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Cognitive Disease and Age-Related Cognitive Decline

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Many aspects of the aging process, such as cognitive decline, are oftentimes overlooked by the general public; thus, it is important to understand aging as it relates to cognitive health and to view cognitive decline as a prevalent health concern. The aging process and the inevitable effects of aging are universal experiences, thereby allowing aging to be observed from the perspective of the medical humanities. Having a better understanding of cognitive decline and looking at aging from the medical humanities perspective can increase awareness about the differences between healthy aging and abnormal aging.

Cognition can be defined as the "mental action or process of acquiring knowledge and understanding through thought, experience, and the senses" (Dhakal et al., 2022). The CDC further describes cognition as a "combination of processes in the brain that includes the ability to learn, remember, and make judgments" (2019). Cognition is a multidimensional mental experience that involves the use of existing knowledge and the generation of new knowledge. The dimensions of cognitive functioning and processing include processing speed, attention, memory, meta-memory, language, perception comprehension, executive functions, visuospatial function, and language (Mendoza-Ruvalcaba et al., 2017). The natural aging process involves changes to human cognition. Changes associated with aging include delayed processing, decreased working memory, decline in performance on cognitive tasks, and slowed executive cognitive function (Murman, 2015). The field of cognitive gerontology brings attention to this direct association between aging and health.

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Cognitive gerontology plays a consequential role in aging, particularly in successful aging. In gerontology, cognitive decline is an especially important health concern due to its high prevalence amongst the older population. The study of cognitive ability amongst the aging population is pertinent because it acts as a risk factor for other issues associated with old age, including depression, frailty, and physical disability (Mendoza-Ruvalcaba et al., 2017). Early pathological changes in cognitive function – otherwise known cognitive decline – are considered "a preclinical state that may progress to dementia" in older individuals (Mendoza-Ruvalcaba et al., 2017). Murman states that structural and functional changes in the brain correlate with age-related cognitive changes (2015). These changes encompass "alterations in neuronal structure without neuronal death, loss of synapses, and dysfunction of neuronal networks" (Murman, 2015). Additionally, other age-related diseases also contribute to poor cognitive changes. These diseases "accelerate the rate of neuronal dysfunction, neuronal loss, and cognitive decline, with many persons developing cognitive impairments severe enough to impair their everyday functional abilities" (Murman, 2015). Impaired cognition has an extensive impact on the health and mental wellbeing of humans.

The Centers for Disease Control and Prevention (CDC) describes Subjective Cognitive Decline (SCD) – as the "self-reported experience of worsening or more frequent confusion or memory loss" (2019). The CDC further states that cognitive decline is "a form of cognitive impairment"; it serves as "one of the earliest [and most] noticeable symptoms of Alzheimer's disease and related dementias" (2019). Cognitive decline varies in severity. The spectrum of cognitive decline ranges from low severity to high severity in which mild cognitive impairment (MCI) is of low severity whereas dementia and other cognitive disorders are of high severity (CDC, 2019).

Cognitive impairment — otherwise known as cognitive deficit — is an all-encompassing term that can be used to "describe the impairment of different domains of cognition" (Dhakal et al., 2022). It should be noted that cognitive impairment is not limited to a certain disease; rather, cognitive impairment is a manifestation of an individual's underlying condition (Dhakal et al., 2022). Cognitive impairment is highly variable in how it presents itself; thus, the presentation of cognitive impairment varies from person to person (Dhakal et al., 2022). The term "cognitive impairment" can refer to a condition that is short-term and impermanent, or it can refer to a condition that is progressive and permanent (Dhakal et al., 2022). The National Cancer Institute (NCI) defines cognitive impairment as "problems with a person's ability to think, learn, remember, use judgment, and make decisions" (2022). Signs of cognitive impairment include "memory loss and trouble concentrating, completing tasks, understanding, remembering, following instructions, and solving problems" (NCI, 2022). Other indicative signs of cognitive impairment are "changes in mood or behavior, loss of motivation, and being unaware of surroundings" (NCI, 2022).

Cognitive disorders — in comparison to cognitive impairment — are a "bigger entity" due to the association with neurocognitive disorders (Dhakal et al., 2022). Dhakal et al. describes cognitive disorders as "any disorder that significantly impairs the cognitive functions of an individual to the point where normal functioning in society is impossible without treatment" (Dhakal et al., 2022) The nature of neurocognitive disorders is dependent on their cause. For instance, the reversibility or irreversibility of a neurocognitive disorder is conditional on the origin of the disorder. MedlinePlus is a trusted health information resource that was developed by the United States National Library of Medicine. MedlinePlus explains that a neurocognitive disorder is a general term that is used to describe "decreased mental function due to a medical disease other than a psychiatric illness" (2022b). MedlinePlus further explains that neurocognitive disorders can be divided into three distinct categories: delirium, mild neurocognitive disorder, and major neurocognitive disorder (2022b). Delirium can be defined as the "sudden severe confusion due to rapid changes in brain function that occur with physical or mental illness" (MedlinePlus, 2022a). Mild neurocognitive disorder is characterized by partially decreased mental function; however, the individual is still able to practice independence and perform day-to-day tasks (MedlinePlus, 2022b). Mild neurocognitive disorder is more commonly referred to as *mild cognitive impairment* (MCI). Alternatively, major neurocognitive disorder is characterized by a drastic decrease in mental function (MedlinePlus, 2022b). In *major neurocognitive disorder*, one loses the ability to perform daily tasks and is unable to remain independent. The term *major neurocognitive disorder* is relatively new; this cognitive condition was previously referred to as *dementia*.

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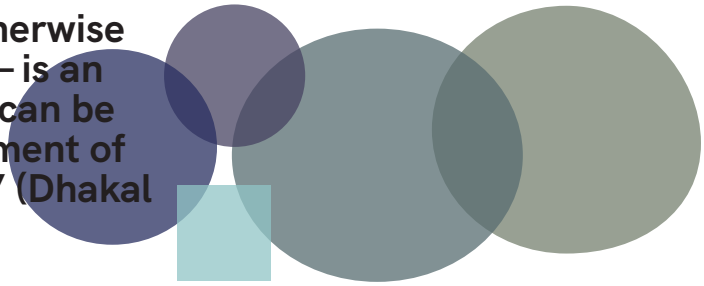
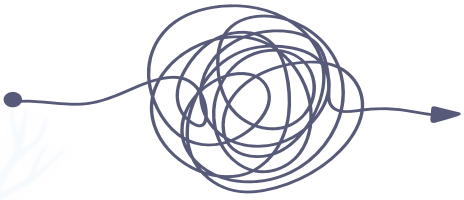


The Diagnostic and Statistical Manual of Mental Disorders (DSM) has stopped using the term dementia to collectively refer to the different levels of cognitive decline (Baptist Health, 2022). The DSM now utilizes the terms *major neurocognitive disorder* and *minor neurocognitive disorder* to reference the two most distinct stages in the progression of cognitive decline (Baptist Health, 2022). It should be noted that the distinction between common forgetfulness and cognitive decline lies in the repetitiveness or severity of one's cognitive behavior. If an individual has difficulty communicating, experiences noticeable memory loss, struggles to perform daily tasks, and has symptoms relating to mood, personality, and confusion – the said individual has a neurocognitive disorder as opposed to the occasional bout of forgetfulness.

Contrary to popular belief, MCI is not the equivalent of dementia. Instead, it is more accurate to say that MCI is the one of the earlier stages of cognitive decline that can eventually progress to dementia. Knopman et al. explains that "the prognosis for mild cognitive impairment and mild dementia is an important motivation for diagnosis" due to the fact that "there is a heightened risk for further cognitive decline" (2014). Knopman et al. goes on to explain that while "both mild cognitive impairment and mild dementia are characterized by objective evidence of cognitive impairment", the main difference is that dementia has "more than one cognitive domain" involved as well as "substantial interference with daily life" (2014). Mayo Clinic declares that MCI "is the stage between the expected decline in memory and thinking that happens with the and the more serious decline of dementia" (2022). Additionally, Mayo Clinic asserts that "MCI may increase the risk of dementia caused by Alzheimer's disease or other brain disorders" (2022). It is important to understand that the progression to dementia is not inevitable if an individual has MCI regardless of the fact that the likelihood of a dementia diagnosis is increased. A number of individuals with MCI may see that their cognitive condition remains unchanged while others can recover completely (Mayo Clinic, 2022). Mayo Clinic states that research on the relation between MCI and dementia finds that "around 10% to 15% of people with MCI go on to develop dementia each year" (2022). Thus, despite the risk that MCI poses in relation to the development of dementia, the likelihood of progression to dementia is lesser than that of recovery.

Cafasso notes that cognitive impairment in normal aging would consist of the occasional forgetfulness and some subtle issues with activities that involve multitasking and concentration (2022). The two aforementioned characteristics are associated with MCI as well. In addition to these characteristics, cognitive decline in MCI would also involve forgetting important information (names, dates, and events), having difficulty producing and utilizing the correct terminology in a conversation, and struggling with comparatively complex tasks that involve planning and organizing (Cafasso, 2022). Cognitive impairment in dementia involves all of the previously described features in addition to more enervative characteristics. The additional characteristics of cognitive decline in dementia include the inability to perform fundamental tasks (using the restroom, getting dressed, eating), issues with the use of accurate language and the incapacity to adequately engage in conversation, the display of inappropriate behavior, changes in personality, wandering and getting lost, problems with balance and coordination, frequent falls and excessive tripping, and finally — repeating a statement, story, or question multiple times (Cafasso, 2022). Cognitive decline is undoubtedly an inevitable part of aging. The McKnight Brain Institute at the University of Florida (MBI-UF) describes cognitive aging as "a natural process in which older adults typically experience decline in many functions, such as memory, that can negatively impact their quality of life" (2022). Cognitive aging is natural and unavoidable; however, cognitive aging in individuals with MCI and dementia is atypical and life-altering.



The National Institute on Aging (NIA), a division of the National Institutes of Health (NIH), asserts that dementia is not a normal part of aging. Dementia is a general term used to refer to a group of conditions that can be characterized by impairment of cognitive functions. The CDC states that the term dementia references the "impaired ability to remember, think, or make decisions that interferes with doing everyday activities" (2019). Dementia includes "the loss of cognitive functioning — thinking, remembering, learning, and reasoning — and behavioral abilities to the extent that it interferes with a person's quality of life and activities" (NIA, 2020). There are multiple different forms of dementia with Alzheimer's disease being the most common form amongst individuals over the age of 65 (NIA, 2020).

Alzheimer's disease is the most frequently occurring type of dementia; it is ranked as the seventh leading cause of death amongst the American population (NIA, 2021). Although the most heavily impacted population is that of older adults, Alzheimer's disease is not typical of late adults. The NIA describes Alzehimer's disease as a "brain disorder that slowly destroys memory and thinking skills, and, eventually, the ability to carry out the simplest tasks" (2021). Evidence demonstrates that, in most cases, symptoms of Alzheimer's appear later in life with subtle changes in the brain appearing nearly a decade or more before symptoms appear (NIA, 2021). The NIA states that the early stages of Alzeimer's disease involve highly toxic shifts in brain function (2021). The progression of Alzehimer's disease involves increased neuron death (NIA, 2021). As an increasingly high rate of neurons die, additional segments of the brain are negatively impacted and begin to shrink (NIA, 2021). Towards the final stages of Alzehimer's disease, damage to brain tissue becomes extensive and unmanageable (NIA, 2021). The brain atrophy and shrunken brain tissue that are associated with Alzeihmer's disease are the two primary reasons why Alzhimer's disease is particularly detrimental and differs so greatly from healthy aging (NIA, 2021). Alzheimer's disease is highly misunderstood; research relevant to the brain function of individuals with Alzheimer's disease is still ongoing.

Poor cognitive health is caused by a number of different genetic, environmental, and lifestyle factors. The NIA states that these factors "may contribute to a decline in thinking skills and the ability to perform everyday tasks such as driving, paying bills, taking medicine, and cooking" (2020). Genetic factors cannot be managed as they are inherited. Environmental and lifestyle, however, *can* be managed. The NIA lists the following as environmental and lifestyle factors that can contribute to cognitive decline: physical health problems, mental health problems, brain injuries due to falls, certain medications, the improper use of medication, lack of physical activity, a poor and unbalanced diet, smoking cigarettes, drinking alcohol, sleep problems, and social isolation and loneliness (2020).

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