Technology And Fall Prevention In Older Adults

Singapore is one of the countries that have a rapidly aging population in the world, and it is estimated that one in four Singaporean will be aged 65 and above in 2030 (Department of Statistics Singapore, 2019). The increasing aging population also brings along lots of issues and concerns. Fall is one of the issues facing by the elderly, political maker and other stakeholders. Fall is the second leading cause of death (World Health Organization, 2018). Study shows that approximately 28% to 35% of people aged 65 years and above fall at least once per year worldwide (World Health Organization, 2008). For individuals, fall may lead to many negative consequences, physical injury is the most common complications after a fall. Study shows that 20-30% of the elderly will have severe injuries, such as skin breakdown, cuts, bruises and even fracture (World Health Organization, 2018). It may also lead to psychological consequences, such as fear of falls, loss of self-esteem, loss of confidence in walking or even depression (Korzelius & Le, 2017). Moreover, the fall of the elderly also places a big burden on the family, not only financially, but physically. The family may consume a lot of time in caring for the injured elderly. some of the injuries are irreversible, they may need long term care from family. Besides that, fall also leads to a high hospitalization rate and high medical cost. Statistics show that 37.3 million falls occur each year, which requires medical attention (World Health Organization, 2018). The cost of fall induced hospitalization is about USD 1.6 billion in the United Kingdom and USD 23 billion in the USA (Davis et al., 2010). Hence, fall is an important issue to be addressed in the elderly population.

There are many contributing factors to fall in the elderly population. Muscle weakness is one of them. Study shows that muscle loss is a part of the normal aging process. It will decrease by 1% to 2% per year after the age of 50 years old (Marzetti & Leeuwenburgh, 2006). Muscle mass, strength, and structure will be affected if the elderly is inactive or have a sedentary lifestyle (Seene, Kaasik, & Riso, 2012). Therefore, maintain a good muscle condition is necessary for fall prevention. The study also shows that regular exercise essential in preventing muscle weakness and functional decline (Marzetti et al., 2017).

Innovation

The name of my innovation is TELE (To Exercise and Enrich life). It's an App that is designed for the elderly to exercise with a group of people. Instead of meeting their exercise buddy physically, this App allows them to meet without traveling. They can have their online live class/training/routine exercise at home. The trainers are retried physiotherapist who is interested in geriatric care.

TELE is a face to face video-based App which require elderly to log in their own account to join the live training/exercise session. The live training class schedule will be released weekly for the elderly to decide which session they want to join. This design allows them to have a regular exercise which will help in preventing muscle weakness.

This App will provide different size of classes for elderly, as some of the elderly may like to have one to one consultation session with their trainer, some elderly prefer to have 3-5 exercise buddies, or some of them may like to join bigger groups. These have been designed for them to

choose based on their preferences.

Besides that, TELE also provides different types of classes for the elderly, such as routine maintenance exercise, rehabilitation exercise, and chair-based exercise, etc. This design meets different groups of people’s needs.

Furthermore, TELE also provides other group activities for the elderly, such as live singing sessions, game sessions. They can enjoy their time with their buddies online.

Moreover, TELE is not only an exercise App, but it's also a platform for the elderly to meet new friends, especially for those with limited mobility and seldom go out. Elderly or family member can post their photos and videos on TELE as well. It provides more chances of social interaction for the elderly who are homebound.

Originality

This App is an advancement of the current exercise App. There are many popular exercise apps among young adults. They can watch the training videos and do their own exercise in their own place and their own time. There is no “communication” between individuals even though most Apps allow them to post their photos. Similar Apps are available for the elderly too. However, not many elderlies are interested in this kind of exercise.

TELE is particularly designed for the elderly. All the participants are aged 65 and above. The App is elderly-friendly which has a big front and easy steps for the elderly to use.

TELE has its own characteristic which is Live exercise with your trainer and other elderly. all of them will be shown on the screen, which allows them to have a chance to join a group activity without traveling to the daycare centers or other elder care centers. it saves caregivers time for sending them to the place and it also convenient for those with mobility limitations. In another way, it saves the cost of transportation as well.

The live group exercises also give participants motivations compare to individual exercise. Study shows that group-based exercise sessions ensure their attendance and result in a positive behavioral change (Stødle, Debesay, Pajalic, Lid, & Bergland, 2019).

Moreover, group activity also promotes social interactions. Many elderly likes to stay at home, this may lead to loneliness and social isolation, eventually result in depression, anxiety, and other mental health issues. TELE make “face” to “face” communication possible, during or after the exercise session, they can always talk to each other. And other group activities also allow them to interact with others. They can always make new friends on this platform. All these designs keep them away from social isolation.

Feasibility

Firstly, it’s user-friendly, which has simple steps for them to sign in and log in. all they need to do is just join the live training as scheduled. They can access it easily. Furthermore, different classes were designed to meet different elderly’s’ needs. They can choose what suitable to them.

Secondly, it’s cost-friendly. They don't have to buy any special device before joining the program, they just need a smartphone. Nowadays, more and more elderly are using smartphones. Study shows that about half of the elderly who own smartphones, which was just about 20% in 2013 (Anderson & Perrin, 2017). Thus, it’s a “costless” program. Besides that, TELE also saves the transportation costs of transferring the elderly to a place for exercise.

Thirdly, it’s time-friendly, which means that the elderly can join any session at their preferred time. Compared to fixed timing in daycare centers, it’s more flexible for the elderly to plan their sessions. Moreover, it saves caregivers time for sending and fetching them from daycare centers. In another way, it saves time in traveling go daycare centers too.

Fourthly it’s “environment” friendly. The elderly can start the exercise in any place they want. If they prefer to exercise in their garden, in the park or in their house, this App can satisfy their needs.

Marketability

The target of the user will be people who are aged 65 and above or those with younger age but will benefit from the training/exercise sessions.

Downloading of App will be free, and all training classes will be nonchargeable. The trainers who conduct all sessions will be volunteers who are professional physiotherapists.

Besides that, using TV, radio, newspaper as channels to show the app to the elderly and their families. Posters, booklets, barcodes, the website also can be used to provide information for them to refer, It will be especially rolled out in a geriatric clinic where there are patients who are suffering from functional decline, have history of falls and other mobility impairment.

Ongoing monitoring is necessary to ensure consistent evaluation and improvement.

Summary

Muscle weakness is one of the contributing factors of falls in older adults. TELE is designed to promote exercise in order to prevent muscle weakness. It's an accessible and affordable App which will benefit the elderly physically, biologically and physiologically.

Reference

1. Anderson, M., & Perrin, A. (2017, May 17). Tech Adoption Climbs Among Older Adults. Retrieved December 8, 2019, from Pew Research Center: Internet, Science & Tech website: https://www.pewresearch.org/internet/2017/05/17/tech-adoption-climbs-among-older-adults/
2. Davis, J. C., Robertson, M. C., Ashe, M. C., Liu-Ambrose, T., Khan, K. M., & Marra, C. A. (2010). International comparison of cost of falls in older adults living in the community: a systematic review. Osteoporosis International, 21(8), 1295–1306. https://doi.org/10.1007/s00198-009-1162-0
3. Department of Statistics Singapore. (2019). Population Trends. Retrieved from https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-

structure/visualising-data/
4. Korzelius, C. A., & Le, L. (2017). Consequences of Falls in Older Patients. Hospital Medicine Clinics, 6(3), 316–329. https://doi.org/10.1016/j.ehmc.2017.04.003
5. Marzetti, E., Calvani, R., Tosato, M., Cesari, M., Di Bari, M., Cherubini, A., … SPRINTT Consortium. (2017). Physical activity and exercise as countermeasures to physical frailty and sarcopenia. Aging Clinical and Experimental Research, 29(1), 35–42. https://doi.org/10.1007/s40520-016-0705-4
6. Marzetti, E., & Leeuwenburgh, C. (2006). Skeletal muscle apoptosis, sarcopenia and frailty at old age. Experimental Gerontology, 41(12), 1234–1238. https://doi.org/10.1016/j.exger.2006.08.011
7. Seene, T., Kaasik, P., & Riso, E.-M. (2012). Review on aging, unloading and reloading: Changes in skeletal muscle quantity and quality. Archives of Gerontology and Geriatrics, 54(2), 374–380. https://doi.org/10.1016/j.archger.2011.05.002
8. Stødle, I. V., Debesay, J., Pajalic, Z., Lid, I. M., & Bergland, A. (2019). The experience of motivation and adherence to group-based exercise of Norwegians aged 80 and more: a qualitative study. Archives of Public Health, 77(1). https://doi.org/10.1186/s13690-019-0354-0
9. World Health Organization. (2008). WHO global report on falls prevention in older age. Geneva: World Health Organization; 2008. Retrieved from http://www.who.int/ageing/publications/Falls_prevention7March.
10. World Health Organization. (2018). Falls [Fact sheet]. Retrieved from https://www.who.int/news-room/fact-sheets/detail/falls