Cognitive Decline/Cognitive Disorder

1. Cognition and Cognitive Functions

Cognition is the process through which humans perceive, acquire, and utilize new information and knowledge. This is achieved through cognitive/mental functions such as perception and attention, memory processes, language, reasoning, abstract thinking, problem-solving, decision-making, and emotional adaptability. Cognition and cognitive functions define us as humans and differentiate us from other organisms. They are essential for both simple activities, like washing dishes, and more complex ones, such as retaining information from a news broadcast or planning and executing summer holidays.

Cognitive functions develop throughout life. Although most development occurs during childhood, skills such as language (e.g., vocabulary), reasoning, and abstract thinking continue to enrich through adult experiences and form part of the "crystallized" knowledge, which is resistant to time. Other functions, like processing speed, multitasking ability, or switching between mental tasks, fall under "fluid" knowledge and are more vulnerable to aging. Studies show alterations in cognitive functions even in early adulthood (e.g., after age 30), but these become more pronounced after age 60. Subjective difficulties reported by individuals over 60 include trouble finding the right word or name and needing repetition of information for better retention and later recall.

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2. What Is Mild Cognitive Impairment (MCI)

Cognitive difficulties observed in older age are usually subtle, develop gradually allowing the individual to adapt over time, and don't significantly interfere with daily life. However, when a person experiences difficulties in one or more cognitive functions,commonly memory or language,to a degree that causes distress and affects daily life, further investigation is warranted to determine the level and cause of the difficulty.

The diagnosis of **Mild Cognitive Impairment (MCI)** is given when the individual experiences mild difficulties (i.e., 1.5 standard deviations below the average for their age and educational level) in one or more cognitive domains. However, the person remains independent, functional, and continues to manage daily responsibilities effectively.

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3. Causes of MCI

The main risk factor for MCI is age. Recent studies identify additional risk factors that accumulate across childhood, early, middle, and late adulthood and contribute to the onset of MCI. Remarkably, **modifiable risk factors account for around 45% of the risk**. High blood pressure, excess body weight, depression, hearing loss in midlife, and medical issues such as brain injuries (e.g., concussions), respiratory problems, type II diabetes, and infections like COVID-19 have been documented as risk factors. Moreover, in some cases, MCI is **reversible**, such as when caused by severe vitamin deficiencies, hormonal disorders, or psychiatric illnesses like depression. According to data from the Neurocognitive Study on Aging at the Center for Applied Neuroscience at the University of Cyprus (www.cancyprus.org), which has monitored a representative sample of Cypriots since 2009 and explores factors affecting brain health, **5–10% of Cypriots over 65 meet the criteria for MCI**, and the rates increase with age.

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4. Prevention

For many people diagnosed with MCI, the condition is not reversible. In such cases, MCI is considered a **transitional phase** between healthy cognitive aging and major neurocognitive disorder, commonly known as dementia.

Dementia is a syndrome of symptoms caused by brain dysfunction, resulting in significant decline (more than 2 standard deviations below the mean) in at least two cognitive functions, as well as impaired adaptability, which significantly impacts daily functioning, safety and independence.

Although Alzheimer's disease is the primary cause of dementia, other conditions like **vascular brain disease** and **Parkinson's disease** are also causes.

Screening programs, such as those in the **Neurocognitive Study on Aging,** help with early detection and prevention.

Findings from this study are encouraging: individuals aged 60+ who were cognitively healthy upon entering the study remained healthy for up to five years, **provided** they have not experienced significant medical issues such as stroke, cardiovascular disease, or depression. Therefore, prevention, good physical and mental health, and proper management of risk factors (e.g., using hearing aids, proper nutrition) contribute not only to **physical** but also to **brain health**.

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5. Management and Rehabilitation of Individuals with MCI

Early and accurate diagnosis is essential in addressing the difficulties caused by MCI. A person with MCI remains functional and can benefit from strategies aimed at improving memory, language, and other cognitive functions.

The **first pillar** of treatment involves proper differential diagnosis, identification of the aforementioned risk factors, and the appropriate intervention to improve both general/physical and brain health. A key goal is to **stabilize the clinical picture** and preserve the individual's functionality.

The **second pillar** is **targeted and evidence based cognitive rehabilitation programs**.Research shows that structured cognitive intervention programs help individuals develop strategies to improve memory, organization, language, and problem-solving. Even a **one-year extension** of independent functioning and reduced reliance on others has a meaningful impact on the individual, their family, and society. **Emotional regulation and adaptability** interact with cognitive well-being.

Thus, in addition to cognitive rehabilitation, **psychological support** and addressing mood or anxiety issues contribute to both mental well-being and overall functionality.

Also, managing **sleep disorders**, following a **healthy diet**, and engaging in **physical activity** are important in rebuilding the nervous system and supporting the cognitive system.

Finally, activities that promote flexible and creative thinking (such as crafts, board games, crosswords, and sudoku)are **encouraged** but **do not replace** cognitive rehabilitation provided by a **qualified healthcare professional**.

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6. The Role of the Speech and Language Therapist in MCI

The **speech and language pathologist or therapist (SLP/SLT)** is an essential member of the multidisciplinary team supporting a person with MCI.
They contribute to the **initial diagnosis** through cognitive-linguistic assessment, the results of which help the healthcare team determine the MCI diagnosis.

With specialized training in cognitive rehabilitation, the SLT designs the intervention plan in collaboration with the patient.

They coordinate with other healthcare professionals to ensure that interventions are **patient- and family-centered**.

Finally, the SLT supports psycho**education and guidance** for the individual and their family,helping them understand the condition, identify resources and support systems, and plan for the future as needs evolve.

References

1. Chadjikyprianou, A., & Constantinidou, F. (2023). A new multidimensional group intervention for cognitive and psychosocial functioning for older adults: Background, content, and process evaluation. Genetic Medicine, Volume 10. https://doi.org/10.3389/fmed.2023.1161060.
2. Constantinidou, F. (2019). Effects of Systematic Categorization Training on Cognitive Performance in Healthy Older Adults and in Adults with Traumatic Brain Injury. Behavioural Neurology, https://doi.org/10.1155/2019/9785319.
3. Chadjikyprianou, A., Hadjivassiliou, M., Papacostas, S., & Constantinidou, F. (2021). The Neurocognitive Study for the Aging (NEUROAGE): Longitudinal Analysis on the Contribution of Sex, Age, Education and APOE-4 on cognitive Performance. Frontiers in Genetics, 12, 1179. https://doi.org/10.3389/fgene.2021.680531.
4. Dimitriadou, M., Michaelides, M., Bateman, A., & Constantinidou, F (2018) Measurement of everyday dysexecutive symptoms in normal aging with the Greek version of the Dysexecutive Questionnaire-Revised. Neuropsychological Rehabilitation, 3(6), 1024-1043. https://doi.org/10.1080/09602011.2018.1543127.
5. Livingston, G. et al., (2024). Dementia prevention, intervention, and care: 2024 report of the Lancet standing Commission. Lancet. Aug 10;404(10452):572-628. doi: 10.1016/S0140-6736(24)01296-0.
6. Maharani, A., Dawes, P., Nazroo, J., Tampubolon, G., Pendleton, N., Bertelsen, S.C.W.G., Cosh, S., Cougnard-GrÃ, A., Dawes, P., Constantinidou, F. and Goedegebure, A. (2020). Associations Between Self-Reported Sensory Impairment and Risk of Cognitive Decline and Impairment in the Health and Retirement Study Cohort. Journals of Gerontology: Series B, 75(6), 1230-1242.
7. Nikolaou, F., Michaelides, M., Prokopiou, J., Metaxas, G., & Constantinidou, F. (2024). The Effects of Age, Sex and Education on HVLT-R Performance Across the Lifespan: Data from the NEUROAGE Cohort. Psychology: the Journal of the Hellenic Psychological Society, 29(2), 105-118. https://doi.org/10.12681/psy_hps.35866.
8. Pettemeridou, E., Kallousia, E., & Constantinidou, F. (2021). Regional Brain Volume, Brain Reserve and MMSE Performance in Healthy Aging From the NEUROAGE Cohort: Contributions of Sex, Education, and Depression Symptoms. Frontiers in Aging Neuroscience, 13, 711301-711301. https://dx.doi.org/10.3389%2Ffnagi.2021.711301.
9. Philippou, E., Michaelides, M. P., & Constantinidou, F. (2018). The role of metabolic syndrome factors on cognition using latent variable modeling: The neurocognitive study on aging. Journal of clinical and experimental neuropsychology, 1-14. https://doi.org/10.1080/13803395.2018.1483487.
10. WHO (2024). Integrated care for older people (ICOP). 2nd Edition. ISBN: 9789240103726. https://www.who.int/publications/i/item/9789240103726.