

Existing research has postulated a relationship between cognition and quality of life (QoL). Components of QoL such as satisfaction with social support may be particularly influential in memory for those with comorbidities. Additional research is needed to characterize the relationship between memory and QoL domains. Findings are presented from a clinical trial using BNA memory scores to assess brain health. BNA uses EEG technology and machine learning to map networks of brain functioning including working memory. Participants were older adults living in The Villages, an active lifestyle community in Florida, between the ages of 55-85, from 8/30/2017-3/11/2019. Participants were stratified into 2 groups: healthy (no CNS/psychiatric conditions; $n=158$) and multi-morbid (>1 CNS and/or psychiatric conditions; $n=106$) and compared across memory and QoL indicators. Subjective QoL was measured by the WHOQOL-BREF across 4 domains (physical, psychological, social, environmental). Scores on QoL domains were divided into 3 levels (high-medium-low) and tested for their relationship to BNA memory scores using ANOVA. Results indicate a relationship between health status, subjective QoL and BNA memory scores. Healthy subjects who scored high in the psychological QoL domain had significantly higher memory scores [$F(2,152)=4.30, p=.02$]. In healthy subjects, satisfaction with social support ($p=.001$) had the strongest impact on memory for social QoL, while body image ($p=.06$) and concentration ($p=.06$) were the most salient predictors of psychological QoL and approached significance. Multi-morbid subjects who indicated high social ratings had higher memory scores ($F(2,100)=3.75, p=.03$) which relied heavily on satisfaction with social support ($p=.003$). Implications for policy and practice are discussed.

AN INNOVATIVE DATA-DRIVEN FALL PREVENTION COMMUNICATION TOOL FOR ADMINISTRATORS, NURSE MANAGERS, AND STAFF NURSES

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Falls are the leading cause of injury among older adults, resulting in 3 million emergency department visits and 800,000 hospitalizations each year in the United States alone. In the hospital setting, falls are among the most common adverse events, causing longer stays and higher costs of care. Substantial efforts have been made to reduce falls in the past decade but with limited sustained effect. This may in part be due to limitations of existing tools for fall-risk assessment and evidence-based fall prevention. Therefore, there is a need to strengthen the evidence on risk factors for hospital-acquired falls and address barriers to translating the best available evidence into practice. To this end, we undertook the development of an innovative dissemination tool to implement fall-related evidence generated through state-of-the-art data science and information visualization approaches. Through a multidisciplinary academic-clinical partnership, we have developed an infographic to disseminate empirical evidence to nurses and administrators in the hospital setting. The infographic was developed based on principles of user-centered design and persuasive communication, and focuses on providing clear and accessible information about factors contributing to a patients' risk of falling in the hospital. This

innovative dissemination approach is intended to foster dialogue between administrators, mid-level nursing management and staff nurses as well as evidence-based practice at the bedside. Future use and evaluation of this fall prevention tool will focus on adapting the infographic as an interactive digital tool for education and engagement of patients and families in the hospital setting.

A MAGIC GATHERING: PILOTING AN AUGMENTED REALITY ENGINE TO PROMOTE MENTAL HEALTH AND WELL-BEING

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Augmented reality (AR), superimposing digital assets onto the real-world (i.e., holograms)—offers a paradigm shift in delivering immersive interventions for aging adults. Reminiscence and life review are robust intervention techniques that have decades of empirical support to boost mood and meaning in older adults. In this presentation, we demonstrate the applied research and technology development process to create an AR reminiscence and life review engine for aging adults and their caretakers. We conducted 25 needs assessment interviews with community-dwelling older adults, and assisted living facility directors, nurses, and residents. Initial analyses revealed the need for: (1) finding scalable and cost-effective solutions to alleviate time burden for caregivers; (2) increasing variety of activities that do not need much instruction; (3) producing activities that grab and maintain attention; and, (4) generating more personalized activities that do not divert too much time from caretakers. We integrated the findings to develop a working prototype AR engine called "Project Phonado." From preliminary user testing, Project Phonado aids in boosting mental health and meaning in aging adults—at least temporarily (immediate and one day follow-up). We will show clips of some pilot user testing of the engine and discuss the next evaluation and development steps.

WRIST-WORN TRI-AXIAL ACCELEROMETER VALIDATION IN YOUNG, MIDDLE-AGED, AND OLDER ADULTS

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Purpose: This study evaluated wrist-worn accelerometers for estimating metabolic intensity and classifying activity types across a wide age spectrum. Methods: Participants ($n=141$, 67% women, aged 20-89 yrs) performed a battery of 31 common daily activities (e.g. washing dishes, walking) in a standardized laboratory setting. A tri-axial accelerometer was worn on the right wrist during each activity while a portable metabolic unit was used to measure oxygen consumption (ml/kg/min), which was converted into metabolic equivalents (METs). Random forest analyses estimated metabolic intensity and classified activity type based on seven data features.

Resulting estimates were cross-evaluated on a separate sample of 16 participants who performed a sub-set of activities in their home. Results: In the laboratory setting, mean differences between measured and predicted MET value for sedentary (0.36), lifestyle (0.02) and locomotor (0.30) activities were low, but the 95% limits of agreement ranges were relatively large (+/-1.0, +/-1.8, +/-3.1, respectively). Data features were 85%, 88%, and 71% accurate for identifying sedentary, lifestyle and locomotor activities. Prediction equations had an overall mean difference of 0.19 METs (95% limits of agreement = -1.3 to 1.7) when activities were performed at home. Conclusion: Data features extracted from a wrist worn tri-axial accelerometer provide a moderate-to-high group estimate of metabolic intensity and had modest accuracy in identifying activity types across a variety of daily activities. However, significant between person variations were evident. Additional work is needed to refine wrist-worn accelerometers for estimating physical activity type, intensity, duration and frequency across the age spectrum.

DETECTION OF FORWARD PROPULSION USING A SINGLE ACCELEROMETER DURING WALKING IN OLDER POPULATION

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In the geriatric population, diminished ankle joint moment and weak plantar flexor can contribute to inadequate forward propulsion and negatively impact gait performance, which can lead to poor energetic efficiency. Detection of propulsion phase can help identify gait normality and guide rehabilitation therapy to improve functional performance. Current methods have limited application in daily life and unsuitable for continuous monitoring. In this study, we aim to develop algorithms based on a single sensor attached to the shin to accurately detect propulsion phase. Six elderly (age: 73 years, BMI: 30.4) were recruited. Participants walked at their normal pace while wearing a plantar pressure system and an accelerometer on the shin. The pressure data was used to define the beginning of the propulsion phase when the pressure switched from the heel to the forefoot. A wavelet algorithm was developed to automatically detect the start and end points of propulsion phase using an accelerometer. The Bland-Altman method was used to evaluate the agreement between these methods. Pearson's Coefficient was used to quantify the correlation. Based on the Bland-Altman analysis, A high agreement was obtained between the proposed method using accelerometer and pressure sensor (bias = 9 ms, precision = 30 ms). Both algorithms are significantly correlated ($r = 0.85$, $p < 0.05$). This study presents an innovative algorithm to automatically detect the propulsion phase for older adults during walking. Using wearable could facilitate the capture of propulsion phase during living activity, which might provide more insights into the mechanism of walking during rehabilitation therapy.

LONG-TERM GAIT SPEED TELEMONITORING IN OLDER ADULTS WITH MILD COGNITIVE IMPAIRMENT OR MILD DEMENTIA. THE DECI STUDY
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Non-intrusive telemonitoring of physical activity in Older Adults suffering from Mild Cognitive Impairment (MCI), or Mild Dementia (MD), was implemented as part of a 6-month multicomponent digital intervention in the DECI study (EU Horizon2020 grant No 643588). Methods: To estimate gait speed long-term trajectory, a processing algorithm was applied on individual accelerometry data continuously recorded via the ADAMO wrist-watch accelerometer. Speed Trend Analysis was performed if patients wore the device ≥ 90 days. Only outdoor activity was analyzed to reflect patients' own natural gait speed. Only time spent in high or very-high-activity level is used, to eliminate rest periods (e.g. sitting on a bench, on a bus or driving). A raw mean walking speed was computed. Stride was computed from gender and height and walked distance from stride and step count. Mean walking speed was estimated by walking distance and duration. A rolling mean algorithm was applied to the computed mean 15-day baseline series, resulting in a new series representing normalized patient's gait speed trajectory during the study. Results: Baseline characteristics: F/M=21/19; MCI/MD=36/4; age=75.4 \pm 6.0 years; BMI= 24.6 \pm 5.2; MMSE=26.5 \pm 2.4; education=8.9 \pm 4.0 years. Monitoring days=147 \pm 29. Overall three main patterns of gait speed trajectory were identified: "relative stability", "improving trend" and "progressive decline": No evident correlation with cognitive status was observed in the sample. Examples of individual patterns are shown. Conclusions: Gait Speed Analysis can describe physical function trajectory over time and identify decliners from stable or improving older adults. Further analyses may clarify the relationship between physical function changes and cognitive status.

AGE- AND ETHNICITY-RELATED DISPARITIES IN TECHNOLOGY USE AMONG HIGH-RISK VETERANS

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Using predictive analytic modelling, the Veterans Affairs has identified Veterans considered to be High Need High Risk (HNHR) requiring increased support. This pilot study sent needs assessment questionnaires to 1112 HNHR Veterans to better understand gaps regarding technology use, access, physical function, and mobility. There were 341(30.7%) respondents: 270(80.4%) Non-Hispanic, 64(18.8%) Hispanic/Latino; 210(61.6%) White, 119(34.9%) Black/African Americans; and 310(90.4%)