

- **Fecal impaction: A systematic review of its medical complications**

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Background: Fecal impaction (FI) is a common problem in the elderly and other at-risk groups, such as patients with a neuro-psychiatric disease. It has been associated with medical problems and high morbi-mortality. A systematic review of this topic might be useful to improve the knowledge in this area and helpful to make an appropriate and early diagnosis.

Methods: A PubMed systematic search was performed using relevant keywords. Case reports published in English, Spanish or French till June 2014 were included if they had a diagnosis of FI and a medical complication secondary to it. Each case was classified based on its principal complication. The main objective is to create a classification of FI complications based on published clinical cases.

Results: 188 articles met inclusion criteria, comprising 280 clinical cases. Out of the total, 43.5% were over 65 years old, 49% suffered from chronic constipation, 29% had an underlying neuropsychiatric disease and 15% were hospitalised or institutionalised. A total of 346 medical complications secondary to FI were collected. They were divided according to gastrointestinal tract involvement and then classified based on their anatomical and pathophysiological mechanism into three groups: Complications secondary to fecaloma effect on the intestinal wall (73.4%), on the intestinal lumen (14%) and on adjacent structures (12.6%).

Conclusions: FI causes complications that might be fatal. The elderly, underlying neuropsychiatric disease and hospitalised or institutionalised patients integrate the high-risk group in which FI must be suspected. The first FI complications classification is presented to improve the knowledge about this entity.

Keywords: Fecaloma Elderly Complications Classification

Keypoints: Fecal impaction, old people, neuro-psychiatric disease, morbi-mortality, systematic review.

- **Association of complete blood cell counts with metabolic syndrome in an elderly population**

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Background: Metabolic syndrome's (MetS) role in predicting cardiovascular diseases and diabetes has been confirmed in many large cohort studies. Nontraditionally, hematogram components are significantly related to MetS in many different age groups. However, little is known about its role among the elderly.

Methods: We enrolled 18,907 subjects over the age of 65 years who underwent regular health examinations. They were divided into three groups according to age: young old (YO: ≥ 65 and < 74 years old), old old (OO: ≥ 75 and < 84 years old), and oldest old (ODO: ≥ 85 years old). The MetS components were determined, and correlations between MetS and hematogram components were evaluated using Pearson and multivariate linear regression analyses. The hematogram components were the independent variables evaluated separately against the dependent variable (MetS components).

Results: While SBP and HDL-C increased, most other MetS and hematogram parameters decreased in men with age. Fewer significant differences were noted among the women. In the YO and OO groups for both genders, the subjects with MetS had higher WBC and Hb. None of the hematogram components were different for subjects with or without MetS in the ODO group. Multiple regression results show that most of the relationships between hematogram and MetS components disappeared in the ODO groups. The WBC levels were mainly correlated with WC and TG. At the same time, Hb was associated with BP, FPG, and LDL-C. Compared to WBC and Hb, PLT

was least related to MetS, except in the cases of LDL-C and TG. Among the MetS components, BMI, LDL-C, and TG were consistently related to all the hematology components in YO and OO men. However, only TG had the same consistency among YO and OO women.

Conclusions: This study's three major findings are as follows: WBC and Hb are associated with MetS, even among the YO and OO groups, regardless of gender; among the three hematology components, Hb had the strongest and PLT had the weakest correlation with MetS; and TG is not the only component with relatively higher r values, and it is related to all hematology components.

Keywords: Metabolic syndrome components Hematology parameters Elderly population

- **The association of serum procalcitonin and high-sensitivity C-reactive protein with pneumonia in elderly multimorbid patients with respiratory symptoms: retrospective cohort study**

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Background: Serum procalcitonin and high-sensitivity C-reactive protein (hs-CRP) elevations have been associated with pneumonia in adults. Our aim was to establish their diagnostic usefulness in a cohort of hospitalized multimorbid patients ≥ 65 years old admitted to hospital with acute respiratory symptoms.

Methods: With a retrospective cohort study design, all multimorbid patients ≥ 65 years-old with acute respiratory symptoms admitted to an internal medicine hospital ward in Italy from January to August 2013 were evaluated. Pneumonia diagnosis, comorbidities expressed through Cumulative Illness Rating Scale (CIRS), setting of living, length of stay, serum hs-CRP and procalcitonin at admission were collected for each patient. Data were analyzed with Mann-Whitney's U test and multivariate Cox logistic regression analysis. A Receiver Operating Characteristic (ROC) curve was used to verify each biomarker's association with pneumonia diagnosis.

Results: Four hundred fifty five patients (227 M) were included in the study, of whom 239 with pneumonia (138 M, mean age 80 ± 13) and 216 without pneumonia (89 M, mean age 80 ± 14).

After adjustment for age and sex, median levels of hs-CRP were significantly higher in patients with pneumonia (116 mg/L, IQR 46.5–179.0, vs 22.5 mg/dl, IQR 6.9–84.4, $p < 0.0001$), while procalcitonin median levels were not (0.22 ng/ml IQR 0.12–0.87, vs 0.15 ng/ml, IQR 0.10–0.35, $p = 0.08$). The ROC analysis showed that, unlike procalcitonin, hs-CRP values were predictive of pneumonia (AUC 0.76, 95% CI 0.72–0.79, $p < 0.0001$, cut-off value 61 mg/L), even after adjustment for possible confounders including nursing home residence and dementia. Serum hs-CRP levels > 61 mg/L were independently associated with a 3.59-fold increased risk of pneumonia (OR 3.59, 95% CI 2.35–5.48, $p < 0.0001$).

Conclusion: In elderly multimorbid patients who require hospital admission for respiratory symptoms, serum hs-CRP testing seems to be more useful than procalcitonin for guiding the diagnostic process when clinical suspicion of pneumonia is present. Procalcitonin testing might hence be not recommended in this setting.

Keywords: Procalcitonin High-sensitivity C-reactive protein Pneumonia Multimorbid elderly

- **Differences in physical aging measured by walking speed: evidence from the English Longitudinal Study of Ageing**

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Background: Physical functioning and mobility of older populations are of increasing interest when populations are aging. Lower body functioning such as walking is a fundamental part of many actions in daily life. Limitations in mobility threaten independent living as well as quality of life in old age. In this study we examine differences in physical aging and convert those differences into the everyday measure of single years of age.

Methods: We use the English Longitudinal Study of Ageing, which was collected biennially between 2002 and 2012. Data on physical performance, health as well as information on economics and demographics of participants were collected. Lower body performance was assessed with two timed walks at normal pace each of 8 ft (2.4 m) of survey participants aged at least 60 years. We employed growth curve models to study differences in physical aging and followed the characteristic-based age approach to illustrate those differences in single years of age.

Results: First, we examined walking speed of about 11,700 English individuals, and identified differences in aging trajectories by sex and other characteristics (e.g. education, occupation, regional wealth). Interestingly, higher educated and non-manual workers outperformed their counterparts for both men and women. Moreover, we transformed the differences between subpopulations into single years of age to demonstrate the magnitude of those gaps, which appear particularly high at early older ages.

Conclusions: This paper expands research on aging and physical performance. In conclusion, higher education provides an advantage in walking of up to 15 years for men and 10 years for women. Thus, enhancements in higher education have the potential to ensure better mobility and independent living in old age for a longer period.

Keywords: Walking speed Population aging Timed walk ELSA

- **Formal support for informal caregivers to older persons with dementia through the course of the disease: An exploratory, cross-sectional study**

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Background: In European countries, knowledge about availability and utilization of support for informal caregivers caring for older persons (≥ 65 years) with dementia (PwD) is lacking. To be able to evaluate and develop the dementia support system for informal caregivers to PwD, a survey of European support systems and professionals involved is needed. The aim of this study was to explore support for informal caregivers to PwD in European countries. We investigated the availability and utilization of support in each of the participating countries, and the professional care providers involved, through the dementia disease.

Methods: A mapping system was used in 2010–2011 to gather information about estimations of availability, utilization, and professional providers of support to informal caregivers caring for PwD. Data collected was representing each country as a whole.

Results: There was high availability of counselling, caregiver support, and education from

the diagnosis to the intermediate stage, with a decrease in the late to end of life stage. Utilization was low, although there was a small increase in the intermediate stage. Day care and respite care were highly available in the diagnosis to the intermediate stage, with a decrease in the late to end of life stage, but both types of care were utilized by few or no caregivers through any of the disease stages. Professionals specialized in dementia (Bachelor to Master's degree) provided counselling and education, whereas caregiver support for informal caregivers and day care, respite care, and respite care at home were provided by professionals with education ranging from upper secondary schooling to a Master's degree.

Conclusions: Counselling, caregiver support, and education were highly available in European countries from diagnosis to the intermediate stage of the dementia disease, decreasing in the late/end of life stages but were rarely utilized. Countries with care systems based on national guidelines for dementia care seem to be more aware of the importance of professionals specialized in dementia care when providing support to informal caregivers. Mapping the systems of support for informal caregivers of PwD is a valuable tool for evaluating existing systems, internationally, nationally and locally for policy making.

Keywords: Dementia Caregivers Health care services Home health nursing Nursing care Persons Europe

- **Exercise and fall prevention self-management to reduce mobility-related disability and falls after fall-related lower limb fracture in older people: protocol for the RESTORE (Recovery Exercises and STEpping On afterR fractureE) randomised controlled trial**

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Background: Lasting disability and further falls are common and costly problems in older people following fall-related lower limb and pelvic fractures. Exercise interventions can improve mobility after fracture and reduce falls in older people, however the optimal approach to rehabilitation after fall-related lower limb and pelvic fracture is unclear. This randomised

controlled trial aims to evaluate the effects of an exercise and fall prevention self-management intervention on mobility-related disability and falls in older people following fall-related lower limb or pelvic fracture. Cost-effectiveness of the intervention will also be investigated.

Methods/Design: A randomised controlled trial with concealed allocation, assessor blinding for physical performance tests and intention-to-treat analysis will be conducted. Three hundred and fifty people aged 60 years and over with a fall-related lower limb or pelvic fracture, who are living at home or in a low care residential aged care facility and have completed active rehabilitation, will be recruited. Participants will be randomised to receive a 12-month intervention or usual care. The intervention group will receive ten home visits from a physiotherapist to prescribe an individualised exercise program with motivational interviewing, plus fall prevention education through individualised advice from the physiotherapist or attendance at the group based “Stepping On” program (seven two-hour group sessions). Participants will be followed for a 12-month period. Primary outcome measures will be mobility-related disability and falls. Secondary outcomes will include measures of balance and mobility, falls risk, physical activity, walking aid use, frailty, pain, nutrition, falls efficacy, mood, positive and negative affect, quality of life, assistance required, hospital readmission, and health-system and community-service contact.

Discussion: This study will determine the effect and cost-effectiveness of this exercise self management intervention on mobility-related disability and falls in older people who have recently sustained a fall-related lower limb or pelvic fracture. The results will have implications for the design and implementation of interventions for older people with fall related lower limb fractures. The findings of this study will be disseminated in peer-reviewed journals and through professional and scientific conferences.

Trial Registration: Australian New Zealand Clinical Trials Registry: ACTRN12610000805077.

Keywords: randomised controlled trial therapeutics exercise, hip fracture

- **Influence of changes in serum uric acid levels on renal function in elderly patients with hypertension: a retrospective cohort study with 3.5-year follow-up**

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Background: Hyperuricemia is closely related to renal diseases. Therefore, the aim of this study was to explore the relationship between the longitudinal changes in serum uric acid and the estimated glomerular filtration rate (eGFR) in a cohort of elderly hypertensive patients.

Methods: Eighty hundred and thirty-seven re-hospitalized patients with hypertension were included in this retrospective cohort study. Multiple regression analysis was used to investigate the relationship between changes in serum uric acid and renal function after 3.5 years follow-up.

Results: The average age at baseline was 69.0±10.0 years, and the average follow-up duration was 3.5 years. Multiple linear regression analysis showed that the baseline uric acid levels had a linearly negative correlation with baseline eGFR ($P < 0.01$), after adjustment for age, gender, blood pressure, and body mass index, et al. An increase of 100 $\mu\text{mol/L}$ baseline uric acid level resulted in a decrease of 5.684 ml/min/1.73 m² in eGFR [95% confidence interval (CI): 7.735-3.633]. Patients with increased uric acid levels had higher risk of renal function decline over the follow-up period, with an adjusted odds ratio of 1.639 (95% CI: 1.129-2.378, $P = 0.009$), whereas eGFR was remained unchanged in patients with hyperuricemia at baseline and with normal uric acid level 3.5-year later.

Conclusions: Longitudinal changes in uric acid levels were independently associated with the renal function decline in elderly patients with hypertension. Uric acid level should be considered in hypertension management in the elderly.

Keywords: Essential hypertension Serum uric acid Renal function

- **Validation of the Sour Seven Questionnaire for screening delirium in hospitalized seniors by informal caregivers and untrained nurses**

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Background: Delirium is a common condition in hospitalized seniors that nonetheless often goes undetected by nurses or is delayed in being detected which negatively impacts quality of care and outcomes. We sought to develop a new screening tool for delirium, The Sour Seven

Questionnaire, a 7-item questionnaire suitable to be completed from informal or untrained caregiver observation. The study aimed to develop the scoring criteria for a positive delirium screen and assess concurrent validity of the questionnaire against a geriatric psychiatrist's assessment.

Methods: A pilot study of 80 hospitalized seniors over age 65 recruited from three units (2 medical, 1 orthopedic). Participants were assessed using the Confusion Assessment Method (CAM) with a brief cognitive screen and the Sour Seven Questionnaire posed to the appointed informal caregiver (family member) or untrained nurse for up-to 7 days. Subjects testing positive on the CAM and a random sample of negatively CAM screened subjects were assessed by the geriatric psychiatrist.

Results: From 80 participants, 21 screened positive for delirium on the CAM. 18 of the 21 CAM positive screens were diagnosed to have delirium by the geriatric psychiatrist, and 17 of the 18 randomly assigned negative CAM screens were confirmed as not having delirium. From the questionnaires on these 39 participants, weighted scoring for each of the 7 questions of the Sour Seven Questionnaire was developed based on their relative risks for correctly predicting delirium when compared to the geriatric psychiatrist's clinical assessment. Total scoring of the questionnaire resulted in the following positive predictive values for delirium: 89% with a total score of 4 (sensitivity 89.5%, specificity 90%), and 100% with a total score of 9 (sensitivity 63.2%, specificity 100%). Comparison between scoring on questionnaires posed to informal caregivers versus untrained nurses showed no differences.

Conclusion: A weighted score of 4 in the Sour Seven Questionnaire has concurrent validity as a screening tool for delirium and a score of 9 is diagnostic for delirium. The Sour Seven Questionnaire is the first screening tool for delirium shown to be suitable for use by informal caregivers and untrained nurses in hospitalized seniors.

Keywords: Delirium Hospitalized seniors Screening tools Delirium detection

- **The effects of a pro-active integrated care intervention for frail community-dwelling older people: a quasi-experimental study with the GP-practice as single entry point**

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Background: This study explored the effectiveness of a pro-active, integrated care model for community-dwelling frail older people compared to care as usual by evaluating the effects on a comprehensive set of outcomes: health outcomes (experienced health, mental health and social functioning); functional abilities; and quality of life (general, health-related and well-being).

Methods: The design of this study was quasi-experimental. In this study, 184 frail older patients of three GP practices that implemented the Walcheren Integrated Care Model were compared with 193 frail older patients of five GP practices that provided care as usual. In the Walcheren Integrated Care Model, community-dwelling elderly were pro-actively screened for frailty from the GP practice using the Groningen Frailty Indicator, and care needs were assessed with the EASYcare instrument. The GP practice functioned as single entry point from which case management was provided, and the GP was the coordinator of care. The entire process was supported by multidisciplinary meetings, multidisciplinary protocols and web-based patient files. The outcomes of this study were obtained at baseline, after 3 months and after 12 months and analyzed with linear mixed models of repeated measures.

Results: The Walcheren Integrated Care Model had a positive effect on love and friendship and a moderately positive effect on general quality of life. The ability to receive love and friendship and general quality of life decreased in the control group but was preserved in the experimental group. No significant differences were found on health outcomes such as experienced health, mental health, social functioning and functional abilities.

Conclusions: The results indicated that pro-active, integrated care can be beneficial for frail older people in terms of quality of life and love and friendship but not in terms of health outcomes and functional abilities. Recommendations for future research are to gain greater insight into what specific outcomes can be achieved with proactive and integrated care, considering the specific content of this care, and to allow for the heterogeneity of frail older people in evaluation research.

Trial registration: Current Controlled Trials ISRCTN05748494. Registration date: 14/03/2013.

Keywords: Integrated care Prevention Frail older people Effectiveness Outcome

- **Sarcopenia-related features and factors associated with lower muscle strength and physical performance in older Chinese: a cross sectional study**

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Background: The associations of sarcopenia with adverse health status have highlighted the importance of sarcopenia research and intervention. This study was designed to analyze the characteristics of aging-related differences in appendicular skeletal muscle mass (ASM), handgrip strength (HS), gait speed (GS) and their associated factors in older Chinese, in order to generate guidance for sarcopenia intervention in this population.

Methods: Population-based cross-sectional study. The criteria proposed by Asian Working Group for Sarcopenia were used to define low ASM, HS, and GS. The time required for five repeated chair stands (RCS) was also measured to evaluate physical performance. The differences of continuous variables were compared using one-way ANOVA tests and the Pearson correlation was used to analyze the relationship of each measurement adjusted by gender and age. Stepwise logistic regression was used to determine associated factors of low HS and low physical performance.

Results: The data were analyzed in a total of 218 younger adults (aged 20–59, 76 males, 142 females) and 461 older adults (≥ 60 year, 207 males and 254 females). There were significant differences among age groups for HS, GS, and RCS while females were found to have significantly lower HS and GS values. ASM was significantly correlated with HS but not with other measures. Correlations among HS and GS, RCS were influenced by age differences. In the older group, unstructured daily routine (OR = 2.77) was associated with the risk of low GS, while physical exercise (OR = 0.27), and engaging in hobbies (OR = 0.11) were associated with faster GS. Co-morbidity (OR = 1.99) was associated with the risk of reduced performance of RCS, while engaging in hobbies was associated with faster RCS performance (OR = 0.35).

Conclusions: Muscle strength and physical performance varied with aging in older Chinese. Measures of GS, HS, and RCS provide a readily available and effective method for assessing the risk of functional mobility decline. Maintaining a healthy life style and physical activity throughout

life is beneficial for older people to improve their physical performance, especially in the early stages of aging.

Keywords: Sarcopenia Muscle mass Muscle strength Physical performance

- **Functional performance, nutritional status, and body composition in ambulant community-dwelling individuals 1–3 years after suffering from a cerebral infarction or intracerebral bleeding**

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Background: Muscle wasting and obesity may complicate the post-stroke trajectory. We investigated the relationships between nutritional status, body composition, and mobility one to 3 years after stroke.

Methods: Among 279 eligible home-dwelling individuals who had suffered a stroke (except for subarachnoid bleeding) 1–3 years earlier, 134 (74 ± 5 years, 69% men) were examined according to the Mini Nutritional Assessment-Short Form (MNA-SF, 0–14 points), including body mass index (BMI, kg/m^2), body composition by bio-impedance analyses (Tanita BC-545), the Short Physical Performance Battery (SPPB, 0–12 points) combining walking speed, balance, and chair stand capacity, and the self-reported Physical Activity Scale for the Elderly (PASE).

Results: BMI ≥ 30 kg/m^2 was observed in 22% of cases, and 14% were at risk for malnutrition according to the MNA-SF. SPPB scores ≤ 8 in 28% of cases indicated high risk for disability. Mobility based on the SPPB was not associated with the fat-free mass index (FFMI) or fat mass index (FMI). Multivariate logistic regression indicated that low mobility, i.e., SPPB ≤ 8 points, was independently related to risk for malnutrition (OR 4.3, CI 1.7–10.5, $P = 0.02$), low physical activity (PASE) (OR 6.5, CI 2.0–21.2, $P = 0.02$), and high age (OR 0.36, CI 0.15–0.85, $P = 0.02$). Sarcopenia, defined as a reduced FFMI combined with SPPB scores ≤ 8 or reduced gait speed (< 1 m/s), was observed in 7% of cases. None of the individuals displayed sarcopenic obesity (SO), defined as sarcopenia with BMI > 30 kg/m^2 .

Conclusions: Nutritional disorders, i.e., obesity, sarcopenia, or risk for malnutrition, were observed in about one-third of individuals 1 year

after stroke. Risk for malnutrition, self-reported physical activity, and age were related to mobility (SPPB), whereas fat-free mass (FFM) and fat mass (FM) were not. Nutrition and exercise treatment could be further evaluated as rehabilitation opportunities after stroke.

Keywords: Mobility limitations Stroke Sarcopenia Sarcopenic obesity Physical activity Obesity Malnutrition Ageing

- **Validation of a Dutch version of the Geriatric Oral Health Assessment Index (GOHAI-NL) in care-dependent and care-independent older people**

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Background: The GOHAI is a frequently used instrument to measure oral health-related quality of life (OHRQoL) of adults, in particular older people. The aim of this study was to translate the original English version of the GOHAI into a Dutch version (GOHAI-NL), and to test the validity and reliability of the GOHAI-NL in care-independent and care-dependent older people.

Methods: The GOHAI questionnaire was translated into Dutch, discussed by an expert panel, back-translated to the original, pilot-tested and assessed for cognitive and conceptual equivalence. The resulting GOHAI-NL was tested in a groups of care-independent (Group A, $n = 109$, mean age 73.1 ± 5.4 years) and care-dependent (Group B, $n = 118$, mean age 85.6 ± 7.0 years) cognitively alert people of 65 years and over. Psychometric properties including reliability (internal consistency, item-total, item-dimension, dimension-total, inter-item correlation, and test-retest stability), and validity (convergent, discriminant, known-group), and floor and ceiling effects were assessed.

Results: Internal consistency was confirmed by Cronbach's alphas of 0.86 (group A) and 0.80 (group B). Item-total score correlations were between 0.4 and 0.7 except for item 3 in group A (0.34) and B (0.08) and for item 12 in group A (0.20). Item-dimension and dimension-total correlations were between 0.30 and 0.78 and around 0.7 respectively for the dimensions 'physical functioning' and 'psychosocial functioning', but lower for the dimension 'pain and discomfort' with item-dimension correlations between 0.13 and 0.44. Average inter-item correlations were 0.34 ± 0.11 (group A) and 0.33 ± 0.08 (group B). Test-retest correlation of the total score (GOHAI-ADD) was

0.88 in group A (ICCs: 0.62 - 0.88) and 0.93 in group B (ICCs: 0.64 - 0.91). Significant correlations in the expected direction were found between GOHAI and most oral health-related variables except for presence of caries in group A, and perceived general health, prosthodontic status and number of natural teeth in group B. No floor or ceiling effects were detected at GOHAI-ADD level; however ceiling effects did occur at dimension level.

Conclusion: The GOHAI-NL has satisfactory reliability and validity and can be used to measure OHRQoL in Dutch care-dependent and care-independent older people.

Keywords: GOHAI GOHAI-NL Validation Oral health-related quality of life Gerodontology Dutch

- **Psychometric properties of multicomponent tools designed to assess frailty in older adults: A systematic review**

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Background: Frailty is widely recognised as a distinct multifactorial clinical syndrome that implies vulnerability. The links between frailty and adverse outcomes such as death and institutionalisation have been widely evidenced. There is currently no gold standard frailty assessment tool; optimizing the assessment of frailty in older people therefore remains a research priority. The objective of this systematic review is to identify existing multi-component frailty assessment tools that were specifically developed to assess frailty in adults aged ≥ 60 years old and to systematically and critically evaluate the reliability and validity of these tools.

Methods: A systematic literature review was conducted using the standardised Consensus-based Standards for the selection of health Measurement Instruments (COSMIN) checklist to assess the methodological quality of included studies.

Results: Five thousand sixty-three studies were identified in total: 73 of which were included for review. 38 multi-component frailty assessment tools were identified: Reliability and validity data were available for 21% (8/38) of tools. Only 5% (2/38) of the frailty assessment tools had evidence of reliability and validity that was within statistically significant parameters and of fair-excellent methodological quality (the Frailty Index-

Comprehensive Geriatric Assessment [FI-CGA] and the Tilburg Frailty Indicator [TFI]).

Conclusions: The TFI has the most robust evidence of reliability and validity and has been the most extensively examined in terms of psychometric properties. However, there is insufficient evidence at present to determine the best tool for use in research and clinical practice. Further in-depth evaluation of the psychometric properties of these tools is required before they can fulfil the criteria for a gold standard assessment tool.

Keywords: Frailty Assessment Older adults

- **Moderate dose melatonin for the abatement and treatment of delirium in elderly general medical inpatients: study protocol of a placebo controlled, randomised, double blind trial**

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Background: Delirium is a frequent, costly and morbid problem. No agent has been shown to modify the natural history of the condition, and current treatments have significant side effects. Prophylactic melatonin in low doses has been shown to prevent delirium developing. This trial then aims to determine the feasibility of a trial to assess if melatonin at a moderate dose effectively treats the symptoms of delirium and modifies the natural history, including abating symptoms after treatment cessation.

Methods/design: Elderly (≥ 70 years of age) patients admitted to the Royal Melbourne Hospital with delirium, and not requiring surgery, will be identified from the current practice of the investigators and through referral by other general medical unit staff. To facilitate this, other staff will be briefed on the project by investigators. Patients will be recruited with suitable informed and documented consent (person responsible) by the study investigators. They will receive orally either 5 mg melatonin (18 patients) or placebo (18 patients) nightly for 5 nights (or until discharged).

During treatment, participants will be assessed by study staff using a validated scale of delirium severity (the Memorial Delirium Assessment Scale), and a validated measure of delirium state (Confusion Assessment Method) to determine if melatonin decreases the severity or the duration of delirium. Assessment will continue for a further two days after treatment has ceased, to determine if the treatment causes persisting

abatement of symptoms, and to assess for adverse events.

Discussion: The on-going study described herein will contribute to our knowledge of available treatment options for elderly inpatients with delirium, where current pharmacological interventions show weak or no effect on hastening the resolution of delirium. As melatonin is safe, cheap, and potentially effective, it would be easily implementable in routine practice and could lead to significant outcome benefits for delirious inpatients.

Trial registration: The trial is registered with the Australia New Zealand Clinical Trials Registry (trial ID: ACTRN12614000101684) (registered 28/01/2014).

- **Case finding for sarcopenia in geriatric inpatients: performance of bioimpedance analysis in comparison to dual X-ray absorptiometry**

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Background: Sarcopenia is a common geriatric syndrome associated with serious adverse health outcomes. The European Working Group on Sarcopenia in Older People (EWGSOP) suggests different methods for case finding for sarcopenia. However, data comparing the different methodological options are scarce for geriatric inpatients.

Methods: On the basis of the recommendations of the EWGSOP sixty geriatric inpatients underwent measurement of gait speed, hand grip strength and muscle mass by both, dual X-ray absorptiometry (DXA) and bioimpedance analysis (BIA). By linear regression analysis and Bland-Altman plots muscle mass measurements of DXA and BIA were compared. Outcomes of the DXA- and BIA-based approaches for classifying participants as having normal or reduced muscle mass and sarcopenia according to the EWGSOP case finding algorithm were compared by raw agreement and kappa statistics. Finally, on the hypothetical assumption that the DXA-based approach can be set as reference, the performance of the BIA-based approach is illustrated.

Results: Muscle mass measured by BIA was highly correlated to DXA ($r > 0.9$), but BIA systematically overestimated muscle mass. The mean difference between DXA and BIA was -1.30 kg ($p < 0.001$) for appendicular and -2.33 kg

($p < 0.001$) for total muscle mass. The raw agreement between the DXA- and BIA-based approaches for classifying participants as having normal or reduced muscle mass was at best 80% depending on the BIA cut-offs used. Functional prescreening according to the sarcopenia case finding algorithm of the EWGSOP reduced the need for muscle mass measurement by 37%, but only marginally changed the agreement between the DXA- and BIA-based approaches.

Conclusion: Clinicians should be aware that in geriatric inpatients the BIA-based approaches resulted in highly different subgroups of sarcopenic/non-sarcopenic subjects compared to the DXA-based approach following the EWGSOP case finding algorithm. In this pilot-study the BIA-based approach misclassified nearly 1 out of 6 patients if the DXA-based approach is taken as reference.

Keywords: Sarcopenia EWGSOP Bioimpedance analysis Dual X-ray absorptiometry

- **The geriatric depression scale and the timed up and go test predict fear of falling in community-dwelling elderly women with type 2 diabetes mellitus: a cross-sectional study**

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Background : Fear of falling is a common and potentially disabling problem among older adults. However, little is known about this condition in older adults with diabetes mellitus. The aims of this study were to investigate the impact of the fear of falling on clinical, functional and gait variables in older women with type 2 diabetes and to identify which variables could predict the fear of falling in this population.

Methods: Ninety-nine community-dwelling older women with type 2 diabetes (aged 65 to 89 years) were stratified in two groups based on their Falls Efficacy Scale-International score. Participants with a score < 23 were assigned to the group without the fear of falling ($n = 50$) and those with a score ≥ 23 were assigned to the group with the fear of falling ($n = 49$). Clinical data included demographics, anthropometrics, number of diseases and medications, physical activity level, fall history, frailty level, cognition, depressive symptoms, fasting glucose level and disease duration.

Functional measures included the Timed Up and Go test (TUG), the five times sit-to-stand test (5-STs) and handgrip strength. Gait parameters were obtained using the GAITRite® system.

Results: Participants with a fear of falling were frailer and presented more depressive symptoms and worse performance on the TUG and 5-STs tests compared with those without a fear of falling. The group with the fear of falling also walked with a lower velocity, cadence and step length and increased step time and swing time variability. The multivariate regression analysis showed that the likelihood of having a fear of falling increased 1.34 times (OR 1.34, 95% CI 1.11–1.61) for a one-point increase in the Geriatric Depression Scale (GDS-15) score and 1.36 times (OR 1.36, 95% CI 1.07–1.73) for each second of increase in the TUG performance.

Conclusions: The fear of falling in community-dwelling older women with type 2 diabetes mellitus is associated with frailty, depressive symptoms and dynamic balance, functional mobility and gait deficits. Furthermore, both the GDS-15 and the TUG test predict a fear of falling in this population. Therefore, these instruments should be considered during the assessment of diabetic older women with fear of falling.

Keywords: Fear of falling Diabetes mellitus Elderly Frailty Depressive symptoms Functional mobility Balance Gait

- **Unravelling the potential mechanisms behind hospitalization-associated disability in older patients; the Hospital-Associated Disability and impact on daily Life (Hospital-ADL) cohort study protocol**

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Background: Over 30% of older patients experience hospitalization-associated disability (HAD) (i.e., loss of independence in Activities of Daily Living (ADLs)) after an acute hospitalization. Despite its high prevalence, the mechanisms that underlie HAD remain elusive. This paper describes the protocol for the Hospital-Associated Disability and impact on daily Life (Hospital-ADL) study, which aims to unravel the potential mechanisms behind HAD from admission to three months post-discharge.

Methods/design: The Hospital-ADL study is a multicenter, observational, prospective cohort study aiming to recruit 400 patients aged ≥ 70 years that are acutely hospitalized at departments of Internal Medicine, Cardiology or Geriatrics, involving six hospitals in the Netherlands. Eligible are patients hospitalized for at least 48 h, without major cognitive impairment (Mini Mental State Examination score ≥ 15), who have a life expectancy of more than three months, and without disablement in all six ADLs. The study will assess possible cognitive, behavioral, psychosocial, physical, and biological factors of HAD. Data will be collected through: 1] medical and demographical data; 2] personal interviews, which includes assessment of cognitive impairment, behavioral and psychosocial functioning, physical functioning, and health care utilization; 3] physical performance tests, which includes gait speed, hand grip strength, balance, bioelectrical impedance analysis (BIA), and an activity tracker (Fitbit Flex), and; 4] analyses of blood samples to assess inflammatory and metabolic markers. The primary endpoint is additional disabilities in ADLs three months post-hospital discharge compared to ADL function two weeks prior to hospital admission. Secondary outcomes are health care utilization, health-related quality of life (HRQoL), physical performance tests, and mortality. There will be at least five data collection points; within 48 h after admission (H₁), at discharge (H₃), and at one (P₁; home visit), two (P₂; by telephone) and three months (P₃; home visit) post-discharge. If the patient is admitted for more than five days, additional measurements will be planned during hospitalization on Monday, Wednesday, and Friday (H₂).

Discussion: The Hospital-ADL study will provide information on cognitive, behavioral, psychosocial, physical, and biological factors associated with HAD and will be collected during and following hospitalization. These data may inform new interventions to prevent or restore hospitalization-associated disability.

Keywords: Acute hospitalization
Hospitalization-associated disability
Functional decline
Older patients

- **Person-centredness in the care of older adults: a systematic review of questionnaire-based scales and their measurement properties**

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Background: Person-centredness is promoted as a central feature of the long-term care of older adults. Measures are needed to assist researchers, service planners and regulators in assessing this feature of quality. However, no systematic review exists to identify potential instruments and to provide a critical appraisal of their measurement properties.

Method: A systematic review of measures of person-centredness was undertaken. Inclusion criteria restricted references to multi-item instruments designed for older adult services, or otherwise with measurement properties tested in an older adult population. A two-stage critical appraisal was conducted. First, the methodological quality of included references was assessed using the COSMIN toolkit. Second, seven measurement properties were rated using widely-recognised thresholds of acceptability. These results were then synthesised to provide an overall appraisal of the strength of evidence for each measurement property for each instrument.

Results: Eleven measures tested in 22 references were included. Six instruments were designed principally for use in long-stay residential facilities, and four were for ambulatory hospital or clinic-based services. Only one measure was designed mainly for completion by users of home care services. No measure could be assessed across all seven measurement properties. Despite some instruments having promising measurement properties, this was consistently undermined by the poor methodological quality underpinning them. Testing of hypotheses to support construct validity was of particularly low quality, whilst measurement error was rarely assessed. Two measures were identified as having been the subject of the most rigorous testing.

Conclusion: The review is unable to unequivocally recommend any measures of person-centredness for use in older adult care. Researchers are advised to improve methodological rigour when testing instruments. Efforts may be best focused on testing a narrower range of measurement properties but to a higher standard, and ensuring that translations to new languages are resisted until strong measurement properties are demonstrated in the original tongue. Limitations of the review include inevitable semantic and conceptual challenges involved in defining ‘person-centredness’.

The review protocol was registered with PROSPERO (ref: CRD42014005935).

Keywords: Person-centred care Patient-centred medicine Systematic review Measurement Psychometrics Community care Older people COSMIN

- **First steps in designing an all-in-one ICT-based device for persons with cognitive impairment: evaluation of the first mock-up**

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Background: This project Smart Assisted Living involving Informal careGivers++ (SALIG) intends to develop an ICT-based device for persons with cognitive impairment combined with remote support possibilities for significant others and formal caregivers. This paper presents the identification of the target groups' needs and requirements of such device and the evaluation of the first mock-up, demonstrated in a tablet.

Methods: The inclusive design method that includes end-users in the design process was chosen. First, a scoping review was conducted in order to examine the target group's need of an ICT-based device, and to gather recommendations regarding its design and functionalities. In order to capture the users' requirements of the design and functionalities of the device three targeted focus groups were conducted. Based on the findings from the publications and the focus groups a user requirement specification was developed. After that a design concept and a first mock-up was developed in an iterative process. The mock-up was evaluated through interviews with persons with cognitive impairment, health care professionals and significant others. Data were analysed using content analysis.

Results: Several useful recommendations of the design and functionalities of the SALIG device for persons with cognitive impairment were identified. The main benefit of the mock-up was that it was a single device with a set of functionalities installed on a tablet and designed for persons with cognitive impairment. An additional benefit was that it could be used remotely by significant others and formal caregivers.

Conclusion: The SALIG device has the potentials to facilitate everyday life for persons with cognitive impairment, their significant others and the work situation for formal caregivers. The results may provide guidance in the development of

different types of technologies for the target population and for people with diverse disabilities. Further work will focus on developing a prototype to be empirically tested by persons with cognitive impairment, their significant others and formal caregivers.

Keywords: Aging Ambient assisted living Assistive technology Informal caregivers Services Quality of life

- **Pathways into chronic multidimensional poverty amongst older people: a longitudinal study**

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Background: The use of multidimensional poverty measures is becoming more common for measuring the living standards of older people. However, the pathways into poverty are relatively unknown, nor is it known how this affects the length of time people are in poverty for.

Methods: Using Waves 1 to 12 of the nationally representative *Household, Income and Labour Dynamics in Australia* (HILDA) survey, longitudinal analysis was undertaken to identify the order that key forms of disadvantage develop – poor health, low income and insufficient education attainment – amongst Australians aged 65 years and over in multidimensional poverty, and the relationship this has with chronic poverty. Path analysis and linear regression models were used.

Results: For all older people with at least a Year 10 level of education attainment earlier mental health was significantly related to later household income ($p = 0.001$) and wealth ($p = 0.017$). For all older people with at less than a Year 10 level of education attainment earlier household income was significantly related to later mental health ($p = 0.021$). When limited to those in multidimensional poverty who were in income poverty and also had poor health, older people generally fell into income poverty first and then developed poor health.

The order in which income poverty and poor health were developed had a significant influence on the length of time older people with less than a Year 10 level of education attainment were in multidimensional poverty for. Those who developed poor health first then fell into income poverty spend significantly less time in multidimensional poverty ($-4.90, p < .0001$) than those who fell into income poverty then developed poor health.

Conclusion: Knowing the order that different forms of disadvantage develop, and the influence this has on poverty entrenchment, is of use to policy makers wishing to provide interventions to prevent older people being in long-term multidimensional poverty.

Keywords: Poverty Overall health status Income Education Longitudinal analysis

- **Understanding non-performance reports for instrumental activity of daily living items in population analyses: a cross sectional study**

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Background: Concerns about using Instrumental Activities of Daily Living (IADLs) in national surveys come up frequently in geriatric and rehabilitation medicine due to high rates of non-performance for reasons other than health. We aim to evaluate the effect of different strategies of classifying “does not do” responses to IADL questions when estimating prevalence of IADL limitations in a national survey.

Methods: Cross-sectional analysis of a nationally representative sample of 13,879 non-institutionalized adult Medicare beneficiaries included in the 2010 Medicare Current Beneficiary Survey (MCBS). Sample persons or proxies were asked about difficulties performing six IADLs. Tested strategies to classify non-performance of IADL(s) for reasons other than health were to 1) derive through multiple imputation, 2) exclude (for incomplete data), 3) classify as “no difficulty,” or 4) classify as “difficulty.” IADL stage prevalence estimates were compared across these four strategies.

Results: In the sample, 1853 sample persons (12.4% weighted) did not do one or more IADLs for reasons other than physical problems or health. Yet, IADL stage prevalence estimates differed little across the four alternative strategies. Classification as “no difficulty” led to slightly lower, while classification as “difficulty” raised the estimated population prevalence of disability.

Conclusions: These analyses encourage clinicians, researchers, and policy end-users of IADL survey data to be cognizant of possible small differences that can result from alternative ways of handling unrated IADL information. At the

population-level, the resulting differences appear trivial when applying MCBS data, providing reassurance that IADL items can be used to estimate the prevalence of activity limitation despite high rates of non-performance.

Keywords: Disparities Function Self-rated health Survey design

- **Self-perceived health in functionally independent older people: associated factors**

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BMC Geriatrics BMC series – open, inclusive and trusted 2016 **16:66 DOI:** 10.1186/s12877-016-0239-9

Background: Self-perceived health (SPH) is a powerful indicator of the health status of elderly people. This issue has been widely studied in oldest populations considering altogether functionally independent and dependent individuals. The objective of this study was to describe SPH and to identify the main factors that have an impact on SPH in a sample of functionally independent community-dwelling older adults.

Methods: For this cross-sectional study, face-to-face interviews were carried out with non-institutionalized functionally independent older individuals in a northern region of Spain. Participants were asked: “Overall, you would say that your health is excellent, very good, good, fair or poor?”. SPH responses were grouped in two categories: good and poor. Binary logistic regression was used to identify factors associated with poor SPH.

Results: A sample of 634 individuals was studied, of whom 55% were women. The mean age was 74.8 (SD 6.7) years. About 18% of the respondents rated their health as poor. In the multivariate model adjusted for age and sex, reported poor health was significantly associated with polypharmacy (≥ 3 drugs per day) (OR: 5.76, 95% CI: 3.60–9.18), the presence of sensory impairment (OR: 1.87, 95% CI: 1.15–3.04), bad sleep quality (OR: 1.82, 95% CI: 1.02–3.28), a bad nutrition pattern (OR: 2.37, 95% CI: 1.08–5.21), not engaging in cognitively stimulating activities (OR: 4.08, 95% CI: 1.64–10.20), or group social activities (OR: 2.62, 95% CI: 1.63–4.23).

Conclusions: The study indicates that several health and social variables are strongly related to SPH in independent community-dwelling older adults. This finding highlights the need for thorough assessment of factors related to SPH in older independent adults, this being essential to

develop health-related programmes for promoting active and healthy ageing and to delay the onset of dependence in this population.

Keywords: Older adults Self-perceived health Ageing Living conditions

- **Does the organisational model of dementia case management make a difference in satisfaction with case management and caregiver burden? An evaluation study**

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Background: In the Netherlands, various organisational models of dementia case management exist. In this study the following four models are distinguished, based on differences in the availability of the service and in the case management function: Model 1: the case management service is available from first dementia symptoms + is always a separate specialist function; Model 2: the case management service is only available after a formal dementia diagnosis + is always a separate specialist function; Model 3: the case management service is available from first dementia symptoms + is often a combined function; Model 4: the case management service is only available after a formal dementia diagnosis + is often a combined function. The objectives of this study are to give insight into whether satisfaction with dementia case management and the development of caregiver burden depend on the organisational model.

Methods: A survey was carried out in regional dementia care networks in the Netherlands among 554 informal carers for people with dementia at the start of case management (response of 85%), and one year later. Descriptive statistics and multilevel models were used to analyse the data.

Results: The satisfaction with the case manager was high in general (an average of 8.0 within a possible range of 1 to 10), although the caregiver burden did not decrease in the first year after starting with case management. No differences were found between the four organisational models regarding the development of caregiver burden. However, statistically significant differences ($p < 0.05$) were found regarding satisfaction: informal carers in the organisational model where case management is only available

after formal diagnosis of dementia and is often a combined function had on average the lowest satisfaction scores. Nevertheless, the satisfaction of informal carers within all organisational models was high (ranging from 7.51 to 8.40 within a range of 1 to 10).

Conclusions: Organisational features of case management seem to make little or no difference to the development in caregiver burden and the satisfaction of informal carers. Future research is needed to explore whether the individual characteristics of the case managers themselves are associated with case management outcomes.

Keywords: Case management Dementia care Integrated care Informal care Caregiver burden Satisfaction

- **A Delphi process to address medication appropriateness for older persons with multiple chronic conditions**

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Background: Frameworks exist to evaluate the appropriateness of medication regimens for older patients with multiple medical conditions (MCCs). Less is known about how to translate the concepts of the frameworks into specific strategies to identify and remediate inappropriate regimens.

Methods: Modified Delphi method involving iterative rounds of input from panel members. Panelists ($n = 9$) represented the disciplines of nursing, medicine and pharmacy. Included among the physicians were two geriatricians, one general internist, one family practitioner, one cardiologist and two nephrologists. They participated in 3 rounds of web-based anonymous surveys.

Results: The panel reached consensus on a set of markers to identify problems with medication regimens, including patient/caregiver report of non-adherence, medication complexity, cognitive impairment, medications identified by expert opinion as inappropriate for older persons, excessively tight blood sugar and blood pressure control among persons with diabetes mellitus, patient/caregiver report of adverse medication effects or medications not achieving desired outcomes, and total number of medications. The panel also reached consensus on approaches to address these problems, including endorsement of strategies to discontinue medications with known benefit if necessary because of

problems with feasibility or lack of alignment with patient goals.

Conclusions: The results of the Delphi process provide the basis for an algorithm to improve medication regimens among older persons with MCCs. The algorithm will require assessment not only of medications and diagnoses but also cognition and social support, and it will support discontinuation of medications both when risks outweigh benefits and when regimens are not feasible or do not align with goals.

Keywords: Medications Chronic conditions Polypharmacy

- **Projecting the effects of long-term care policy on the labor market participation of primary informal family caregivers of elderly with disability: insights from a dynamic simulation model**

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Background: Using Singapore as a case study, this paper aims to understand the effects of the current long-term care policy and various alternative policy options on the labor market participation of primary informal family caregivers of elderly with disability.

Methods: A model of the long-term care system in Singapore was developed using System Dynamics methodology.

Results: Under the current long-term care policy, by 2030, 6.9 percent of primary informal family caregivers (0.34 percent of the domestic labor supply) are expected to withdraw from the labor market. Alternative policy options reduce primary informal family caregiver labor market withdrawal; however, the number of workers required to scale up long-term care services is greater than the number of caregivers who can be expected to return to the labor market.

Conclusions: Policymakers may face a dilemma between admitting more foreign workers to provide long-term care services and depending on primary informal family caregivers.

Keywords: Long-term care Policy analysis System dynamics Simulation modeling Caregivers Labor market

- **Increasing the qualitative understanding of optimal functionality in older adults: a focus group based study**

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Background: Decreased independence and loss of functional ability are issues regarded as inevitably connected to old age. This ageism may have negative influences on older adults' beliefs about aging, making it difficult for them to focus on their current ability to maintain a good health. It is therefore important to change focus towards promoting Optimal Functionality (OF). OF is a concept putting the older adult's perspective on health and function in focus, however, the concept is still under development. Hence, the aim was to extend the concept of optimal functionality in various groups of older adults.

Methods: A qualitative study was conducted based on focus group discussions (FGD). In total 6 FGDs were performed, including 37 older adults from three different groups: group 1) senior athletes, group 2) free living older adults, group 3) older adults living in senior living homes. All data was transcribed verbatim and analyzed following the process of deductive content analysis.

Results: The principal outcome of the analysis was "to function as optimally as you possibly can", which was perceived as the core of the concept. Further, the concept of OF was described as multifactorial and several new factors could be added to the original model of OF. Additionally the findings of the study support that all three cornerstones comprising OF have to occur simultaneously in order for the older adult to function as optimal as possible.

Conclusions: OF is a multifaceted and subjective concept, which should be individually defined by the older adult. This study further makes evident that older adults as a group are heterogeneous in terms of their preferences and views on health and should thus be approached as such in the health care setting. Therefore it is important to promote an individualized approach as a base when caring for older adults.

Keywords: Older adults Optimal functionality Person Centered Care Focus group discussions.