Chapter 18
Technology-Aided Solutions to Promote the Healthcare of Neurodegenerative Diseases: A Narrative Review

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ABSTRACT

The chapter provides the reader with a narrative overview of technological-aided solutions to help individuals with neurodegenerative diseases. Five categories were identified, namely (1) functional and physical activities, (2) communication skills, (3) positive participation, (4) leisure and recreation, and (5) telerehabilitation. Results were fairly satisfactory although few failures occurred. Findings and implications were critically discussed. Some useful insights for future research and practice were highlighted.

INTRODUCTION

Young and older adults with neurodegenerative diseases (e.g., Alzheimer disease, Parkinson disease, amyotrophic lateral sclerosis and multiple sclerosis) may present relevant problems and pose significant challenges to daily contexts such as families, caregivers, professionals, and medical or rehabilitative centers. Thus, they frequently exhibit communicative, emotional, intellectual, motor, and social disorders while tackling day life requests. Because of their significantly compromised health conditions, individuals with severe disabilities basically experience isolation, passivity, and detachment with negative consequences on their quality of life. That situation may meaningfully hamper their social image, desirability, and status. In

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fact, they constantly rely on caregivers' assistance (Bassi et al., 2020; Gil-Gonzales, Perez-San-Gregorio, Conrad, & Martin-Rodriguez, 2021; Schischlevskij et al., 2021). To favorably overcome this issue, one may rely on assistive technology-based programs (AT). Such approach includes basic supports to help people with relevant disorders within daily settings. AT-based interventions are implemented to fill the existing gap between the individual's capacities and the environmental' s requests. Moreover, AT may build a functional bridge enabling self-determination of persons with different levels of disabilities and decreasing caregivers' burden accordingly (Behera, Condell. Dora, Gibson. And Leavy, 2021; Gongora Alonso et al., 2019). Thus, an active role, constructive engagement, and functional occupation of individuals with neurodegenerative disorders may be enhanced (Leuty, Boger, Young, Hoey, & Mihaillidis, 2013; Savvidis et al., 2018).

Recently, Covid-19 pandemic dramatically exacerbated the precarious conditions of persons with neurodegenerative diseases (NDD) due to quarantine and social distancing preventive measures. Additionally, the unavailability of National Medical Services reduced the opportunity in NDD people to receive adequate medical care. The diffusion of the vaccine partially improved that situation. To overcome this latter issue, one may use telerehabilitation strategies (TR) (Akbas & Mummolo, 2021; Caprì et al., 2021).

For example, Hung and Fong (2019) reviewed the current literature on the application of TR in occupational therapy practice and its clinical outcomes over last decade. Studies retrieved from seven electronic databases were assessed and findings evidenced positive therapeutic effects although data were considered insufficient to demonstrate the validity of TR compared to face – to – face interventions. Caprì et al. (2021) systematically reviewed the literature on the use of TR in individuals with multiple disabilities, and examined the effects of TR on adaptive skills of individuals with severe to profound and multiple delays. Furthermore, the different types of devices and families' satisfaction were assessed. Nevertheless, by including AT, NDD, and TR in Scopus, no records were found.

In light of the above, the first goal of the chapter was to provide the readers with an update and concise narrative overview on the use of AT-based programs and TR to promote cognitive, communicative, and motor functions in persons with NDD. Positive participation and leisure opportunities were additionally examined. The second objective of the chapter was to emphasize advantages and limitations of the adopted technological solutions. Finally, some useful insights for both future research and practice were critically discussed.

BACKGROUND

AT-based strategies may provide persons diagnosed with different neurodegenerative diseases and various levels of disabilities with a valid aid in basic problematic domains. For instance, independent access to positive stimulation, functional activities, physical exercise, reminiscence, communication skills, leisure and recreation, request and choice processes are frequently included (De Pace & Stasolla, 2014; Stasolla, Perilli, & Boccasini, 2016). Furthermore, the area of detachment and passivity encompasses the difficulty of being favorably committed in adaptive behaviors and/or physical activities with beneficial consequences. Functional activities may be considered as crucial for occupational purposes. Communication skills and reminiscence are essential for social interaction and recovery of personal events. Leisure and recreation domains include the inability of manage leisure or recreation opportunities independently. Request and choice processes refer to the awareness and the capacity to select and ask for desired items, and satisfy personal needs (Lancioni & Singh, 2014). AT-based interventions are