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Independent Study and Mentorship I

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Technology and Dementia: The Future is Now

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Astell, Arlene J et al. "Technology and Dementia: The Future is Now." *Dementia and geriatric cognitive disorders* vol. 47,3 (2019): 131-139. doi:10.1159/000497800. Accessed 06 Nov. 2020.

Assessment:

In order to provide insight into the role of technology in the treatment and prevention of Alzheimer's in my comprehensive patient guide for Alzheimer's Disease (AD), I read "Technology and Dementia: The Future is Now" by Arlene J. Astell. This article provided an informative overview as I was able to learn more about how development in technology is advancing diagnosis, assessment and monitoring, maintenance of functioning, leisure and activity, and caregiving and management for patients suffering from dementia, a common symptom of AD.

Foremost, I learned about how traditional cognitive tests like the mini-mental status examination (MMSE) are transformed into web-based and app-based assessments to diagnose dementia. Current touchscreen-based cognitive assessments in place include the Cambridge Neuropsychological Test Automated Battery and Examen Cognitif par Ordinateur with clock-drawings and other conventional tasks. Everyday activities like "making tea and toast, coffee-making" are even simulated through these technological assessments. Technology has also been leveraged to offer results

beyond standard cognitive tests as systems like Cognitive Orthosis for Assisting aCtivities at Home (COACH) have utilized computer vision to monitor patients' activity during common tasks like hand washing; it uses artificial intelligence to announce verbal prompts. This is extremely beneficial because it allows patients to be "tested" while they are performing daily tasks while they also receive instant commands to ensure that they complete the task correctly. Additionally, technology has served as a gateway to efficient diagnosis as cloud computing and data analytics systems like the Big Data for Advancing Research Project are able to extract large amounts of data from health records, fluid biomarkers, and magnetic resonance imaging (MRI) patterns and analyze it to identify dementia in its earlier stages in patients.

In addition to diagnostic and monitoring functions, technology has become crucial to support the emotional and intellectual needs of patients. Music and art platforms have become popular as patients are able to immerse themselves in leisurely activities while also enhancing their memory and other cognitive functions. To complement these therapy-based outlets and improve quality of life, dementia patients have also been encouraged to socialize through video conferencing applications (ie. Skype, Facetime, Zoom). This diminished the emergence of negative emotions and agitation, helping to maintain good mental health. Furthermore, digital tools like virtual reality (VR) and video games have been employed to serve as brain training and cognitive evaluations that are engaging and entertaining for the patient.

Something incredibly interesting mentioned in the article was the potential for nanotechnology to be used for repairing brain damage and/or drug delivery. Delivering interventions for people with dementia and hopefully before the onset of dementia will be crucial in the prevention of the condition and effective treatment. Moreover, I was fascinated by the idea of smart homes that emerged in the late

1990s as personal caregivers for dementia patients. Being able to trace the roots of designs for smart hubs (ie. Google Home, Alexa) that we know today and knowing that they were created for the purpose of assisting patients is very intriguing. This advancement in the technological industry paves the path for clinical trials being conducted within one's home; this possibility would eradicate troubles of transportation for bed-ridden patients and facilitate easy assessments to track the progression of dementia or AD.

Overall, the article "Technology and Dementia: The Future is Now" was extremely helpful in furthering my research on AD as it allowed me to learn about the machinery being used for treatment, diagnosis, and while also gaining a look into prospective developments in technology in the future. The article stated the use of "in-home sensors, wearable monitoring, and integration of devices for healthcare management". However, I was not sure about the logistics behind these technologies and how they function. *Do these types of equipment track the electrical activity of the nerves in the brain? How effective are they in predicting the progression or presence of Alzheimer's? Have they been tested?* Additionally, because the article primarily focuses on the positive attributes of technology for use by dementia patients, I had a few questions that came to mind: *If patients spend copious amounts of time with technology, will the blue-light emitted not further decay brain cells? What is the proper amount of screen time?* These are questions that I intend to explore further as I continue my research. My findings on the biological aspects of Alzheimer's has given me an excellent understanding of the complexities of the disorder and ignited in me a willingness to achieve an in-depth understanding of other facets associated with AD as I piece together my original work.

My annotated article can be found here.