Digital cognitive interventions for people with cognitive impairment

The growing ageing population has increased the demand in interventions to address cognitive impairment associated with ageing. Traditional non-pharmacological interventions targeting cognition rely on the direct contact between care staff and the service users. This service arrangement might be affected by a wide range of factors, such as the availability of a meeting venue, manpower, travel time, and even weather. Elderly with fewer resources, in particular, might find it hard to receive the services they need [1].

The interest in digital interventions is emerging in recent years. With the flexibility to be delivered at home with little supervision, computer-based activities provide more options in time and location compared to face-to-face interventions. Programmed intervention materials ensure consistency in the stimulus. For people who cannot receive direct service, computer-based cognitive intervention might be a potential alternative. Besides, compared with paper-and-pen interventions, a real-time feedback and score recording provided by computer programs make it easier to keep track on the training progress [2].

Computer training program is also effective in enhancing the cognitive performance of people with mild cognitive impairment [3]. In a recent research on a home-based online training program, Lin et al. [4] reported that the intervention significantly improved both trained and untrained domains in people with mild cognitive impairment. Participants spent one hour per day for four days a week over the course of six weeks on vision-based, speed-of-processing tasks. They received a cognitive test after the training, their performance in selected instrumental daily life activities were timed, and their test results were compared to people who spent the same amount of time on leisure games. The results showed that participants not only improved in trained process speed, but also showed significant improvement in working memory, and the time they needed to perform tasks of daily activities was significantly lower. It was suggested that the rich stimulation provided by computer speed-of-processing training might be able to help memory and functional abilities.
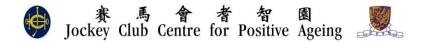
Computer-based cognitive interventions were also found to benefit the cognition in people with dementia [5]. A computer game program developed to stimulate cognitive abilities was provided to 348 elderly in four European countries, among which 118 were people with dementia. Participants attended a 60-minute gaming session twice-weekly for 12-week. Comparing to people who were on waitlist, participants who received intervention showed improvement in overall cognition, verbal memory, and executive functions [6].

It is uncertain whether a short-term commitment in computer cognitive activities can delay the progression of dementia as it might require sustained training to achieve so [7]. However, computer use might provide high motivation for continued learning. Older adults are able to engage in enjoyable activities without time constraints, and the experience of novel technology is reported to increase self-confidence [8]. In the mean time, the use of technologies among older people in Hong Kong is increasing in rapid speed. In 2009, 10.6% of people aged 65 or above were reported to have knowledge of using personal computer. In 2014, the percentage of computer knowledge increased to 23.5%, and 24.3% of people aged 65 years or above were reported to have owned a smartphone within the previous year [9]. As digital devices become more accessible, digital cognitive interventions will be likely to become more disseminative, with the hope to benefit elderly with weaker mobility, less social support, and even those who are admitted into long term care facilities.

References

1. Kueider AM, Parisi JM, Gross AL, Rebok GW. Computerized cognitive training with older adults: a systematic review. PloS one. 2012;7(7):e40588.
2. Wild K, Howieson D, Webbe F, Seelye A, Kaye J. Status of computerized cognitive testing in aging: a systematic review. Alzheimer's & Dementia. 2008;4(6):428-437.
3. Hill NT, Mowszowski L, Naismith SL, Chadwick VL, Valenzuela M, Lampit A. Computerized Cognitive Training in Older Adults With Mild Cognitive Impairment or Dementia: A Systematic Review and Meta-Analysis. American Journal of Psychiatry. 2016:appi. ajp. 2016.16030360.
4. Lin F, Heffner KL, Ren P, et al. Cognitive and Neural Effects of Vision-Based Speed-of-Processing Training in Older Adults with Amnestic Mild Cognitive Impairment: A Pilot Study. Journal of the American Geriatrics Society. 2016;64(6):1293-1298.
5. García-Casal JA, Loizeau A, Csipke E, Franco-Martín M, Perea-Bartolomé MV, Orrell M. Computer-based cognitive interventions for people living with dementia: a systematic literature review and meta-analysis. Aging & mental health. 2016:1-14.
6. Zaccarelli C, Cirillo G, Passuti S, Annicchiarico R, Barban F. Computer-based cognitive intervention for dementia sociable: Motivating platform for elderly networking, mental reinforcement and social interaction. Paper presented at: 2013 7th International Conference on Pervasive Computing Technologies for Healthcare and Workshops2013.
7. Singh MAF, Gates N, Saigal N, et al. The Study of Mental and Resistance Training (SMART) study—resistance training and/or cognitive training in mild cognitive impairment: a randomized, double-blind, double-sham controlled trial. Journal of the American Medical Directors Association. 2014;15(12):873-880.

8. Chen Y-RR, Schulz PJ. The effect of information communication technology interventions on reducing social isolation in the elderly: A systematic review. Journal of medical Internet research. 2016;18(1).

9. Census and Statistics Department. Thematic Household Survey Report No. 54: Information technology usage and penetration. Hong Kong Special Administrative Region 2015.

[End of document]