Abstract: Frailty and associated falls are among the most important reasons for hospitalization in the older adult population. Each year, three million older adults are treated in emergency rooms for fall injuries. Frailty becomes more prevalent with increasing age and confers high risk of adverse health outcomes, including falls, hospitalization, institutionalization, as well as mortality in some cases. Numerous geriatric interventions have been developed to improve clinical outcomes for frail older adults. A major obstacle to the success of such interventions has been the absence of a standardized and clinically practical method for screening of those who are truly frail, as well as at the onset, so as to effectively target care. Development of such intervention methods to clinically assess frailty is comparatively challenging as it requires space, equipment and personnel to administer the tests or questionnaire, and hence is also time consuming. Additionally, older adults, especially those with mobility difficulties, may not be able to commute to the clinic with ease, and may require assistance to do so. In such scenarios, an option of in-home health assessment would reduce the hassle of commute to the clinic for the elderly. With the advent of affordable wearable sensors, activity monitoring has become fairly simple and convenient. Daily physical activity (DPA) recording in older adults at home enables continuous activity monitoring for extended durations of time in their natural surroundings with minimal constraints, and could provide an affordable and reliable frailty assessment. This work aims to assess frailty among older adults using sensor-based DPA and potentially develop a method for in-home/in-community frailty assessment.

To evaluate the use of sensor-based DPA in a home-based environment to achieve frailty assessment, in the current series of studies, we capture the daily physical activities from the volunteers for two consecutive days using body-worn tri-axial accelerometer sensors. We process the data collected from the sensor to identify and categorize daily activities such as sitting, standing, walking, lying and postural transitions. Subsequently, we use the quality of walking or gait as a diagnostic element of physical function decline among the elders and its associations with frailty. We also assess the test-retest repeatability of gait parameters between day-1 and day-2 of recording in the entire population sample and also among each frailty group. The variability in DPA is also examined in terms of variability in the durations of DPA and variability in the performance of DPA, and their associations with frailty groups are observed. In the future, we plan to develop machine learning algorithms for the quality assessment of DPA and early detection of frailty by incorporating the sensor-based features characterizing gait and activity proposed in the current studies.

Please join us on
WEDNESDAY, APRIL 14TH, 2020
REMOTE - ZOOM
HTTPS://US02WEB.ZOOM.US/J/88946444582?PWD=TWZUKFTAXLDM5KBZLYTC9JDXLZZ09
12:00 PM
HOSTS: DR. KAVEH LAKSARI & DR. NIMA TOOSIZADEH

Persons with a disability may request a reasonable accommodation by contacting the Disability Resource Center at 621-3268 (V/TTY).