Study Protocol

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1 Background

Falls is one of the cause major causes to serious injuries in older people. About one-third of the frail adults age over 65 will experience at least one fall a year when living in their own homes, and the fall rate is three times higher in older people who are residents of care homes [1], [2]. Identifying and reducing risk of falls in the community-dwelling elderly hence have been extensively studied to carry out appropriate therapeutic interventions for the fallers. Aging and mental disorders lead to gait and cognitive impairments. Correlation between cognitive impairments and fall risks have been identified in existing studies. Both literature evidence was provided and trials of experiments were conducted to in the studies to prove that older people with cognitive impairment are entitled to higher fall risk [3]–[6]. Theses studies mainly focused on examining damaged or declined cognitive functions impacts on gait in older people, and their relations to falls. Since falling in older people happened mostly when gait and balance control is poor, risk factors related to gait variables were investigated [6], [7]. Results from the studies ascertained that specifically attention and working memory in the cognitive domain are essential to control gait and postural tasks in human body. Memory is one of the key clusters of executive function in cognitive domain. A wide range of fall risk assessment tools are widely used to identify fall risks of older people who are dwelling in the community [8]–[11].

2 Rationale

Falls in older people are major health care issue worldwide. Suitable interventions to reduce fall risk in care-home-dwelling older people with cognitive impairments were addressed in several studies. To date, emerging studies on the use of Brain-Computer-Interface(BCI) for cognitive training suggested that BCI could strengthen neural plasticity by neurofeedback training. Specifically, neurofeedback training applies BCI to change cognitive process and provide real-time feedbacks in either visual or acoustic form. The aim of the study is to confirm that BCI can enhance cognitive function to reduce fall risks in older adults.

3 Theoretical Framework

4 Research Question/Aim

5 STUDY DESIGN and METHODS of DATA COLLECTION AND DATA ANALYIS

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