Editorial

Digital Dementia in Children: An Emerging Challenge to Cognitive Health in This Digital Era

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"Dementia" is an umbrella term used to refer to a range of degenerative neurological illnesses that lead to a decrease in cognitive function serious enough to interfere with daily life.[1] Dementia describes symptoms caused by brain injury that impair cognitive skills beyond the boundaries of natural ageing. This disorder impairs emotional regulation, behavior, and motivation while maintaining consciousness.

In the year 2012, in this digital era, Manfred Spitzer, a German neuroscientist, invented the phrase 'Digital Dementia,' referring to the cognitive decline linked with excessive reliance on digital technologies such as cell phones and Google, which may exacerbate attention-deficit hyperactivity disorder (ADHD) or memory loss, especially in children and adolescents.[2]

Digital dementia, the term has gained popularity as research has revealed the neurological and behavioral alterations related to digital multitasking and decreased physical activity and social connection, notably among the adolescents.[3]

Digital dementia, also known as virtual dementia, is not a formally recognized medical condition, yet it is gaining a growing attention in neuroscience and public health discourse. The concept describes dementia-like symptoms - such as memory lapses, reduced attention span and impaired cognitive processing - arising from excessive reliance on digital devices and screen-based activities. Although still debated, this evolving framework highlights the potential long-term impact of digital lifestyles on brain health and has sparked increasing concern among researchers, clinicians and policymakers.[4]

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In recent years, the development of digital tools, including smartphones, social media platforms and artificial intelligence technology, has led to a substantial paradigm shift in how we interact with information. These gadgets have undoubtedly improved our lives by providing extraordinary comfort in terms of connectivity, speed and efficiency.[5] But constant scrolling, instant notifications, and exposure to fast-paced content overstimulate the brain's reward system, reducing tolerance for slower, deeper emotional exchanges and often making individuals more reactive or irritable in real-world interactions, especially in children and among the young generation.

Memory Impairment

Digital dementia refers to the tendency to forget information that is readily accessible through digital devices, a phenomenon that has become increasingly prevalent with the widespread use of smartphones, cloud storage and search engines. In cognitive neuroscience terms, it reflects a shift in how the brain encodes, stores and retrieves information. Normally, memory formation involves deep encoding through attention, elaboration and consolidation processes that engage the hippocampus and interconnected cortical regions. Also, another term, digital amnesia, is not pathological in itself; its cumulative impact, combined with other effects of digital overuse such as attentional fragmentation, may contribute to measurable cognitive inefficiencies over a period of time.[6,7] The growing human brain is constantly building neural connections while pruning away less-used ones, and digital media use may play a negative role in this normal process.

Language and attention problem

Neuroimaging links heavy screen time with decreased gray matter regions controlling emotional regulation, memory, and impulse control, as well as lower white matter integrity. Problems like shorter attention spans, fragmented focus, difficulty in forming long-term memories, language problems, as well as executive

dysfunction in terms of critical thinking, problem-solving, and impulse control, are also affected.[8]

Reduced skill and awareness

Children rely on physical facial cues to build empathy. Fast-paced, on-screen content can also trigger chronic "fight-or-flight" stress responses, resulting in increased anxiety and emotional dysregulation, which affect social and emotional functions. Lack of physical activity decreases spatial awareness and delays motor skills.[9]

Sleep disturbance

Blue light disrupts essential sleep cycles needed for brain restoration. A goodnight sleep is also key for brain development. Using blue light-emitting screen devices like smartphones before bedtime can disrupt sleep patterns by suppressing secretion of the hormone melatonin. Many teens who stay up late texting are not only getting less shut-eye, they are also lacking the deep REM sleep essential for processing and storing information from that day into memory.[10]

Long term learning

Increased screen time and digital device use can have widespread consequences, particularly on learning. Storing information on digital devices reduces the need for individuals to use their own memory abilities[11].

However, strategies for mitigation and prevention can effectively counter these effects.

1. Strive for balanced device use.

- Set specific times for using digital devices.
- Practice taking regular breaks from devices to reduce screen time.
- Use devices for productive purposes rather than constant entertainment or social media
- Keep smartphone or tablet in a separate room or out of reach from the children.

2. Engage in mentally stimulating activities.

- Engage in activities that challenge the brain, such as puzzles, reading, or learning new skills.
- Practice memory exercises, such as recalling information without digital aid.

3. Lead a healthy lifestyle.

- Ensure adequate sleep by limiting screen time before bed and using blue light filters on devices.
- Maintain a balanced diet and regular physical exercise, both of which support cognitive health.

Final messages are that digital dementia, or virtual dementia, represents a potentially reversible form of technology-associated cognitive impairment. Appropriate digital hygiene and proper use of this technology, proper cognitive training, and policies can protect cognitive health.

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