- **Prevalence and correlates of frailty among older adults: findings from the German health interview and examination survey**

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BMC Geriatrics 2015, **15**:22 doi: 10.1186/s12877-015-0022-3

Background: Despite having the third highest proportion of people aged 60 years and older in the world, Germany has been recently reported as having the lowest prevalence of frailty of 15 European countries. The objective of the study is to describe the prevalence of frailty in a large nationwide population-based sample and examine associations with sociodemographic, social support and health characteristics.

Methods: We performed a cross-sectional analysis of the first wave of the German Health Interview and Examination Survey for Adults (DEGS1) conducted 2008–2011. Participants were 1843 community-dwelling people aged 65–79 years. Frailty and pre-frailty were defined, according to modified Fried criteria, as 3 and more or 1–2 respectively, of the following: exhaustion, low weight, low physical activity, low walking speed and low grip strength. The Oslo-3 item Social Support Scale (OSS-3) was used. Patient Health Questionnaire (PHQ-9) measured depressive symptoms and the Digit Symbol Substitution Test (DSST) measured cognition. Associations between participants' characteristics and frailty status were examined using unadjusted and adjusted multinomial logistic regression models estimating relative risk ratios (RRR) of frailty and pre-frailty.

Results: The prevalence of frailty among women was 2.8% (CI 1.8-4.3) and pre-frailty 40.4% (CI 36.3-44.7) and among men was 2.3% (CI 1.3-4.1) and 36.9% (CI 32.7-41.3) respectively. Independent determinants of frailty, from unadjusted models, included older age, low socioeconomic status, poor social support, lower cognitive function and a history of falls. In adjusted models current depressive symptoms (RRR 12.86, CI 4.47-37.03), polypharmacy (RRR 7.78, CI 2.92-20.72) and poor hearing (RRR 5.38, CI 2.17-13.35) were statistically significantly associated with frailty.

Conclusions: Frailty prevalence is relatively low among community-dwelling older adults in Germany. Modifiable characteristics like low physical activity provide relevant targets for individual and population-level frailty detection and intervention strategies.

- **Social cohesion and belonging predict the well-being of community-dwelling older people**

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BMC Geriatrics 2015, 15:30 doi: 10.1186/s12877-015-0027-y

Background: The neighborhood social environment has been identified as an important aspect of older people's well-being. Poor neighborhood conditions can pose difficulties in obtaining support, especially for older people who live alone. Although social environments have been found to be related to well-being among older people, the longitudinal relationship between the social environment and well-being remains poorly understood. Research on the effects of changes in neighborhood characteristics, such as social cohesion and social belonging, on well-being is lacking. Therefore, the study aims are (i) describe social cohesion, social belonging, and instrumental goals to achieve well-being among community-dwelling older people, (ii) determine whether these factors varied according to neighborhood social deprivation and compare these findings to those from chronically ill/previously hospitalized older people, and (iii) identify longitudinal relationships between social cohesion and belonging and well-being.

Methods: Independently living Dutch older adults (aged ≥70 years) were asked to complete questionnaires in 2011 (T0) and 2013 (T1). Response rates at T0 and T1 were 66% (945/1440) and 62% (588/945), respectively. Descriptive statistics, paired sample *t*-tests, analysis of variance, univariate analyses and multilevel regression analyses controlling for background characteristics and baseline well-being were performed.

Results: Of 945 respondents [43% male; mean age, 77.5±5.8 (range, 70–101) years], 34.7% were married and 83.3% were Dutch natives. Social cohesion remained constant over time, whereas

social belonging improved ($p \leq 0.05$). Older people living in socially deprived neighborhoods report poorer overall well-being and instrumental goals to achieve well-being. Baseline social cohesion, changes therein (both $p \leq 001$), baseline social belonging, and changes therein (both $p \leq .05$) predicted well-being at T1.

Conclusion: This study showed that social cohesion, belonging, and changes therein predict the social as well as physical well-being of community-dwelling older people in the Netherlands over time. The creation of stronger ties among neighbors and a sense of belonging is needed.

- **Screening for frailty phenotype with objectively-measured physical activity in a west Japanese suburban community: evidence from the Sasaguri Genkimon Study**

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BMC Geriatrics 2015, 15:36 doi: 10.1186/s12877-015-0037-9

Background: The low physical activity domain of the frailty phenotype has been assessed with various self-reported questionnaires, which are prone to possible recall bias and a lack of diagnostic accuracy. The primary purpose of this study was to define the low physical activity domain of the frailty phenotype using accelerometer-based measurement and to evaluate the internal construct validity among older community-dwellers. Secondly, we examined potential correlates of frailty in this population.

Methods: We conducted a cross-sectional study of 1,527 community-dwelling older men and women aged 65 and over. Data were drawn from the baseline survey of the Sasaguri Genkimon Study, a cohort study carried out in a west Japanese suburban community. Frailty phenotypes were defined by the following five components: unintentional weight loss, low grip strength, exhaustion, slow gait speed, and low physical activity. Of these criteria, physical activity was objectively measured with a tri-axial accelerometer. To confirm our measure's internal validity, we performed a latent class analysis (LCA) to assess whether the five components could aggregate statistically into a syndrome. We examined the correlates of frailty using multiple stepwise logistic regression models.

Results: The estimated prevalence of frailty was 9.3% (95% confidence intervals, CI, 8.4-11.2); 43.9% were pre-frail (95% CI, 41.5-46.4). The percentage of low physical activity was 19.5%. Objectively-assessed physical activity and other components aggregated statistically into a syndrome. Overall, increased age, poorer self-perceived health, depressive and anxiety symptoms, not consuming alcohol, no engagement in social activities, and cognitive impairment were associated with increased odds of frailty status, independent of co-morbidities.

Conclusions: This study confirmed the internal construct validity of the frailty phenotype that defined the low energy expenditure domain with the objective measurement of physical activity. Accelerometry may potentially standardize the measurement of low physical activity and improve the diagnostic accuracy of the frailty phenotype criteria in primary care setting. The potential role of factors associated with frailty merits further studies to explore their clinical application.

- **Does the timed up and go test predict future falls among British community-dwelling older people? Prospective cohort study nested within a randomised controlled trial**

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BMC Geriatrics 2015, 15:38 doi: 10.1186/s12877-015-0039-7

Background: Falling is common among older people. The Timed-Up-and-Go Test (TUG) is recommended as a screening tool for falls but its predictive value has been challenged. The objectives of this study were to examine the ability of TUG to predict future falls and to estimate the optimal cut-off point to identify those with higher risk for future falls.

Methods: This is a prospective cohort study nested within a randomised controlled trial including 259 British community-dwelling older people ≥65 years undergoing usual care. TUG was measured at baseline. Prospective diaries captured falls over 24 weeks. A Receiver Operating Characteristic curve analysis determined the optimal cut-off point to classify future falls risk with sensitivity, specificity, and predictive values of TUG times. Logistic regression models examined future falls risk by TUG time.

Results: Sixty participants (23%) fell during the 24 weeks. The area under the curve was 0.58

(95% confidence interval (95% CI)=0.49-0.67, p=0.06), suggesting limited predictive value. The optimal cut-off point was 12.6 seconds and the corresponding sensitivity, specificity, and positive and negative predictive values were 30.5%, 89.5%, 46.2%, and 81.4%. Logistic regression models showed each second increase in TUG time (adjusted for age, gender, comorbidities, medications and past history of two falls) was significantly associated with future falls (adjusted odds ratio (OR)=1.09; 95% CI=1.00-1.19, p=0.05). A TUG time ≥12.6 seconds (adjusted OR=3.94, 95% CI=1.69-9.21, p=0.002) was significantly associated with future falls, after the same adjustments.

Conclusions: TUG times were significantly and independently associated with future falls. The ability of TUG to predict future falls was limited but with high specificity and negative predictive value. TUG may be most useful in ruling in those with a high risk of falling rather than as a primary measure in the ascertainment of risk.

- **Relationship between biomarkers of inflammation, oxidative stress and endothelial/microcirculatory function in successful aging versus healthy youth: a transversal study**

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BMC Geriatrics 2015, 15:41 doi: 10.1186/s12877-015-0044-x

Background: There is a functional decline of endothelial- dependent vasodilatation in the aging process. The aims of this study were to investigate if various microcirculatory parameters could correlate to anthropometrical variables, oxidative stress and inflammatory biomarkers in successful aging and compare the results to young healthy controls.

Methods: Healthy elderly women (HE, 74.0±8.7 years, n=11) and young controls (YC, 23.1±3.6 years, n=24) were evaluated through nail-fold video capillaroscopy (NVC), venous occlusion plethysmography (VOP) and laboratorial analysis. Functional capillary density (FCD) and diameters, maximum red blood cell velocity ($RBCV_{max}$) during the reactive hyperemia response/ $RBCV_{baseline}$ after 1 min arterial occlusion at the finger base, time to reach $RBCV_{max}$ were determined by NVC, peak increment of forearm blood flow (FBF) during the reactive hyperemia response (%Hyper) and after 0.4 mg sublingual nitroglycerin (%Nitro) by VOP and lipidogram, fibrinogen, fasting and postload glucose, oxidized LDL-cholesterol (oxLDL), sICAM, sVCAM, sE-Selectin, interleukines 1 and 6 and TNF-α by laboratorial analysis. Correlations and linear multiple regression (LMR) between %Hyper, %Nitro, microcirculatory parameters, oxidative stress and inflammatory biomarkers were investigated.

Results: sVCAM, sE-Selectin and oxLDL were higher and $RBCV_{max}/RBCV_{baseline}$ and %Hyper lower in HE, while %Nitro and FCD remained unchanged. Fibrinogen, LDL-cholesterol, oxLDL correlated negatively to %Hyper while sVCAM correlated negatively to %Hyper and $RBCV_{max}/RBCV_{baseline}$. Healthy aged women presented dilated capillaries with sustained perfusion and endothelial dysfunction with preserved vascular smooth muscle reactivity. Fibrinogen, LDL-cholesterol, oxidized-LDL and sVCAM correlated negatively to endothelial function but not to microcirculatory parameters. Oxidized-LDL and sVCAM could determine %Hyper through LMR.

Conclusion: Oxidized-LDL and sVCAM might be used as endothelial dysfunction biomarkers for elderly with normal cardiovascular risk factors.

- **Inappropriate prescribing to the oldest old patients admitted to hospital: prevalence, most frequently used medicines, and associated factors**

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BMC Geriatrics 2015, 15:42 doi: 10.1186/s12877-015-0038-8

Background: Scientific evidence on treatments of chronic diseases in patients 85 years old or older is very limited, as is available information on inappropriate prescription (IP) and its associated factors. The study aimed to describe medicine prescription, potentially inappropriate medicines (PIM) and potentially prescribing omissions (PPO) and their associated factors on this population.

Methods: In the context of an observational, prospective and multicentric study carried out in elderly patients admitted to seven Spanish hospitals for a year, a sub-analysis of those aged 85 years and over was performed. To assess PIMs, the Beers and STOPP criteria were used, and to assess

PPOs, the START and the ACOVE-3 criteria were used. To assess factors associated with IP, a multivariate logistic regression analysis was performed. Patients were selected randomly every week on consecutive days from the hospitalization lists.

Results: A total of 336 patients were included in the sub-analysis with a median (Q1-Q3) age of 88 (86–90) years. The median medicines taken during the month prior to admission was 10 (7–13). Forty-seven point two per cent of patients had at least one Beers-listed PIM, 63.3% at least one STOPP-listed PIM, 53.6% at least one START-listed PPO, and 59.4% at least one ACOVE-3-listed PPO. Use of benzodiazepines in patients who are prone to falls (18.3%) and omission of calcium and vitamin D supplements in patients with osteoporosis (13.3%) were the most common PIM and PPO, respectively. The main factor associated with the Beers-listed and the STOPP-listed PIM was consumption of 10 or more medicines (OR=5.7, 95% CI 1.8-17.9 and OR=13.4, 95% CI 4.0-44.0, respectively). The main factors associated with the START-listed PPO was a non-community dwelling origin (OR 2.3, 95% CI 1.0-5.0), and multimorbidity (OR1.8, 95% CI 1.0-3.1).

Conclusions: Prescribed medicines and PIM and PPO prevalence were high among patients 85 years and over. Benzodiazepine use in those who are prone to falls and omission of calcium and vitamin D in those with osteoporosis were the most frequent PIM and PPO, respectively. Factors associated with PIM and PPO differed with polypharmacy being the most important factor associated with PIM.

- **Risk factors associated with lower defecation frequency in hospitalized older adults: a case control study**

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BMC Geriatrics 2015, 15:44 doi: 10.1186/s12877-015-0041-0

Background: Constipation is highly prevalent in older adults and may be associated with greater frequency of acute exacerbation of chronic obstructive pulmonary disease (AECOPD). We investigated the prevalence of lower defecation frequency (DF) and risk factors (including AECOPD) associated with lower DF among hospitalized elderly patients.

Methods: We conducted a retrospective case–control study in a community hospital of Southeast Ohio. Adults aged 65 years or older admitted during 2004 and 2006 were reviewed (N=1288). Patients were excluded (N=212) if their length of stay was less than 3 days, discharge diagnosis of *Clostridium difficile*-associated diarrhea, death or ventilator-dependent respiratory failure during hospitalization. Lower DF was defined as either an average DF of 0.33 or less per day or no defecation in the first three days of hospitalization; cases (N=406) and controls (N=670) were included for the final analysis.

Results: Approximately 38% had lower DF in this patient population. Fecal soiling/smearing of at least two episodes was documented in 7% of the patients. With the adjustment of confounders, AECOPD (adjusted odds ratio [AOR] =1.47, 95% confidence interval [CI] =1.01-2.13) and muscle relaxant use (AOR =2.94; 95% CI =1.29-6.69) were significantly associated with lower DF. Supplementation of potassium and antibiotic use prior to hospitalization was associated with lower risk of lower DF.

Conclusions: Approximately 38% of hospitalized older adults had lower DF. AECOPD and use of muscle relaxant were significantly associated with lower DF; while supplementation of potassium and antibiotic use were protective for lower DF risk after adjusting for other variables.

- **Unmet needs in long-term care and their associated factors among the oldest old in China**

Haiyan Zhu

BMC Geriatrics 2015, 15:46 doi: 10.1186/s12877-015-0045-9

Background: With a rapidly aging population and a decline in the availability of family caregivers, the number of elders in China who have unmet long-term care needs is increasing. Because unmet needs often have negative consequences, it is increasingly important to identify factors associated with unmet needs. Utilizing Andersen's behavioral model of health services use, this study examines the roles of predisposing factors (demographics), enabling factors (resources), and need (e.g., illness level) in long-term care among the oldest old in China.

Methods: Data from three waves (2005, 2008, and 2011) of the Chinese Longitudinal Healthy Longevity Survey (CLHLS) were analyzed. Four sequential, logistic regression models were designed to investigate how predisposing factors, enabling factors, and need were associated with unmet needs in long-term care.

Results: Logistic regression analyses reveal that the significant factors for *both* rural and urban residents were economic status, someone other than a family member as the primary caregiver, caregivers' willingness to provide care, timely medication, self-rated health, and self-rated life satisfaction. Significant factors among only *urban* residents were age, a son/daughter-in-law as the primary caregiver, activities of daily living (ADL) disabilities expectation of access to community-based care services, and optimism. Significant factors among only *rural* residents were gender and cognitive function.

Conclusions: The risk of having unmet needs associated with ADL disabilities in long-term care is largely determined by the oldest old's economic status and caregivers' willingness to provide care for both rural and urban residents. Given that the availability of informal caregivers—mainly family members—is declining, it is crucial to provide financial assistance to the oldest old, to increase formal services such as paid home service and community-based care services, and to reduce family caregivers' burden in order to reduce the unmet needs of the oldest old in China.

- **Characteristics of older adults admitted to the emergency department (ED) and their risk factors for ED readmission based on comprehensive geriatric assessment: a prospective cohort study**

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BMC Geriatrics 2015, 15:54 doi: 10.1186/s12877-015-0055-7

Background: Patients aged 75 years and older represent 12% of the overall emergency department (ED) population, and this proportion will increase over the next decades. Many of the discharged patients suffer an unplanned readmission in the immediate and midterm post-discharge period, suggesting under recognition of psychosocial, cognitive and medical problems. The aim of this study was to compare the characteristics of older patients admitted and discharged from the ED and to determine independent predictors for ED readmission 1 month and 3 months after ED discharge based on comprehensive geriatric assessment (CGA).

Methods: Cohort study in a Belgian university hospital. A CGA, including demographic and medical data (e.g. reason for admission, comorbidity, number of medications), functional (e.g. activities of daily living, falls), mental (i.e. cognition, dementia, delirium), and nutritional status, and pain, was performed in 442 ED patients aged 75 years or older.

Results: Patients discharged from the ED (n=117, 26.5%) were significantly less dependent for ADL, mobility, shopping and finances compared with hospitalised patients. Hospitalised patients (n=325, 73.5%) were significantly more at risk for having nutritional problems, had a higher comorbidity index, and a lower cognitive status compared with those discharged. Ninety-seven patients (82.9%) were discharged home from the ED. Of the latter, 18 (18.6%) and 28 patients (28.9%) suffered an ED readmission within 1 and 3 months, respectively. At one month post-discharge, nursing care at home, meals on wheels, and risk for depression; and at 3 months post-discharge previous hospitalisation in the last 3 months, physiotherapy and meals on wheels were found to be independent predictors for ED readmission, respectively.

Conclusions: This study observed a geriatric risk profile in older adults at the ED and a high readmission rate of those discharged, and suggests the potential value of CGA in identifying older patients at high risk for ED readmission.

- **Expert opinion on the management of pain in hospitalised older patients with cognitive impairment: a mixed methods analysis of a national survey**

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BMC Geriatrics 2015, 15:56 doi: 10.1186/s12877-015-0056-6

Background: Hospitalised older patients are complex. Comorbidity and polypharmacy complicate frailty. Significant numbers have dementia and/or cognitive impairment. Pain is highly prevalent. The evidence base for pain management in cognitively impaired individuals is sparse due to methodological issues. A wealth of expert opinion is recognised potentially providing a useful evidence base for guiding clinical practice. The study aimed to gather expert opinion on pain management in cognitively impaired hospitalised older people.

Methods: Consultant Geriatricians listed as dementia leads in the National Dementia Audit were contacted electronically and invited to respond. The questionnaire sought information on their role, confidence and approach to pain management in cognitively impaired hospitalised

patients. Responses were analysed using a mixed methods approach.

Results: Respondents considered themselves very confident in the clinical field. Awareness of potential to do harm was highly evident. Unequivocally responses suggested paracetamol is safe and should be first choice analgesic, newer opiates should be used preferentially in renal impairment and nefopam is unsafe. A grading of the safety profile of specific medications became apparent, prompting requirement for further evaluation and holistic assessment.

Conclusion: The lack of consensus reached highlights the complexity of this clinical field. The use of paracetamol first line, newer opiates in renal impairment and avoidance of nefopam are immediately transferrable to clinical practice. Further review, evaluation and comparison of the risks associated with other specific analgesics are necessary before a comprehensive clinical guideline can be produced.

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