive and emotional dysfunction. The sense of being overwhelmed by daily cognitive tasks, combined with the emotional toll of anxiety and depression, leads to a decreased interest in social interactions and a heightened sense of isolation (Cytowic 2024). In severe cases, the deterioration of both cognitive and emotional function may result in complete social disengagement, further reinforcing the individual's sense of loneliness and exacerbating psychiatric symptoms.

The clinical features of brain rot are multifaceted, encompassing both cognitive and psychiatric symptoms that significantly impact an individual's quality of life. Cognitive decline, characterized by impairments in memory, attention, and executive functioning, is a central feature of the condition. Psychiatric comorbidities such as depression, anxiety, and emotional dysregulation are commonly observed and contribute to the worsening of cognitive symptoms (Angermann and Ertl 2018). As the condition progresses, the interplay between cognitive dysfunction and psychiatric disorders can create a vicious cycle, making it difficult to effectively treat and manage the symptoms of brain rot (Kusnanto et al. 2018). Addressing these clinical features requires an integrated approach that considers the biological, psychological, and environmental factors contributing to the condition.

Preventing Brain Rot

Preventing brain rot requires a multifaceted approach that incorporates mindful technology use, cognitive engagement, stress management, and a healthy lifestyle. Practicing digital hygiene is essential, including setting screen time limits, reducing multitasking, and engaging in active rather than passive digital consumption, as excessive screen exposure has been linked to cognitive decline and reduced attention span (Twenge and Campbell 2018). Avoiding excessive social media scrolling and utilizing blue light filters can also improve focus and sleep quality, which is crucial for cognitive restoration (Czeisler and Gooley 2007, Silvani 2022).

Strengthening cognitive function through activities such as reading, problem-solving, and engaging in intellectual discussions has been shown to enhance memory and critical thinking skills (Chang et al. 2021, Howard et al. 2023). Additionally, managing stress through mindfulness, meditation, and regular breaks helps reduce cognitive overload and emotional exhaustion, as chronic stress and elevated cortisol levels have been associated with hippocampal atrophy and memory deficits (Lupien et al. 2009).

Prioritizing sleep, regular exercise, and a brain-healthy diet rich in omega-3 fatty acids and antioxidants further support cognitive well-being by promoting neurogenesis and reducing inflammation (Gomez-Pinilla 2011). Social interactions also play a crucial role—fostering real-life connections, participating in offline hobbies, and limiting instant gratification can enhance mental resilience and emotional stability (Holt-Lunstad et al. 2015). By integrating these strategies, individuals can mitigate the negative effects of digital overstimulation and stress, thereby protect their cognitive health and prevent brain rot.

Integration of Findings from Interdisciplinary Studies

To overcome the challenges posed by brain rot, it is essential to integrate findings from interdisciplinary studies. The condition is not confined to a single field of inquiry but is shaped by insights from psychiatry, neurology, psychology, environmental science, and social work. Collaborative research across these domains can yield novel understandings of the condition and inform more effective treatments.

For instance, advances in neuropsychology and neuroscience can illuminate the brain regions affected by chronic stress and neuroinflammation. Concurrently, psychological and social research may help elucidate the impact of lifestyle variables—such as digital addiction and social isolation—on mental well-being and cognitive functioning (Carnevale and Lembo 2019, Beauchet et al. 2020, Brandt et al. 2022).

A multidisciplinary approach also allows for a more holistic view of treatment. For example, combining neuropsychological interventions such as cognitive rehabilitation with psychosocial therapies—like cognitive-behavioural therapy (CBT) and mindfulness-based interventions (MBIs)—may offer a more comprehensive response to brain rot (Carnevale and Lembo 2019, Beauchet et al. 2020). Moreover, the involvement of social workers and counselors helps address environmental and relational stressors such as isolation and chronic stress, which are closely associated with both cognitive and emotional deterioration (Brandt et al. 2022).

Incorporating the perspectives of public health and environmental psychology is likewise crucial for understanding the broader societal dimensions of brain rot. These fields can investigate how contemporary trends—like the pervasive use of digital technology—affect mental health and cognitive performance. By drawing upon findings across disciplines, researchers and clinicians can better diagnose root causes and devise multifaceted interventions that address brain rot from several angles (Beauchet et al. 2020).

Interdisciplinary collaboration also enhances early detection and prevention. For example, neuroscientists and psychologists could jointly identify early biomarkers of brain rot that signal cognitive deterioration. Psychiatrists and counselors might co-design early intervention programs focused on stress regulation, digital detox, and social reconnection. When various fields converge, the result is a more robust and targeted intervention framework that can reduce the impact or even halt the progression of brain rot (Hutton et al. 2020).

AI-Based Diagnostic Tools

Artificial Intelligence (AI) is playing an increasingly transformative role in the diagnosis and management of neurological and psychiatric conditions. In the context of brain rot, AI-based tools can help overcome diagnostic ambiguity by analyzing large, complex datasets to detect early patterns of cognitive decline (Liss et al. 2021, Carnevale and Lembo 2019, Kalani et al. 2024).

For example, machine learning algorithms applied to functional magnetic resonance imaging (fMRI) or positron emission tomography (PET) scans can identify subtle indicators of neuroinflammation or neurodegeneration—biological hallmarks associated with brain rot—before symptoms become clinically apparent. Additionally, AI can process cross-disciplinary datasets, integrating genetic, neurobiological, and psychosocial variables to offer a more complete and precise understanding of the condition.

AI systems can also detect behavioral and environmental risk factors such as chronic stress, sleep disturbances, or substance abuse, which often co-occur with cognitive decline. These insights can help tailor personalized intervention plans and preventive strategies, thereby improving clinical outcomes and long-term mental health (Carnevale and Lembo 2019).

By enabling earlier, more accurate diagnoses and supporting individualized treatment approaches, AI-based technologies offer enormous potential for addressing the growing concerns surrounding brain rot in today's hyper-digital world.

This review is limited by the availability of studies that specifically focus on the term "brain rot," as it is a relatively novel and informal term in scientific literature. Therefore, the review will need to include studies on related conditions such as neurodegeneration, cognitive decline, and psychiatric comorbidities in order to offer a comprehensive analysis. Additionally, while the review will aim to be exhaustive, there may be inherent biases in publication, language, and access to full-text articles, which may limit the breadth of the literature included.

Conclusion

The concept of "brain rot" reflects an increasing worry in neurology and psychiatry. It covers a spectrum of mental illnesses and cognitive impairment resulting from various environmental elements, neurodegenerative processes, and persistent stress. Notwithstanding difficulties in defining and diagnosing this disorder, multidisciplinary research combining environmental science, psychology, and neuroscience has shed important light on the fundamental processes and symptoms of this syndrome. The aetiology of "brain rot" is complicated, comprising biological processes like neurodegeneration and neuroinflammation as well as psychological and environmental influences, including long-term stress, drug misuse, and digital addiction. The way these elements combine highlights the need to treat diagnoses and illnesses holistically. Individualized treatment programs can accommodate each patient's unique needs, improve results and lower adverse effects.

New technologies, including sophisticated neuroimaging methods and AI-powered diagnostic instruments, have enormous promise for earlier identification and more exact evaluation of the disease. The public health policies and a combination of pharmaceutical and non-pharmacological treatment may considerably benefit the management of disease on both an individual and societal level. Prioritizing early intervention and prevention in public health campaigns is crucial as they might help to enhance lives and minimize the effects of "brain rot" in already at-risk groups. As knowledge develops, future paths should concentrate on developing more customized treatment approaches, improving diagnostic tools, and adopting public health policies, giving prevention a top priority. The combination of artificial intelligence technologies, individualized care, and multidisciplinary cooperation will assist to define the future of "brain rot" therapy and bring hope for improved results for persons with this difficult and varied ailment. The quality of life for individuals who are at risk may ultimately improve because of these efforts to better understand, cure, and prevent cognitive decline and the mental symptoms that accompany it.

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