

CONFERENCE ON ACTIVE AND HEALTHY AGEING 2019

14-16 May, 2019

Technical University of Denmark
Copenhagen / Kgs. Lyngby, Denmark



Conference co-organized by:

REACH2020: <http://reach2020.eu>

EIP AHA A3 & C2: https://ec.europa.eu/eip/ageing/actiongroup/index/a3_en

Danish Healthtech: <https://www.welfaretech.dk/projekter/danish-healthtech>

Copenhagen Health Innovation: <https://copenhagenhealthinnovation.dk/>

Conference on Active and healthy Ageing 2019
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Editors: Humira Ehrari, Henning Boje Andersen

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Tuesday 14 May	
12:00-12:30	Conference busses from Copenhagen Airport direct to venue (approx. 40 minutes. See 'Airport Bus' at website)
12:30-13:15	Registration/name badges. Light lunch: sandwiches, refreshments
	Opening address
13:10-13:50	Dr. Malcolm Fisk, Ethical Imperatives around Product and Service Standards for Assistive Technologies
13:50-14:30	Dr.Maddalena Ilario, The European Blueprint for the digital transformation of health and care in an ageing society
14:30-15:00	Prof.M. Vollenbroek-Hutten, E-Supporter: Personalized technology supported coaching of people with type 2 diabetes mellitus
15:00-15:30	Coffee break/ refreshments
15:30-16:00	Dr.Veronica Zavagli, Care for carers: an investigation on family caregivers' needs, tasks, and experiences.
16:00-16:30	Giuseppe Liotta, Social interventions to limit the mortality increase during the summer 2017 heat waves in Rome – Italy
16:30-17:00	Prof. C. Holland, Integrated Housing, Care and Support: Outcomes on frailty, psychological health and mobility
17:15-18:15	Separate meetings for members (AHA; Gerontechnology)
18:30-20:30	Dinner at venue (sign up required – see sign-up)
20:30	Conference bus from venue to drop-off points in downtown Copenhagen
Wednesday 15 May	
08:30	Conference bus from pick-up points in downtown Copenhagen
09:00:09:45	Reception: coffee, tea & croissants
	AHA A3 and C2 presentations, session 3 and 4
09:45-10:15	Dr. Lucia Pannese, Savings and Better Quality of Life: Gamifying Rehabilitation

10:15-10:45	Prof. Giuseppe Liotta, Multidimensional determinants of higher use of hospital care services rate
10:45-11:15	Coffee break/ refreshments
	EIP AHA A3 + C2 presentations (session 4)
11:15-11:45	Prof. D. van Dartel, Feasibility of ambulatory monitoring devices to monitor recovery of patients after a hip fracture treatment
11:45-12:15	Dr. Nikolay Koblyakov How a Municipality can foster the implementing of ICT solutions by PME Senior Care Operators. Based on successful experience of Riga City Hall and Senior Group.
	Exhibitions and posters
12:15-13:00	Lunch-to-go, poster visit, overview of exhibition
13:00-13:20	Prof. Henning Langberg, Copenhagen Univ.: Introduction to exhibition themes – Warm hands and technologies
14:00-18:00	Guided tours through exhibition + interactive exploration of exhibits Companies, developers, projects exhibitors 14:00 – 15:00: Visit to elderly care technology demo site (care home) in Lyngby / Sign-up invitations sent to conference delegates
18:15	Conference bus from venue to drop-off points in downtown Copenhagen
19:00	Conference Dinner at Restaurant downtown Copenhagen
Thursday 16 May	
8:30	Conference bus from Copenhagen pick-up points
09:00-09:30	Reception: coffee, tea & croissants
09:30-10:00	Prof. Thomas Bock (REACH PI), TUM; Prof. Henning Boje Andersen, DTU; Dr. Thomas Linner (REACH Scientific Director), TUM: Welcome and Overview
10:00-10:30	Prof. Andrew Sixsmith, Simon Fraser Univ.: Responding to the Challenge of Aging - The Canadian AGE-WELL Network of Centres of Excellence
10:30-11:00	Prof. Yeong-Ran Park, Dept. of Silver Industry, Kangnam University: Healthy and Active Aging in Korea from a Gerontechnology Perspective
11:00-11:15	Coffee break

11:15-11:45	Dr. Atsushi Hiyama, Univ. Tokyo: Geron-Informatics: Geron-Informatics: Techno-logical engagement for the elderly in physical, cognitive, and social activities
11:45-12:15	Dr. Friedemann Müller, Schön Klinik; Dr. Jörg Güttler, TUM; Lisa Schrader, Fraunhofer IAIS: Advanced sensing and Human Activity Recognition in early intervention and rehabilitation for older persons
12:15-13:30	Lunch
13:30-13:45	Rasmus Tolstrup Larsen, Copenhagen Univ.; Humira Ehrari, DTU: Wearable sensing and motivational strategies to enhance physical activity among older persons
13:45-14:00	Ole Stangegaard: A patient's perspective on using telehealth services
14:00-14:20	Christian Graversen, CEO Welfare Tech: Challenges and solutions in creating effective assistive technologies
14:20-14:45	Coffee
14:45-15:10	Dr. Thomas Visser, Philips Design: "Design to Engage – how design can help to create engaging health solutions"
15:10-15:40	Carlijn Valk, TU/e; Prof. Pearl Pu, EPFL: Personalizing behaviour change strategies toward stimulating active ageing.
15:40-16:10	Dr. Lydia Vogt, DIN, Prof. Henning Boje Andersen, DTU, Dr. Thomas Linner: The role of standardisation for empowerment and ICT-based engagement of older persons
16:10-16:45	Plenary session: Q&A
16:45-17:00	Conference summary (Prof. Sixsmith)
17:00	End of conference
17:20	Conference bus to Copenhagen airport (approx. arrival 18:00)

AHA 2019 Conference: Part 1, 14 May	
Speaker(s)	Title
Malcolm Fisk	Ethical Imperatives around Product and Service Standards for Assistive Technologies
Maddalena Illario, Vincenzo De Luca, Giovanni Tramontano, Strahil Birov , Guido Iaccarino, Veli Stroetmann and the Blueprint working group	The European Blueprint for the digital transformation of health and care in an ageing society
M. Vollenbroek-Hutten, W. Oude Nijeweme – d’Hollosy ,L. Schrijver	E-Supporter: Personalized technology supported coaching of people with type 2 diabetes mellitus
Veronica Zavagli	Care for carers: an investigation on family caregivers’ needs, tasks, and experiences.
Giuseppe Liotta, Olga Madaro , Maria Chiara Inzerilli, Maria Cristina Marazzi	Social interventions to limit the mortality increase during the summer 2017 heat waves in Rome – Italy
C. Holland, I. Garner, J. O’Donnell & H. Gwyther	Integrated Housing, Care and Support: Outcomes on frailty, psychological health and mobility
AHA 2019 Conference: Part 2, 15 May	
Lucia Pannese	Savings and Better Quality of Life: Gamifying Rehabilitation
Giuseppe Liotta, Francesco Gilardi, Paola Scarcella	Multidimensional determinants of higher use of hospital care services rate.
D. van Dartel, J.H. Hegeman, M.M.R. Vollenbroek-Hutten	Feasibility of ambulatory monitoring devices to monitor recovery of patients after a hip fracture treatment
Nikolay Koblyakov	How a Municipality can foster the implementing of ICT solutions by PME Senior Care Operators. Based on successful experience of Riga City Hall and Senior Group.

AHA 2019 Conference: Part 3, 16 May	
Speaker(s)	Title
Thomas Bock (REACH PI), Henning Boje Andersen, Thomas Linner (REACH Scientific Director)	Welcome and Overview REACH
Andrew Sixsmith	Responding to the Challenge of Aging - The Canadian AGE-WELL Network of Centres of Excellenc
Yeong-Ran Park	Healthy and Active Aging in Korea from a Gerontechnology Perspective
Atsushi Hiyama,	Techno-logical engagement for the elderly in physical, cognitive, and social activities
Friedemann Müller, Jörg Güttler, Lisa Schrader	Advanced sensing and Human Activity Recognition in early intervention and rehabilitation for older persons
Rasmus Tolstrup Larsen, Humira Ehrari	Wearable sensing and motivational strategies to enhance physical activity levels among older persons
Ole Stangegaard	A patient's perspective on using telehealth services
Christian Graversen	Challenges and solutions in creating effective assistive technologies
Thomas Visser	Design to Engage – how design can help to create engaging health solutions
Carlijn Valk, Pearl Pu,	Personalizing behaviour change strategies toward stimulating active ageing
Lydia Vogt, Henning Boje Andersen, Thomas Linner	The role of standardisation for empowerment and ICT-based engagement of older persons

POSTERS	
Author(s)	Title
Miriam Schaepers, Constanze Hesse	The Effects of Environmental Illumination on a Pick-and-Place Task in Younger and Older Age
Vincenzo De Luca	Procuring innovative ICT for patient empowerment and self-management of type 2 diabetes mellitus – PROEMPOWER
Stephanie Schmidle, Manuela Stürzer, Joachim Hermsdörfer, Carmen Krewer	The influence of foot position on static and dynamic standing balance in healthy older adults
B. Schäpers, C. Krewer, M. Steinböck, E. Koenig, F. Müller	Activity detection with wearables and ambient sensors in a clinical environment - Preliminary testing with healthy subjects
M. Steinböck, C. Krewer, B. Schäpers, E. Koenig, F. Müller	The transfer and trainings device activLife in neurological patients – a study protocol of a feasibility und usability trial
Mika Yasuoka	Open not Closed - Community-based Living Lab as Regional Management Method
Ad van Berlo, Mart Wetzels, Daan de Viet	Do ACTIVE: a promising way to keep persons with MCI active and healthy
Christos Kleisiaris, Simeon Panagiotakis, Ioanna Papatthanasiou, Serena Alvino, Emmanouil Androulakis, Chariklia Tziraki	The role of home care in the prevention of cognitive decline and frailty syndrome
Federica Gilli, Spyros Skafidas Federico Stella, Luca Busettoa, Maria Letizia Petroni, Carlotta Chiari, Federico Schena	Using digital tool to improve long term efficacy of physical activity program in obese elderly subjets

<p>Simona Budui, Sabrina Salvetti, Federica Gilli, Spyros Skafidas, Carlotta Chiari, M. Letizia Petroni, Luca Busetto, Federico Schena</p>	<p>Effects of an Intensive Inpatient Rehabilitation Program in Elderly Patients with Obesity</p>
<p>Henning Boje Andersen</p>	<p>Working Group for establishing a Nordic Chapter for Gerontechnology</p>
<p>Humira Ehrari</p>	<p>The effect of playful exercise</p>
<p>Rasmus Tolstrup Larsen</p>	<p>Criterion validity for step counting in four consumer-grade physical activity monitors among older adults with and without rollators</p>
<p>Stephanie Schmidle, Manuela Stürzer, Joachim Hermsdörfer, Carmen Krewer</p>	<p>The influence of foot position on static and dynamic standing balance in healthy older adults</p>

ABSTRACTS

Part 1

Ethical Imperatives around Product and Service Standards for AT

*Dr Malcolm J, Fisk
De Montfort University*

This presentation appraises the role of standards in the context of product and service design; and discusses the ethical foundation that requires to be put in place. Such a foundation takes a step towards answering the question ‘How do we make standards work for us (in the field of AT)?’ Issues explored include the extent to which standards achieve their intention to draw together (in the standardisation process) an adequate range of stakeholders and therefore reflect an appropriate consensus of views. Reference points used (and which give pointers to the required ethical foundation) include ISO 26000 on Social Responsibility, the European Commission funded PROGRESSIVE project; and (drawing on ‘Design Theory’) the EIPonAHA promoted PUX (Personal User Experience) Guidelines.

The European Blueprint for the digital transformation of health and care in an ageing society

Maddalena Illario (1), Vincenzo De Luca(2), Giovanni Tramontano(2), Strahil Birov(3), Guido Iaccarino(4), Veli Stroetmann(3) and the Blueprint working group. (1) Campania Region, (2)Federico II University Hospital. (3) empirica Gesellschaft für Kommunikations- und Technologieforschung mbH (4) University of Naples Federico II

Introduction

Demographic change is a globally recognised and well documented societal challenge. The rising demand for health, social and informal care services due to the ageing population and a growing burden of chronic diseases is estimated to increase health and care expenditure in the EU on average by 1-2% of GDP until 2060. Moreover, limited public resources for health and social assistance encourage the choices of Member States to move towards paths of digital transformation of health and care in an ageing society. A shared vision is essential to mobilise investment and guarantee the commitment of all actors. For this reason, a grouped called Blueprint Partners was formed, comprising a number of industrial players, regional healthcare authorities, professional organisations and multi-stakeholder platforms such as the European Innovation Partnership on Active and Healthy Ageing. The Blueprint Partners initiated jointly a shared policy vision in the form of a European Blueprint on the transformation of health and care in Europe.

Objectives

European policy makers, civil society, professional organisations and the industry have developed a European blueprint to address the challenges in innovating better health and care provisions for the ageing society. More specifically, the Blueprint aims to:

- 1) reach out to more than 50 regions that will invest in the implementation and/or deployment of these large-scale, sustainable, digital solutions for active and health ageing;
- 2) reach a total of € 500 million investment in digital innovation for Health & care; and
- 3) reach an additional 4 million people in Europe that benefit from the digital innovations in active and health ageing.

Methods

Four initial key topic areas have been selected jointly by the Blueprint Partners to represent digital health and care priorities. The priority topic area descriptions have been refined by Blueprint Partners and the main results were presented during the EIP on AHA Conference of Partners on February 27, 2018. Each topic area provides a detailed picture about the situation in Europe with regard to:

Needs addressed

- Key ICT-enabling technologies available
- Barriers and challenges to scaling up
- Potential solutions available or in development that address these challenges
- Recommendations and actions needed at different levels (regional, national, Member-State and EU) in order to promote innovation and achieve a triple win for Europe.

The Blueprint approach to identifying high-impact user scenarios in AHA is adopted from the general “User Experience” design approach that has already been used in different settings such as in the software industry and even the health and care sector. With this approach technologies are being designed based on a deeper understanding of how a user from the target group will interact with particular technologies by developing “personas” and “persona scenarios”.

The concept of a persona was introduced by Alan Cooper and is generally defined as a single, specific hypothetical/ fictitious person who represents a segment of the user population.

Results

Within the context of the Blueprint work and objectives, personas have been developed to envision realistic health and care needs of certain groups in the society. Twelve personas have been developed, representing different “population segments” with different health conditions and needs. They are grouped according to four points along a person’s life-course (childhood/young adulthood, working age, retirement and age under 80, and aged 80+) and three groups of wellbeing or needs (generally well/good wellbeing, chronic conditions and/or social needs, and complex needs).

Conclusion

Using the personas and their representative needs as a starting point, the Blueprint Partners will work towards developing high-impact persona scenarios with using the following elements:

- Available best practices/solutions targeting personas’ identified needs;
- Regions with strong experience, willing to provide the necessary knowledge and support to scale up and deployment across Europe;
- Considering interactions: personas with digital solutions, personas with other key actors, digital solutions with other digital solutions;
- Needs of other key actors (such as GPs, nurses, social carers, public health authorities, other care providers, etc.) who are involved in health and care provision;
- Focus on the outcomes and high impact on patients and the health care system;
- High scalability and replication potential.

E-supporter: personalized technology supported coaching of people with type 2 diabetes mellitus

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Background

Type 2 Diabetes Mellitus (T2DM) is an increasing disease in the Western world. A healthy lifestyle (physical activity, nutrition, medication intake, stress, smoking) is a key component in the management of T2DM. eHealth interventions have great potential in this. Although earlier eHealth interventions showed diverse results, some interventions were successful others were not. The reasons for this success or failure are not fully clear yet. What is known, is that low treatment adherence is a problem for eHealth interventions and preferences of end users are important to incorporate to ensure a fit between technology and end-users. Additionally, based on results of traditional face to face treatments, incorporation of behavioural change theories and strategies in eHealth interventions is hypothesised to improve effectiveness.

Objective

The aim is to develop and evaluate a platform, called e-supporter, for personalized evidence-based technology supported coaching on self-management of people with diabetes, to improve perceived quality of care and quality of life.

Methods

The e-supporter is developed using an iterative user centric design approach. It starts from a module on physical activity that was developed and appeared to be effective in people with chronic fatigue after cancer (Bruggeman-Everts, 2017). Starting from this and diabetes literature the content of this eCoaching module was developed in cooperation with health care professionals. Subsequently, 15 people with T2DM in treatment in second-line care tested the updated version on physical activity. Halfway and in the end telephone interviews took place about their experience, appreciation and feedback. The results of this formative evaluation were used for further improvements: the second iteration focused on further tailoring of the coaching content to individual end user needs and preferences, their individual goals and stage of change as well as their daily state of mind. Next to this, currently a second module with a focus on nutrition is being developed taking the same approach and the evaluation of this nutrition module will also be performed with people with T2DM.

Results

The e-supporter resulting from this development approach consists of a 9 weeks intervention. The intervention consists of monitoring modules to assess the relevant lifestyle behaviours in daily life i.e. physical activity with a wearable and nutrition with an app. Based on these data, individual preferences and self-efficacy beliefs an individually goal is set with the professionals. Starting from this the user receives 2 SMSs a day and a weekly tailored e-mail message. The SMSs and the e-mails are based on the different factors of the I-change model (de Vries, 2017); awareness, motivation, action, sustaining behaviour. Important used strategies are education, information and instruction, goal setting and action planning, self-monitoring, feedback and self-efficacy. For example in the weekly tailored e-mail it is being discussed to what extent the goal is being achieved and which next concrete implementation intentions can be made to actually achieve this goal. The people with T2DM who received the 9 weeks e-supporter for physical activity were positive about the intervention, for using the monitoring tools as well as receiving the SMSs and emails. They provided feedback that the SMSs were still too general, and they wished more personalized messages. Looking at health outcome on individual level, results show that especially individuals with a high self-efficacy and improper physical activity level at the start, improved their physical activity level.

Conclusion

Digital health coaching seems feasible and is appreciated by persons with T2DM. Including behavioural change models and strategies as basis for coaching is an effective strategy however more sophisticated personalization, tailoring and the availability of multiple life style modules is still needed.

References

- Bruggeman-Everts, F. Z., Wolvers, M. D., Van de Schoot, R., Vollenbroek-Hutten, M. M., & Van der Lee, M. L. (2017). Effectiveness of two web-based interventions for chronic cancer-related fatigue compared to an active control condition: results of the “Fitter na kanker” randomized controlled trial. *Journal of medical Internet research*, 19(10), e336.
- De Vries, H. (2017). An integrated approach for understanding health behavior; the I-change model as an example. *Psychol Behav Sci Int J*, 2(2), 555-585.

Care for carers: an investigation on family caregivers' needs, tasks, and experiences

Zavagli, V., Raccichini, M., Ercolani, G., Franchini, L., Varani, S., Pannuti, R. (2019). Care for carers: an investigation on family caregivers' needs, tasks, and experiences. Translational Medicine @UniSa, in press

Introduction

Cancer is a family disease and the World Health Organization has recommended approaching patients and their caregivers as a 'unit of care', focusing on the overall well-being of the patient-caregiver dyad rather than just on the patient. Nowadays family caregivers are an invaluable part of healthcare teams whose needs remain unmet despite their active role in patient care. In fact, it is well known that family caregivers often give priority to their patient's necessities, although they have multiple unmet needs that have a negative impact on their quality of life and consequently on the quality of care they provide to the patient. Some studies indicate that caregivers' unmet needs are multidimensional, but limited research has investigated the psycho-physical disorders of home-cared cancer patients family caregivers and a systematic assessment of their necessities is rarely practiced. In fact, evaluation is often informal and undocumented, making caregivers' needs less "visible".

Objectives

This investigation was designed to better identify unmet needs and lifestyles' changes of family caregivers of oncological patients and subsequently correlate them with the patients' functional status in order to investigate if caregivers' needs change as the patients' functional abilities change. Methods. Participants were enrolled in Italy among the caregivers of the patients assisted by the National Tumor Assistance (ANT) Foundation through its 20 specialized and multidisciplinary teams in 11 Italian regions. The 251 caregivers filled out autonomously a battery of self-report questionnaires (Activities of Daily Living - ADL; Instrumental Activities of Daily Living - IADL; Cancer Caregiving Tasks, Consequences and Needs - CaTCoN) and completed the first two questionnaires with reference to their patients' condition.

Results

Frequencies, mean and standard deviation scores for each CaTCoN item were calculated. Simple correlations were used to assess the statistical link between caregivers' tasks and needs and patients' functional status. The results confirmed that cancer care-giving is burdensome. Large proportions of caregivers experienced substantial caregiving workload related to practical help (63%), personal care (73.1%), and emotional/psychological support (67.7%). Regarding the

consequences caused by caregiving, 69.5% of caregivers reported lack of time for social relations and 81.3% referred to experience distress. The caregiving workload and the negative social

consequences had a negative and significant correlation with the scores of ADL and IADL. Furthermore, considerable proportions of caregivers experienced problems or had unmet needs regarding the interaction with the health care professionals (HCPs). Prominent problematic aspects included the provision of enough information to the caregivers: 54% of the caregivers reported that not enough time had been spent informing them and that often they had to ask the HCPs questions in order to get the information they needed (45.2%). More than half of the participants, 60% and 67.3% respectively, referred that the HCPs only rarely/never or sometimes paid attention to them and had shown interest in their feelings.

Conclusion

The results confirm that cancer caregiving is burdensome and that being a caregiver is demanding and has its costs. These findings are in agreement with previous studies. This investigation can be viewed as guidance for determining appropriate support services, providing high-quality care, achieving caregiver satisfaction, and decreasing caregiver burden. Such results will certainly contribute to develop and publish Guidelines and to provide programmes and on-going education where caregivers feel supported in their role. In particular, it would be innovative to develop a suitable Smartphone application that reflects carers' needs to support them in their role. Furthermore, investigations of this kind can urge legislators to recognize the caregivers' figure and improve their role and status. For this purpose, it would be interesting to extend the investigation to different European countries and to get data from caregivers in varied contexts (including gender, age, and care-giving situations).

References

Zavagli, V., Raccichini, M., Ercolani, G., Franchini, L., Varani, S., Pannuti, R. (2019). Care for carers: an investigation on family caregivers' needs, tasks, and experiences. *Translational Medicine @UniSa*, in press.

Ethics

The investigation received a formal approval by the Area Vasta Emilia Centro Research Ethical Committee of Emilia-Romagna Region (CE-AVEC). Participants gave informed written consent for participation to the investigation, data analysis, and data publication.

Social interventions to limit the mortality increase during the summer 2017 heat waves in Rome – Italy

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Background

Heat waves are recurrent extreme climate events associated to increase of mortality, especially among older adults. Social isolation is one of the most important mortality risk factor during a heat wave. The aim of this study is to assess the impact of a program based on social interventions on older adults mortality during the heat waves occurred in Rome in the 2017.

Methods

The “Long Live the Elderly!” (LLE) program, carried out by the Community of Sant’Egidio in the centre of Rome since 2004, is aimed at counteracting social isolation by a pro-active monitoring of the over-75 population, providing them personal support in case of need as well as strengthening their social connections at community level with formal and informal caregivers who accepted to be involved in the program. Mortality of the whole population followed up during 2016-2017 (aggregated by month) has been compared with the mortality of an over-75 population sample, resident in the Lazio region, followed up by the University of Tor Vergata, Biomedicine and Prevention Department, that receive the standard of care. Non-parametric tests have been performed to assess differences of death rates and multivariate analyses to assess the impact of risk factors on mortality.

Results

From December 2015 to November 2017, the LLE population and the control population were made up by an average of 5,181 and 528 individuals respectively, comparable for age and gender. The monthly average death rate from June to September 2017 was 6.0/1000 (CL95%: 0.8-11.1) and 6.1/1000 (CL95%: 3.3-9.0) for the control sample and the LLE population respectively ($p=0.8$). Compared to the summer 2016 mortality, an increase of 100.7% and 12.3% among controls and LLE population respectively has been observed. The multivariate analysis, weighted for the summer 2017 population and adjusted for age, gender and pre-summer 2017 mortality, showed the protective effect of the LLE program ($R^2=0.504$; $\beta=-0.599$; $p<0.001$).

Integrated Housing, Care and Support: Outcomes on frailty, psychological health and mobility

C. Holland⁽¹⁾, I. Garner⁽²⁾, J. O'Donnell⁽²⁾ & Dr H. Gwyther⁽¹⁾

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Introduction

This report provides research findings from a cohort study examining the health and wellbeing outcomes for people moving in to a group of retirement villages offering an “extra care” model that includes increasing care support as needs change. Key factors include a wellbeing programme, support for cognitive impairment if needed, and a socially and physically accessible environment. The findings are from the period 2012 to 2018. The focus of the background study is on residents living in ExtraCare Charitable Trust villages and schemes, examining markers of health, frailty and wellbeing for residents, and subsequent use and cost implications for health and social care. This paper will focus on investigating effects of time and relationships between indices of depression, anxiety, frailty and mobility indices.

Objectives

The objective of the analyses reported was to evaluate whether the extra care approach gave positive outcomes for healthy ageing. Wellbeing and frailty related data is now available from moving in (0 months) to 60 months later, with assessments taken at 3, 12, 18, 24, 36, 48 months in between. The study aims to compare residents with controls remaining in their original homes, and to comment on the role that purpose built retirement villages can have in the range of housing choices for both the fit and the frail.

Methods

The study began as a longitudinal repeated measures study but because of attrition and a desire to go beyond the originally planned 18 month study, we recruited new participants based on the duration people had lived in the ExtraCare environments. Thus growth curve analysis is used. This uses time since moving in as the main independent variable and examines change over time. 162 new residents and 31 controls took part at baseline (mean age 75 years), with reducing numbers over time. Participants were assessed for a range of physical and psychological health measures, (e.g. number of chronic illnesses, anxiety and depression, global cognition). A frailty index was calculated and measures of quality of life, health and social care usage and health behaviour (diet and exercise) were taken.

Results

The control group were significantly healthier than the residents on a range of measures, and despite efforts to age match, were significantly younger. However, this gave the opportunity to examine age-related versus location-related effects. Over time, differences between the groups in

some important aspects of cognitive function and in anxiety and depression reduced, with anxiety level being 23% less than at baseline for residents after 5 years. Once level of frailty was controlled for, there was no difference between the groups in depression, highlighting the role of frailty, rather than age. Linear regression analyses also demonstrated that the impact of mobility impairment on depression was less for the residents than for the controls. Walking speed improved over time for the residents, and this was shown to be an important mediator of the effect of time on depression. This analysis showed that if walking speed had stayed the same, depression would have increased over time. The number of times a person did 30 minutes or more of exercise per week increased over time, and this was related both to walking speed and to reducing falls, although falls did not decrease in the population as a whole after the first 18 months. When Residents were examined separately, there was a significant reduction in frailty over the first 36 months, after which frailty increased. Over the 5-year period, there was no clear increase in frailty with increasing age, in contrast to expectations based on previous studies. This is important and suggests that although frailty still increases with age, it is being delayed in the ExtraCare residents.

Conclusion

Over the five-year period since moving in, significant improvements can be found in ExtraCare residents' health and wellbeing. In some critical health factors where a downward trend might normally be expected with age, no such trends are emerging or are delayed.

Funding

This study was funded by the Extracare Charitable Trust but independently run and analysed by the researchers.

Ethics

This study was given ethics approval by the Research Ethics Committee at Aston University.

Part 2

Savings and Better Quality of Life: Gamifying Rehabilitation

Lucia Pannese
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Objective

This presentation aims at discussing opportunities and barriers to remote rehabilitation, underlying the advantages of a gamified approach. It also calls for a shared reflection on how to facilitate the process of introducing digital supports to connected health and personalized medicine.

Description

This oral contribution is first presenting REHABILITY www.rehability.me, a best practice connected health solution, that allows patients to take part in neurological rehabilitation therapy both within a specialist facility and from home with continuous remote medical support. Co-designed with specialists and patients and resulting from two EU funded research projects, the product has proven research to show that it motivates elderly people to comply with the prescribed therapy, thus supporting therapy adherence. Although already proven and stable, highly appreciated by specialists and patients in Europe and SE Asia and supported by a strong scientific bibliography, the product still fails to conquer the market. Starting from this case discussion, the ultimate aim of this presentation is to debate what needs to be done to successfully introduce tools such as REHABILITY into the market, to effectively support connected health and personalized medicine. Although such a solution would clearly reduce costs of national health care systems and enhance the patients' quality of life at the same time, some organizational shortcomings and practical barriers are still hindering its adoption. This presentation calls for a common reflection on this situation.

Conclusion

A programme dealing mainly with the individuals' lack of social resources showed to be able to limit mortality of an older adult population, during an extreme climate event, like the heat wave, in a setting with poor community care services, as the Lazio region. Further analysis are needed to identify the key components able to affect the older citizens mortality as, for example, the role played by the urban heat island effect that is more relevant in Rome than in other regional settings.

Multidimensional determinants of higher use of hospital care services rate

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Background

European health systems forecast an increasing demand for hospital care, due to the increasing prevalence of non-communicable diseases as a result of epidemiologic transition. The understanding of the determinants that fuel the request for hospital care is crucial to plan intervention able to manage the request without overcoming the capacity of the hospital services. The aim of this study is to assess the determinants of using hospital services.

Methods

A randomized sample from the population of the Lazio region (Italy) above the age of 64 was enrolled in 2014 by the administration of a questionnaire to assess frailty; the rates of use of hospital services (hospital admission, DH accesses and Emergency Room visit) during 3 years following the enrolment have been retrieved by the regional database. Univariable and multivariable analyses addressed the association of health status, social and economic variables with use of hospital care services.

Results

The mean rate of use of hospital services was 785.5 per 1000 observation/year (robusts 561.0, pre-frails 731.6, frails 1,327.9 and very frails 1,362.2, $p < 0.001$). In the multivariate analysis, the higher rate of use of hospital services was independently associated with older age, lower education, presence of cardiopathy, worse functional status, living alone or without anyone able to help.

Conclusions

The medium-term use of the hospital services by older adults is independently associated with functional status, social resources, and physical status in a sample of older adults living at community level in poor community service environment, like Lazio Region. Policy makers who want to reduce Hospital Use should take into account this scenario instead of relying only on the assessment of the diseases prevalence which could bring to mistakes in the health services planning

Feasibility of ambulatory monitoring devices to monitor recovery of patients after a hip fracture treatment

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Introduction

Each year approximately 19.000 patients above 65 years are hospitalized with a hip fracture in the Netherlands. The goal of hip fracture treatment is functional recovery of the patient to the pre-fracture state. Currently, functional recovery is suboptimal in 53% of the patients. More insight in the patients' rehabilitation process is expected to enable further optimization of rehabilitation treatment.

Objectives

The aim of this study is to assess the feasibility of ambulatory monitoring devices to continuously monitor physical activity behavior of elderly patients after hip fracture treatment.

Methods/Approach

Based on a multi stakeholder requirement analysis, the Fitbit Charge and MOX Activity Monitor are chosen to monitor physical activity. To assess the feasibility of the sensors, patients wore them during the whole rehabilitation trajectory from hospital admission till admission from the geriatric wing of a nursing home. The Fitbit is worn around the wrist and MOX is placed just above the knee. The wearing comfort was assessed and the following parameters were measured to assess if a change in physical activity could be monitored: number of steps, heart rate, longest activity block, and number of active and sedentary minutes.

Results

At the moment 38 elderly patients are included (21 analyzed). The preliminary results of the Fitbit (n=12) and MOX (n=9) show that both sensors do have the potential to monitor changes in physical activity. On average all parameters show an improvement meaning that the activity parameters (number of steps, longest activity block and number of active minutes) increase during the course of the rehabilitation and that heart rate and the number of sedentary minutes decrease. However, there is a large variability between subjects in the amount of progress made as well as in the parameters on which progress is being shown. Results also show that compared to the standard

point in time clinimetry, were bad and good days, that often occur, can cause inadequate reflection of the actual status of the patients, this continuous monitoring is less sensitive for this and as such more adequate. However, results also show that the feasibility of the Fitbit in the elderly population was suboptimal. The Fitbit is, in contrast to the MOX, not able to count the number of steps correctly when walking with a rollator, because no arm movements are made. With regard to the wearing comfort, the results show that both sensors are well tolerated.

Conclusion

Ambulant monitoring of recovery after hip fracture using of the shelf sensors like Fitbit and MOX is feasible and do have the potential to get more in depth insight in the rehabilitation process of patients with a hip fracture compared to standard point in time clinimetry. The large variability between subjects on amount progress made as well as the parameters on which progress is being shown argues for a more personalized approach which can be enable such continuous monitoring devices.

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Ethics

This feasibility study was approved as not subject to WMO. All participants signed informed consent prior to participation.

How a Municipality can foster the implementing of ICT solutions by PME Senior Care Operators. Based on successful experience of Riga City Hall and Senior Group.

*Nikolay Koblyakov, Senior Group, Paris
“Senior Group” Oral Lecture Proposal.*

Background information

Implementing and scaling up of open solutions/platforms for AHA is one of the 3 important objectives of renovated action plan of AG C2 for 2018-2020. The reasons why Innovative Public Procurement are not often launched by Public Administrations and municipalities have to be examined and the alternatives proposed. We are going to present the guidelines and standards to easily combine a variety of solutions for communications between ICT developers, Municipalities and Social care

operators. We intend to share the positive experience of Riga City Hall and Senior Group of alternative to traditional recommended Innovative Public Procurements for ICT independent living solutions, while Municipalities act as Public Administrations.

Speaker

Senior Group

- Mr. Nikolai Koblyakov, PDG, kobliakov@senior-group.fr , +33 6 0725 8031, www.senior-group.fr

Relevance to and alignment with the priorities of the EU in the digital innovation for active and healthy ageing

- Better data to advance research, disease prevention The mobile applications used in the basic models of services provided by Senior Group with help of ICT and ordered by Riga Municipality collect and store the data (upon receipt of consent).
- personalised health and care;
The mobile APPlications that are used in SME Operator- Municipality co-operation assures the new level of personification of care. The senior-coding application assures the permanent adaptation of care plans of operator, completely opened for control from the Municipality side for instance.
- digital tools for citizen empowerment and person-centred care The distribution via reference sites networks of the developed in workshop road map for aged- care operator and municipality for implementing of ICT solutions (based on AALdeveloped example) in
- municipality will help to advance the person- centered care in area of other's than Baltic states regions.

Quadruple helix approach

We believe that ‘laissez faire’ regime, where industry, based on the feedback from Media/civil society is leading the innovative capacity in the presented framework, ruled

by municipality and academia provides support in terms of knowledge is more useful than “statist regime” where government leads by driving the innovative capacity of industry, or than “balance regim” where the universities play the most important role.

Target audience

- Regional Public Administrations;
- Local Public Administrations;
- Industry;
- Senior Care PME Operators (they are definitely a part of industry, but we consider the manufacturer of ICT solutions as industry usually)

Geography

Riga is the biggest city of the Baltic countries (Estonia, Latvia, Lithuania). Currently there are no reference sites in any of these countries. We work to assure the fact that the successful experience of Senior Care PME of cooperation with city halls of Tallinn, Vilnius and other Baltic cities will be presented there and the participants of many Eastern European countries, mainly from North (Estonia, Latvia, Lithuania, Poland) to take part in a WorkShop.

C2-D4 connection

Also one of the ICT solutions to be used as an successful example of the Municipality-Operator cooperation- the mobile Application “EIP-AHA Profiling Motivation Application prototype” was drawn out in 2018 as the C2-D4 working group co-operation outcome.

Signature

Nikolay Koblyakov, Senior Group, Paris. 23/4/2019

Part 3

Prof. Thomas Bock (REACH PI), TUM; Prof. Henning Boje Andersen, DTU; Dr. Thomas Linner (REACH Scientific Director), TUM: Welcome and Overview REACH

Abstract: Active Healthy Ageing (AHA) systems such as REACH turn clinical and care environments such as homes, home care, and everyday life, day care centers, and other geriatric facilities into highly personalized and data-driven early intervention settings that engage older persons in meaningful preventative and rehabilitative activity (primarily physical activity but also with regard to cognitive, mobility, social, and nutritional aspects). A unique feature of REACH is the integrated utilization of personalized behavior change and engagement techniques informing the deployment of the toolkit elements (sensors, interfaces, devices, etc.). REACH implements a combination of wearable and ambient sensors for each Touchpoint along with a set of co-adapted Machine Learning elements. Personalized Intelligent Interior Units (PI²Us) are used to integrate the above described functional elements physically and seamlessly into daily life.

Prof. Andrew Sixsmith, Simon Fraser Univ.: Responding to the Challenge of Aging - The Canadian AGE-WELL Network of Centres of Excellence

Abstract: Information and communication technologies (ICTs) have huge potential to enhance the health, well-being, and independence of seniors, and also open up opportunities for new services and businesses. ICTs can be used to meet the desire of most seniors to age in place and to provide solutions to increased demands on health and community services. Despite this “win-win” scenario, the actual impact of research has often been limited, with good ideas and technologies failing to be turned into new products and services. This presentation looks at how AGE-WELL (Aging Gracefully across Environments using Technology to Support Wellness, Engagement, and Long Life NCE Inc.), a Canadian Network of Centres of Excellence (<http://www.agewell-nce.ca>), is working towards taking the outcomes of great research from the laboratory into the real-world.

***Prof. Yeong-Ran Park, Dept. of Silver Industry, Kangnam University:
Healthy and Active Aging in Korea from a Gerontechnology Perspective***

Abstract: In Korea, people aged 65 or older make up 14.3 percent of the population, but this ratio is expected to reach 40.1 percent in 2060. As one of the fastest aging countries in the world, there is an increasing demand for policy and practice innovations to support healthy and active aging in Korea. In order to respond more effectively to the challenges of the speed and the magnitude of population aging, the Korean government has introduced legislations such as Low Fertility and Aging Society Act, Act for Long-term Care Insurance for the Elderly, Act for Promotion of Age-friendly Industry and Dementia Management Act. Moreover, with recent developments in the 4th industrial technologies, more interests and R&D funds are being invested in the field of gerontechnology. This presentation will introduce some latest projects such as Mobile-based & customer-oriented INtegrated platform Development for Mental health OutReach services for older adults (MIND MORE), ICT-based community care services for lone elders (Ministry of Health and Social Welfare), KB Good Memory School and robot care service. Implications for improving accessibility, usability, and the linkage between health and social care will be discussed.

Dr. Atsushi Hiyama, Univ. Tokyo: Geron-Informatics: Geron-Informatics: Techno-logical engagement for the elderly in physical, cognitive, and social activities

Abstract: Abstract: In the latest statistics in 2017, the demographic ratio of people over 65 in Japan is 27.7%, creating what is being called a "hyper-aged society." Although there are countless challenges posed by an aging population, they can be overcome by the power of ICT. Geron-informatics is a newly coined term for this research field in computer science that encompasses work in which computer-based and interactive technologies are being designed and evaluated to resolve issues posed by hyper-aged societies. In this talk, I will introduce our empirical research projects being conducted on HCI/VR for improving elders' social participation and promoting healthcare activities for the elderly.

Dr. Friedemann Müller, Schön Klinik; Jörg Güttler, TUM; Lisa Schrader, Fraunhofer IAIS: Advanced sensing and Human Activity Recognition in early intervention and rehabilitation for older persons

Abstract: One of the objectives of our efforts in EU project REACH is to reduce the duration of hospitalization and avoid a decline after discharge that possibly results in readmission. In the talk we report on this subproject where several key indicators and assessments were defined to trace the patients' Activities of Daily Living and their health condition. To monitor activities and biometric signals, specific wearables, ambient sensors, and activation devices were used and evaluated in clinical trials at SKBA. We describe the validation of sensors and the processes and assessments for the early detection of the users' health status in the test scenario. A model of a typical patient room at our clinic was used as an initial scenario and lead use case. The room and the test settings are strictly based on modular principles (physical modularity, modularity of sensors, etc.), so that adapted versions for care homes and home care environments can be generated.

Rasmus Tolstrup Larsen, Copenhagen Univ.; Humira Ehrari, DTU: Wearable sensing and motivational strategies to enhance physical activity levels among older persons

Abstract: There is an increasing recognition that physical activity is an efficient “medicine” for especially older adults. They will benefit from increased physical activity in terms of lower mortality and a higher everyday function. Frailty has previously been seen as irreversible, but emerging results show otherwise. The most important barrier to higher activity levels is lack of motivation; hence, efficient motivational strategies are highly important if national strategies on physical activity programs are to succeed. We present results from several studies with different motivational strategies, including playful exercise and feedback on activity levels and we discuss measurement properties, and the social and motivational prospects of modern health technology.

Ole Stangegaard: A patient's perspective on using telehealth services

Abstract: Based on personal experience from an inclusion since 2013 in 'The Epital', a tele medicine project for COPD patients, the presentation will describe the functionality of the project emphasizing the patient interface. Some problems encountered and results achieved by the Epital will be discussed and possible future developments described. The experiences gained so far have resulted in development of 'The Citizen's Manifesto of e-Health'. This document intended as a 'yardstick' for evaluation of different COPD tele medicine systems will be briefly presented and commented.

Christian Graversen, CEO Welfare Tech: Challenges and solutions in creating effective assistive technologies

Abstract: The demographic challenge has been a strong motivation for investing in assistive technology for the last fifteen years. Many new technologies fail because they don't address a clear NEED, has a defined APPROACH to market, has a compelling BENEFIT for customer or an understanding of what the COMPETITION is to fulfill the need. This presentation will use cases to demonstrate challenges and solutions in creating effective assistive technologies.

Dr. Thomas Visser, Philips Design: "Design to Engage – how design can help to create engaging health solutions"

Abstract: It is important to have patients actively engage in being and staying healthy, as this improves their health outcomes, as well as overall healthcare efficiency and patient experience. At the same time, healthcare today is delivered more and more through a complex ecosystem of connected technologies, services and professionals. Philips Design is exploring how we can design and leverage such an ecosystem to increase patient engagement. The work presented will touch upon guidelines for engagement and behaviour change, as well as provide a sneak peek into the ground breaking design research methodology to which the REACH activities have contributed so far.

Carlijn Valk, TU/e; Pearl Pu, EPFL: Personalizing behaviour change strategies toward stimulating active ageing

Abstract: This presentation will give an overview of how personalised behaviour change strategies have been designed into the interventions to stimulate active ageing. Through a field test with older adults using Fitbit from the Meet&Greet centre and the REACHhealtytogether app co-designed with older adults, the researchers demonstrate how the different social support strategies support different older adults to be physically active. Both data analytics and machine learning algorithm were applied to help identifying the personalised strategies.

Dr. Lydia Vogt, DIN, Prof. Henning Boje Andersen, DTU, Dr. Thomas Linner: The role of standardisation for empowerment and ICT-based engagement of older persons

Abstract: Standardisation is a key strategic tool of REACH to build a network with relevant stakeholders within Europe and worldwide, disseminate the new developed technologies and concepts for empowerment and ICT-based engagement of older persons in a sustainable manner and support their sustainable transfer into the market. This is achieved, amongst others, by actively contributing to the work of the newly founded ISO Technical Committee Ageing Societies. Furthermore, a specification on European level on guidelines for introducing tele-medical and pervasive monitoring technologies balancing privacy protection against the need for oversight and care is in the process of being developed.

Poster abstracts

The Effects of Environmental Illumination on a Pick-and-Place Task in Younger and Older Age

Miriam Schaepers and Dr Constanze Hesse*

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The ability to pick up and place objects is essential to many everyday activities, thus a decline in this ability can mean a threat to a person's independent living. The purpose of the study was to investigate how grasping movements in a pick-and-place task are affected by different indoor lighting conditions in older and younger adults. Our hypothesis was that older participants will struggle more with performing quick and accurate actions under lower lighting conditions than younger adults. The sample consisted of 15 older participants (mean age=71 years; SD=3.2) and 18 younger participants (mean age= 21years; SD=1.8). Participants were asked to grasp, pick-up, and place a water glass in three different lighting conditions (bright: ~410, medium: ~12, and dim: ~0.002 lux). An electromagnetic motion tracking system (trakSTAR) was used to record hand movements. The results indicated that total movement time and the time needed to place the glass increased with decreasing illumination for all participants. Furthermore, interactions between illumination and age suggested that older participants slowed their movements more than younger adults under the lowest illumination level. As expected, all participants' accuracy decreased with decreasing illumination. Most interestingly, however, older adults were considerably more accurate than younger adults in all conditions. The findings suggest that older adults place much greater value on maintaining high accuracy in all lighting condition than younger adults and that this comes at the cost of increased movement times. Therefore, high illumination levels appear to be important for accurate and fast pick-up-and-place movement regardless of age, however if movement time is important bright lighting appears to be particularly important for older adults.

The study was approved by the ethics committee of the School of Psychology at the University of Aberdeen and was conducted in conformity with the Declaration of Helsinki.

Keywords: Aging, Environment illumination, Pick up and place, Reach-to-grasp,

Procuring innovative ICT for patient empowerment and self-management of type 2 diabetes mellitus – PROEMPOWER

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Introduction

Diabetes mellitus is a chronic disease with a broad spectrum of severity, accompanied by many concomitant conditions, complications and development stages. Its prevalence is increasing worldwide towards becoming a pandemic, representing an ever greater burden on health care systems (Bommer et al., 2017).

Objectives

PROEMPOWER is an European funded project under Horizon 2020 programme, with the aim of purchasing R&D services, through a PCP procedure, in order to develop an innovative IT solution for early diagnosis and management of diabetes, facilitating the lives of people with type 2 diabetes, supporting them in their daily lifestyle choices and giving healthcare professionals access to the clinical data needed for the management of the disease and its complications (ProEmpower consortium, 2018). The project involves four public procurers across Europe – Turkey, Portugal, Campania and Murcia.

Methods

The four procurers requested the development of a Shared Care Plan, accessible by patients and healthcare professionals, to enable them to use a common entity/document that uses relevant information about the patient's diabetes management and allows for scheduling events and reminders, such as follow-up visits and regular tests. The Shared Care Plan is to allow both patients and professionals to enter data such as measurements, while giving each specific rights to do so and integrating data captured directly from devices.

The requirements associated with delivering training to diabetic patients in various disease stages include the topics of: Physical activity and exercise; Tobacco and alcohol consumption; Hygiene (mouth, feet); Complications from and prevention of diabetes; Hyper- and hypoglycaemia and blood glucose self-control; Diet and nutrition; Insulin therapy and injectable drugs; Drug therapy; Life with diabetes; Sleep and stress avoidance. Measurement of parameters used by health professionals and patients to manage the disease are transferable to the main ProEmpower solution, including automatic data transfer from device. The solution is furthermore able to deliver messages

to the patient, including messages formulated by a professional and those automatically generated through data analysis - notifications of deviation from goals, tips for better management, etc. ProEmpower procurers have requested a platform capable of tapping neighbourhood and/or family resources to deliver patients with co-operative diabetes support. This online platform is also for diabetic patients to communicate and be trained on their disease. Professionals may also use it to exchange ideas with colleagues and provide advice to patients. (De Luca et al., 2019).

Results

At the core of ProEmpower is a competitive R&D process comprising three phases:

- PCP Phase I: Concept design, solution architecture and technical specifications
- PCP Phase II: Development of prototype systems
- PCP Phase III: Development and testing of pilot systems.
- Three supplier consortia have been selected for phase II of the ProEmpower PCP:
 - DM4ALL – consortium led by Gnomon Informatics SA (Greece)
 - CarpeDiab – consortium led by Health Insight Solutions GmbH (Germany)
 - DiaWatch – consortium led by Tech4Care srl (Italy)

Two of them have been selected for phase III (testing) of the ProEmpower solutions

Conclusions

The ProEmpower procurers have produced a comprehensive set of specifications for value-based pre-commercial procurement of innovative ICT for empowerment and self-management of diabetes mellitus patients. The requirements, use cases and process models reflect the joint needs of four European regions – Turkey, Portugal, Murcia and Campania. Proempower will contribute to the management of type 2 diabetes mellitus by patients and will allow a harmonious development of the digitization of care services for patients with diabetes throughout Europe

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The influence of foot position on static and dynamic standing balance in healthy older adults

Stephanie Schmidle⁽¹⁾, Manuela Stürzer⁽¹⁾, Joachim Hermsdörfer⁽¹⁾, Carmen Krewer^(1,2)

(1) Technical University of Munich, Germany (2) Schoen Clinic Bad Aibling, Germany

Introduction

Deficiencies in postural control due to a decline in sensory and motor functions are the main causes for increased number of falls during aging. To quantify balance disorders and the risk of falls, it is crucial to record the static and dynamic aspects of balance. Posturography is an objective and quantitative biomechanical method for the analysis of human postural control. Although some standardized test procedures for posturography exist, e.g., the Sensory Organization Test, there is no standardization for the positioning of the feet during most of these measurement. As there is general consensus that the base of support – in unsupported standing defined by the feet – is an essential component in postural control, this aspect needs investigation.

Objectives

The aim of this study was to investigate the influence of different feet positions on posturographic parameters during static and dynamic standing in healthy older adults.

Methods

A total of 15 healthy elderly (age: 66 ± 5.6 years; body height: 166.9 ± 7.7 cm; body weight: 68.8 ± 16.7 kg) participated in this study. Sensory function (tactile, proprioception/position sense, vibration) was assessed prior to posturography. Participants completed five conditions on a Kistler force platform: a condition with self-selected foot position and four conditions with set feet distances (feet together, 10 cm, 20 cm, 30 cm). Distance was measured between the middle of both heels. In each condition measurements were done for 60 seconds for static standing (as still as possible) and dynamic standing (limits of stability testing (LOS) in eight different directions). Maximal sway amplitudes of the center of pressure recordings were analyzed in antero-posterior (A-P) and medio-lateral (M-L) directions. A repeated measurement ANOVA was used to analyze differences between several feet position. Bonferroni post-hoc tests were used for pair-wise comparisons. Alpha significance level was set at 0.05.

Results

Repeated measurement ANOVAs revealed significant differences between the static and between the dynamic foot positions. In static standing, values in the A-P direction showed the significantly greatest values for the feet together condition. In M-L also the 10 cm condition produced significantly greater values than the 20 cm, 30 cm, and self-selected conditions. Moreover, standing with feet together led to significantly greater values compared to all other feet positions. LOS analyses revealed that the conditions ‘feet together’ and ‘10 cm’ were significantly lower compared to all other conditions. All other comparisons were not significantly different. In

addition, the best foot position was detected for each participant, i.e., the greatest or lowest values of static and dynamic conditions, respectively. The analysis showed that this position was always between 20 and 30 cm (mean 26 cm). The sensory assessment showed only minor abnormalities across the elderly subjects. Participants with slight deviations showed no statistically significantly different values compared to subjects without deviation.

Conclusions

In using posturography for static and dynamic standing balance, the foot position should be self-selected by the participants, representing a more natural, highly used posture. Regarding the influence of the sensory system, participants with slight deviations in the tested sensory subsystems showed no differences compared to participants without deviations. In order to test whether the sensory system has an impact on balance in different foot positions and whether this correlates with the number of falls, further research with older participants having sensory deficits and a history of previous falls should be conducted.

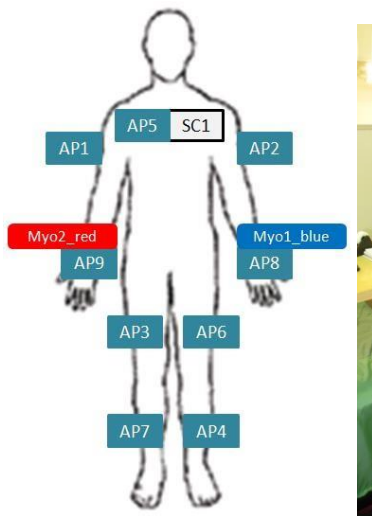
The work presented in this paper was made possible in part by funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 69042.

Activity detection with wearables and ambient sensors in a clinical environment - Preliminary testing with healthy subjects

B. Schäpers, C. Krewer, M. Steinböck, E. Koenig, F. Müller

In the REACH project the Schoen Clinic Bad Aibling is the use case for the application scenario rehabilitation. The system specific algorithms have to be trained to detect the patient's condition and its relevant changes. For this process the comparison of datasets from healthy subjects and patients are needed. Based on the data analytics, the intervention concepts can be personalized and adjusted to the needs of specific users. At the Schoen Clinic Bad Aibling patients with diagnoses such as stroke, Alzheimer's, Parkinson's or Critical Illness Polyneuropathy will be measured.

The data collection focused on the recognition of activities of daily living (ADL runs) and repeated sequences (drill runs). Immediately after the runs, the data were analyzed for its quality and integrity. Data experts from Fraunhofer Institute for Intelligent Analysis and Information Systems (FIAIS) annotated the sequences to allow the detection of specific activities, e. g., eating, taking medication, sleeping. The annotation strategy is based upon the concept of the "Opportunity data collection experiment" from Roggen et al., 2010.



n	Wearables
9	ActivPAL™ (AP1-9)
1	SmartCardia (SC1)
2	MyoArmband (Myo1_blue, Myo2_red)

In October 2018 Schoen Clinic Bad Aibling together with the TU Munich (TUM) and FIAIS performed a 5-day methodology development workshop in the laboratory apartment at TUM. The testing was a pre-trial with 5 healthy subjects to evaluate the feasibility of the complex trial protocol, the possible strains for the patients, and the data handling. Further aims of the workshop were to define the exact timing for the measurements with patients and obtain data of healthy subjects as a baseline dataset. Additional to these aims resource requirements, handling of the sensor set, a standardized synchronization procedure, and the roadmap for the data annotation (with ELAN) were evaluated. The protocol followed key-items of activities of daily living (ADLs)

(Mahoney, 1965). ADLs are important parameter to describe the patients' health status and indicating changes.

In April 2019 the test setting was transferred into a patient room at Schoen Clinic Bad Aibling. In a 2-day data collection workshop the handling of the protocol was evaluated in the clinical environment. The protocol and sensor setting was adapted to the requirements requested from the ethics committee. One healthy subject was measured with 4 ADL runs and 3 drillruns.

This lead to fundamental considerations regarding data quality, data protection, and ethical and legal issues. Due to the commencement of the GDPR General DataProtection Regulation in May 2018, an in-depth analysis of data handling and processing in the project had to be developed. This required a close collaboration with the technical partners, the Ethics Committee, the Data Protection Officer, and specialized lawyers.

Central elements of the discussion were data transfer, data storage, data sharing of pseudonymized and personal data, allocation of responsibilities, automatic information processing, and compliance with user rights.

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The transfer and trainings device activLife in neurological patients – a study protocol of a feasibility und usability trial

M. Steinböck, C. Krewer, B. Schäpers, E. Koenig, F. Müller

Activities of daily living, such as getting up from a chair and sitting down safely, are prerequisites for maintaining autonomy in older people and patients. Difficulties and uncertainties during this transfer performance can lead to an inactive lifestyle and thus a deterioration of the general health condition. Various aspects of the sit-to-stand and stand-to-sit transitions are also associated with an increased risk of falling¹⁰. In order to maintain or re-establish that elderly people can live independently as long as possible, these transfers need to be trained. Transfer devices can assist the training of a secure position change. Within the modularly built REACH system, the device *activLife* (Alreh Medical, Poland) is one of the activation modules that can be used to support the transitions. The feasibility and usability of the *activLife* as a transfer aid for performances from sitting to standing and from standing to sitting will be evaluated in the Schoen Clinic Bad Aibling.

In order to quantify normative values for transfer movements without transfer device in healthy elderly and to elaborate the influence of several neurological diseases, a literature search was performed.

Nine studies were found to have investigated this motor function. Of these studies, 3 included healthy elderlies^{9,3,4}, 2 were performed with patients having Parkinson's disease^{6,10}, 2 observed patients with paraparesis^{5,2}, and 2 measured patients after a stroke^{7,1}. Most studies used the FTSST (5 times sit-to-stand test) as the standardized assessment. Bohannon (2006) published values across the age span from 60 to 89, ranging from 11.4 to 14.8 seconds. As a general finding from all studies, a cut-off value of 15 seconds was found to be critical with respect to the risk of fall occurrence. A duration of more than 15 seconds doubled the risk of falls. In patients with Parkinson's disease, a value of 16 seconds discriminated between fallers and non-fallers. No values were established for patients with paraparesis, as the standardized procedure does not allow any additional walking tools to perform the test.

These reference values are essential in setting individual goals for the REACH system. In addition, a modification the 5xSST for patients with paraparesis is needed, allowing the use of aids. Optionally, the *activLife* could be a possibility for a standardized procedure. This would also open to test more severely affected patients who are not able to perform the transfer movements.

Open not Closed - Community-based Living Lab as Regional Management Method

Mika Yasuoka, Atsunobu Kumura

Introduction

Omuta, once a city of coal mining, is a typical rapidly aging city in Japan. The aging population (+ 65) is 35.7% (2018) and the third biggest aging ratio in Japan. The last decade, local citizens have expressed their worries of people with dementia who lost their way and failed to be found for a long time. Helping seniors with dementia who wanders has become one of the most urgent problems to be solved together with other worries such as an increase in isolated deaths among the city's elderly. The city of Omuta, Japan has conducted diverse experimental and spontaneous initiatives, together with people with dementia, industrial partners, municipalities, local care institutions, and citizens, and made substantial achievements.

Due to a need to protect people with dementia from wandering and getting lost, majority of senior houses for people with dementia usually takes a strategy to keep institutions closed. Some institutions build closed inner garden and others make fake doors and bus stops. A Danish care institution places fake bookshelf wall papers at the entrance door so that people will not get out from their section by accident. A German public transportation department partners with local care associations to construct exact replicas of standard bus stops outside of care homes (Telegraph, 2008). Some cities such as Demensby (Denmark) and Hogeweyk (Holland) established closed small inner city with physical walls only for people with dementia. Although these strategies would diffuse the panic and anxiety of people with dementia who get lost and missing or who want to go back home, it would generate ethical challenges (Hendriks and Kamphof, 2017); *Are we allowed to trick people with dementia for their safety reason? Is segregated utopia for people with dementia is optimal solution?*

Objectives

The City of Omuta, on the other hand, took an open community model, as a substitute of a closed space for people with dementia, which guaranteed, to some extent, secure unlimited interaction with local community. As a leading and unique open community case, the city of Omuta (Yasuoka, 2017) attracted attentions. However, after 10 years with a big applause, the City of Omuta realized importance to establish comprehensive eco system rather than conducting varied individual initiatives which lack interconnectivities and sustainability. The City of Omuta sought for an appropriate regional management strategy which embody their philosophy of Citizen Centre Care and achieve sustainability on finance and human resource.

Methods

To understand and suggest sustainable solutions for the city of Omuta, authors (university researcher and corporate researchers) conducted workshops with citizens and municipalities, and field interviews to municipality, citizens, the project owners and care institutions in 2017-2018. Through collected cases, authors extracted success factors and exemplified them with two exemplified cases of the Omuta's dementia care programs.

Results

Ms. E was worried by people in her region due to her wandering behavior as she was found on the street away from her home. Her behavior was taken as dementia act and dangerous as well. This case of Ms. E showed us an importance to see her behavior from her point of view. For her, it was not wandering but enjoyable walk on familiar streets. As a person who has ownership of her life, her wandering act ought to be taken as her own way of well-being.

A co-habitation case of a woman with intellectual disability and one with dementia showed us an importance to utilize their capability at most. Supported each other, two women managed to leave hospitals and live their own life. They were never people with disabilities anymore. Although they need weak-tie at local community to get occasional support, they can live independently than ever and achieve their own well-being.

Conclusion

Based on the investigation, we suggest an open eco system Community-based Living Lab with person centered mindset to support people with dementia and people with socially challenged for safe and happy living. In this model, just as shown in the city strategy, instead of establishing a closed and secure area for people with dementia, open, independent and reciprocal community is proposed as one of the optimal strategies for future aging society. This regional management method for the aging society which achieve innovation, well-being and regional development, portrayed as Person Centered City in Omuta. With three layers of philosophy, education and co-creation, the method aims at further achievement of SDGs and sustainability in the city of Omuta.

Do ACTIVE: a promising way to keep persons with MCI active and healthy

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Introduction

Research in MCI has shown that there are moderate but beneficial effects on cognitive functions of persons with MCI related to combined intervention strategies including cognitive training, physical exercise and social engagement. Risk estimations vary highly between studies and range from 20 -35% for annual conversions rates of MCI to dementia. So far, there is not enough empirical evidence which factors are responsible for maintaining at an MCI stage. Although physical, cognitive and social activities seem to play a certain role in this prediction, clear results for developing specific preventive interventions are missing and required. The central focus in Do ACTIVE is to change every day habits using Do Something Different behaviour change technology that targets the main risk factors for developing dementia.

Objectives

1) To activate new lifestyle habits which persons with MCI can integrate in everyday living physically, cognitively and socially and which might help them better cope with their impairment, prevent further deterioration and build up a social network for later support if needed. 2) To evaluate effectiveness of the intervention in a sufficiently large group with the right tools.

Methods/approach

From a behavioural science perspective, the failure of current medical practices based on information transfer might be due to several factors, for instance the habitual nature of human behaviour but also the mismatch between intervention and the psychological characteristics of people in different stages of behaviour change. The Do ACTIVE project will implement “Do Something Different”, and combine this with innovative wearable sensor tools to help people in the self-management of their health. Do Something Different aims to change habits by increasing behavioural flexibility and breaking the ‘unhealthy’ habits. This is accomplished by encouraging people to step out of their comfort zone.

An exploratory study design will be used where people with MCI or mild dementia will receive a new app + Do programme on their smartphone + Fitbit Versa as intervention for a period of 3 months. The Montreal Cognitive Assessment tool will be used to measure the cognitive state at 0 and 9 months later. Furthermore Quality of Life questionnaires will be used at 0, 3 months and 9

months. The outcomes will be measured within each individual person, as a group and versus findings in literature.

Results

There are no results yet, as the study is about to start at the writing of this abstract.

Discussion

It is interesting to see if this explorative study can indeed induce a sustainable change of lifestyle habits of persons with MCI and beginning dementia on the longer term. It is for debate if a control group would have been desired or subjects in this study can be their own control. Also, it has to be seen if the MOCA test is accurate enough to reliably indicate changes in cognitive impairment over a period of 9 months.

Conclusion

There is no conclusion related to the study results yet. Nevertheless, preliminary tests with 5 persons with beginning dementia, who used the Fitbit Versa and their smartphone, are very promising: people were definitely determined to change into more healthy lifestyle, f.e. by walking 10.000 steps daily. It is interesting to learn if persons with MCI can also change their habits, without being disturbed from fixed routines, which would be expected to be a of importance when deteriorating in cognitive health.

Ethics

Participants' data will be collected by means of real time monitoring and self-report and will be uploaded in a secure database. The procedures for the collection and storage of personal data will be conducted in alignment with the relevant General Data Protection Regulation. All partners will follow the relevant Advanced Encryption Standard procedures for personal password use and data encryption. Electronic data will be password protected and will be accessed only by authorised personnel.

Note

This study has been made possible thanks to a research grant of the Municipality of Bergen op Zoom (The Netherlands) and research investments by Care Organisation tanteLouise (The Netherlands).

The role of home care in the prevention of cognitive decline and frailty syndrome

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Introduction It is commonly accepted that frailty and dementia-related cognitive decline are strongly associated. However, the degree of this association is often debated, especially in homebound older adults with disabilities. Therefore, this study was aimed to investigate possible interactions of frailty on cognitive function in older adults receiving home care.

Methods A screening for frailty and cognitive function was conducted at 12 primary healthcare settings of the nationally funded program “Help at Home” in Heraklion Crete, Greece. Cognitive function and frailty were assessed using the *Montreal Cognitive Assessment* questionnaire and the *SHARE-Frailty Instrument*, respectively. *Barthel*-Activities of Daily Living and the *Charlson Comorbidity Index* were also used for the identification of independence level and comorbidity, respectively. Statistically, in order to investigate the impact of frailty on cognitive function (decline), crude linear regression models were performed, adjusting for potential confounding effects (age, gender, education, depression, comorbidity and homebound status).

Results: The mean age of the 192 participants (66% female) was 78.04 ± 8.01 years old. As expected, frailty is strongly associated with decreased cognitive function among older adults; frail (14.62, $p=0.008$) vs. pre-frail (16.82) vs. non-frail (19.86) and thus cognitive decline. However, a multiple linear regression revealed that this reduction on cognitive function ($B'=-2.39$, $p=0.246$) between frail and non-frail older adults was no longer significant after adjusting for depression and comorbidity. Most importantly, annual individual income ($B'=2.31$, $p=0.005$) and higher education level ($B'=2.94$, $p=0.019$) were both found as protective factors for cognitive decline progression and thus dementia development. However, depression was associated with cognitive decline regardless of socioeconomic variables. **Conclusion:** Our results suggest that health

professionals caring for frail people with cognitive impairment must focus on early recognition and management of depression.

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Using digital tool to improve long term efficacy of physical activity program in obese elderly subjects

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(Your Health into Movement)
A3 Functional decline and frailty - Physical Activity

Description of the commitment

Objective

The long term efficacy of weight loss program is a key problem in the management of obesity even in aged population. The aim of this study was to evaluate the effectiveness of applying a tailored physical activity prescription, implemented through smartphone, after three weeks of multidimensional rehabilitation program (MRP) in obese elderly subjects. Primary outcome of the study was the adherence to the follow up treatment program, secondary outcome the ability to reach the individual target exercise.

Methods

Forty-two obese elderly patients (age 61.9, BMI 34) were enrolled and after 3 weeks of intensive multidimensional program for weight loss, shared in three groups: 26 in control group (CG), 10 in general prescription group (GPG) and 6 in organized physical activity group (OPAG). All groups have the same general indication of daily physical activity (guideline of OMS, goal 10.000 steps per day) but CG by the usual clinical report whereas GPG and OPAG used a smartphone application called Bot Chat "CERISM+Salute" to record daily activity (GPG) or to additionally obtain personalize goal (OPAG). All subjects were evaluated after three and six months from MPR about: participation of follow up, anthropometric data, performance datas and answers of IPAQ questionnaire. GPG and OPAG also about: number of daily steps and daily physical activity were recorded.

Results

The adherence in follow up after three month was 69% of CG, 80% of GPG and 100% of OPAG and after six months: 50% of CG, 60% of GPG and 100% of OPAG. Global active life style measured by IPAQ questionnaire showed positive changes: all three groups increased physical activity and reduced sitting time after three months, but only OPAG further improve physical activity at the six months follow up.

Results and current status

Conclusion

The study suggests that the availability of a digital solution combined with specific feedback on physical activity, in addition to the normal features, helps even a critical population as obese elderly subjects to stay more active. This probably belongs by improving their motivation and stimulating individual skills to maintain at home the practice acquired during the intense care setting. In the long-term, this is translated into better quality of life, through management of obesity-associated morbidities and reduction of risk of frailty .

Collaborations that are welcome/needed

Any collaboration of research groups interested in the study of chronic diseases mechanisms are welcome.

Publications that came out of this commitment

This research is a very recent development of general project La salute nel Movimento. A master thesis on this topic has been already discussed and a first paper is in preparation

Effects of an Intensive Inpatient Rehabilitation Program in Elderly Patients with Obesity

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A3 Functional decline and frailty – Physical Activity

Description of the commitment

Objective

Weight lost in obese elderly person is a difficult task because of the complicate management of diet restriction and maintenance of functional capacity in the aged metabolism. *This study aim to assess the short-term effectiveness of an intensive inpatient multidimensional rehabilitation program (MRP), including diet, exercise, and behavioural therapy, in elderly patients with severe obesity.*

Methods

Forty-four elderly subjects (old; age 69.3 ± 3.5 years, BMI 41.9 ± 14.9) were analyzed against a larger group of 215 adult subjects (adult; age 48.2 ± 18.5 years, BMI 43.9 ± 9.4), who were used as controls. All patients underwent MRP, based on group therapy guided by a multidisciplinary team (physicians, dietitians, exercise trainers, psychologists). We evaluated changes in anthropometry, cardiovascular risk factors, physical fitness, quality of life, and eating behavior.

Results: After 3 weeks of MRP, we observed a reduction in body weight (old -3.8% , adult -4.3%), BMI (old -3.9% , adult -4.4%), waist circumference (old -3.4% , adult -4.1%), total cholesterol (old -14.0% , adult -15.0%), and fasting glucose (old -8.3% , adult -8.1%), as well as improved performance in the Six- Minute-Walk Test (old $+28.7\%$, adult $+15.3\%$), chair-stand test (old $+24.8\%$, adult $+26.9\%$), and arm-curl test (old $+15.2\%$, adult $+27.3\%$). Significant improvements were also registered in all other domains.

Results and current status

Conclusion

Our 3-week MRP provided significant clinical and functional improvement, which was similar between elderly and adult subjects with severe obesity. In the long-term, this may be translated into better quality of life, through better management of obesity-associated morbidities and reduced frailty.

Collaborations that are welcome/needed

Any collaboration of research groups interested in the study of chronic diseases mechanisms are welcome.

Publications that came out of this commitment

The European Journal of Obesity: Obes Facts 2019;12:199–210

Working Group for establishing a Nordic Chapter for Gerontechnology

Henning Boj Andersen

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The International Society for Gerontechnology (ISG) defines gerontechnology as "designing technology and environment for independent living and social participation of older persons in good health, comfort and safety". A Nordic Chapter for Gerontechnology is in the process of being established, and interested researchers and practitioners are invited to join the working group.

ISG Mission

ISG encourages and promotes technological innovations in products and services that address older peoples' ambitions and needs on the basis of scientific knowledge about ageing processes including cultural and individual differences.

ISG Vision

ISG works toward the realization of a society fully served by technology that is as accessible to ageing people as it is to people in younger generations.

<http://www.gerontechnology.org/>

Why a Nordic Chapter?

Development, implementation and use of technologies for older people raise a number of challenges to safety, quality as well as ethical issues. While most of such challenges and issues are the same across national borders, some of these vary very much from country to country. The Nordic healthcare systems, their infrastructure, payment base and not least the culture and values behind are quite similar, relative to other countries. We therefore have a shared understanding of care quality, equality and protection of dignity and privacy which form common ground on which design, implement and assess technologies for independent living.

Contact:

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First Working Group meeting:

14 May, 17:15 -18:15, DTU / AHA 2019

ISG World Conference of Gerontechnology 2020

18-20 May, 2020, Trondheim, Norway
<https://www.sintef.no/ISG2020>

The effect of playful exercise on functional and physical ability

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Background

According to the world health organization's report (WHO 2009) one area of increasing focus in health is the demographic development and the life expectancy of older adults. The amount of adults aged 65+ is growing. The proportion of adults aged 65 was estimated at about 521 million in 2011 and this number is growing by 939 million by 2030 (Chodzko-Zajko et al. 2009; United Nations 215AD). The increased life expectancy imposes many challenges for the individual in terms of difficulties in daily life activities and normal functioning. Evidence from epidemiological and clinical studies shows that one of the most important approaches to improve the quality of life and healthy aging is to encourage daily physical activity among older adults. However, motivation to engage in physical activity is often low in old age. A potential method to increase physical activity may be the use of play ware technologies such as moto tiles.

Aim

This study aims to investigate the potential of moto tiles in motivating older adults to become physically active. Hence, we examine what extent playful physical exercise during a 12 week period by of older (65+) citizens improves physical and functional abilities and to what extend it is accompanied by changes in physical activities outside exercise sessions. As secondary purpose we want to determine weather changes in performance on MOTO tiles over time correlate with changes in balance and functional measures.

Method

We conduct a randomized control trial with an n=38 older mean age was 84.years (SD=7.47) and n=26 were women. The participants were randomly allocated to an intervention (n = 19) or a control group (n = 19). The intervention consisted of playful exercise to improve balance in small groups twice a week for 12 weeks. The control condition was leisure activities.

Results

Our results shows that intervention on average improved functional balance. However, the improvement is not significant $p=0.11$. Furthermore, there can be seen no changes in physical activities outside exercise sessions. During the 12 weeks, intervention has a mean 4159.49 steps control group has 4853.80 steps. Furthermore, no correlation between Moto sores and BBS scores are observed.

Conclusion

The p-value is below statistical significance for bergs balance score while the effect size is ok. Therefore, there is reason to believe that if there were more subjects, a significant effect would be seen. The analysis has 80% power, alpha of 0.05, and an average difference of 3 points in change score ($SD = 5$) between the intervention group and the control group. The analysis indicated that we should include at least 45 participants in each group, to show a statistically significant difference.

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Criterion validity for step counting in four consumer-grade physical activity monitors among older adults with and without rollators

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Background

Few studies have investigated the measurement properties of consumer-grade physical activity monitors (PAMs) in older adults. Therefore, we investigated the criterion validity of consumer grade PAMs in older adults and whether the measurement properties differed between older adults with and without rollators and whether worn on the hip or at the wrist.

Methods

Consumer-grade PAMs were eligible for inclusion in this study if they: 1) could be fastened at the hip as well as on the wrist, 2) were simple in function and design and thus easy to use for participant with minimal technical skills, 3) included only step-counting as outcome measure and 4) were powered by a button cell battery. Participants performed self-paced walking for six minutes while two physiotherapists counted their steps with a click-counter. The average of the two counts was used as criterion. The participants wore 16 monitors, four located bilaterally on both hips and wrists. Our prior expectation was that all monitors would have at least moderate criterion validity for all participants, good criterion validity for participants walking without a rollator and poor criterion validity for participants walking with a rollator.

Results

Four PAMs were included in this study; Misfit Shine, Nokia GO, Jawbone UP Move and Garmin Vivofit 3. A total of 103 older adults participated. One type of PAM was excluded from this study due to technical issues. Therefore, we present results on the frequency of data loss, ICC(2,1) and percentage measurement error for three different PAMs located on four different positions.

Conclusions

The hip-worn PAMs did not differ significantly in terms of measurement error or criterion validity. Wrist-worn monitors cannot adequately measure number of steps in a population of older adults using rollators. The hip-worn PAMs were superior to wrist-worn PAMs among older adults with and without rollators.

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