- **How older adults with mild cognitive impairment relate to technology as part of present and future everyday life: a qualitative study**

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*BMC Geriatrics 2016**16**:73* ***DOI:*** *10.1186/s12877-016-0245-y*

Background: Existing everyday technology as well as potential future technology may offer both challenges and possibilities in the everyday occupations of persons with cognitive decline. To meet their wishes and needs, the perspective of the persons themselves is an important starting point in intervention planning involving technology. The aim of this study was to explore how persons with mild cognitive impairment relate to technology as a part of and as potential support in everyday life – both present and future.

Methods: Qualitative in-depth interviews with six participants aged 61–86 were conducted and analyzed, using a grounded theory approach.

Results: The findings describe the participants' different ways of relating to existing and potential future technology in everyday occupations as a continuum of downsizing, retaining, and updating. Multiple conditions in different combinations affected both their actions taken and assumptions made towards technology in this continuum. Both when downsizing doing and technology use to achieve simplicity in everyday life and when striving for or struggling with updating, trade-offs between desired and adverse outcomes were made, challenging take-off runs were endured, and negotiations of the price worth paying took place.

Conclusions: Our findings suggest that persons with mild cognitive impairment may relate to technology in various ways to meet needs of downsized doing, but are reluctant to adopt video-based monitoring technology intended to support valued occupations. Feasibility testing of using already-incorporated everyday technologies such as smartphones and tablets as platforms for future technology support in everyday occupations is suggested.

Keywords: Activities of daily living Aging in place Grounded theory Mild cognitive impairment Technology

- **Anticholinergic medication use and falls in postmenopausal women: findings from the women's health initiative cohort study**

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*BMC Geriatrics 2016**16**:76* ***DOI:*** *10.1186/s12877-016-0251-0*

Background: Results from studies assessing the association between anticholinergic use and falls are mixed, and prior studies are limited in their ability to control for important potential confounders. Thus, we sought to examine the association between anticholinergic medication use, including over-the-counter medications, and recurrent falls in community-dwelling older women.

Methods: We analyzed data from a prospective cohort study of women aged 65 to 79 years from the Women's Health Initiative Observational Study and Clinical Trials. Women were recruited between 1993 and 1998, and analyses included 61,451 women with complete information. Medications with moderate or strong anticholinergic effects were ascertained directly from drug containers during face-to-face interviews. The main outcome measure was recurrent falls (≥2 falls in previous year), which was determined from self-report within 1.5 years subsequent to the medication assessment.

Results: At baseline, 11.3% were using an anticholinergic medication, of which antihistamines (commonly available over-the-counter) were the most common medication class (received by 45.2% of individuals on anticholinergic medication). Using multivariable GEE models and controlling for potential confounders, the adjusted odds ratio for anticholinergic medication use was 1.51 (95% CI, 1.43–1.60) for recurrent falls. Participants using multiple anticholinergic medications had a 100% increase in likelihood of recurrent falls (adjusted odds ratio 2.00, 95% CI 1.73–2.32). Results were robust to sensitivity analysis.

Conclusions: Anticholinergic medication use was associated with increased risk for recurrent falls. Our findings reinforce judicious use of anticholinergic medications in older women. Public health efforts should emphasize educating older women regarding the risk of using over-the-counter anticholinergics, such as first-generation antihistamines.

Keywords: Anticholinergic Falls Community dwelling Older adults

- **A study protocol of a randomised controlled trial to measure the effects of an augmented prescribed exercise programme (APEP) for frail older medical patients in the acute setting**

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*BMC Geriatrics 2016**16**:79;* ***DOI:*** *10.1186/s12877-016-0252-z*

Background: Older adults experience functional decline in hospital leading to increased healthcare burden and morbidity. The benefits of augmented exercise in hospital remain uncertain. The aim of this trial is to measure the short and longer-term effects of augmented exercise for older medical in-patients on their physical performance, quality of life and health care utilisation.

Design & Methods: Two hundred and twenty older medical patients will be blindly randomly allocated to the intervention or sham groups. Both groups will receive usual care (including routine physiotherapy care) augmented by two daily exercise sessions. The sham group will receive stretching and relaxation exercises while the intervention group will receive tailored strengthening and balance exercises. Differences between groups will be measured at baseline, discharge, and three months. The primary outcome measure will be length of stay. The secondary outcome measures will be healthcare utilisation, activity (accelerometry), physical performance (Short Physical Performance Battery), falls history in hospital and quality of life (EQ-5D-5 L).

Discussion: This simple intervention has the potential to transform the outcomes of the older patient in the acute setting.

Trial registration: ClinicalTrials.gov Identifier: NCT02463864, registered 26.05.2015.

Keywords: Frail Medical Inpatients Exercise Physiotherapy Length of stay

- **Impact of a decision-making aid for suspected urinary tract infections on antibiotic overuse in nursing homes**

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*BMC Geriatrics 2016**16**:81* ***DOI:*** *10.1186/s12877-016-0255-9*

Background: Antibiotics are highly utilized in nursing homes. The aim of the study was to test the effectiveness of a decision-making aid for urinary tract infection management on reducing antibiotic prescriptions for suspected bacteriuria in the urine without symptoms, known as asymptomatic bacteriuria (ASB) in twelve nursing homes in Texas.

Method: A pre- and post-test with comparison group design was used. The data was collected through retrospective chart review. The study sample included 669 antibiotic prescriptions for suspected urinary tract infections ordered for 547 nursing home residents. The main measurement for the outcome variable was whether an antibiotic was prescribed for suspected urinary tract infections with no symptoms present.

Results: Most of the prescriptions for antibiotics UTIs were written without documented symptoms – thus for asymptomatic bacteria (ASB) (71% during the pre-intervention period). Exposure to the decision-making aid decreased the number of prescriptions written for ASB (from 78% to 65% in the low-intensity homes and from 65% to 57% in the high-intensity homes), and decreased odds of a prescription being written for ASB (OR = 0.63, 95% CI = 0.25 – 1.60 for low-intensity homes; OR = 0.79, 95% CI = 0.33 – 1.88 for high-intensity homes). The odds of a prescription being written for ASB decreased significantly in homes that succeeded in implementing the decision-making aid (OR = 0.35, 95% CI = 0.16–0.76), compared to homes with no fidelity.

Conclusions: The decision-making aid improved antibiotic stewardship in nursing homes.

Keywords: Nursing home Antibiotic stewardship Urinary tract infection Asymptomatic bacteria Antibiotics

- **Cost-effectiveness of a physical exercise programme for residents of care homes: a pilot study**

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*BMC Geriatrics 2016**16**:83* ***DOI:*** *10.1186/s12877-016-0261-y*

Background: Oomph! Wellness organises interactive exercise and activity classes (Oomph! classes) for older people in care homes. We investigated the cost-effectiveness of Oomph! classes.

Methods: Health-related quality of life was measured using the EQ-5D-5 L questionnaire at three time points; 3 months and 1 week prior to the start of the classes and after 3 months of Oomph! classes. Costs included the costs of organising the classes, training instructors and health service use (General Practitioner (GP) and hospital outpatient visits). To determine the cost-effectiveness of Oomph! classes, total costs and quality-adjusted life-years (QALYs) during the 3 months after initiation of the classes were compared to the total costs and QALYs of the 3 months prior to the classes and extrapolated to a 1-year time horizon. Uncertainty was taken into account using one-way and probabilistic sensitivity analysis.

Results: Sixteen residents completed all three EQ-5D-5 L questionnaires. There was a decrease in mean health related quality of life per participant in the 3 months before Oomph! classes (0.56 to 0.52, $p = 0.26$) and an increase in the 3 months after the start of Oomph! classes (0.52 to 0.60, $p = 0.06$), but the changes were not statistically significant. There were more GP visits after the start of Oomph! classes and fewer hospital outpatient visits, leading to a slight decrease in NHS costs (mean £132 vs £141 per participant), but the differences were not statistically significant ($p = 0.79$). In the base case scenario, total costs for Oomph! classes were £113 higher per participant than without Oomph! classes (£677 vs £564) and total QALYs were 0.074 higher (0.594 vs 0.520). The incremental costs per QALY gained were therefore £1531. The 95% confidence intervals around the cost/QALY gained varied from dominant to dominated, meaning there was large uncertainty around the cost-effectiveness results. Given a willingness to pay threshold of £20,000 per QALY gained, Oomph! classes had a 62%–86% probability of being cost-effective depending on the scenario used.

Conclusions: Preliminary evidence suggests that Oomph! classes may be cost-effective, but further evidence is needed about its impact on health-related quality of life and health service use.

Keywords: Quality of life Physical activity Care homes Cost-effectiveness

- **Health and social support services in older adults recently discharged from hospital: service utilisation and costs and exploration of the impact of a home-exercise intervention**

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*BMC Geriatrics 2016**16**:82* ***DOI:*** *10.1186/s12877-016-0254-x*

Background: Admission to hospital can lead to persistent deterioration in physical functioning, particularly for the more vulnerable older population. As a result of this physical deterioration, older people who have been recently discharged from hospital may be particularly high users of health and social support services. Quantify usage and costs of services in older adults after hospitalisation and explore the impact of a home-exercise intervention on service usage.

Method: The present study was a secondary analysis of data from a randomised controlled trial (ACTRN12607000563460). The trial involved 340 participants aged 60 years and over with recent hospitalisation. Service use and costs were compared between intervention (12 months of home-exercise prescribed in 10 visits from a physiotherapist) and control groups.

Results: 33% of participants were re-admitted to hospital, 100% consulted a General Medical Practitioner and 63% used social services. 56% of costs were associated with hospital admission and 22% with social services. There was reduction in General Medical Practitioner services provided in the home in the intervention group (IRR 0.23, CI 0.1 to 0.545, $p < 0.01$) but no significant between-group difference in service use or in costs for other service categories.

Conclusion: There appears to be substantial hospital and social service use and costs in this population of older people. No significant impact of a home-based exercise program was evident on service use or costs.

Trial registration: Australian and New Zealand Clinical Trial Registry ACTRN12607000563460>TrialSearch.

Keywords: Hospitalisation Older people Resource use Costs Mobility improvement

- **Mid-life socioeconomic status, depressive symptomatology and general cognitive status among older adults: inter-relationships and temporal effects**

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*BMC Geriatrics 2016**16**:88* ***DOI:*** *10.1186/s12877-016-0257-7*

Background: Few longitudinal studies have analyzed how socioeconomic status (SES) influences both depressive and cognitive development over an individual's life course. This study investigates the change trajectories of both depressive symptomatology and general cognitive status, as well as their associations over time, focusing on the effects of mid-life SES.

Methods: Data were obtained from the Taiwan Longitudinal Study on Aging (1993–2007), a nationally representative cohort study of older adults in Taiwan. The short form of the Center of Epidemiological Studies-Depression (CES-D) scale that measures depressive symptomatology in two domains (negative affect and lack of positive affect) was used. General cognitive status was assessed using the brief Short Portable Mental Status Questionnaire scale. Assessments of the subjects' mid-life SES included measurement of the participant's education and occupation. Analyses were conducted by the parallel latent growth curve modeling.

Results: The participants' initial levels of depressive symptomatology and general cognitive status were significantly and negatively correlated; furthermore, any changes in these two outcomes were also correlated over time. The initial assessment of general cognitive status significantly contributed to any advancement towards more severe depressive symptomatology over time, particularly when this occurred in a negative manner. Furthermore, a mid-life SES advantage resulted in a significant reduction in late-life depressive symptomatology and also produced a slower decline in general cognitive status during later life. In contrast, lower mid-life SES exacerbated depressive symptomatology during old age, both at the initial assessment and in terms of the change over time. In addition, female gender was significantly associated with lower general cognitive status and more severe depressive symptomatology in negative affect.

Conclusions: These findings suggest a complex and longitudinal association between depressive symptomatology and general cognitive status in later life and this complicated relationship seems to be affected by mid-life SES over time.

Keywords: General cognitive status Depressive symptomatology Life course Longitudinal studies Socioeconomic factors Taiwan

- **Home and health among different sub-groups of the ageing population: a comparison of two cohorts living in ordinary housing in Sweden**

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*BMC Geriatrics 2016**16**:90* ***DOI:*** *10.1186/s12877-016-0265-7*

Background: At present a majority of older people remain in their ordinary homes. Research has generated knowledge about home and health dynamics and increased the awareness of the complexity of housing as related to ageing. As this knowledge is based mainly on research on very old, single-living people in ordinary housing there is a need to study other sub-groups of the ageing population. Thus, the aim of the present descriptive study was to compare a younger old cohort with a very old cohort living in ordinary housing in Sweden in order to shed new light on home and health dynamics in different sub-groups of the ageing population.

Methods: Cross-sectional study of two population-based cohorts: one aged 67–70 years (n = 371) and one aged 79–89 years (n = 397) drawn from existing Swedish databases. Structured interviews and observations were conducted to collect data about socio-demographics, aspects of home, and symptoms. Besides descriptive statistics we computed tests of differences using the Chi-squared test and Mann–Whitney U-test.

Results: Accessibility was significantly lower in the very old cohort compared to the younger old cohort even though the former were objectively assessed to have fewer environmental barriers. Those in the very old cohort perceived aspects of their housing situation as worse and were more dependent on external influences managing their housing situation. Although a larger proportion of the very old cohort had more functional limitations 22% were independent in ADL. In the younger old cohort 17% were dependent in ADL.

Conclusions: Keeping in mind that there were cohort differences beyond that of age, despite fewer environmental barriers in their dwellings the very old community-living cohort lived in housing

with more accessibility problems compared to those of the younger old cohort, caused by their higher prevalence of functional limitations. Those in the very old cohort perceived themselves in a less favourable situation, but still as satisfied with housing as those in the younger old cohort. This kind of knowledge is indicative for prevention and intervention in health care and social services as well as for housing provision and societal planning. Further studies based on truly comparable cohorts are warranted.

Keywords: Aspects of home Health Younger older Very old

- **Factors associated with frailty in primary care: a prospective cohort study**

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*BMC Geriatrics 2016**16**:91* ***DOI:*** *10.1186/s12877-016-0263-9*

Background: Frailty can be defined as a progressive loss of reserve and adaptive capacity associated with an overall deterioration in health that can result in disability, loss of independence, hospitalisation, extensive use of healthcare resources, admission to long-term care and death. Nevertheless, despite widespread use of the term, there is no agreement on the definition of frailty or an instrument to identify it in a straightforward way. The purpose of the current study was to explore which factors are associated with frailty-related adverse outcomes in elderly individuals and to propose a suitable tool for identifying such individuals, particularly in primary care settings.

Methods: A prospective open cohort study of community dwelling, independent individuals aged 75 or over, followed up for 2 years. The study was entirely conducted in a primary care setting. Study variables included independence status measured by Barthel's Index and the Lawton Instrumental Activities of Daily Living Scale, functional performance, assessed by Timed Up and Go (TUG) and Gait Speed (GS) tests and levels of polipharmacy, comorbidity and social support. Outcome variables were specific frailty-related adverse events, namely, loss of independence and death.

Results: Overall, 215 community-dwelling independent individuals initiated the study. Of these, 46 were lost to follow-up and 50 had frailty-related adverse events during the follow-up period. Individuals with adverse events during the study had poorer functional status at baseline. The multivariate model that best explained the occurrence of these events included the variables of age, presence of polipharmacy and the TUG time. The AUC (Area under the curve) of this model was 0.822.

Conclusions: Given the simplicity of assessing the three derived factors and their combined discriminant power, the proposed model may be considered a suitable tool for identifying frail patients, i.e., people more likely to lose their independence or die within a relatively short time interval.

Keywords: Frailty Identification Primary care

- **A combination of clinical balance measures and FRAX® to improve identification of high-risk fallers**

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*BMC Geriatrics 2016**16**:94* ***DOI:*** *10.1186/s12877-016-0266-6*

Background: The FRAX® algorithm quantifies a patient's 10-year probability of a hip or major osteoporotic fracture without taking an individual's balance into account. Balance measures assess the functional ability of an individual and the FRAX® algorithm is a model that integrates the individual patients clinical risk factors [not balance] and bone mineral density. Thus, clinical balance measures capture aspects that the FRAX® algorithm does not, and vice versa. It is therefore possible that combining FRAX® and clinical balance measures can improve the identification of patients at high fall risk and thereby high fracture risk.

Our study aim was to explore whether there is an association between clinical balance measures and fracture prediction obtained from FRAX®.

Method: A cross-sectional study design was used where *post hoc* was performed on a dataset of 82 participants (54 to 89 years of age, mean age 71.4, 77 female), with a fall-related wrist-fracture between 2008 and 2012. Balance was measured by tandem stance, standing one leg, walking in the figure of eight, walking heel to toe on a line, walking as fast as possible for 30 m and five times sit to stand balance measures [tandem stance and standing one leg measured first with open and then with closed eyes] and each one analyzed for bivariate relations with the 10-year probability values for hip and major osteoporotic fractures as

calculated by FRAX® using Spearman's rank correlation test.

Results: Individuals with high FRAX® values had poor outcome in balance measures; however the significance level of the correlation differed between tests. Standing one leg eyes closed had strongest correlation to FRAX® (0.610 $p = < 0.01$) and Five times sit to stand was the only test that did not correlate with FRAX® (0.013).

Conclusion: This study showed that there is an association between clinical balance measures and FRAX®. Hence, the use of clinical balance measures and FRAX® in combination, might improve the identification of individuals with high risk of falls and thereby following fractures. Results enable healthcare providers to optimize treatment and prevention of fall-related fractures.

Trial registration: The study has been registered in Clinical Trials.gov, registration number NCT00988572.

- **Self-management by family caregivers to manage changes in the behavior and mood of their relative with dementia: an online focus group study**

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*BMC Geriatrics 2016**16**:95* ***DOI:*** *10.1186/s12877-016-0268-4*

Background: Self-management is important for family caregivers of people with dementia, especially when they face changes in their relative's behavior and mood, such as depression, apathy, anxiety, agitation and aggression. The aim of this study is to give insight into why these changes in behavior and mood are stressful for family caregivers, what self-management strategies family caregivers use when managing these changes and the stress they experience.

Methods: A qualitative study was conducted using four online focus groups with 32 family caregivers of people with dementia living in the Netherlands. Transcripts of the focus group discussions were analyzed using principles of thematic analysis.

Results: Managing changes in the behavior and mood of their relative with dementia is stressful for family caregivers because of constantly having to switch, continuously having to keep the person with dementia occupied and distracted, the fact that others see a different side to the relative, and the fact that caregivers know what to do, but are often not able to put this into practice. Caregivers use calming down and stimulation as self-management strategies for influencing the changes in the behavior and mood of their relative. Furthermore, caregivers describe three self-management strategies that let them manage their own stress and keep up the care for their loved ones: looking for distractions, getting rest, and discussing their feelings and experiences.

Conclusions: Behavior and mood changes of a person with dementia are stressful for family caregivers. They use several self-management strategies to positively affect the mood and behavior changes, and also to manage their own stress.

Keywords: Self-management Dementia Changes in behavior and mood Challenging behavior Online focus groups Internet discussion Family Informal caregivers.

- **Caring for frail older people in the last phase of life–the general practitioners' view**

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*BMC Palliative Care 2016**15**:52* ***DOI:*** *10.1186/s12904-016-0124-5*

Background: Frail older people are an increasingly important group in primary care due to demographic change. For these patients, a palliative care approach may be useful to sustain the quality of life in the last phase of their lives. While general practitioners (GPs) play a key role in the primary care for older patients, general palliative care is still in its infancy and little is known in Germany about caring for frail older people towards the end of life. This study aims to explore the tasks and challenges regarding the care for frail older patients in the last phase of life from the GPs' point of view, and the latter's perception of their own role and responsibilities.

Methods: Explorative qualitative study based on semi-structured in-depth interviews with 14 GPs from urban and rural regions in Lower Saxony, Germany. Analysis was carried out according to the principles of Grounded Theory.

Results: The GPs' key commitment "caring for frail older patients until the end" as an integral part of primary care was worked out as a key category, flanked by central issues: "causal conditions and challenges," which include patients' preconditions and care needs as well as communication and cooperation aspects on the carers'

level. "Barriers and facilitators within the health system" refers to prerequisites of the German healthcare system, such as high caseloads. Regarding "strategies to comply with this commitment", various self-developed strategies for the care of frail older people are presented, depending on the GPs' understanding of their professional role and individual circumstances.

Conclusions: The GPs show a strong commitment to caring for the frail older patients until the end of life. However, it is a challenging and complex task that requires significant time, which can take GPs to their limits. There is a great need to improve patient—and family-centered proactive communication, as well as interprofessional cooperation. Strengthening the team approach in primary care could relieve the burden on GPs, especially in rural areas, while simultaneously improving end-of-life care for their patients.

Keywords: General practice Primary care Frailty Old age Palliative care End-of-life care Qualitative methods Health services research

- **Initial blood pressure is associated with stroke severity and is predictive of admission cost and one-year outcome in different stroke subtypes: a SRICHS registry study**

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*BMC Neurology 2016**16**:27* ***DOI:*** *10.1186/s12883-016-0546-y*

Background: To investigate if initial blood pressure (BP) on admission is associated with stroke severity and predictive of admission costs and one-year-outcome in acute ischemic (IS) and hemorrhagic stroke (HS).

Methods: This is a single-center retrospective cohort study. Stroke patients admitted within 3 days after onset between January 1st and December 31st in 2009 were recruited. The initial BP on admission was subdivided into high (systolic BP ≥ 211 mmHg or diastolic BP ≥ 111 mmHg), medium (systolic BP 111–210 mmHg or diastolic BP 71–110 mmHg), and low (systolic BP ≤ 110 mmHg or diastolic BP ≤ 70 mmHg) groups and further subgrouped with 25 mmHg difference in systole and 10 mmHg difference in diastole for the correlation analysis with demographics, admission cost and one-year modified Rankin scale (mRS).

Results: In 1173 IS patients (mean age: 67.8 ± 12.8 years old, 61.4% male), low diastolic BP group had higher frequency of heart disease (p =0.001), dehydration (p =0.03) and lower hemoglobin level (p <0.001). The extremely high and low systolic BP subgroups had worse National Institutes of Health Stroke Scale (NIHSS) score (p =0.03), higher admission cost (p <0.001), and worse one-year mRS (p =0.03), while extremely high and low diastolic BP subgroups had higher admission cost (p <0.01). In 282 HS patients (mean age: 62.4 ± 15.4 years old, 60.6% male), both low systolic and diastolic BP groups had lower hemoglobin level (systole: p=0.05; diastole: p <0.001). The extremely high and low BP subgroups had worse NIHSS score (p =0.01 and p<0.001, respectively), worse one-year mRS (p =0.002 and p =0.001, respectively), and higher admission cost (diastole: p <0.002).

Conclusions: Stroke patients with extremely high and low BP on admission have not only worse stroke severity but also higher admission cost and/or worse one-year outcome. In those patients with low BP, low admission hemoglobin might be a contributing factor.

Keywords: Blood pressure Stroke Ischemia Hemorrhage Cost Outcome.