30th Annual Congress of Gerontology
cum 37th Annual General Meeting

Smart Living Smart Ageing

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Content

30th Annual Congress of Gerontology
cum 37th Annual General Meeting
<u>Smart Living Smart Ageing</u>

Date: 18th November 2023

Time: 9:00am - 5:00pm

Location: Ngan Pui Ying Lecture Theatre (Z207), Zone Z, the Hong Kong Polytechnic University,
Hung Hom, Hong Kong

Time	Programme
9:00am–9:15am	**Welcome Address** Dr LEUNG Man Fuk Edward *President, Hong Kong Association of Gerontology*
9:15am–9:30am	**Keynote Address** Dr LI Kwok Tung Donald *Chairman, Elderly Commission*
Plenary Session (Moderator: Dr Leung Man Fuk Edward)	
9:30am–9:55am	**Efforts to Develop Person Center Long-term Care - Lessons Learned from Local and International Experiences** Prof LUM Yat Sang Terry *Henry G Leong Professor in Social Work and Social Administration,* *The University of Hong Kong*
9:55am–10:20am	**Review on the Potential and Development of GeronTechnology on Aged Care in Hong Kong** Prof ZHENG Yongping *Henry G. Leong Professor in Biomedical Engineering,* *The Hong Kong Polytechnic University*
10:20am–10:35am	Break
10:35am–12:00noon	**Outstanding Paper Presentation** (Moderator: Prof Leung Yee Man Angela) 1. **Risk Factors for Fall in Older Adults Living in Residential Care Homes of Hong Kong** *Elderly Health Service, Department of Health, Hong Kong* 2. **Effectiveness of Caregiver Support Model for Informal Caregivers of Frail Older Adults in Hong Kong: A Clustered Randomized Controlled Trial** *City University of Hong Kong; Caritas Institute of Higher Education; University of Bolton* 3. **The Integrated Cognitive and Physical Fitness Training Programme for Community-Dwelling Elderlies with Risk of Dementia in Hong Kong** *Dementia Support Team, The Hong Kong Society for the Aged* 4. **An Electronic Medication Management Service for Residential Care Homes for the Elderly (RCHE) in Hong Kong: A Pre-post Interventional Study** *School of Pharmacy, Faculty of Medicine, The Chinese University of Hong Kong; Hong Kong Pharmaceutical Care Foundation* 5. **The Effects of a Co-created Mixed Intervention on Dementia Knowledge and Friendliness in Hong Kong: Findings from a Community-based Participatory Action Research Project** *Sau Po Centre of Ageing, The University of Hong Kong*
12:00noon–12:30pm	Annual General Meeting

12:30pm–12:40pm	Prize Presentation
12:40pm– 2:15pm	Lunch Break

	Free Paper Presentation I (Long Term Care) Room:Z207 Moderator: Prof Ngan Man Hung Raymond	**Free Paper Presentation II (Healthy Ageing) Room:Z205** Moderator: Dr Luk Wing Hong Calvin
2:15pm-3:30pm	1. **Design Thinking in Speech Therapy: A Therapist-Designed Toolkit to Enhance Communication Skills of Elderly in Residential Care Homes.** *Hong Kong Sheng Kung Hui Welfare Council Limited; The University of Hong Kong* 2. **Resident Aggression and Staff Burnout in Residential Care Facilities in Hong Kong** *Department of Applied Social Sciences, The Hong Kong Polytechnic University* 3. **Rejuvenating Relational Personhood and Fulfilling End-of-life Needs of Older Adults with Dementia in RCHEs** *Department of Social Work and Social Administration, The University of Hong Kong; Sau Po Centre of Ageing, The University of Hong Kong; The Salvation Army Hong Kong and Macau Territory* 4. **Barriers and facilitators of tele-exercise among the older people at risk of falls: a qualitative study embedded within a randomized controlled trial.** *College of Professional and Continuing Education, The Hong Kong Polytechnic University* 5. **Feature Analysis of Salivary Glands Under Ultrasonography** *Department of Chinese & Bilingual Studies, The Hong Kong Polytechnic University* 6. **Older adults' experiences of chronic low back pain and its implications on their daily life: a systematic review of qualitative research** *Department of Rehabilitation Sciences, The Hong Kong Polytechnic University of Hong Kong*	1. **Immediate Effects of Transcutaneous Electrical Nerve Stimulation and Kinesiology Tape on Lower-Limb Joint Proprioception and Body Balance in Healthy Older Adults** *Department of Biomedical Engineering, The Chinese University of Hong Kong* 2. **Empowering the Future: Evaluation of a Three-Phased Program for Developing Gerontechnological Talents among Gifted Students in Hong Kong** *The Hong Kong Academy for Gifted Education* 3. **A novel participatory model-making design activity in engaging stakeholders of a senior-friendly city to be active contributors in designing future outdoor exercise space for seniors: Preliminary findings from a Pilot Study** *Department of Rehabilitation Sciences, The Hong Kong Polytechnic University* 4. **Digital divide and life satisfaction in older adults: Evidence from a baseline survey of mHealth App users in Hong Kong** *Department of Sociology and Social Policy, Lingnan University; Department of Social Work, Hong Kong Shue Yan University; Faculty of Social Sciences, Chinese University of Hong Kong; School of Health and Social Work, University of Hertfordshire, UK; Evangelical Lutheran Church Social Service-Hong Kong* 5. **A Meta-Analysis on the Influence of Social Capital on Older Migrants' Subjective Well-Being** *Applied Social Sciences, The Hong Kong Polytechnic University* 6. **SmartConnect - Digital Literacy Enhancement for the Older Adults** *Hong Kong Sheng Kung Hui Welfare Council Limited*
3:30pm-3:45pm	Break	

	Free Paper Presentation III (Dementia/Mental Health) Room:Z207 Moderator: Prof Kwan Yiu Cho Rick	Free Paper Presentation IV (Community Care) Room:Z205 Moderator: Prof Fong Nai Kuen Kenneth
3:45pm -5:00pm	1. **Evaluating the effectiveness of a self-design training kit using the DementiAbility Methods™ on Elders with Dementia** *Hong Kong Sheng Kung Hui Welfare Council Limited: Multi-disciplinary Outreaching Support Team for the Elderly (Kowloon East Cluster)* 2. **Applying DementiAbility Methods in the Culture of Dementia Care Mapping for People with Dementia in Long-term Care Settings of SAGE** *Occupational Therapist Team, The Hong Kong Society for the Aged* 3. **Effects on Cognitive Function and Functional Motor Performance for Patients with Mild Cognitive Impairment Using Dual-Task Training System with Moderate-Intensity Cycling** *Department of Biomedical Engineering, The Chinese University of Hong Kong* 4. **Purposes of use, time spent online, and depression among older Chinese Internet users** *Department of Social Work, The Chinese University of Hong Kong; School of Graduate Studies, Lingnan University; Department of Social Work and Social Administration, The University of Hong Kong* 5. **Decrease in Visual Chromatic Sensitivity as a Potential Biomarker for Early Detection of Mild Cognitive Impairment - a Pilot Study** *School of Optometry, The Hong Kong Polytechnic University* 6. **Designing a mixed reality and cultural-based intervention in Sensory urban green care farm for older persons with mild cognitive impairment (MCI)** *Jockey Club Design Institute for Social Innovation, The Hong Kong Polytechnic University*	1. **The Use of Augmented Reality Exercise for pain management in older adults** *Hong Kong Sheng Kung Hui Welfare Council Limited* 2. **Enhancing Smart Living for Healthy and Active Ageing: A Multidimensional Approach** *Bo Lo Yeo Collective* 3. **Visualizing swallowing muscle wasting through patterns in the muscle morphology and contraction sequences of healthy and aging individuals under ultrasound imaging: A pilot study** *Department of Biomedical Engineering, Department of Chinese and Bilingual Studies, Research Institute of Smart Aging, The Hong Kong Polytechnic University* 4. **Optimizing Gerontechnology for Asian Eldercare: A Mixed Methods Study Assessing the Viability and In-Context Impact of Social Robots Through Community Surveys and In-Context Testing Among Hong Kong Seniors.** *School of Design, The Hong Kong Polytechnic University* 5. **The effects of telerehabilitation using a novel wearable device, 'Smart reminder' on hemiplegic upper limb recovery for community-dwelling stroke survivors: A cross-over study** *The Hong Kong Polytechnic University* 6. **Investigating the effect of ageing on swallowing movement sequencing, velocities, and muscle contraction in non-invasive multimodal swallowing examination: a pilot study** *Department of Chinese and Bilingual Studies; Department of Biomedical Engineering; Department of Mechanical Engineering; Research Institute for Smart Ageing, The Hong Kong Polytechnic University*

Plenary Session (Moderator: Dr Leung Man Fuk Edward)

Introduction of the Speaker:

Professor Lum is the Henry G. Leong Professor in Social Work and Social Administration. His research interests focus on long-term care, productive aging, environmental gerontology, and geriatric mental health. He is an advisor to the Hong Kong Government on long-term care and has led the development of new assessment instruments and services matching mechanisms for long-term care in Hong Kong. He also advised the Government on the implementation of the community care voucher pilot project that introduced participants directed care to Hong Kong and the implementation of the carers' allowance pilot schemes that provide cash allowance to low income carers of frail older people and people with disabilities. He also advised the Hong Kong Housing Society to develop its aging-in-place program for older people living in public rental estates. Professor Lum is currently directing the HKJC JoyAge Project that provides innovative step-care intervention for older people with depression; the HKJC Age Friendly City Project that promotes age friendliness in Hong Kong; the GrandMove project that prevents and reverses frailty among older people. Professor Lum is an invited member of two WHO committees on healthy aging and long-term care. Before returning to HK, he was a tenured professor at the University of Minnesota. He was elected as a Fellow of the Gerontological Society of America in 2011 and was awarded the Career Leadership Award by the Association of Gerontology Education in Social Work in 2016. Professor Lum is an editor of the Journal of Aging and Mental Health. He is serving as a member of social welfare committees of several major NGOs and is a member of the Minimum Wage Commission of the Government that sets the minimum wage of Hong Kong.

Prof. Lum Yat Sang, Terry
Henry G. Leong Professor in Social Work and Social Administration
The University of Hong Kong

Topic: Efforts to Develop Person Center Long-term Care – Lessons Learned from Local and International Experiences

Introduction of the Speaker:

Prof. Zheng Yongping

Henry G. Leong Professor in Biomedical Engineering

The Hong Kong Polytechnic University

Professor Yongping Zheng, Henry G. Leong Professor in Biomedical Engineering, is currently a Chair Professor of Department of Biomedical Engineering in the Hong Kong Polytechnic University, and he is also the Director of Research Institute for Smart Ageing and Director of Jockey Club Smart Ageing Hub. He served as the Founding Head of Department of Biomedical Engineering during 2012-2020. Professor Zheng's main research interests include biomedical ultrasound and smart aging technologies. He was rated as the top 2% citation scholar in the area of Artificial Intelligence and Image Processing in a survey conducted by Stanford University in 2021 and 2022. He has trained over 19 PhD and 8 MPhil graduates as Chief Supervisor, and over 10 postdoctoral fellows. He also owned more than 50 patent families (with a total patent number over 150), published over 300 journal papers, and wrote two books "Measurement of Soft Tissue Elasticity In Vivo: Techniques and Applications" and "Sonomyography: Dynamic and Functional Assessment of Muscles. A number of technologies invented by his team have been successfully commercialized by startup companies that he co-founded, including Scolioscan (http://scolioscan.com): a 3D ultrasound imaging device to provide radiation-free assessment of scoliosis, and Liverscan (http://eieling.com): a wireless palm-sized ultrasound device for liver fibrosis and fatty liver assessment. His inventions have won many international and local awards, including the laureate (life and health category) of the 1st Bank of China Hong Kong Science and Technology Innovation Prize in 2022. Professor Zheng is a Senior Member of IEEE, a Fellow of Hong Kong Institution of Engineers (HKIE), past Secretary of World Association of Chinese Biomedical Engineers (2017-2019), past Chair of Biomedical Engineering Division of HKIE, and Honorary Advisors of Hong Kong Federation of Senior Citizen Industries and Hong Kong Medical and Healthcare Device Industry Association. He also serves as the President of Guangdong Hong Kong Macau Chapter of the International Society of Gerontechnology. He has served as Associate Editor and Editorial Board Members for some leading journals in the field.

Topic: Review on the Potential and Development of GeronTechnology on Aged Care in Hong Kong

Abstract

Hong Kong possesses the world's highest life expectancy, which speaks volumes about its healthcare quality. However, this blessing simultaneously presents challenges due to the growing population of seniors in the city. The Census and Statistics Department of Hong Kong anticipates that by 2066, one in three Hong Kong residents will be aged 65 or above, leading to a rise in demands for elderly care services and infrastructure. Meanwhile, the working population will continue to decrease from now to 2066. This is where gerontechnology - the intersection of gerontology and technology - steps in as a potential solution.

Gerontechnology aims to leverage technological advancements to support longevity and improve the quality of life for elderly people as well as to ease work for carers. It encompasses various fields, including healthcare, communication, transportation, and housing, among others. It can help society manage the issues linked to an ageing population more efficiently, addressing not only their care needs but also enhancing their autonomy and social inclusion. In Hong Kong, the potential for gerontechnology development is enormous, for both institution-based care and homecare. Innovative devices such as wearable gadgets that monitor vital signs or beds equipped with sensors that detect irregular movements could facilitate early disease detection and improve medical response times for emergencies, and companion robots that can interact with elderly people. Technologies like IoT-based systems could also improve most aspects of elderly care, from medication tracking to fall detection and intelligent reminders for daily activities. Moreover, the application of aids such as robotic companions and virtual reality (VR) technology can provide mental and emotional sustenance, potentially reducing feelings of loneliness and isolation. Meanwhile, technologically-enhanced mobility aids, high-tech home appliances, and AI-enabled smart homes can provide physical support, promoting greater levels of independence and safety for the elderly in their homes.

Jockey Club Smart Ageing Hub is supported by Hong Kong Jockey Charitable Fund in 2017, aiming to support application, innovation, promotion, education, and connection in the area of gerontechnology. It has worked with 6 NGOs taking care of elderly peoples with different conditions, and developed different gerontechnology items being used in these NGOs, including eNightLog, smart companion doll, etc. Meanwhile, the Hong Kong Government has recently recognized the potential merits of technology in eldercare. A notable initiative is 'Innovation and Technology Fund for Better Living' launched in 2017, which includes projects addressing the daily needs of the elderly population. In addition, SIE Fund directly supports NGOs taking care of elderly people to purchase gerontechnology items, and also funded Gerontechnology Platform to promote and evaluate gerontechnology items through trials in real situations. All these have helped Hong Kong to be a vibrant city of embracing gerontechnology.   However, seizing the full potential of gerontechnology in Hong Kong requires substantial effort beyond these initial steps. However, barriers like the technological illiteracy among the elderly population and among elderly homes need to be addressed.

In conclusion, gerontechnology holds great potential in tackling the challenges of an ageing population in Hong Kong. The integration of gerontechnology into the daily lives of Hong Kong's seniors is a key development that could significantly enhance the quality of life and independence for this growing demographic. Therefore, both the public and private sectors in Hong Kong need to make gerontechnological advancement a priority, ensuring that the city remains a world leader in healthy and productive ageing.

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[#]Conducted at the Nutritional Health of the Elderly Reference Centre (NHERC) in Singapore on 811 community-dwelling older persons aged 65 years and above who were at risk of malnutrition, using nutrition supplement with 0.74g CaHMB [##] and 10.5g protein per serving
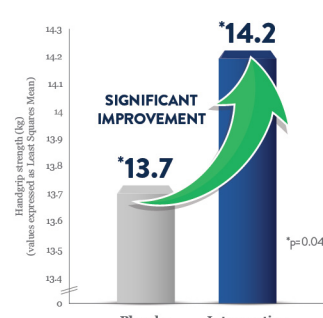

SIGNIFICANTLY HIGHER LEG STRENGTH AT DAY 90 [▲5]

Leg strength (kg)

SIGNIFICANT IMPROVEMENT

*12.2 (Placebo n=311) → *12.9 (Intervention n=317)

*p=0.030
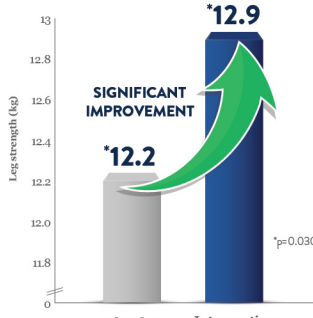
*Data is of statistical significant

SIGNIFICANTLY HIGHER HANDGRIP STRENGTH AT DAY 180 [△5]

Handgrip strength (kg) (values expressed as Least Squares Mean)

SIGNIFICANT IMPROVEMENT

*13.7 (Placebo n=195) → *14.2 (Intervention n=185)

*p=0.048

*Data is of statistical significant

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*SAM Sensory Test Results for Fresubin 2kcal DRINK Vanilla /Sensory panel consisting of 11 trained panelists according to QDA methodology (country scope: DE, FR, CH, GB, ES, N=140)

Risk Factors for Fall in Older Adults Living in Residential Care Homes of Hong Kong

MK Kong[1], MC Cheung[2], CK Lau[3], CP Chau[4], OYC Fung[5], PT & OT Teams[6]

1. Physiotherapist, Elderly Health Service, Department of Health, Hong Kong
2. Occupational Therapist, Elderly Health Service, Department of Health, Hong Kong
3. Senior Physiotherapist, Elderly Health Service, Department of Health, Hong Kong
4. Senior Occupational Therapist, Elderly Health Service, Department of Health, Hong Kong
5. Senior Medical & Health Officer (Visiting Health Team), Elderly Health Service, Department of Health, Hong Kong
6. Physiotherapists & Occupational Therapists, Elderly Health Service, Department of Health, Hong Kong

Purpose

Older adults living in residential care homes (RCHs) are more likely to fall compared to those living in the community, and their fall risk factors are multifactorial [1]. In Hong Kong, a recent survey reveals that around 9.5% of RCHs have a fall rate over 30% [2]. The purpose of this survey is: 1) To investigate the common risk factors of frequent fallers in RCHs in biological, environmental, and behavioural domains, according to WHO's risk factor model for fall [1]; 2) To identify areas for improvement in the fall management of RCHs.

Method

A cross-sectional retrospective survey of 197 frequent fallers from 67 RCHs across 18 different districts with prevalence of fall over 30% in 2020 was conducted. Fall management records and fall incident reports were examined through questionnaires and staff interviews by physiotherapists and occupational therapists. The most common fall risk factors, time period and places of fall of all fallers were identified.

Results

Twenty fall risk factors were included in the analysis. In the biological domain, chronic illnesses, decreased mobility, gait instabilities, lack of physical activities and cognitive impairment are the most common fall risk factors, whereas unsafe behaviour and inappropriate use of walking aids are the two most common fall risk factors in the behavioural domains among these RCHs fallers. Bedsides, residents' bedrooms and bathrooms are the most common places of falls, while the peak hours of falls occurs around meal times. Nearly 24% of RCHs did not perform fall risk assessments for residents.

Conclusion

Behavioural and biological fall risk factors play a more important role than environmental risk factors in these frequent fallers, and many of them are modifiable. Large variations exist in the fall management of different RCHs. Interventions to prevent falls in RCHs should target on improving the fall management protocol and addressing the specific fall risk factors of frequent fallers.

[1] Step safely: strategies for preventing and managing falls across the life-course. Geneva: World Health Organization; 2021

[2] Integrated Assessment 2021/2022, Department of Health, Elderly Health Service, HKSAR, 2022

Effectiveness of Caregiver Support Model for Informal Caregivers of Frail Older Adults in Hong Kong: A Clustered Randomized Controlled Trial

Kin-Kit Li, Dannii Yeung, Alice Chong, Marcus Chiu, T. Wing Lo

Purpose

With population ageing, the demand for informal caregivers is increasing. However, existing caregiver support is insufficient. This study, hence, developed and examined the Caregiver Support Model (CSM), which provides social workers with an evidence-based, comprehensive, and caregiver-centred working model to assist and empower informal caregivers of frail older adults according to their needs and resources.

Method

The 8 participating community centres were randomly assigned to the experimental (282 caregivers in 4 centres) and control groups (284 caregivers in 4 centres), recruited from January to August 2022, in a clustered randomized controlled trial. CSM included assessment of needs and resources, intervention plan formulation, service provision and monitoring, and evaluation. The intervention plan contained 1) service matching based on a collaborative selection of need dimensions and 2) strength-based strategy development based on the caregivers' resources. The control group provided treatment as usual. The outcomes were measured at baseline and at 6 months. Missing data were handled using multiple imputations. Change scores were compared between groups using multilevel regression models. Qualitative feedback was obtained from 10 social workers and 32 caregivers through interviews.

Results

The participants in both groups showed improvements over time. However, the improvements in the main outcomes, including needs, resources, and life-enriching (i.e., one positive aspect of caregiving), were significantly greater in the intervention group. The social workers found the assessment was easy-to-understand, comprehensive and facilitated mutual sharing. They also appreciated the simultaneous, convenient reporting system and the strength-based approach. The participants expressed the wish to learn more knowledge and skills and became aware of the needs hitherto unaware of.

Conclusion

The intervention was effective in helping informal caregivers of frail older adults and served to build up the capacity of the social workers. The next stage of the project is to disseminate CSM to the wider professional community.

Acknowledgement

The Integrated Cognitive and Physical Fitness Training Programme for Community-Dwelling Elderlies with Risk of Dementia in Hong Kong

WONG Chi-kin William, WONG Wai-sang Wilson, CHEUNG Tung-wai Alvin, KONG Chun-hin Lisley, TANG Nga-wai Ivy, NG Shuk-chong Anna

Dementia Support Team, The Hong Kong Society for the Aged (SAGE)

Background

Dementia is a growing health concern in Hong Kong, and physical exercise has been shown to benefit cognitive function in elderlies. Based on the "Brain Invigoration and Gross Motor Activation Programme" (BIGMAP) organized by the Dr. Stephen Hui Research Centre for Physical Recreation and Wellness at Hong Kong Baptist University, SAGE has developed the "Integrated Cognitive and Physical Fitness Training Programme" (新「耆」益智運動) for community-dwelling elderlies with risk of dementia, aimed at improving their cognitive and physical capacities simultaneously.

Purpose

To evaluate the effectiveness of this programme on cognitive and physical capacities in elderlies with risk of dementia.

Method

A total of 150 elderlies with risk of dementia were recruited from four District Elderly Community Centres (DECCs) and four Neighbourhood Elderly Centres (NECs) in 2022. The participants were divided into groups of 10 to 12 persons for a 6-week training programme consisting of 10 dual-task exercises that required both physical and cognitive efforts. The exercises were originally designed with reference to local cultural activities and instrumental activities of daily living (IADL) for enhancing engagement. Each participant received two training sessions weekly. Montreal Cognitive Assessment 5-Minute Protocol Hong Kong Version, 30-second Chair-Stand Test, and 3-meter Timed Up and Go Test, were used to evaluate cognitive and physical capacities before and after the programme. Participants who achieved 80% or above attendance level would be considered. The within-group comparisons before and after the programme were based on paired-T test. Factors influencing changes in physical and cognitive capacities were evaluated using Pearson correlation. Statistical significance was set at $\alpha=0.05$.

Results

Of the 80 participants included in the analysis (81.1 ± 7.2 years of age, 83% female), 46 were categorized as having mild cognitive impairment (MCI) and 34 were categorized as being at risk of MCI. After completing the training, significant improvements were observed in all outcome measures for all participants ($p<0.05$). The improvements were not correlated with age or education level ($p>0.05$). The MCI group showed greater improvements in physical capacity than the at-risk-of-MCI group, with a 13.5% improvement in the TUG test compared to 4.3% in the at-risk-of-MCI group ($p<0.05$). The improvement in the 30-second Chair-Stand Test was 15.2% in the MCI group and 13.8% in the at-risk-of-MCI group.

Conclusion

The "Integrated Cognitive and Physical Fitness Training Programme" is effective in improving cognitive and physical capacities in elderlies with MCI and those at risk of MCI.

An Electronic Medication Management Service for Residential Care Homes for the Elderly (RCHE) in Hong Kong: A Pre-post Interventional Study

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Purpose

In Hong Kong, medication management in RCHE is typically handled manually, and is time-consuming and labor-intensive. In 2021, the Hong Kong Pharmaceutical Care Foundation (a local NGO) developed and implemented an integrated medication management system to a cluster network of RCHE. This system featured a comprehensive database with drug images and common dosages to build electronic medication profiles and electronic medication administration records (eMARs) for residents. This analysis evaluated the impact of this program in improving the time efficiency and technical competency of RCHE staff. The secondary objective was to estimate the drug wastage costs that could potentially be circumvented when the centralized automated packaging service of the program is fully implemented.

Method

This was a pre-post interventional study. Time efficiency was evaluated using time motion analysis. The number of doses prepared, checked and administered in 10-minute blocks before and after implementation was compared using 3-way analysis of variance. The RCHE staff completed a structured survey to report their technical competencies in various aspects of medication management. The quantity and cost of wasted medications were quantified from drug disposal reports.

Results

This analysis included 14 RCHEs (total 1,218 residents; age 85.8±8.7 years; median 11medications per resident). The program has improved time efficiency, as reflected by a significant increase in the number of doses prepared (pre: 14.0±3.1; post: 44.7±7.9), checked (pre: 18.8±9.6; post: 119.8±22.6), and administered (pre: 12±3.2; post: 41±1.9) in 10-minute blocks (P's <0.001). At post implementation, the RCH staff reported improved competency in managing residents' eMARs (86.9%), and enhanced safety in the preparation (85.4%), checking (91.7%), and administration (91.7%) of medications.   The total monthly cost of oral medication wastage was HKD645,949, which is approximately HKD530 per resident.

Conclusions

Our findings suggested that an electronic medication management service improved time efficiency and could potentially enhance medication safety in RCHE.

The Effects of a Co-created Mixed Intervention on Dementia Knowledge and Friendliness in Hong Kong: Findings from a Community-based Participatory Action Research Project

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Background
As part of the Dementia Hand in Hand project, which seeks to cultivate a dementia-friendly community, the Baptist Oi Kwan Social Service (BOKSS) and the Sau Po Centre on Ageing, the University of Hong Kong (HKUCoA) have co-created a community-based intervention protocol promoting dementia knowledge and friendliness.

Purpose
To evaluate the effects of a community-based intervention on promoting dementia knowledge and friendliness.

Method
BOKSS and HKUCoA co-designed a 1-hour mixed intervention protocol comprising a 30-minute psychoeducation session and a 30-minute dialogical movie review. The protocol integrates training sessions, piloting, implementation and on-site observations to maintain standardization. A pre-post study with a quasi-experimental group design was conducted in 2023. Three-hundred-and-sixty-one participants were recruited from local neighbourhood elderly centres, M_{age} = 68.91, SD = 13.47. The intervention was administered to the experimental group (n=184) while the control group (n=177) did not receive any interventions. Dementia knowledge was assessed using the Alzheimer's Disease Knowledge Scale (ADKS). Dementia friendliness was assessed using the Dementia Attitude Scale (DAS). To evaluate the intervention, ADKS and DAS scores of the experimental group were collected before and after the intervention. For the control group, ADKS and DAS scores were collected at a 3-month interval. Repeated measure ANOVAs were used to examine the intervention's effectiveness.

Results
After controlling age, sex, employment status, and caregiving experience, repeated measure ANOVAs revealed significant improvements in dementia knowledge (ADKS: $F(1, 340) = 137.42$, $p<.001$) and friendliness (DAS: $F(1, 340)=15.93$, $p<.001$) within the experimental group as compared with the control group. Post-hoc paired samples t-test revealed the three knowledge domains with the greatest improvements were *risk factors*, *caregiving*, and *courses* (*risk factors*: $MD = 1.77$, $t(183)=15.22$, $p<.001$; *caregiving*: $MD=0.91$, $t(183)=9.66$, $p<.001$; *courses*: $MD=0.80$, $t(183)=10.13$, $p<.001$).

Conclusion
The mixed intervention was effective in promoting dementia knowledge and friendliness in the community. The successful collaboration serves as a role model for empowering community partners and co-creating grounded intervention strategies in Hong Kong.

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Design Thinking in Speech Therapy: A Therapist-Designed Toolkit to Enhance Communication Skills of Elderly in Residential Care Homes.

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Purpose

Vast majority of elderly living in residential care homes were reported to have different degrees of communication impairment, hindering their social engagement and daily care. Professionals like speech therapists also found it difficult to deliver effective training given the variation of needs and the lack of standardized tools. This study investigated the impact of a speech therapist-designed training toolkit on the naming, semantic, and overall communication skills of elderly patients with aphasia.

Method

The toolkit, grounded in design thinking principles, was painstakingly tailored to meet the abilities and needs of the elderly. It incorporated adaptations such as an age-appropriate and nostalgic images, enlarged picture size and words, usage of a magnetic board, and collections of classic items to stimulate memory recall upon multiple stages of testing and revision. The therapy adopted Semantic Feature Analysis (SFA), a method known to enrich semantic networking of concepts and promote word retrieval ability. A cohort of 35 participants (17 females, 18 males) aged 70-93 (mean 85.3) with mild to moderate aphasia were recruited from local residential care homes in Hong Kong. These participants underwent 10 weekly sessions of 30-minute training, with pre- and post-training baselines established. Two sets of items from same categories were used as training items and control items to study treatment effect and carryover effect.

Results

Outcome measures included word retrieval accuracy (%) and communication effectiveness, as evidenced by Treatment Outcome Measures (TOMs) rated by trained speech therapists. Pre-post comparisons were conducted using t-tests, revealing significant improvements in both measures following the treatment. Furthermore, the carryover effect was shown as the retrieval accuracy of control items had significantly improved.

Conclusion

The findings endorse the implementation of Semantic Feature Analysis for elderly individuals with limited communication capabilities. Additionally, the results underscore the value of a well-designed toolkit in enhancing communication between speech therapists and patients, potentially fostering greater social engagement among language-impaired elderly in care homes. Our study provides a compelling argument for the integration of design thinking into speech therapy toolkits, promising a more engaging and effective therapeutic experience for our elder population and promoting professional input in service enhancement.

Resident Aggression and Staff Burnout in Residential Care Facilities in Hong Kong

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Purpose

Resident aggression is a risk factor of staff burnout in residential care facilities (RCFs). This cross-sectional study in 2022 examines resident aggression and its association with staff burnout.

Method

800 personal care workers in RCFs participated in this study. They reported information on their demographics, facility characteristics, and work situation. Besides, the study measured their level of burnout, experiences in resident aggression, self-efficacy, neuroticism, and attitude towards dementia. Participants averaged 42.03 years of age (SD=7.63), were mostly female (92.7%), married (79.1%) and had been in the industry for an average of 6.28 years. Resident-to-resident aggression was common: All participants witnessed verbal aggression (100%), 18% disruptive behaviors, 11.8% physical violence, and 3.1% sexual aggression. Resident-to-staff aggression was also common: Almost all experienced verbal aggression (97.6%), following by disruptive behaviors (13.7%), physical violence (10.7%), and sexual aggression (8.5%).

Results

Results show that RCF characteristics and staff demographics were not associated with burnout. Instead, participants who witnessed resident-to-resident aggression (OR=1.82, p<.01) or experienced resident-to-staff aggression (OR=1.63, p<.05) were at greater odds of experiencing burnout, and so were those who were in the profession for shorter period of time (OR=0.90, p<.001), lacked experience in dementia care (OR=7.23, p<.05), and did not receive any training in dementia care (OR=2.36, p<.05). Participants high in neuroticism (OR=1.12, p<.001) and social comfort (OR=0.90, p<.001) had lower chance of experiencing burnout.

Conclusion

Supportive services for staff, e.g., training workshops and close supervision, for enhancing prevention and intervention on resident aggression are urgently needed. Preventing resident aggression not only prevent staff from burnout but also improve the quality of living of older adults in RCFs. Person-centered care is suggested for resident aggression intervention. The moderation effect of person-centered care training on resident aggression is suggested for further study. Operators of RCFs can thus consider implementing person-centered care in core training in long run.

Rejuvenating Relational Personhood and Fulfilling End-of-Life Needs of Older Adults with Dementia in RCHEs

Vivian W. Q. Lou[1, 2], Tommy H. F. Chung[2], Artemis S. K. Fung[2], Shirley K. W. Wong[3],
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The CORE-UPHOLD Model provides healthcare professionals with innovative solutions for assessing and addressing the unique end-of-life needs of residents. It promotes smart aging by generating a deeper understanding of the individual needs and preferences of residents during their late stage of life. By establishing a sensory library and utilizing technological solutions like social media platforms, it guides healthcare professionals in providing tailor-made interventions. The application of the CORE-UPHOLD model promotes well-being of residents with dementia by optimizing their family capacities and improving their living environments in residential care homes.

Background
Identifying the end-of-life (EoL) needs of older adults with dementia in residential care homes for the elderly (RCHEs) is a crucial aspect in sustaining their well-being during cognitive decline. To address this, The Salvation Army and the Sau Po Centre on Ageing, the University of Hong Kong have co-developed the **Co**nfiguration, **Re**juvenating, and **Uphold**ing of Relational Personhood (**CORE-UPHOLD**) model. This model capitalizes on the conceptualization of Relational Personhood (RP) as a nine-aspect construct informed by *Individual-Relational-Societal* (IRS) personhood and *Sensory-Emotional-Existential* (SEE) needs.

Purpose
To evaluate the effectiveness of the CORE-UPHOLD model and demonstrate its application on older adults with dementia in RCHEs.

Method
Ninety-two older adults residing in RCHEs in Hong Kong were recruited between 2018 and 2022, M_{age}=88.79, *SD*=9.10. 49 of them (53.3%) were individuals with dementia. The EoL needs of participants with dementia were assessed using the proxy version of the CORE-UPHOLD assessment, which was designed to capture nine aspects of EoL needs. The CORE-UPHOLD assessment has demonstrated satisfactory internal consistency for all nine aspects among participants with dementia. Descriptive analyses were used to identify the unique configuration of RP of individuals with dementia. Pearson correlation analyses were used to explore the association among the nine EoL needs.

Results
Among demented individuals, 73.5% (*n*=36) reported relational-emotional needs (REm), 57.1% (*n*=28) reported relational-sensory needs (RS), and 53.1% (*n*=26) reported individual-sensory needs (IS). Compared with non-demented individuals, demented individuals had significantly more REm and societal-existential needs (SEx) (REm: $t(92) = 2.75$, *p*=.007; SEx: $t(92)=2.03$, *p*=.045). Pearson correlation analyses revealed REm was significantly associated with other aspects, highlighting the importance of REm needs in relational personhood.

Conclusion
Relational needs were common among older adults with dementia. Findings suggest that REm and SEx needs among demented individuals in RCHEs should receive greater attention. Overall, the CORE-UPHOLD model offers an effective framework for healthcare professionals to better understand individuals with dementia and provide individualized interventions. To promote an age-friendly living environment in RCHEs, it is recommended to establish a sensory library and implement technological solutions in EoL care.

Barriers and Facilitators of Tele-Exercise among the Older People at Risk of Falls: a Qualitative Study Embedded within a Randomized Controlled Trial

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Background

Regular physical activity is essential for older people to maintain muscle mass and strength, reducing the risks of sarcopenia and accidental falls. However, the COVID-19 pandemic has limited traditional outdoor exercise opportunities. This qualitative study examines barriers and facilitators on tele-exercise experienced by older people at risk of falls.

Method

A qualitative study embedded within a randomized controlled trial was conducted in Hong Kong from December 2022 to April 2023. Community-living older people aged 65 years or above, who were at risk of falls, were recruited from three local community centres. Participants engaged in remote exercise training based on the Otago Exercise Programme three days per week for three months. Semi-structured individual interviews with open-ended questions were conducted post-intervention. Interviews were audio-recorded, transcribed, and analyzed based on the Theoretical Domains Framework (TDF).

Results

The study included twenty-five participants with a mean age of 78.28 (ranging from 65-91). The majority were females (80%) with a primary education or below (56%). Analysis revealed several barriers such as background noise, hearing difficulties, fear of new technology and small screen size. Facilitators of tele-exercise included the absence of travel hassles, clear instructions from the instructor, easy technical operation, and the simplicity of movements. The home environment acted as both a facilitator and barrier to tele-exercise. These themes were mapped to the TDF domains.

Conclusion

This study provided insights into the tele-exercise experiences of older people at risk of falls. Despite the identified barriers, participants reported enjoying the tele-exercise training programme. Addressing specific challenges is crucial for older people participating in tele-exercise.　Further research should focus on optimizing tele-exercise programmes to promote regular physical activity and enhance well-being among older people at risk of falls. Identification of barriers and facilitators using the TDF will improve older people's adherence to tele-exercise intervention in the future.

Acknowledgement

Feature Analysis of Salivary Glands under Ultrasonography

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Background

Oral frailty, an ageing-associated phenomenon of oral condition changes that limits oral motor and sensory abilities, contributes to reduced swallowing ability and speech clarity (Japan Dental Association, 2020; Watanabe, 2020). Salivary glands, which are physiologically responsible for secretion of saliva, deteriorates in course of ageing and in turn alters the quantity and composition of saliva. Deterioration of salivary glands is one of the causes contributing to oral frailty, increasing dental caries and causing 'dry mouth' conditions; these contribute to reduced efficiency of mastication and bolus formation in oral preparatory phase of swallowing; reduced quality of bolus formation is one of the core symptoms in oral frailty individuals. The proposed concept of 'Oral Frailty' is explored by range of longitudinal and cohort studies on orthodontic aspects, yet findings remain preliminary and fragmented. This research thus aimed to investigate glands changes across ageing through both quantitative and qualitative manners, it hopes to elucidate the ageing process and dwell to lay a universal definition on oral frailty.

Method

Ten young adults (aged 18 to 60 years) and ten older adults (aged above 60 years) were recruited. All subjects were screened with the 3oz water swallowing test and were confirmed to be non-dysphagic. Anatomical presentations of three sets of salivary glands; namely, the sublingual, submandibular and parotid glands; were captured using B-mode ultrasound with a linear-shaped transducer. Images were processed using the Computer Vision Annotation Tool (CVAT). Cross-sectional areas of individual salivary glands were first measured, the features of echogenicity, homogeneity, number of hypoechogenic areas, hyperechogenic reflection and clearness of gland borders with reference to Hočevar et al. (2005) were preliminary reviewed. Comparisons between the young- and older-adult groups will be presented.

Results

The feature of border clearness are prominently differed between two groups. Detail comparisons between the two groups will also be presented.

Conclusion

Gland size difference and quality differences across groups are possibly contributing to reduced salivary flow rate during ageing process. Ultrasonographic examinations on salivary glands may be included as part of the clinical bedside instrumental swallowing assessment to evident the functional decline of swallowing ability.

Older Adults' Experiences of Chronic Low Back Pain and its Implications on their Daily Life: A Systematic Review of Qualitative Research

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Purpose

Low back pain (LBP) is the major chronic musculoskeletal condition among older adults. This systematic review of qualitative research aimed to synthesize and conceptualize lived experience of older adults with chronic LBP.

Method

Pubmed, CINAHL, and PsycINFO were searched from inception to September 2023 to identify relevant publications. Studies were included if they reported lived experiences of older adults with chronic LBP. Two independent reviewers screened the titles, abstracts, and full-text articles for eligibility. The included studies were critically appraised for methodological quality using the Consolidated Criteria for Reporting Qualitative Research (COREQ) framework. Findings were extracted and analyzed using meta-ethnography.

Results

A total of 2,571 citations were screened. Fourteen out of 53 full texts were included. The included studies fulfilled approximately half (14, 44%) to 27 items of the 32 COREQ items to be low risk of bias. Six themes were identified: (1) perspective and perceived cause of LBP; (2) family dynamics (as a burden or experiencing support); 3) social isolation or social support; (4) coping and self-management; (5) interference with daily activities; and (6) acceptance or negative emotional response to chronic LBP. Collectively, chronic LBP significantly affected older adults' daily living, family and social life to different extents. Poor LBP management may be related to negative emotion (e.g., depression) and avoidance behaviors. Acceptance of chronic LBP and having a definitive diagnosis of LBP facilitates their self-management, whereas comorbidities and rumination hinder their self-management.

Conclusion

Given that acceptance of chronic LBP would improve self-management of chronic LBP in older adults, healthcare professionals should actively listen to older patients and provide proper education to these patients and their caregivers so as to improve their self-management of chronic LBP. Proper screening of potential risk factors (e.g., depression and comorbidity) may help identify high-risk individuals for timely management.

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Immediate Effects of Transcutaneous Electrical Nerve Stimulation and Kinesiology Tape on Lower-Limb Joint Proprioception and Body Balance in Healthy Older Adults

Shirley S.M. Fong and Raymond K.Y. Tong

Department of Biomedical Engineering, The Chinese University of Hong Kong

Purpose

An age-related decline in lower-limb joint proprioception and body balance increases the risk of falls in older adults. This study examined the acute effects of transcutaneous electrical nerve stimulation (TENS) and kinesiology tape (KT) on lower-limb joint proprioception, static single-leg standing balance performance and limits of stability balance performance in healthy older adults.

Method

From January to February 2023, participants were recruited from the community by convenience sampling. Twenty-four older participants were eligible and exposed to two TENS conditions (i.e., with TENS and sham TENS applied to the knee and ankle joints) and two KT conditions (i.e., with KT and sham tape applied to the knee and ankle joints) while undergoing an active joint angle repositioning test, a single-leg standing balance test on a force platform and a Functional Reach Test (FRT). The outcome measures were bilateral knee and ankle joint repositioning errors, center of pressure sway path length and velocity, FRT score and forefoot weight load, respectively.

Results

The application of both TENS and KT reduced left knee joint repositioning errors by 0.94° ($p = 0.044$) and 0.85° ($p = 0.020$), respectively, compared with applying KT alone or TENS alone. No significant main or interaction effects were demonstrated for other outcome measures.

Conclusion

Applying TENS and KT to the lower-limb joints immediately improved knee joint proprioception, but did not improve ankle joint proprioception, in the older adult population. The application of TENS and/or KT had no immediate effects on balance performance in older adults. Therefore, TENS and KT may be applied as prophylactic measures to prevent the age-related decline in knee joint proprioception. In addition, the findings of this study are a reminder to healthcare professionals that TENS and KT, when applied to the knee and ankle joints, have no immediate effects on balance performance in healthy older adults.

Developing Future STEM Talents via Gerontechnology: Action Research for Gifted Students in Hong Kong

Debbie Tsoi Ling Yu

The Hong Kong Academy for Gifted Education

Background
By 2035, around 400 million individuals in China would have reached the age of 60 or above, accounting for around 30% of the total population (South China Morning Post, 2023). The challenges arising from a rapidly aging society have escalated over the past two decades (Cavendish, 2023). Addressing the challenges faced by the elderly necessitates an urgent focus on developing innovative and smart solutions.

Purpose
Under the ageing society, developing young talents have become one of the greatest concerns for the Hong Kong government (Chan, 2022). There is a need to develop literacy in STEM among young people (The Education Bureau, 2016). While community-based STEM programs before tertiary education were reported to ignite long-term talents in STEM (VanMeter-Adams et al., 2014), gifted students interested in STEM area should be exposed earlier to STEM-related community-based programs to develop their fullest potentials.

Method
In response to the need of developing talents and addressing the issue of ageing society, the present research reports on the design of a three-phased program designed to develop talents in Gerontechnology. The program involves leaders from the education sector (n=5), tech industry (n=5), social service sector (n=2), and gifted senior secondary school students in Hong Kong (n=35). From year 2022 to 2023, students progressed from building a foundation of artificial intelligence (AI) (phase 1), utilizing different applications of AI (phase 2), to creating their own minimal viable applications to solve problems faced by the elderly in Hong Kong (phase 3).

Results
After collecting data from focus groups, lesson observations, and textual materials, the students reported experiencing a broadening of their horizons through direct interaction with industry leaders in Gerontechnology. Moreover, they developed a heightened understanding and empathy towards the elderly population in Hong Kong, successfully overcoming technical challenges while creating an AI product. Additionally, the process allowed them to cultivate their creativity by engaging in product marketing activities.

Conclusion
Though availability of gifted students; balance of technical knowledge and empathy towards the elderly remained challenges for the program, the present study serves as a pilot study to inform local schools and institutions in designing and implementing similar programs to foster the development of talents in Gerontechnology, ultimately contributing to the ageing population in Hong Kong.

A Novel Participatory Model-Making Design Activity in Engaging Stakeholders of a Senior-Friendly City to be Active Contributors in Designing Future Outdoor Exercise Space for Seniors: Preliminary Findings from a Pilot Study

Janet Lok Chun Lee, Kwok Lang Lee, Arnold Yu Lok Wong, Karen Lee, Rainbow Tin Hung Ho, William Kong, Samuel Mo

Purpose

This presentation describes the acceptability of a participatory design method, model-making, in eliciting older adults' views on designing outdoor exercise space for a senior-friendly city through short surveys and interviews. Preliminary findings from the small pilot sample will be presented.

Method

A model-making participatory qualitative method was used to elicit views among current stakeholders of outdoor exercise space on their views on designing exercise space for older adults. Participant recruitment used a direct approach at public parks. The pilot participatory model-making approach successfully elicited views from 13 older adults ranging from 63 to 93 years old through individual or focus group interviews. Three of them are male, and ten of them are female. The education level attainment of the majority of them is primary school level.

Results

Quantitative data revealed that all participants agree or strongly agree that they enjoyed taking part in the activity, the activity was easy to understand and easy to take part in, and could provide an opportunity for them to highlight topics which they felt important, and the activity was an effective method in exploring their views on the design of the environment. Qualitative thematic analysis revealed that the participants found the model-making approach to be a straightforward way in expressing their opinions. The visual and touchable nature of the equipment models makes the activity easy to understand and easy for them to express their views.

Conclusion

Pilot findings revealed that participants select their most desired equipment if they believed that the equipment would facilitate their physical functioning and promote health maintenance (i.e., maintain their walking ability). The model created by the participants elicited their vision of inclusive exercise space and equipment for older adults with different physical conditions, especially for the oldest-old and those who survived a stroke. How the equipment is placed to facilitate social interaction is also elicited.

Digital Divide and Life Satisfaction in Older Adults: Evidence from a Baseline Survey of mHealth App Users in Hong Kong

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Purpose

Digital health technologies, including mHealth applications, hold great potential for promoting healthy aging among older adults. However, the persistent issue of the digital health divide, characterized by varying technology adoption leading to unequal health and wellbeing outcomes, poses a barrier to harnessing the full benefits of these technologies. This study explores the impact of the digital divide on life satisfaction among older social services users in Hong Kong.

Method

This study draws from the baseline survey of a quasi-experimental multi-center panel investigation that evaluates the effectiveness of an mHealth intervention. Participants aged 60 and above were recruited from six NGOs in Hong Kong, assessing their levels of life satisfaction (LS), self-care self-efficacy (SCSE), health and wellbeing (HWB), and technology acceptance and competence (TAM-LR and TAM-ICT), along with socioeconomic and demographic information.

Results

Between April and August 2023, 231 social service users (average age=79.28, SD=8.5, 76.1% female, 23.8% male) participated. Results revealed that female participants, individuals with no formal education, the oldest-old, and those not cohabiting with their spouse had lower ICT competence compared to their counterparts. Additionally, the oldest-old participants showed less acceptance of mHealth technologies than their younger counterparts. Findings indicated that participants' enhanced self-care self-efficacy contributes to better health and wellbeing, consequently elevating their life satisfaction. Furthermore, TAM-LR and TAM-ICT played a moderating role in the mediation between SCSE, HWB, and LS, suggesting that participants with higher technological acceptance and competence perceiving heightened self-efficacy in self-care, which positively impacts health and wellbeing, thereby fostering greater life satisfaction.

Conclusion

The extent of technology acceptance and competence emerges as a crucial predictor of improved health, wellbeing, and life satisfaction for older adults in Hong Kong. The study underscores the importance of facilitating the equitable adoption of mHealth technologies among older adults. Implications for health and social services will be drawn.

A Meta-Analysis on the Influence of Social Capital on Older Migrants' Subjective Well-Being

KANG Rui, BAI Xue

Purpose

The empirical and theoretical literature has emphasized the significance of social capital for older migrants. However, a comprehensive quantification of the strength of the association between social capital and the well-being of older adults is lacking. This meta-analysis aims to synthesize and quantify the relationship between social capital and the well-being of older migrants, considering the unique characteristics of the family and community dimensions.

Method

Twenty-six eligible studies were included in this meta-analysis.

Results

The findings from a random-effects model revealed a small yet significant correlation between family social capital and the well-being of older migrants ($r = 0.160$, 95% CI [0.066, 0.251], $p < 0.01$). Moreover, significant correlations were also observed between community structural social capital and well-being ($r = 0.186$, 95% CI [0.102, 0.267], $p < 0.001$), as well as between community cognitive social capital and well-being ($r = 0.257$, 95% CI [0.137, 0.370], $p < 0.001$). The association between family social capital and well-being was further moderated by the migration intention of older migrants, with a stronger association observed among studies focusing on older migrants who migrated to live with their adult children ($r = 0.322$, 95% CI [0.232, 0.406], $p < 0.001$).

Conclusion

These results suggest that, overall, community social capital may have a greater impact on promoting the well-being of older migrants, while for those who migrate to live with their adult children, family social capital plays a stronger role. It is recommended that policy makers and service providers implement various and tailored programs for older migrants to enhance their family and community social capital, thereby promoting their well-being in their new living environments.

SmartConnect - Digital Literacy Enhancement for the Older Adults

Dai Anni, Annie; Poon Lok Yiu, Tiffany; Wong Yeuk Hang, Twiggy; Wong Chui Yan, Esther

Background

With the support of SIE fund, the Hong Kong Sheng Kung Hui Welfare Council has launched the 2-year SmartConnect Project since 2021. It is recognized that embedding digital literacy into the daily practice can enhance the provision of support and care for individuals, families and the community.

Purpose

The project aims to promote well-being for older adults where enhances accessibility and competence of the information and communication technology as well as enhance their resilience. Additionally, the project promotes co-creation and collaboration between the elderly and adolescents.

Method

Four major components are involved. "Digital Satellite Centre" provided digital technology training and technical support to the elderly. "Digital Mobile Classroom" reached out to the elderly living in remote areas and provide them with knowledge of digital technologies and technical support. Adolescent cooperated with the elderly in "Digital City Adventure" to complete missions in the city with mobile applications. Besides, they were paired up with the elderly in "Co-creation of Digital Life" to make use of design thinking to co-create solutions that would enhance the digital lives of the elderly.

Results

The project has liaised with J.C.D.I.S.I, The Hong Kong Polytechnic University for the evaluation. As of August 2023, over 2,900 seniors have benefited from the project, and their average age was 74. The pre-post design was adopted. Significantly, the project increased elderly's acceptance (T = 2.40, $p < 0.05$), and confidence (T = 3.70, $p < .001$) by using digital devices. Moreover, their interpersonal relationships established by the mobile devices remarkably increased (T = 2.709, $p < .01$), which indicates the effectiveness on the digital connections and social relationship, particularly in the post-pandemic context.

Conclusion

Overall, the project has a significant impact on the digital literacy for the older adults. It empowers individuals to access and utilize information and communication technology effectively, also fosters better collaboration, and connectivity within families regardless of physical distance. Importantly, the project plays a crucial role in building inclusive and connected communities.

Evaluating the Effectiveness of a Self-Design Training Kit Using the DementiAbility Methods ™ on Elders with Dementia

Nancy Yeuk Man TANG, Eva Yee Wa CHENG, Arthur Ka Kei TUNG

Background

Dementia is a growing global issue. Non-pharmacological interventions are preferred for individuals with dementia to maintain their quality of life. DementiAbility Methods ™ (DM), is a person-centered model that aims to create worthwhile and meaningful activities, roles, and routines based on the individual's needs, interests, skills, and abilities (NISA) within a supportive environment to improve quality of life. The Hong Kong Sheng Kung Hui Welfare Council launched a DM promotion program in 2020 to enhance its dementia services, including staff volunteer and caregiver training, production of a DM training kit, and a practice research study to evaluate its effectiveness.

Method

The study recruited participants aged 60 and above with dementia from various elderly service units and residential care homes. The study used a within-subjects non-randomized controlled cross-sectional design. The levels of engagement and affect were measured using the DementiAbility's Enabling Engagement Monitoring Assessment Tool (DEEMAT) and the Menorah Park Engagement Scale (MPES).

Results

The results of the study showed that participants involved in the DM intervention activities had significantly higher levels of engagement and affect compared to those participating in conventional activities. They demonstrated higher levels of concentration, ability to focus, engagement, interest, active participation, constructive engagement, smiling, and pleasure. Both intervention and conventional activities were effective in reducing sadness and anxiety. There were no significant differences in passive engagement, self-engagement, and non-engagement between the two groups.

Conclusion

This study provides strong evidence that the DM training kit, customized with the DementiAbility Methods ™ framework and cultural characteristics, is effective in promoting engagement and improving mood for individuals with mild to moderate dementia. Larger studies with randomized controlled designs are recommended for more rigorous evidence. The DM training kit can serve as a structured framework for healthcare professionals to create customized activity kits, benefiting more individuals with dementia.

Applying DementiAbility Methods in the Culture of Dementia Care Mapping for People with Dementia in Long-term Care Settings of SAGE

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Background

"Person-centred Care" is the key direction of the service for the elderly with dementia in The Hong Kong Society for the Aged (SAGE). We have successfully incorporated the "DementiAbility Method" with the "Dementia Care Mapping (DCM)" to make a new dementia care model. In year 2020, 25 professional staff of SAGE participated a tailor-made "Certification Course on DementiAbility Methods — The Montessori Way™ (DMMW)".

Purpose

To promote the evidence-based practice, a new study has been launched in 2022 in three Residential Care Homes and one Day Care Centre for the Elderly, after the pilot study in one of our Residential Homes in 2017.

Method

Eight participants were selected in June 2022 according to the following criteria: 1) diagnosed with dementia; 2) presented with low Well-ill Being (WIB) score in DCM evaluation; 3) with high percentage of the four behaviour categories, i.e., Borderline (B), Cool (C) and Nod, land of (N) in DCM evaluation; 4) with behavioural problems assessed by the Cohen-Mansfield Agitation Inventory (CMAI).

Each participant received comprehensive assessment and tailor-made individual and 10-sessions of 1-hour group activities under the DMMW programme. Environmental modification was also done to support the participants. DCM and CMAI were applied to evaluate and analyse the effectiveness in pre-programme (baseline), immediate after-programme (T1) and 2-month follow up (T2).

Results

The group Well-ill Being (WIB) Scores in DCM improved from +1.3 (baseline) to +1.7 at T1, and sustained at +1.6 at T2. The CMAI scores also decreased gradually from baseline to T2. The result indicated that intensive DMMW training was effective in improving participants' well-being, as well as reducing agitation behaviours in elderly with dementia.

Implications

As this pilot study only included eight cases within SAGE, future study with a larger scale is indicated to increase the generalizability. SAGE will continue to strive for excellence in enhancing its supportive environment for people with dementia in Residential Care Homes and Day Care Centres for the Elderly, using DementiAbility Methods.

Effects on Cognitive Function and Functional Motor Performance for Patients with Mild Cognitive Impairment Using Dual-Task Training System with Moderate-Intensity Cycling

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Purpose
The purpose of this study was to investigate the effects on cognitive function and functional motor performance in patients with mild cognitive impairment (MCI) after using the dual-task cycling training system with 30 rehabilitation sessions.

Background
All participants were recruited from the local rehabilitation centers in Hong Kong and were diagnosed with mild cognitive impairment (MCI) from 2018-2020. The following inclusion criteria were used: (a) total scores of Montreal Cognitive Assessment, Hong Kong version (HK-MoCA) ranging from 7th to 16th percentile stratified by age and education [1, 2], (b) be able to follow the instructions and perform cycling independently, (c) free of any other neuromuscular that affect the motor performance, (d) free of any cardiovascular diseases that may have a potential risk of life during cycling. In total, 19 patients were eligible and volunteered themselves to participate in the study.   Participants were randomly allocated to each group, and they maintained their regular training during the study period.   All subjects provided informed consent approved by the Joint Chinese University of Hong Kong – New Territories East Cluster Clinical Research Ethics Committee (identifier: NCT05384639).

Method
The self-developed system consisting of the exercise bike (Monark 928E, Monark Sport & Medical, Sweden), heart rate sensor (Polar H10, Polar Electro, Finland) and RehaCom software for cognitive rehabilitation (HASOMED GmbH, Germany) was developed for the dual-task cycling training. The user's personalized cycling performance of elapsed time, heart rate (HR), RPM, power output, and power ratio between left and right pedals were displayed in real-time on a monitor. In this study, the cognitive therapy modules of attention, memory, executive functions, and visual field were used for cognitive training while using the dual-task cycling training system with the touchscreen. All subjects were asked to perform the Graded Exercise Test modified from YMCA Sub-Maximal Cycle Ergometer Test to determine the upper and lower boundary of workloads for moderate-intensity cycling at pedaling rate of 50 RPM [3]. In this study, the definition of HR_{max} was calculated: 208-(0.7*age) [4], and the moderate-intensity cycling was defined as the range from 55% to 75% HR_{max} [5]. After finishing the Graded Exercise Test, all subjects received 30 sessions using the dual-task cycling training system in the frequency of four sessions weekly. Baseline and post training of cognitive function and functional motor performance were assessed by using MoCA, Trail Making Tests (TMTs), 5-Times Sit to Stand Test (5TSTS), 10-Meter Walk Test (10MWT) and 6-Minute Walk Test (6MWT). Paired *t*-tests were used to test the differences of the outcomes in cognitive function and functional motor performance within groups between baseline and post assessments. All comparisons were performed using SPSS 22.0 software (SPSS, IBM, Armonk, New York, U.S.A.), and the statistical significance was set at $\alpha = 0.05$.

Results
No differences in demographics, baseline of cognitive function and functional motor performance were found between Cognition (N=7), Cycling (N=7) and Dual-Task (N=5) groups. After 30 training sessions, assessments in cognitive function and functional motor performance between baseline and post were conducted. For cognitive function, significant improvements in MoCA were found in Cognition and Dual-Task groups, and the significant differences in TMTs – part A and part B were found in Cognition group. For functional motor performance, both Cycling and Dual-Task groups showed significant improvements in 5TSTS, 10MWT and 6MWT.

Purposes of Use, Time Spent Online, and Depression among Older Chinese Internet Users

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Background

Associations between Internet use and older people's depression have been inconclusive. The current study investigated two Internet use patterns (purposes of Internet use and time spent online) and their associations with older Chinese Internet users' depressive symptoms.

Method

A sample of 974 Internet users aged 60 and above was adopted from the 2020 China Family Panel Studies (CFPS) wave. Based on a latent class analysis (LCA) of Internet use purposes (work, leisure, socialization, information seeking, and online shopping/banking), they were categorized into three types: socializers, basic users, and maximizers. Basic users and maximizers use the Internet for various purposes, despite different intensities; socializers use the Internet only to keep connected with families and friends.

Results

Neither typology of users nor time spent online was significantly associated with depression independently. However, the interaction between them was significantly associated with depression. Specifically, compared with basic users and maximizers, a longer time spent online among socializers was significantly associated with more depressive symptoms. While keeping social connection is the most prevalent purpose of using the Internet among older Chinese people, our findings suggest that using the Internet excessively for social purposes is associated with potential negative mental health conditions, compared to those using the Internet for more diverse purposes.

Conclusion

This study calls for a closer examination of online profiles and more attention to the potential harms of excessive Internet use among older people. Practitioners should enhance older Internet users' digital literacy to maximize the wide-range benefits of Internet use and reduce potential health inequality.

Decrease in Visual Chromatic Sensitivity as a Potential Biomarker for Early Detection of Mild Cognitive Impairment – a Pilot Study

CHOI Kai Yip, LAM Bess Yin-hung, CHAN Henry Ho-lung

Purpose

Vision is essential to maintain daily activities and quality of life for the elderlies. Studies have suggested that elderlies with cognitive impairment would also face visual challenges. In particular, colour vision requires an intact visual pathway, starting from the retina to the brain, and a good brain function for colour information processing. In this pilot study, we conducted comprehensive eye examinations for elderlies of different cognitive capabilities, and revealed the possibility of utilizing chromatic sensitivity as a biomarker for the early detection of mild cognitive impairment (MCI).

Method

Sixty elderlies were recruited, and 56 completed all the measurements (aged 73.5 ± 8.2, range 60 – 91 years old, 44 female & 12 male). Eye examination included, but not limited to, visual acuity (VA), external and internal ocular health assessments. Additionally, contrast sensitivity (CS) and colour vision (CV) were also evaluated. To assess the cognitive function of the elderlies, the Cantonese version of the Mini-Mental State Examination (MMSE) was conducted.

Results

Of the participants, 42.9% had MCI based on the MMSE (cutoff score 24/25), having a mean score of 24.52 ± 4.73 out of 30. The VA and CS were significantly better in normal than MCI participants ($p < 0.05$). Interestingly, MCI participants were subjectively more aware of a reduced vision ($p < 0.05$). Despite the statistical insignificance, MCI participants had a consistently higher rate of having problems on ocular health issues, e.g., cataract and macular degeneration. In particular, the MMSE score was positively correlated with the CV, even after controlling for covariates, indicating that CV is an independent factor in relation to cognitive function.

Conclusion

MCI is difficult to detect when the symptoms are mild. On the other hand, patients are more aware of a reduced vision, which may be indicative of an impaired cognitive ability. Changes of colour vision may be a potential sign for the early detection of MCI for elderlies. Regular eye examination is recommended to the public to early reveal visual and cognitive impairments.

Designing a Mixed Reality and Cultural–Based Intervention in Sensory Urban Green Care Farm for Older Persons with Mild Cognitive Impairment (MCI)

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Background

Horticultural programmes in urban settings have been proven to generate wellness beneficial to a wide range of people, but its application to improve cognitive functioning based on mixed reality (MR) interface is seldom explored. In the vertical city of Hong Kong, the opportunity exists to create a versatile and adaptable planting station which is self-sustainable, suitable to be located in small balconies, roof top or underutilized public space.

The sensory urban green care farm (S-Farm) project, as a Community Participatory Action Research, combines research in spatial design, computing science, nursing and medicine, with community collaboration to promote community health for those with MCI. It consists of three phases – (I) Phase one "community co-design" to identify (a) the MR interface (multi-sensory) with the plant in a farming routine; (b) users' design preference on the spatial design of the planting station; (II) Phase two "development of IT platform" to enable multiple sensory interface of the virtual reality of plant conditions and visualization of farming instructions; and (III) Phase three "multi-centre clinical trial" to determine the significance of the efficacy of the interventions.

Method

Phase one has been conducted with 25 participants and completed in 2022-2023. The co-design process indicated that the MR interface shall incorporate the virtual reality of a growing plant as a coherent experience alongside the physical reality. The resulting strong metaphoric association of virtual and physical reality may guide the users to make timely decisions on the appropriate farming tasks accordingly, such as water, nutrients, lighting, and/or insect control. For spatial design of the plant station, five preferred themes have been identified– companion animal; familiar routines; Asian landscape features; presence of nature/outdoor; and sensory stimuli. These features will be built into the prototype of the MR-planting station at the end of Phase 2 (end 2023), with a functioning MR media interface. Phase two is currently in process, developing multiple sensory interface for users including (1) visualization of both the plant conditions and farming instructions through a mobile application, (2) tactile feedback through an oversized plant model made of soft material allowing touching and hugging; (3) sound/musical feedback. Phase 3 will take place in early 2024, conducting clinical trials with 12 MCI cohorts in two centres, to investigate the retrospective results of MR intervention measured by validated scoring tools, including intergroup comparison (according to two or more body types based on Chinese medicine syndrome differentiation) with additional treatment using the adaptive features such as (i) bright light therapy (yang qi deficient); (ii) music therapy (liver qi stagnant) integrated in the S-Farm planting station. The customized approach with cultural adaptation is expected to significantly increase the treatment efficiency.

Acknowledgement

The Use of Augmented Reality Exercise for Pain Management in Older Adults

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Background

With the increasing use of Gerontology in recent years, the use of Augmented Reality (AR) promises many benefits for older adults, such as promoting a healthy lifestyle with health-related gaming, maintaining social contact via digital interfaces, supporting rehabilitation, and aiding in everyday life tasks. At the same time, many older adults are suffering from chronic joint pain due to degenerative changes or other pathological reasons.

Purpose

To investigate the effectiveness of the AR Rehab-based training in older adults who suffered from chronic joint pain when compared with conventional training

Methods

Twenty seven older adults (Mean age: 81.5 years old, 4 Males and 23 Females) who suffered from chronic joint pain participated 8 sessions of AR exercise training and then resumed their Conventional training for 8 sessions at residential care homes or day care centre from May 2023 to August 2023. Pre and Post outcome measures including Numerical Pain Rating Scale (NPRS), Range of Motion (ROM) and Muscle Power (MMT) were assessed in AR exercise training and Conventional training respectively.

Results

Statistically significant improvement was observed after the AR exercise training ($p<0.0001$) but not in Conventional training ($p=0.083$). Both trainings could significantly improve the Range of Motion but the improvement was greater in AR exercise training ($p<0.0001$) compared with Conventional training ($p=0.0133$). No significant difference in muscle power was observed in both trainings (AR: $p=0.083$; Conventional: $p=0.6632$).

Conclusion

Based on the results of this study, Augmented Reality exercise training was more effective in relieving chronic joint pain as well as increasing range of motion of chronic painful joints.

Enhancing Smart Living for Healthy and Active Ageing: A Multidimensional Approach

YUEN Chi Wai

Bo lo yeo collective

Purpose

The purpose of this study is to propose a multidimensional approach to enhance smart living for healthy and active ageing among older adults. The study aims to explore the integration of technology, social engagement, and environmental considerations in promoting smart living for older adults.

Methods

A comprehensive literature review was conducted to gather relevant information on the use of technology, social engagement, and environmental factors in smart living and ageing. Various databases were searched, including PubMed, Google Scholar, and relevant academic journals, using keywords such as "smart living," "smart ageing," "technology for older adults," "social engagement," and "environmental considerations." The study did not involve primary data collection; instead, it focused on synthesizing existing research and knowledge. The literature review spanned articles published between 2010 and 2021 to ensure the inclusion of recent studies and developments in the field.

Results

The study revealed that technology plays a pivotal role in enabling smart living for older adults. Emerging technologies such as IoT, AI, and wearable devices offer opportunities for independent living, remote healthcare monitoring, and personalized interventions, empowering older adults to maintain their autonomy, enhance safety, and access healthcare services more conveniently. Additionally, social engagement emerged as a critical aspect of smart living and ageing, promoting mental and emotional well-being among older adults.   Social connections, community participation, and intergenerational activities were found to mitigate social isolation, with social robots and virtual reality technologies fostering meaningful interactions. Furthermore, creating age-friendly environments was highlighted as essential for successful ageing, with design principles for smart homes, urban planning considerations, and community infrastructure promoting physical activity, safety, and social connectivity.

The multidimensional approach presented in this study provides valuable insights and recommendations for policymakers, researchers, and practitioners to enhance smart living for healthy and active ageing. By integrating technology, promoting social engagement, and creating age-friendly environments, older adults can lead fulfilling lives, maintain independence, and actively participate in society. These findings emphasize the need for collaborative efforts between technology developers, healthcare professionals, urban planners, and community organizations to create a supportive ecosystem for smart living and ageing.

Conclusion

In conclusion, the study highlights the importance of a multidimensional approach in enhancing smart living for older adults. By leveraging technology, fostering social engagement, and creating age-friendly environments, we can address the challenges and opportunities associated with the ageing population. This approach has the potential to improve the quality of life, health outcomes, and overall well-being of older adults, allowing them to age gracefully and actively contribute to society. It is imperative for stakeholders to embrace these strategies and work towards creating a future where smart living and smart ageing are seamlessly integrated into the fabric of our societies.

Visualizing Swallowing Muscle Wasting through Patterns in the Muscle Morphology and Contraction Sequences of Healthy and Aging Individuals under Ultrasound Imaging: A Pilot Study

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Background
Suprahyoid muscles including geniohyoid, mylohyoid and digastric muscles are responsible for hyoid bone excursion. Paresis in suprahyoid muscles may lead to inadequate hyoid excursion, reduced epiglottic retroflexion and reduced cricopharyngeal relaxation; leading to pharyngeal stasis, penetration or aspiration of food and fluids, causing dysphagia. Increasing evidence shows that morphological changes in muscle mass and quality is closely associated with swallowing difficulties (Feng et al., 2021), especially in individuals with muscle wasting. Due its strength of visualizing muscle features, ultrasound imaging is gaining attention in swallowing assessment. With the strength of visualizing the features of muscles, Kwong et al. (2022) identified kinematic sequences of swallowing muscle contractions by scanning the submental area using ultrasound imaging on the mid-sagittal plane, in which limited muscles could be captured considering the geometric alignment of the swallowing muscles.

Purpose
This pilot study aims to provide a preliminary analysis on the swallowing muscle morphology and the event sequences in muscle contractions on the coronal plane, which allows cross-sectional examination of multiple swallowing muscles.

Method
Ultrasound images of the submental area on the coronal plane were obtained from eight   subjects (four healthy young adults with age range 18-30, and four ageing seniors with the age range of 51 to 70 years, balanced gender ratio) using B-mode ultrasound with a standardized protocol. Ultrasound images depicting swallowing actions and musculatures at rest were obtained. The regions of interest (ROI), including geniohyoid and mylohyoid muscles, were manually annotated using a Computer Vision Annotation Tool (CVAT) program. Pixel-based analyses using codes from the OpenCV library in Python were administered. Cross-sectional areas (CSA) were obtained by counting the number of pixels in the area and converted into cm^2 with reference to the physical delta values from the DICOM files. The echogenicity of the swallowing muscles was obtained by grayscale analyses, where the grayscale images were defined on a scale from zero to 255, with zero referring to black and 255 referring to white. The obtained CSA predicts the mass of the muscles in statics and the degree of muscle contraction in kinematics, and the echogenicity predicts the density of muscles and thus the extent of muscle contraction.

Results
Between the two age groups, the aging individuals showed a higher echogenicity and a smaller cross-sectional area of geniohyoid and mylohyoid muscles at rest than the mean values of the young group. During maximum geniohyoid and mylohyoid muscle contraction, young participants also showed muscles with lower echogenicity and higher cross-sectional area.

Conclusion
Emerging evidence shows muscle morphology differences would potentially lead to a different swallowing mechanism and kinematics, leading to swallowing difficulties. Healthy young participants had larger and denser swallowing muscles, allowing them to achieve stronger muscle contractions than the elderly group. The details of muscle contraction sequences will be discussed.
Understanding swallowing difficulties from a muscle morphological and physical interaction level could help explaining the kinematic events of swallowing. Ultrasound imaging could further be developed into routine clinical, or home assessment tool for screening of swallowing muscle deficits and dysphagia in the future.

Optimizing Gerontechnology for Asian Eldercare: A Mixed Methods Study Assessing the Viability and In-Context Impact of Social Robots through Community Surveys and In-Context Testing Among Hong Kong Seniors.

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Purpose

Social robots demonstrate potential for enhancing elderly care, however, there is a dearth of comprehension regarding their acceptance and real-world impact within Asian cultures. This two-phase study aimed to optimize social robots for dementia care in the high-density Hong Kong setting.

Method and Results

Phase 1 involved an online survey of 92 Hong Kong adults over 60 years old to assess cultural perceptions of social robots. Results showed cautious openness to social robots, with preferences for culturally-aligned characteristics and functions. In Phase 2, 10 humanoid social robot were deployed in Hong Kong dementia care homes and elderly centre for a span of 10 weeks. Using a mixed methods approach, researchers investigated its impact on engagement, behaviors, and care quality for 13 residents with moderate dementia. This was achieved via a composite of experimental interactions, observational ethnography, and staff interviews. Introduction of the social robots led to substantive increases in engagement duration relative to baseline measurements. Personalized robot interactions elicited more affirmative responses. Staff reported benefits such as eased workload and improved quality of life. Some negative behaviors were observed initially but diminished over time.

Conclusion

The study furnishes evidence that social robots constitute a viable avenue for amplifying engagement and care in Asian dementia contexts contingent on cultural alignment. Further research is necessitated to develop optimal implementation frameworks.

The Effects of Telerehabilitation Using a Novel Wearable Device, 'Smart Reminder' on Hemiplegic Upper Limb Recovery for Community-Dwelling Stroke Survivors: A Cross-over Study

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Background

Home-based self-directed training provides an opportunity to practise the hemiplegic arm intensively without the need for a significant amount of resources. Emerging literature suggests that wearable devices offer a promising option for self-directed upper limb training for stroke rehabilitation at home. However, little research is available to explore the integration of smartphone applications with wearable devices to provide upper limb rehabilitation to stroke survivors in the home setting. This study examined the feasibility and potential therapeutic effects of a wearable device integrated with a smartphone-based telerehabilitation system to provide upper limb rehabilitation to community-dwelling stroke survivors at home.

Method

Twelve stroke survivors from community support groups participated in a treatment consisted of 4-week telerehabilitation using a wearable device and 4-week conventional therapy successively in a single-blind, randomised crossover study. A 3-week washout period was administered between the two 4-week treatments. The primary outcome measures were the Fugl Meyer Assessment, the Action Research Arm Test, and the active range of motion of the upper limb. Secondary outcome measures included the Motor Activity Log and exercise adherence.

Results

Results showed that participants improved more significantly in active ROM of their hemiplegic shoulder after 4 weeks of telerehabilitation with the wearable device than with conventional therapy. No significant differences were found in other outcome measures.

Conclusion

A 4-week telerehabilitation using a wearable device improves the hemiplegic upper limb in community-dwelling stroke survivors and may be feasible as an effective intervention for self-directed upper limb rehabilitation at home.

Investigating the Effect of Ageing on Swallowing Movement Sequencing, Velocities, and Muscle Contraction in Non-Invasive Multimodal Swallowing Examination: a Pilot Study

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Introduction

Swallowing is a complex physiological process that governs the safety and efficiency of nutritional intake across the lifespan. Previous studies using ultrasonography have shown that the variability and concurrency of swallowing movement sequences decreased with ageing as well as the presence of dysphagia (e.g. Lam et al, 2023a). The combination of sequence variability and concurrency also achieved AUC-ROC scores of .961, .926, .952 in differentiating healthy, ageing, and dysphagic individuals respectively from one another (Lam et al, 2023b). While there has been evidence showing that suprahyoid muscle mass and quality changes along with ageing (e.g. Mori et al, 2019), little attention has been placed on how such changes are correlated with swallowing movement sequencing and velocities.

Purposes

The current study took one step further to (1) investigate the effect of ageing on and correlation among sequence variability and concurrency, swallowing movement velocities, and swallowing muscle contraction changes using multimodal measurements in order to (2) lay the groundwork for the development of portable and non-invasive smart swallowing screening/assessment technologies enabled by machine learning algorithms.

Methods

Forty participants, including 20 healthy young and 20 healthy old individuals, were recruited from the community to undergo multimodal swallowing examinations from April to September 2023. The examinations were conducted using ultrasonography (visual) at the submental area on the mid-sagittal plane, and accelerometer array (acoustic) along the neck surface simultaneously. The participants performed repeated swallowing trials of 5mL and 10mL water boluses Level 0, Level 2, and Level 4 consistencies with respect to the International Dysphagia Diet Standardization Initiative (IDDSI) via syringes. Swallowing movement events were extracted and analyzed using sequence analysis (Lam et al, 2023a), movement velocities extracted from both ultrasound images and accelerometers, and area changes of the geniohyoid muscle contraction from ultrasound images.

Results and Conclusion

Results of two-way MANOVA (Group and Gender) and Pearson's correlation among movement sequencing, velocities, and area changes of swallowing muscles will be discussed with respect to ageing. The feasibility and future directions of utilizing AI-enabled, portable, and non-invasive multimodal swallowing assessment using ultrasonography and digital cervical auscultation (i.e. accelerometer array) in community and home care settings will also be discussed.