The 3rd International Alliance of Research Universities Aging, Longevity, and Health Initiative Graduate Student Conference 2016

Oral Presentations

November 4, 2016
9:30-11:25

Ito International Research Center
The University of Tokyo, Tokyo, Japan

This conference is co-organized by International Alliance of Research Universities (IARU) Aging, Longevity, and Health(ALH) Initiative, Institute of Gerontology and Graduate Program in Gerontology (Global Leadership Initiative for an Age-Friendly Society; GLAFS) at The University of Tokyo.
[Oral Presentations]

9:20-11:25am, November 4th

- Venues and Schedule

Oral presentations will take place in three venues concurrently. The first sessions will begin just after a short opening remarks and three or four presentations will be held till 10:30. After a short break, the second session with three speakers will be held from 10:40 till 11:25.

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<td>C</td>
<td>Gallery 1, B1F</td>
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<td>D</td>
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<td>E</td>
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For presenters of the second sessions, please come to the venue by 10:35.

Please make sure which group you belong to. You are required to be in a presentation room during the one-hour session.

- Presentation preparation

Each of the oral presentation has a 15minutes slot.

Please prepare a PowerPoint presentation in English that lasts for up to 10-12 minutes maximum to allow 3-5 minutes for discussion after your talk.

Please bring your presentations on a USB memory stick or your own laptop computer at the venue.
Oral Presentation Abstracts
### Oral Presentation List (1/3)

**Venue:** Seminar Room, 3F

#### Group A: Prevention and Care Programs for the Aged

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<tr>
<td>9:30-9:45</td>
<td>&quot;The Effects of Horticultural Therapy on the Biomarkers of Elderly in Singapore: A Randomized Controlled Trial&quot;</td>
<td>Ted K.S. NG</td>
<td>Department of Psychological Medicine, National University of Singapore, SG</td>
</tr>
<tr>
<td>9:45-10:00</td>
<td>&quot;Physical Activity as Intervention for Age-Related Loss of Muscle Mass and Function: Protocol for a Randomized Controlled Trial (the LISA study)&quot;</td>
<td>Christian Eriksen</td>
<td>Medicine, University of Copenhagen, DK</td>
</tr>
<tr>
<td>10:00-10:15</td>
<td>&quot;Application of brain waves in geriatric community service&quot;</td>
<td>Wenchu Cheng</td>
<td>Economics, Peking University, CH</td>
</tr>
<tr>
<td>10:15-10:30</td>
<td>&quot;Individualised Human Models for Quantitative, Patient-centric Healthcare&quot;</td>
<td>Sarah Seko</td>
<td>Electrical Engineering &amp; Computer Science, University of California Berkeley, USA</td>
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**10:30~10:40**  **Break**

#### Group B: Technology, Devices, and Design Innovation for Aged Society

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<tr>
<td>10:40-10:55</td>
<td>&quot;Proposal of the Representation Scheme of Personal Situation for Personalization Design&quot;</td>
<td>Kazuki Kaneko</td>
<td>Precision Engineering, School of Engineering, the University of Tokyo, JP</td>
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<tr>
<td>10:55-11:10</td>
<td>&quot;Prescriptive Upper-limb Wearable Assistive Devices for Augmenting Residual Strength of Individuals to Restore Independence and Quality of Life&quot;</td>
<td>Eric Mica</td>
<td>Mechanical Engineering, University of California Berkeley, USA</td>
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### Oral Presentation List (2/3)

**Venue:** Gallery1, B1F

**Group C: Social-level Approaches for better QOL of the Elderly**

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<tr>
<td>9:30-9:45</td>
<td>“Contribution of Health to Life Satisfaction and Quality of Life in Old Age”</td>
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<tr>
<td></td>
<td>By Sasmita Kusumastuti</td>
<td></td>
<td>Public Health, University of Copenhagen, DK</td>
</tr>
<tr>
<td>9:45-10:00</td>
<td>“The Impact of Loneliness on Ambulatory Care Visits Among Community-Dwelling Elderly in Singapore”</td>
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<tr>
<td></td>
<td>By Ka Keat Lim</td>
<td></td>
<td>Duke NUS Medical School, SP</td>
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<tr>
<td>10:00-10:15</td>
<td>“Senior Leaders in Action: The development of lifelong program for urban-dwelling seniors in the Philippines”</td>
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<td></td>
<td>By Rogie Royce Carandang</td>
<td></td>
<td>Community and Global Health, Graduate School of Medicine, the University of Tokyo, JP</td>
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<tr>
<td>10:15-10:30</td>
<td>“Promoting social connection &amp; healthy aging: Improving social ties through mobile technology”</td>
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<td></td>
<td>By Carrie Gladstone</td>
<td></td>
<td>Business Administration, Public Health, UC Berkeley, USA</td>
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<tr>
<td>10:30~10:40</td>
<td>Break</td>
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**Group D: Aged People in the Society-Past, Present, and Future**

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<tr>
<td>10:40-10:55</td>
<td>“Past lessons for the future? - On different ways of handling old age, c.1890-1940”</td>
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<tr>
<td></td>
<td>By Anders Møller</td>
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<td>Center for Healthy Aging, Faculty of Humanities, The Saxo Institute, Dept. of Ethnology, University of Copenhagen, DK</td>
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<tr>
<td>10:55-11:10</td>
<td>“Rethinking the Role of Social Education and Lifelong Learning in Aged Society”</td>
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<td></td>
<td>By Makoto Suto</td>
<td></td>
<td>Graduate School of Education, the University of Tokyo, JP</td>
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<tr>
<td>11:10-11:25</td>
<td>“Designing an integrated supportive urban environment for people with dementia”</td>
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<td></td>
<td>By Shifang Ang</td>
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<td>Philosophy (Architecture), National University of Singapore, SP</td>
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Oral Presentation List (3/3)

Venue: Gallery2, B1F

**Group E: Longevity and Health in the Aged Society**

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<tr>
<th>Time</th>
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<tr>
<td>9:30-9:45</td>
<td>“Deciphering phytosterol metabolism of fish; aspiring cost effective aquaculture and functional food for healthy society”</td>
<td>Mai Takase, Agricultural and Life Sciences, The University of Tokyo, JP</td>
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<tr>
<td>9:45-10:00</td>
<td>“Higher fasting plasma glucose is associated with smaller striatal volume and poorer fine motor skill performance in a longitudinal cohort: the PATH 2sweet project”</td>
<td>Tianqi Zhang, Centre for Research on Ageing, Health and Wellbeing, The Australian National University, AU</td>
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<tr>
<td>10:00-10:15</td>
<td>“Effects on lifespan of Caenorhabditis elegans undergoing a chronic circadian rhythm disruption paradigm”</td>
<td>Yee Zhuangli, Biochemistry, Yong Loo Lin School of Medicine, National University of Singapore, SP</td>
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**10:15~10:40 Break**

**Group F: New Technologies for Better Medical Care for the Aged**

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<tr>
<td>10:40-10:55</td>
<td>“Home-based Care Service Quality in the “Internet plus””</td>
<td>Chen Jing, Institute of Population Research, Peking University, CH</td>
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<td>10:55-11:10</td>
<td>“Fostering equitable &amp; healthy aging: Advancing broadband and telehealth policy for patient-centered care of elderly populations”</td>
<td>Brandie Nonnecke, Tech Innovation and Policy, CITRIS and the Banatao Institute, UC Berkeley, USA</td>
</tr>
<tr>
<td>11:10-11:25</td>
<td>“Simulation study of Focus-related issues for HIFU cancer treatment”</td>
<td>mingzhen ZHANG, Mechanical Engineering, School of Engineering, The University of Tokyo, JP</td>
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</table>
The Effects of Horticultural Therapy on the Biomarkers of Elderly in Singapore: A Randomized Controlled Trial

Kheng Siang Ted Ng¹, Roger Chun-Man Ho¹,², Crystal Tze Ying Tan³, Hui Yu Chan¹, Angelia Sia⁴, Chay Hoon Tan¹,²,⁵, Lei Feng¹, Maxel Kian-Wee Ng⁶, Rathi Mahendran¹,², Anis Larbi³ and Ee Heok Kua¹,²

¹ Department of Psychological Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore. ² Department of Psychological Medicine, National University Hospital, Singapore. ³ Singapore Immunology Network, Agency for Science, Technology and Research, Singapore. ⁴ Centre for Urban Greenery and Ecology Research, National Parks Board, Singapore. ⁵ Department of Pharmacology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore. ⁶ Horticulture & Community Gardening Division, National Parks Board, Singapore.

Introduction: For Singaporean elderly, social isolation is one of the main factors affecting the prevalence of depressive symptoms. In this regard, we proposed Horticultural Therapy (HT), which employed gardening and parks visits, as an intervention to maximize the psychological well-being of community-dwelling elderly. There was also a paucity of research examining biomarkers in HT studies. We proposed this pilot randomized controlled trial (RCT) in Singapore to investigate the effects of HT on the biomarkers of elderly. We hypothesized that HT could improve the regulation of psychoneuroimmunological markers.

Methods: Based on a set of pre-determined inclusion and exclusion criteria, 69 community-dwelling elderly were recruited from the Training and Research Academy at Jurong Point (TaRA@JP). Participants were randomized into either the active treatment (HT) or waitlist control arms. For both arms, HT programmes were conducted weekly for the first three months and monthly for the subsequent three months. To assess the levels of the biomarkers of the participants, fasting blood were withdrawn by the research nurses at three time-points: baseline, three-month and six-month. Using single-analyte enzyme-linked immunosorbent assay (ELISA), nine plasma biomarkers were measured.

Results: There was a significant reduction (p=0.031) in interleukin 6 (IL-6) levels in the active treatment arm, from the baseline to sixth month time-points. In the active treatment arm, there was a significant increase (p=0.045) in Stromal cell-Derived Factor 1-alpha (SDF-1α) from the third- to sixth-month time-points. In contrast, the waitlist
control arm experienced a significant decrease of SDF-1α from baseline to 3rd month (p=0.002). Psychometric measures also showed improved social connectedness and positive relationship for the active treatment arm across all the three time-points. **Conclusions:** Past studies revealed that IL-6 was elevated in individuals with depression and social isolation has been found to be a major risk factor for depression. In this study, we showed that HT was able to decrease the levels of IL-6, coupled with enhanced psychological well-being. HT also had significant effect on increasing the levels of SDF-1α. Similar to IL-6, the effect of HT on the biomarker was significant at sixth-month time-point. This may indicate a cumulative effect of participation in HT. Our results indicate that HT, a form of communal gardening, may be promising in reducing the risks of developing psychiatric conditions and cancers. With these positive findings, the government of Singapore is planning to develop therapeutic gardens in phases across the nation.
Group A: Prevention and Care Programs for the Aged

Conference Room, 3F, 9:30-10:30

A-2: 9:45-10:00
Physical Activity as Intervention for Age-Related Loss of Muscle Mass and Function: Protocol for a Randomized Controlled Trial (the LISA study)

Christian Eriksen

Medicine, University of Copenhagen

Introduction: Physical and cognitive function decline with age, accelerating during the 6th decade. Loss of muscle power (force x velocity product) is a dominant physical determinant for loss of functional ability, especially if the lower extremities are affected. Muscle strength training is known to maintain or even improve muscle power as well as physical function in older adults, but the optimal type of training for beneficial long-term training effects over several years is unknown. Moreover, the impact of muscle strength training on cognitive function and brain structure remain speculative. The primary aim of this randomized controlled trial is to compare the efficacy of two different one year strength training regimens on immediate and long-lasting improvements in muscle power in retirement-age individuals. Secondary aims are to evaluate the effect on muscle strength, muscle mass, physical and cognitive function, mental well-being, health-related quality of life, and brain morphology.

Methods: The LISA study is a multidisciplinary study including 450 home-dwelling men and women (62-70 years). Participants are randomly allocated to (i) one year of supervised, center-based heavy resistance training (HRT), (ii) home-based moderate intensity resistance training (MIT), or (iii) habitual physical activity (Control). Changes in primary (leg extensor power) and secondary (muscle strength, muscle mass, physical and cognitive function, mental well-being, health-related quality of life, and brain morphology) outcomes are analyzed according to the intention to treat principle and per protocol at 1, 2, 4, 7, and 10 years.

Status and perspectives: As of May 2016, 307 individuals have been randomized and 165 have completed 1 year follow-up. Data analysis has not been initiated. The study is expected to generate new insights into training induced promotion of functional ability and independency after retirement and will help to formulate national recommendations regarding physical activity schemes for the growing population of older individuals.
A-3: 10:00-10:15

**Application of brain waves in geriatric community service**

Wenchu Cheng

*Economics, Peking University*

As aging population significantly increased in China society, satisfying the variety of demands of the old is extremely urgent. In this century, the daily monitoring and control technology of brain waves is gradually developed, the detection means and tools became much simpler and more convenient. Meanwhile, the related softwares have also been developed at the same time. Predictably, in the nearest future, the application of brain waves can become one of the indispensable tracks of smart housing system, especially in care and rehabilitation of elders with disabilities or dementia. In addition, aiming at the increasing number of suffering from mental disease of elderly (such as depression) as well as the unexpected and unique subside behaviors, the application of brain waves detection may provide a new possible strategy and working approaches for social workers.
A-4: 10:15-10:30

**Individualised Human Models for Quantitative, Patient-centric Healthcare**

Sarah Seko

*Electrical Engineering & Computer Science, University of California Berkeley*

Healthcare is going to change, and that change may not be for the better. There exciting new technologies emerging in the form of wearable sensors and exoskeletons that act as a glimmer of what is possible. The world that patients see however is a limited by the affordability and accessibility of healthcare. The fear of debt, difficulty in reaching the clinic, and social stigma lead to isolation, depression, and declining health. Healthcare providers are overburdened by the number of individuals needing support, and the lack of quantitative methods for tracking patient progress over time. This leads to poor intervention customisation, decreasing quality of care. As populations age, this problem will worsen unless the methods used to assess and treat patients change. It is this patient centric right to care we aim to change by assisting clinicians in assessing patients out of the clinic in a quantitative manner.

We provide these changes by presenting a platform for tracking an individual’s ability to move and function. Using a combination of affordable sensors such as balance boards and depth cameras, it is possible to create an individualised model of a person. This model captures the length of their limbs and the masses of their body segments. The protocols to perform these measurements are based on existing clinical tests, reducing the retraining burden on care providers. Instead these sensors are used to augment the existing measures, providing clinicians with quantitative metrics that can be tracked over the course of care. The affordability of these sensors, allows for deployment out of the clinic in community centres. This improves patient care by allowing for more frequent measurements, and decreases both clinician and patient burden by providing a method for remote triage.
Group B: Technology, Devices, and Design Innovation for Aged Society
Conference Room, 3F, 10:40-11:25
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B-1: 10:40-10:55
Proposal of the Representation Scheme of Personal Situation for Personalization Design
Kazuki Kaneko

Department of Precision Engineering, School of Engineering, the University of Tokyo

Keywords: personalization, design methodology, sustainable consumption and production, rehabilitation

Manufacturing companies in developed countries confront hard problems such as the requirement for resource efficiency and shrinking market, due to population aging and the commodization of products. To solve these problems, the manufacturer needs to create a new value system towards sustainable manufacturing. Personalization, which means providing a different product for each user, is one of the promising ways. It can produce customer-oriented value with high resource efficiency. Moreover, Personalization is meaningful to the aging society, because it can add familiarity onto products and services, which has a significant impact on product selection and use by the elderly.

To realize personalization, methodology to design special products tailored to each person is essential. We call such design “personalization design.” The objective of this research is to develop a design methodology for personalizing products including services.

First, we classified existing business cases to clarify products and processes of personalization. We also carried out interviews to the designers doing personalization in the rehabilitation field. We found that it is important to consider not only a primary user, but also his/her surrounding environment. To show it clearly, we propose a representation scheme of personal situation based on the graph structure. We described actual cases using the representation scheme and derived their characteristics. From the perspective of personalization design, designer uses this representation as input and provide products and services to meet the requirement of a primary user.
B-2: 10:55-11:10

**Prescriptive Upper-limb Wearable Assistive Devices for Augmenting Residual Strength of Individuals to Restore Independence and Quality of Life**

Eric Mica

*Mechanical Engineering, University of California Berkeley*

Many individuals, such as the elderly and those with neuromuscular ailments, suffer from a loss of independence as well as quality of life due to the inability to perform self-care tasks and daily living activities. In recent years, wearable assistive device technologies have proven useful in rehabilitation and increasing task performance in clinical setting. However, current assistive devices are often impractical for everyday environment due to low operational time and high costs.

This work aims to develop individualized, low cost upper-limb assistive devices to restore user’s independence and quality of life by improving their ability to perform self-care and daily living tasks. By combining individualized human modeling with innovative actuation methods, a new branch of wearable assistive devices can be produced and tailored to the user’s needs, resulting in affordable assistive devices for everyday living.

Current wearable assistive devices are either actively driven via motors, which are costly and have low operational time, or passive devices, which are not versatile in tasks performance. Rather than using traditional methods to develop a wearable assistive device, Active/Passive EXoskeleton (APEX) utilizes pneumatic actuators to provide variable amounts of assistance to joints.

Utilization of individualized human modeling allows APEX to provide gravity compensation to users while allowing the user to exercise their remaining strength to retain their functionality as opposed to over compensating the user, potentially causing further loss of abilities due to increased muscular dystrophy. The conversion from motor driven assistive devices to pneumatic actuators significantly reduces the weight and cost of the device while retaining the large amounts of assistance provided to the user.

By analyzing an individual’s abilities through human modelling methods, the assistive device can be tailored to enhance functionality through minimal hardware, allowing users to regain independence and quality of life.
Meeting the Needs of an Aged Society: Use of Home Modification and Assistive Devices in Studio Apartments in Singapore

Elaine Ho¹, Gerald Koh¹, Hong Song Iee, Thang Leng Leng²

¹ Saw Swee Hock School of Public Health, National University of Singapore
² Department of Japanese Studies, National University of Singapore

Singapore is one of the world’s most rapidly aging society. By 2050, the number of older people aged 60 years and above is projected to grow from 814,000 (15 per cent of the population) in 2012 to 2,308,000 (38 per cent). Amidst this backdrop, there is a growing need for technology in facilitating individual functioning and independence in older persons. Singapore is moving towards a technology-enabled society, with the introduction of the ‘Smart Nation’ initiative, which is a person-centric approach in creating innovation solutions using technology. One of the technologies used in the realm of aging include older person friendly studio apartments that are eligible for older persons aged 55 years and above. Past research have shown that older person friendly fixtures in the home, in combination with home modification and use of assistive devices, helps older persons increase their quality of life, slow functional decline and maintain dignity and independence. A cross-sectional study was conducted in 2012 to look at the use of home modification and assistive devices in studio apartments in Singapore (n=925). The study examines the various home modification and assistive devices used in studio apartments to understand how older persons leverage on technology to maintain functional capabilities and healthy aging in their homes. With many older persons in Singapore displaying a preference for remain living independently in their own homes, there is increasing recognition for the role of technology in facilitating aging-in-place in a rapidly aged society.
C-1: 9:30-9:45

**Contribution of Health to Life Satisfaction and Quality of Life in Old Age**

Sasmita Kusumastuti\(^1,2\), Rikke Lund\(^1,2\), Erik Lykke Mortensen\(^1,2\), and Rudi GJ Westendorp\(^1,2\)

\(^1\)Section of Social Medicine, Department of Public Health, University of Copenhagen, Copenhagen, Denmark
\(^2\)Center for Healthy Aging, University of Copenhagen, Copenhagen, Denmark

**Context**
Studies have indicated that life satisfaction, quality of life, and health are closely related. However, many older individuals highly rate their quality of life and feel satisfied with their life despite being burdened with diseases and disabilities.

**Objective**
To investigate the contribution of objective and subjective health indicators to life satisfaction and quality of life in old age.

**Design**
Cross sectional study.

**Setting**
Survey of Health, Ageing, and Retirement in Europe (SHARE) including information on health and wellbeing of older persons from 14 European countries and Israel.

**Participants**
36,121 community-dwelling participants aged 50 through 104 with a mean age of 65.2 ± 10.0 (SD) years.

**Methods**
Comorbidity was expressed as the Charlson Comorbidity Index; disability as limitations with (Instrumental) Activities of Daily Living ((I)ADL); subjective health as the self-perceived health ranging from 'poor' to 'excellent'; self-rated life satisfaction as Cantril’s ladder; and quality of life as the Control Autonomy Self-realization Pleasure Index.

**Main outcome measures**
Proportion of total variance explained and standardized regression coefficient over age categories.

**Results**
Average ratings of life satisfaction (7.5 ± 1.8 (SD) points) were markedly different between countries but showed little variation over age. Subjective health explained the biggest proportion of variance in life satisfaction (9.6%), followed by limitations in IADL (5.4%), next to that ADL (4.6%), whereas comorbidity contributed the least (3.0%). These proportions of explained variances gradually increased from the youngest to the oldest old (subjective health 7.2% to 16.7%, limitations in IADL 1.8% to 12.0%, ADL 1.3% to 10.3%, and comorbidity 1.5% to 9.8%). These patterns were similar for quality of life and results were not dependent on gender, GDP per capita, or life expectancy.

**Conclusion**
Over age, estimates of health had an increasing despite modest contribution to life satisfaction and quality of life of older persons.
C-2: 9:45-10:00

THE IMPACT OF LONELINESS ON AMBULATORY CARE VISITS AMONG COMMUNITY-DWELLING ELDERLY IN SINGAPORE

Lim KK, Chan A

Duke NUS Medical School, Singapore, Singapore

OBJECTIVES:
Few studies examined the impact of loneliness on healthcare utilization among community-dwelling elderly, especially in Asia. Current evidence is mixed – literatures from the US and Europe tend to show that loneliness is associated with higher healthcare utilization whereas a study from Asia demonstrated the opposite. Our study aims to determine the effect of loneliness on ambulatory care visits among community-dwelling elderly in Singapore.

METHODS:
Using two-year data (2009 and 2011) from Panel on Health and Aging of Singapore Elderly (PHASE, a longitudinal cohort study of randomly selected 4,990 community-dwelling elderly ≥60 years), we performed negative binomial hurdle regressions to assess the independent effect of past (Period 1: 2009) and current (Period 2: 2011) loneliness on current frequency of ambulatory care visits in the last one month. The regressions controlled for demographic characteristics, current enabling factors (income, insurance coverage, education), social capital (marital status, number of children), health needs (self-reported health, chronic diseases) and depression. Variance inflation factors (VIF) were used to determine co-linearity. p<0.05 was considered statistically significant.

RESULTS:
The final dataset contained 2,812 elderly aged 60–96 years old who visited ambulatory care 0–12 times in the last one month. Past loneliness was significantly associated with lower frequency of ambulatory care visits (-0.11±0.05) whereas current loneliness was significantly associated with lower odds of ambulatory care visits (OR 0.94±0.03). Alternative specification of loneliness revealed no difference in frequency of visits among elderly who were lonely in only either or both periods, however those who never
felt lonely in both periods had significantly higher odds of visits (OR 1.54±0.23). VIF for loneliness variables were <5 in all regressions.

**CONCLUSIONS:**
Our analysis found a small yet significant negative impact of past and current loneliness on ambulatory care utilization among community-dwelling elderly. Future studies to assess whether this mediates elderly health outcomes are recommended.
Group C: Social-level Approaches for better QOL of the Elderly

Gallery1, B1, 9:30-10:30

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C-3: 10:00-10:15

Senior Leaders in Action: The development of lifelong learning program for urban-dwelling seniors in the Philippines

Rogie Royce Carandang\textsuperscript{1,4)}, Edward Asis\textsuperscript{2)}, Karen Rose Vardeleon\textsuperscript{3)}, Maria Aileen Marges\textsuperscript{3)}
Hiroshi Murayama\textsuperscript{4)}, Ryogo Ogino\textsuperscript{4)}, Akira Shibanuma\textsuperscript{1)}, Masamine Jimba\textsuperscript{1)}

\textsuperscript{1) Department of Community and Global Health, Graduate School of Medicine, The University of Tokyo}
\textsuperscript{2) Department of Communication, College of Education and Liberal Arts, Adamson University, Philippines}
\textsuperscript{3) Childfam-Possibilities Psychosocial Services, Quezon City, Philippines}
\textsuperscript{4) Institute of Gerontology, The University of Tokyo}

The elderly population in the Philippines is steadily increasing. It is expected that the elderly will be 11.5\% of the population by 2030. However, appreciation of the issues of the elderly is low. There is no standardized program available for seniors’ self-development and lifelong learning. Elderly contribution to the society and nation building is also minimal. They constitute the eight poorest sector, with a poverty incidence of 16.2\% in 2006.

The ENGAGE (\textbf{E}mbracing and \textbf{N}urturing \textbf{G}lobal \textbf{A}GE\textit{ing}) project has an overall goal of improving the quality of life of senior participants in Muntinlupa City by 20\% within a year. It aims to identify the urgent needs of urban-dwelling seniors. A core group of committed Senior Leaders will be created and they will be trained for leadership and peer counseling. A lifelong learning program will be developed and implemented at the community level. Impact evaluation will follow one year after project implementation.
Group C: Social-level Approaches for better QOL of the Elderly

Gallery1, B1, 9:30-10:30

C-4: 10:15-10:30
Promoting social connection & healthy aging: Improving social ties through mobile technology
Carrie Gladstone

Business Administration, Public Health, UC Berkeley

Almost 90% of older adults want to stay in their current home and community as they grow old. Yet recent research suggests that more than two out of five people who do stay in their homes (age in place) will suffer from social isolation. A host of physical and health factors may cause individuals to have fewer in person interactions with family members and friends -- cessation of driving to death of a spouse. Yet these physical interactions do not form the whole of social connectedness. Today mobile technologies offer new engagement mechanisms that can strengthen social ties and improve social networks among family, friends and community members. A widely held and unproven belief is that older adults do not use technology, but a 2012 Pew Research Center report found that in the United States, 85% of adults owned a cell phone and more than half of those owned a smartphone. In this research I present case studies of the use of mobile and information technology to strengthen ties between older adults and their local and remote community. In particular, I examine the use of partner-based mobile gaming apps, video calls and social media networks to activate the mechanisms associated with healthy aging -- social support, social influence, social engagement and attachment, and access to resources.
D-1: 10:40-10:55
**Past lessons for the future? - On different ways of handling old age, c. 1890-1940**
Anders Møller

*Center for Healthy Aging, Faculty of Humanities, The Saxo Institute, Dept. of Ethnology, University of Copenhagen*

In this paper I will provide a historical analysis on how old age was handled in the emerging welfare state in Denmark. In the paper I analyse selected practices of old age within an old age home that involved technologies and knowledges, and discuss what today and 2050 can learn from these past lessons on old age.

The paper arises from my on-going PhD project on, how old age was configured in specific practices of old age within and around old age homes in Denmark, in the period 1891-1976. The public handling of old age in the institution of the old age home is fairly new. In Denmark the handling of old age within public homes stem from the end of the 19th century, at which point some elderly people were delineated from the social-legal category of the poor. Thus old age was established as a specific legal and social category. Old aged people were provided with certain rights and were entitled to receive public support, e.g. a place in an old age home, which was established as an institution without any prior practical experience.

In the paper I will present the historical analysis of this new way of regulating and handling old age in two steps. First I will qualify some of the technologies and knowledges that the handling of old age involved. Here I stress that when looking back at the handling of old age, different constructions of ‘un-active’, but ‘good’ elderly lives arise, such as pleasant, quit life in old age without the toils of daily life. Second I will discuss which lessons from the past that can be learnt for now and for 2050. Here I argue that a historical perspective can problematize the present and point to the future alternatives of the good elderly life.
D-2: 10:55-11:10

Rethinking the Role of Social Education and Lifelong Learning in Aged Society

Makoto SUTO

Graduate School of Education, the University of Tokyo

Japanese society is going through social structural change that deprives people of the basic place, or local community, where people can feel the sense of belonging. In order to secure human dignity and human rights of local residents, social education and lifelong learning have to reorient the previous theory which tries integrating administrative departments or distributing social resources in local community level to adapt people for social needs towards new theory that can recreate local communities through residents’ dynamic learning activities. This also leads to new theory of social condition or foundation in which residents can feel human dignity through accepting and taking care of each other.

Some field studies conducted in local-welfare activities by Social Welfare Council in an aged rural area in Japan shows that residents’ human dignity can be secured through the process of accepting other residents’ multitiered senses in life world. Also, inspired by this mutual relationship, residents can expand their imagination for other residents, which can create their new relationship and care for those happen to be present. Through such a process, residents’ interest expand social and cultural activities and networking in the area. In this process, the staffs in the council promote people giving various sense for place by participating their activities.

In this study, lifelong learning plays the role of making the residents’ sense towards their life world more multitiered, and staffs in the council promote learning activities of local residents. We can regard this study as a new trial for making dynamic society through learning.
D-3: 11:10-11:25

Designing an integrated supportive urban environment for people with dementia
Shifang Ang

Philosophy (Architecture), National University of Singapore

Population ageing is a global phenomenon of the 21st century. An ageing society is accompanied with an increase of chronic illnesses such as dementia and cognitive impairment in elderly.

Globally, a new case of dementia arises every seven seconds. There is a staggering growth rate and the number of people living with dementia worldwide is currently estimated at 35.6 million. This number will double by 2030 and more than triple by 2050. Due to its high global prevalence, the financial strain on families, caregivers and communities, and the associated social stigma, the World Health Organisation has identified dementia as a significant public health challenge.

Singapore is facing an ageing population with a declining old-age support ratio due to increasing life expectancy and persistent low birth rates. Since care giving for people with dementia typically stretches over a prolonged period and entails significant expenditure of time, energy, finances and tasks, the sandwiched generation - those with young children and aged parents to care for are straining under the burden.

Given Singapore’s high-rise and high density context, the research looks at forming the basis of supportive environment for people with dementia to age-in-place within a familiar urban community. It aims to integrate dementia-friendly design features that allow people with dementia to continue to live life the way they would like to and are still capable of, and to delay institutionalization. By effectively empowering and nurturing people with dementia, it works towards reducing social stigma and improving the quality of life for all involved in the giving and receiving of care.
Group E: Longevity and Health in the Aged Society

Gallery2, B1, 9:30-10:15

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E-1: 9:30-9:45
Deciphering phytosterol metabolism of fish; aspiring cost effective aquaculture and functional food for healthy society
Mai TAKASE

Graduate School of Agricultural and Life Sciences, The University of Tokyo

Aim: Fish is drawing global attention as a choice of healthy diet. Fish derived ingredient is a major component of fish feed, and a marked increase in price of them is shifting the market towards using plant derived ingredient as an alternative. Sterol is collective term for indispensible compound for animal and plant. Cholesterol, animal-origin, structurally resembles with phytosterols, plant-origin. Similar structure might cause metabolic disturbance: phytosterols might halt or substitute the metabolism of cholesterol. This trend might have a negative aspect since adequate amount of cholesterol is required for stress tolerance, growth and reproduction. This study focuses on gene expressions of proteins responsible for sterol uptake in fish enterocyte.

Methods: Wild type zebrafish (Danio rerio) was used for analysis. Diets containing cholesterol (CD) or phytosterol (PD) was fed. Fish were sampled with interval of 3 hours after feeding at the onset of lighting period. Expression of genes related to sterol intake (srb1, npll1l, abcg5/8, acat 2, and abca1) and circadian rhythm (cry1) were evaluated by real time PCR.

Results: Expression of cry1 followed the circadian rhythm. The mRNA expression increased 2-fold after 3 hours of light emission after dark hour. An initial level of sterol metabolism related gene expression was high, but decreased to about half (relative mRNA expression: 0.014 to 0.0075) and stabilized within 2 hours in fasted groups. Difference in gene expression upon diet consumption was estimated. Genes expressed higher in parts of intestine where diet were present. Increase in gene expression related to sterol intake was detected in both groups of fish fed CD and PD. This implies that sterol related genes are expressed upon diet intake, and the expressions are similar for both cholesterol and phytosterol consumptions.
Higher fasting plasma glucose is associated with smaller striatal volume and poorer fine motor skill performance in a longitudinal cohort: the PATH 2sweet project

Tianqi Zhang\textsuperscript{a}, Marnie Shaw\textsuperscript{a}, Erin Walsh\textsuperscript{a}, Perminder Sachdev\textsuperscript{b}, Kaarin J. Anstey\textsuperscript{a}, Nicolas Cherbuin\textsuperscript{a}

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Previous studies have demonstrated associations between type 2 diabetes (T2D), impaired fasting glucose (IFG), or higher “normal” (<5.6 mmol/l) fasting plasma glucose (FG) levels and brain atrophy and functional deficits. Little is known about the association between higher blood glucose levels and the striatum despite sensori-motor deficits being implicated in T2D. We studied the relationship between higher FG or T2D, striatal volumes from brain MRI and fine motor skills among 60-years-and-older participants. Participants were cognitively healthy individuals from PATH Through Life study, a community-based longitudinal study on relationship between health variables and mental health. Our cross-sectional study investigated association between higher FG or T2D and morphological differences at the striatum eight years later among 287 participants, using MRI vertex-based shape analysis methods. Results showed that higher FG and T2D were associated with shape differences indicating smaller volume at caudate and putamen. Our second, longitudinal study investigated the relationship between blood glucose levels, striatal volume and fine motor skills among 271 participants over a follow-up of twelve years. Purdue Pegboard (PP) scores were used as measurement of fine motor skills, and MRI volumetry was conducted to measure striatal volumes. Results showed significant association between higher FG or T2D and lower fine motor skills performance, but limited association between FG/T2D and striatal volume or between striatal volume and motor skills. Our studies showed that higher blood glucose levels may affect both fine motor skill performance and the related striatal structures. Findings suggest managing higher blood glucose levels early to improve cerebral health at old age.
Group E: Longevity and Health in the Aged Society

Gallery2, B1, 9:30-10:15

E-3: 10:00-10:15

**Effects on lifespan of *Caenorhabditis elegans* undergoing a chronic circadian rhythm disruption paradigm**

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Circadian rhythms are molecular and physiological oscillations generated endogenously over the 24-hour period in organisms to allow synchronisation (entrainment) of internal rhythms to daily environmental fluctuations. Long-term disruption of circadian rhythms in humans has been linked to metabolic disorders and cancer. Data from animal studies also suggest that circadian rhythm disruption is associated with disease and shorter lifespan.

Several previous reports have suggested that *C. elegans* show circadian behaviour albeit with incomplete understanding of their molecular details. I decided to explore the potential of *C. elegans* as a model to examine consequences and mechanisms of circadian rhythms alterations in lifespan.

Using temperature (25:20 °C, 12:12h) or light (600:0 lux, 12:12h) as cues, I developed an inversion paradigm to disrupt the normal rhythm in nematodes. Despite success with entraining nematodes, my results suggest that, disruptions did not cause harm to lifespan in *C. elegans*. A likely explanation is that circadian rhythm function may not be vital for the lifespan of *C. elegans*.

In contrast with the reported animal and human studies, my study found that circadian disruption in *C. elegans* does not impair lifespan.
F-1: 10:40-10:55
**Home-based Care Service Quality in the “Internet plus”**
Chen Jing

*Institute of Population Research, Peking University, China*

**Background:** In the "Internet plus" era, home care services is inseparable with the cloud computing and big data which promote the elderly care omnipotent and efficient. The issues of disease prevention, health care, rehabilitation and care are closely related to personalized care. Relying on the Internet resources and social forces, we promote the integrated development of Internet and home-based care service system, and realize interconnected and intelligent aged services.

**Aims:** Assess the quality of home-based care services and put forward some suggestions for improvement.

**Methods:** Design questionnaire and use empirical research method, then use the elderly's satisfaction as measurement index to assess the quality of home-based care services.

**Results:** The measurement index showed that many aged people were satisfied with the system, but based on special needs, they want to get some improvement about the system.

**Conclusions:** In this paper, we analyzed the home-based care service quality in the “Internet plus” under an evaluation system based on the data of Beijing. The results showed that home-based care services with the “Internet plus” should more care about emergency services, psychological consultation, mental care and value-added services so that the elderly can enjoy all-round, day and night services, and the home-based care service system can keep sustainable and healthy development.
Fostering equitable & healthy aging: Advancing broadband and telehealth policy for patient-centered care of elderly populations
Brandie Nonnecke

Tech Innovation and Policy, CITRIS and the Banatao Institute, UC Berkeley

By 2050, nearly one-fourth of the world’s population will be over 60 years old, of which nearly 80% will live in low- and middle-income countries. Globally, countries will face increasing strain to meet the health care needs of their aging populations. Technological advances offer great potential to provide high quality, affordable, patient-centered, and home-based care that can enable more equitable and efficient monitoring and evaluation of elderly patients, decreasing the likelihood of expensive (and often traumatic) clinical or hospital visits and re-admittances. The World Health Organization (WHO) outlined three priority objectives for improving the livelihoods of elderly populations: creating elderly-friendly living environments, increasing chronic disease care and management, and developing long-term care services that keep elderly patients in the home as long as possible. Broadband and technology adoption among elderly and their care networks will be critical to achieving these objectives. In this research, I provide case study examples of the use of broadband-enabled telehealth services to achieve the WHO objectives. Additionally, I evaluate current trends in broadband and telehealth policy initiatives and provide recommendations for how to align these policy initiatives with the Institute for Healthcare Improvement’s Triple Aim to improve quality of patient care and population health while reducing per capita cost of health care.
F-3: 11:10-11:25
Simulation study of Focus-related issues for HIFU cancer treatment
Mingzhen Zhang

Department of Mechanical Engineering, Graduate School of Engineering, The University of Tokyo

HIFU (High-Intensity Focused Ultrasound) treatment is a relatively new way to treat cancer. Due to thermal effect inside those targeted cancer parts, cancer cells are ablated and incapacitated. However, it's not easy to deliver energy from outside human body into the inside target efficiently and precisely through ultrasound, because both acoustically and thermally, human body is heterogeneous.

In this research, real patient data-based simulation model was constructed from medical images, and simulation study to tackle with focus-related issues for breast cancer was performed. Time reversal method was used to obtain phase difference table, with which phase compensation in acoustic field was conducted. Besides, temperature dependency of sound speed was incorporated.

HIFU treatment for cancer is low invasive, because it does not incise human body and excise tissues as well. Therefore, it might be the only change to survive for elderly people who cannot bear burdensome treatment like surgery.