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Free Communications

FC01.1

The association of anxiety and comorbid depression with cognitive functioning in older persons; results of the Longitudinal Aging Study Amsterdam (LASA)

Hannie Comijs[1]; E Bierman[2]; C Jonker[1]; A Beekman[1]

[1]VU University Medical Center, Amsterdam, Netherlands; [2]VUMC, Amsterdam, Netherlands

We have investigated whether anxiety in older persons is related to cognitive performance and cognitive decline. In addition, we studied the role of comorbid depression symptoms. Data were used from the Longitudinal Aging Study Amsterdam. Anxiety symptoms were measured with the Hospital Anxiety and Depression Scale (HADS-A), and depression symptoms were measured with the Center for Epidemiologic Studies Depression Scale (CES-D). General cognitive functioning was measured with the Mini-Mental State Examination, episodic memory with the Auditory Verbal Learning Test, fluid intelligence with the Raven's Coloured Progressive Matrices and information processing speed with the coding task. Multivariate cross-sectional and longitudinal analyses over a period of 9 years were performed to investigate the relationship between anxiety and cognitive decline, taking into account confounding variables. The results showed that the prevalence of anxiety, depressive and comorbid anxiety and depressive symptoms increase in the early phase of cognitive decline. We found a curvilinear association of anxiety symptoms with cognitive performance, whereas depression showed a negative linear association with cognition measures. Persons with comorbid anxiety and depression symptoms performed worst on cognitive tests. Anxiety symptoms were not predictive of cognitive decline over a period of 9 years.

This study suggests that the effect of anxiety on cognition depends on the severity of the present anxiety symptoms, with mild anxiety associated with better cognition, whereas more severe anxiety and anxiety with comorbid depression is associated with worse cognition. The effect of anxiety symptoms on cognitive functioning seems to be a temporary effect, and anxiety is not predictive of cognitive decline.

FC01.2

Prevalence and correlates of anxiety disorders and subthreshold anxiety among community-dwelling older adults

Sebastien Grenier[1]; M Preville[1]; R Boyer[2]; K O'Connor[2]

[1]Hôpital Charles LeMoyne's Research Centre, Greenfield Park, QC, Canada; [2]Fernand-Seguin Research Centre, Montreal, QC, Canada

Recent worldwide studies have suggested that many older adults may present anxious symptoms that fall below the threshold for a DSM anxiety disorder (de Beurs *et al.*, 1999; Heun, Papassotiropoulos, & Ptok, 2000; Rivas-Vazquez, Saffa-Biller, Ruiz, Blais, & Rivas-Vazquez, 2004). The purpose of this communication is to examine correlates of different patterns of anxiety and to document the impact of the use of different diagnostic criteria on the prevalence estimates of anxiety problems among older adults living in the community. Data was collected from a large representative sample of community-dwelling older adults aged 65 years and over (N = 2784). Results showed that the 12-month prevalence rate of any anxiety problem varied from 5.6% when DSM-IV criteria for anxiety disorders were used to 26.2% when all subthreshold manifestations of anxiety were considered (i.e. having at least one symptom of anxiety). The findings also suggested that respondents meeting DSM-IV criteria for anxiety disorders and those reporting different patterns of subthreshold anxiety showed similarities in terms of sociodemographic, health and health behavior characteristics. Clinical implications of these results will be discussed and further research will be proposed.

FC01.3

Anxiety in late-life: Moving toward proper diagnosis and referral and a tailored treatment

Josien Schuurmans; G Hendriks; A Pot; M Veerbeek

Vrije Universiteit, Amsterdam, Netherlands

Anxiety disorders are highly prevalent in older adults and are associated with increased disability, a great negative impact on quality of life and an

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inadequate use of health care services. Nevertheless, treatment studies in this area are scarce and late-life anxiety disorders seem to go unrecognized and untreated in the vast majority of cases. In the current presentation, we would like to provide an overview of the current state of affairs in science and clinical practice on the recognition and treatment of late-life anxiety disorders. This overview is based on a systematic search of the literature (Medline, Psychinfo, Cochrane, Embase and PiCarta) which has ultimately resulted in an amendment on the multidisciplinary guidelines for anxiety disorders in the Netherlands.

Apart from presenting the main conclusions that are included in this amendment, we would like to illuminate some of the conclusions on the basis of our own research findings and clinical experiences. We performed the first RCT on the immediate comparison between CBT and SSRI's for anxiety in late life (Schuurmans *et al.*, 2006) and we examined differences in phenomenology of anxiety in late life between older, younger and middle-aged adults in both clinical and normal populations (Schuurmans *et al.*, submitted for publication). Furthermore, the overview of the literature clearly shows several obstacles to appropriate referral and treatment for anxiety in late life, which we argue might be resolved by a new research project that we intend to perform in the near future. This project will have three main aims: 1. The testing of a short screening method implemented in general practice in order to improve the adequate diagnosis and referral of late-life anxiety disorders; 2. The development of a psychological intervention based on existing treatment protocols for anxiety disorders and modified for the specific needs of an older population; and 3. Testing the effectiveness of this intervention in a primary care setting and embedded within a stepped care model.

Publications: Schuurmans, J., Comijs, H. C., Emmelkamp, P. M., Gundy, C. M., Weijnen, I. J. C., van Hout, M. A. *et al.* (2006). A randomized controlled trial of the effectiveness of cognitive-behavioral therapy and sertraline versus a wait-list control group for anxiety disorders in older adults. American Journal of Geriatric Psychiatry, 14, 255–263.

Trimbos-instituut (2008). [Amendment for older adults to the multidisciplinary guidelines for anxiety disorders].

FC01.4

The interplay between personality disorders, psychiatric disorders, age and outcomes: A prospective controlled study

Janine Stevenson[1]; H Brodaty[2]

[1]*Westmead Hospital, Northbridge, NSW, Australia;* [2]*Prince of Wales Hospital, Sydney, NSW, Australia*

Elderly psychiatric patients often have multiple comorbidities. Whereas their medical comorbidities are frequently considered, axis II comorbidities rarely are. A sample of over 200 consecutive consenting younger and older in-patients from Westmead and Prince of Wales Hospitals in Sydney were assessed in detail using standardised instruments prior to their discharge. Personality disorders, which were prevalent in up to 68% of younger and 60% of older inpatients, but often undiagnosed in both age cohorts, had negative outcomes on resolution of their axis 1 diagnosis, length of stay and condition at discharge. There were striking differences in the axis II diagnoses found in older psychiatric inpatients in comparison to younger inpatients. Reasons for poorer outcome in patients with personality disorders include poorer coping strategies and social supports. These findings have implications for patient management.

FC01.5

Psychogeriatrics specialist course program for geriatrics specialists

Dick Verburg

VU University Medical Center, Amsterdam, Netherlands

The professional scope of activities for 'geriatrics specialists' (formerly: nursing home physicians) encompasses the broad field of chronic somatic complaints, geriatric revalidation, palliative care and psychogeriatrics. Treatment is administered to persons of all ages, the majority of which comprises those over eighty—the oldest among the elderly. This group, especially those suffering from psychogeriatric complaints, has been increasing in number. Their living situations have been changing as well; in spite of their limitations they continue to live independently for longer than was previously the case. Geriatrics specialists are increasingly involved in diagnostics, treatment and care for the elderly within and—increasingly more often—outside of the nursing home. The existing range of outpatients' clinics and geriatric psychiatric institutions is not suitable for this specific group, because this group especially requires diagnostics with respect to care in addition to medical diagnostics.

More expertise is required in this unique discipline: medical specialists with specific competencies within their organization in the field

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of psychogeriatrics. These specialists must also be able to call upon these competencies to treat their patients, to train colleagues and members of other disciplines and to fulfill an advisory role for colleagues, general practitioners and other medical specialists. In order to fulfill all these tasks, the specialist in question must have a visionary and extra-disciplinary perspective in this field.

The department of nursing home medicine of the VU university medical center in Amsterdam is organizing a specialist training program for "geriatrics specialists": a competency-based advanced course for future specialists in psychogeriatrics. The Canmeds model has been used as the basic structure to determine the competency profile for this psychogeriatric specialist training program.

The competency-based program has the following distinguishing features:

- On-the-job training is a key factor. Cursory education is supplementary to the program and supports the aspect of practical training.
- Individual responsibility for the learning process is encouraged.
- Assessment will take place at competency level and the students' progress will be recorded in a portfolio.

The structure of the program expressly follows the principles of Kolb's learning cycle. Taking this learning cycle as a point of departure, certain aspects of the discipline are examined: "What am I doing?" (experience), "How do I achieve this?" (observation and reflection), "What is known about this?" (conceptualization) and "What will I do and what can I do differently?" (action). To achieve this, preparing for a unit of study will often involve a description of the students' current working method as well as material taken from literature. In conclusion, a reflective essay on the subject will be written that will include plans, if applicable, for changes in working method. The process of change itself will be supervised intensively for one project, and a report will be compiled as part of a quality improvement project.

Until now, research has only been conducted on student satisfaction about the program and not on the effect of the program. It is crucial that this is carried out.

FC01.6

A pilot study on post-earthquake stress-related problems among Chinese elderly in Sichuan

Huali Wang[1]; H Ma[1]; M He[2], N Ma[1]; X Wu[1]; H Xiang[3]; X Yu[1]

[1]*Peking University Institute of Mental Health, Beijing, China;* [2]*Hangzhou Mental Health Center, Hangzhou, China;* [3]*Sichuan Mental Health Center, Mianyang, China*

Objective: To explore the stress-related mental health problems among Chinese elderly after the Sichuan earthquake.

Subjects and Methods: Participants were recruited from relocation shelters specifically designed for residents affected by the Wenchuan earthquake in China. Approximately 7 months after the earthquake, a convenience sample of 87 individuals aged over 60 years was approached in the relocation community, provided written informed consent, and then self-administered a 7-item PTSD screen test (PTSD-7). All participants were then administered with a stress response questionnaire (SRQ). Eighty-five participants completed the survey. A cutoff score of 4 on PTSD-7 was used to define the PTSD-positive group. A cutoff score of 10 on SRQ was used to define the SRQ-positive group.

Results: Thirty-five participants (41.2%) were classified as the PTSD-positive group. More participants in the PTSD-positive group reported medical conditions at a visit than in the PTSD-negative group (93.5% vs 61.5%, chi-square = 9.62, $P = 0.002$). The total score on the SRQ was significantly higher in the PTSD-positive group than in the PTSD-negative group (14.6 ± 3.9 vs 7.5 ± 4.0, $t = 8.10$, $P < 0.001$). There were no significant differences in age, gender distribution, educational level, replacement times, destruction of estate property, physical hurt, number of relatives lost in the earthquake, family income and previous medical conditions diagnosed before the earthquake ($P > 0.05$).

Forty-six participants (54.1%) were classified as the SRQ-positive group. Similarly, more participants in the SRQ-positive group reported medical conditions at a visit than in the SRQ-negative group (chi-square = 9.43, $P = 0.004$). There was a trend that more participants in the SRQ-positive group reported physical hurt during the earthquake than in the SRQ-negative group ($P = 0.06$). The total score on the PTSD-7 was significantly higher in the SRQ-positive group than in the SRQ-negative group (5.04 ± 1.63 vs 2.3 ± 1.5, $t = 8.01$, $P < 0.001$). There were no significant differences in age, gender distribution, educational level, replacement times, destruction of estate property, number of relatives lost in the earthquake, family income and previous medical conditions diagnosed before the earthquake ($P > 0.05$). There was a strong correlation between the total score on the SRQ and the PTSD-7 ($r = 0.79$, $P < 0.01$).

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Discussion & Conclusion: There are significant stress-related mental health problems among Chinese elderly affected by the Wenchuan earthquake. More medical conditions are reported among participants with possible stress-related disorders. It is suggested that integrative psychosocial supportive intervention with primary care of physical conditions is important for the elderly affected by the earthquake.

FC02.1

Urinary tract infections in older women is associated with delirium

Irene Eriksson[1]; B Olofsson[1]; L Fagerstrom[2]; Y Gustafson[1]

[1]Geriatric Medicine, Umea, Sweden; [2]University of Skovde, Skovde, Sweden

Background: Delirium and urinary tract infection (UTI) are both major health problems among frail old people and causes of much suffering. The aim of the present study was to investigate whether UTI in older women is associated with delirium.

Methods: This part of the Gerontological Regional Database project (GERDA) (2005–2007), included half the women aged 85, and all women aged 90 and ≥95, in Umeå, Sweden and in Vaasa and Korsholm in Finland. Six-hundred and forty-three women were asked to participate and 504 (78.4%) were able to be evaluated for delirium and UTI. Data were collected from structured interviews and assessments made during home visits, medical charts, caregivers and relatives. The participants were assessed with the Organic Brain Syndrome (OBS) Scale, the Mini Mental State Examination (MMSE), the Geriatric Depression Scale-15 (GDS-15) and the Montgomery-Åsberg Depression Rating Scale (MADRS). Delirium, dementia and depression were diagnosed according to the DSM IV criteria. A diagnosed, symptomatic UTI with ongoing treatment documented in medical records was registered. Multivariate logistic regression analyses were conducted to find independent factors associated with delirium.

Results: In the present study sample of 504 women, 137 (27.2%) were delirious. Nearly one third of these women with delirium (28.5%) were diagnosed as having had a UTI when they were assessed. In a multivariate logistic regression model, delirium was associated with Alzheimer's disease (OR = 5.8), multi-infarct dementia (OR = 5.4), depression (OR = 3.1), heart failure (OR = 2.3) and urinary tract infection (OR = 1.9).

Conclusions: Almost one third of a representative sample of very old women with delirium suffered from a UTI, which might indicate that UTI is a common cause of delirium. More focus should be on detecting, preventing and treating UTI to avoid unnecessary suffering among old women.

FC02.2

Prevalence and 6-month incidence of delirium in nursing home residents

Jane McCusker[1]; M Cole[1]; P Voyer[3]; J Monette[1]; N Champoux[2]; A Ciampi[1]; T Vu[2]; E Belzile[1]

[1]McGill, Montreal, QC, Canada; [2]University of Montreal, Montreal, QC, Canada; [3]Laval University, Quebec City, QC, Canada

There has been little prior research on the occurrence of delirium among older adults in long-term institutional care. Limitations of most prior research include the exclusion of those with severe cognitive impairment, the lack of systematic follow-up over time, and the use of unvalidated measures of delirium. This presentation will summarize the results of a longitudinal multi-site study designed to overcome these limitations. The objectives were: 1) to describe the prevalence, 6-month incidence, and proportion of time with delirium in nursing home residents age 65 and over; 2) to describe differences in these measures by patient baseline characteristics and by facility.

Residents aged 65 and over of 7 nursing homes in Montreal and Quebec City were recruited into a 6-month prospective study comprising two cohorts: with and without severe cognitive impairment. Weekly patient assessments and nurse interviews were conducted by trained research assistants for up to 6 months. Measures included: the Confusion Assessment Method (CAM) to identify delirium; the Mini Mental State Exam (MMSE), used to define the two cohorts (MMSE <10 and 10+); the Hierarchic Dementia Scale (HDS); and the Barthel activities of daily living scale. Delirium was defined using CAM criteria for probable delirium. Prevalence of delirium was estimated at baseline, and the incidence of the first episode of delirium during follow-up was estimated among those free of delirium at baseline. The proportion of time with delirium was estimated as the number of days with delirium per 100 patient-days of observation. Impact of baseline characteristics on our endpoints was assessed using: multiple logistic regression for delirium prevalence; the Cox proportional hazards model for delirium incidence; and Poisson regression for the number of days with delirium.

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Results: 279 residents were recruited and completed baseline assessments: 75 in the cohort with severe cognitive impairment (MMSE <10) and 204 in the cohort without severe cognitive impairment (MMSE 10+). Of the 279 residents, 215 (77%) completed 6-month follow-up, and 28 (10%) died during follow-up. 113 (40.5%) residents met criteria for delirium at some point in the study, 32 at baseline and 81 during follow-up. The proportions with prevalent and/or incident delirium were 69.3% in the cohort with an MMSE less than 10, and 29.9% in the cohort with an MMSE of 10 or more. Overall, the prevalence of delirium at baseline was 11.5%, the incidence of delirium among those without delirium at baseline was 2.2/100 person-weeks of follow-up; and the proportion of the time under observation with delirium was 8.2%. The main patient characteristics associated with the measures of delirium were low MMSE, HDS, and Barthel scores. After adjustment for patient characteristics, there remained large differences in these measures by facility.

These results show that a substantial proportion (2 out of every 5) residents of these nursing homes experienced delirium at least once over a 6-month period. Severity of cognitive impairment was a strong predictor of delirium prevalence and incidence. Further investigation of the reasons behind the inter-facility differences is warranted.

FC02.3

Dementia after delirium in patients with femoral neck fracture: A three year follow up study

Birgitta Olofsson; M Stenvall; Y Gustafson; M Lundstrom

Geriatric Medicine, Umea, Sweden

Background: Delirium is common in old people suffering a hip fracture and might result in serious consequences for the affected. The aim of the present study was to investigate the development of dementia in patients with femoral neck fracture three years after surgery.
Methods: The present study sample consisted of 135 patients, aged ≥70 years, with femoral neck fracture but with no dementia on admission, 101 women and 34 men. All patients were tested with the Mini Mental State Examination (MMSE), the Organic Brain Syndrome Scale (OBS-Scale) and Geriatric Depression Scale (GDS-15) postoperatively and at the 4-, 12- and 36-month follow up.
Results: 42 (31%) of the 135 patients had developed dementia three years after the surgery, 35/101 (35%) women and 7/34 (20%) men. Thirty seven (88%) of the 42 who developed dementia had suffered postoperative delirium during hospitalization. In a logistic regression model it was found that postoperative delirium was significantly associated with the development of dementia, while patients with diabetes seemed to have a reduced risk of developing dementia. However, both men and patients with diabetes had a higher mortality; 15/34 (44%) of the men compared to 27/101 (27%, $p = 0.058$) of the women and 15/27 (56%) of patients with diabetes compared to 27/108 (25%, $p = 0.002$) of patients with no diabetes had died three years after surgery.
Conclusion: Postoperative delirium is a strong predictor for the development of dementia, but it is still not known if delirium might indicate the presence of pre-clinical dementia or if delirium is involved in the pathophysiology of dementia. Women seem to have an increased risk of developing dementia and patients with diabetes a lower risk; however, the higher mortality among men and among those with diabetes might explain the lower incidence of dementia in men and in those with diabetes.

FC02.4

A multidisciplinary, multi-factorial intervention program reduces postoperative complications and improves performance in ADL and mobility after a femoral neck fracture among older people with dementia: Subgroup analyses of a randomised controlled trial

Michael Stenvall; B Olofsson; M Lundstrom; Y Gustafson

Geriatric Medicine, Umea, Sweden

Objective: To evaluate whether a multidisciplinary, multi-factorial intervention program could reduce postoperative complications and enhance the activity of daily living performance among patients with dementia after a femoral neck fracture.
Method: 199 patients with femoral neck fracture, 64 with dementia, aged ≥70 years were randomized, to postoperative care in a geriatric ward ($n = 28$) with a special intervention program or to conventional care in an orthopaedic ward ($n = 36$). The intervention consisted of staff education, individualised care planning and rehabilitation, active prevention, and detection and treatment of postoperative complications such as delirium and infections. Complications during hospitalization, including falls, length of stay, morbidity and mortality, were systematically registered. The staff in the intervention group worked in teams

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applying comprehensive geriatric assessment, management and rehabilitation. A geriatric team also assessed those in the intervention group four months postoperatively to detect and treat any complications.

Results: One patient with dementia sustained a single fall during hospitalization in the intervention group compared with 11 patients sustaining 34 falls in the control group. The IRR was 0.07 (95% CI: 0.01–0.57, $p = 0.013$). The number of days with postoperative delirium in patients with dementia was 3.2 ± 4.1 days in the intervention group and 12.8 ± 17.6 days in the control group ($p = 0.003$). In addition, 15 patients with dementia in the control group were still delirious on discharge and none in the intervention group ($p < 0.001$). There were also fewer with urinary tract infections ($p = 0.001$) in the intervention group. The hospitalization was 12 days shorter in the intervention group. One year after the fracture a larger proportion in the intervention group had regained their earlier activity of daily living performance and their ability to walk independently without walking aids indoors.

Conclusion: A multidisciplinary postoperative intervention program can successfully prevent postoperative complications and enhance the ADL performance and mobility after a femoral neck fracture in patients with dementia.

FC02.5

A systematic review and standardised recalculation of incidence rates for late onset schizophrenia

Margriet van Werf[1]; M Hanssen[2]; S Köhler[1]; M Verkaaik[2]; F Verhey[1]; J van Os[1]; J Allardyce[1]

[1]*Maastricht University, Maastricht, Netherlands;* [2]*Regional Centre for Ambulant Mental Health Maastricht, Maastricht, Netherlands*

Background: The onset of schizophrenia in late life has been considered a rare event. The aim of this review was therefore to systematically identify all studies related to the onset of schizophrenia in older adults (presenting after the age of 40). We present the key features of these studies and examine the distribution of the incidence rates derived from these studies.

Methods: We identified all articles (published between 1950 and 2008) that presented age-specific incidence data for late-onset psychotic disorder drawn from either a general population sample or a subgroup of the population using electronic databases, review of cited papers and by directly contacting authors. Data was extracted relating to study level variables: case ascertainment methods, diagnostic criteria employed, and rate level variables. The primary individual sample data was requested to allow the age specific rates for the late onset schizophrenia (LOS) and the very late onset schizophrenia like psychosis (VLOSLP) subgroups to be recalculated for each sample, rather than having to make a judgment on which paper to include when multiple publications were non-independent. Variation in incidence estimates was summarised with quartiles and measures of central tendency (formal meta analyses using random effects models were also carried out) and the variation of the rates was plotted graphically using cumulative plots to show the cumulative percentage of the rate ratio in the incidence in 1) males vs. females and 2) urban vs. rural living.

Results: A total of 81 studies were identified. These studies, from 41 samples, drawn from 20 countries (primarily Western European) contained 662 different and potentially overlapping incidence rates. The most commonly used diagnostic criterion was one of the ICD classifications (62%) with CATEGO derived classification (6%). The remaining used other criteria, most often DSM. Data from 35 of the primary samples have been analyzed. When examining the late onset defined group, the distribution for men was relatively symmetrical with a mean rate of 3.84 (sd 1.71) median of 4.09 and the width 10%–90% quartiles of 1.4–5.85 per 100,000. For females the mean rate was 4.07 (sd 1.87) median of 4.01 and 10%–90% quartile range of 1.44–6.56. Formal meta analytical methods found similar results. No significant difference in the rate ratio median for males and females and for urban and rural environment was found. Study features were not significantly associated with different rate distributions. 9 studies examined the VLOSLP group, range (0.017–0.09 per 100,000).

Conclusion: This review complements previous systematic reviews that have focused more extensively on the younger age of onset, which had median values of 15.2 per 100,000 population, suggesting that the risk for formally diagnosed schizophrenia is lower in the older age group and may not have the same risk factor profile as the younger age of onset group.

FC02.6

Clinical presentation and neuropsychological profile of late and very late onset psychosis: First results from the Psychosis In The Elderly (PSITE) study

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Mike Verkaaik[1]; S Koehler[2]; M van der Werf[2]; J van Os[2]; F Verhey[2]

[1]Mental Health Institute RIAGG Maastricht, Maastricht, Netherlands; [2]School for Mental Health and Neuroscience, EURON, SEARCH, Maastricht University, Maastricht, Netherlands

Background: Little is known about non-affective non-organic psychoses of higher ages. Few prospective studies have been carried out during the last 10 years to fill in existing gaps of knowledge. The PSITE study is an ongoing cross-sectional and longitudinal study that aims at a better understanding of the aetiology, phenomenology and prognosis of the psychoses of higher ages.
Methods: Forty patients with onset of first symptoms after age 45 years (late onset psychosis, LOP, n = 18) or age 65 years (very late onset psychosis, VLOP, n = 22) and 44 healthy controls underwent extensive clinical and neuropsychological testing. Demographics and symptomatology for lifetime and present state symptoms were assessed and comparisons were made between LOP and VLOP and between patients and controls.
Results: Paranoid delusions dominated the clinical picture and were seen in 39 (98%) of patients. Auditory hallucinations were present in 27 patients (65%), with 9 (23%) patients reporting visual hallucinations and 10 (25%) reporting olfactory hallucinations. LOP more often displayed delusions of grandiosity (33% versus 0%, p = .003), delusions of passivity (27% versus 5%, p = .041), religious delusions (33% versus 5%, p = .017) and tactile hallucinations (27% versus 5%, p = .041) than patients with VLOP. In addition, delusions of the former more often were of a bizarre content (50% versus 9%, p = .004). No differences were seen regarding negative symptoms (50% versus 43%, p = .666) or global functioning (GAF-score 54 versus 57, p = .500). Compared to healthy controls, patients on average performed significantly worse on MMSE (mean: 28.2 versus 26.2, p <.001) and CAMCOG total scores (94.6 versus 85.2, p <.001), including the subscales attention (p = .006), memory (p <.001), verbal fluency (p = .021), abstract reasoning (p <.001) and visuconstruction (p = .002). While VLOP outperform LOP with regard to CAMCOG total score (p = .015) and verbal fluency (p = .007), they display worse memory consolidation (p <.001).
Conclusion: Both LOP and VLOP are dominated by paranoid delusions and auditory hallucinations. The delusions of the elderly are however more intelligible and non-bizarre. In contrast to previous reports, negative symptoms were found to be quite common. Psychosis with onset in the second half of life is characterised by significant and widespread cognitive impairment. Late and very late onset psychosis show differential associations with executive functioning and memory, which suggests different pathophysiological processes.

FC03.1

Gray matter correlates of apathy in Alzheimer's disease

Pauline Aalten[1]; J van Deursen[1]; P Hofman[2]; F Barkhof[3]; F Verhey[1]

[1]Alzheimer's Center Limburg, Maastricht, Netherlands; [2]Maastricht University Medical Centre, Maastricht, Netherlands; [3]Alzheimer's Center Amsterdam, Amsterdam, Netherlands

Apathy is among the most prevalent and severe neuropsychiatric symptoms in Alzheimer's disease (AD). The pathogenesis of apathy, and in particular of its sub-dimensions, has not yet been clarified. The aim of the present study was to investigate structural neuroimaging correlates of apathy while taking the following sub-dimensions into account: emotional blunting, lack of initiative and lack of interest. Gray matter (GM) densities were determined by using voxel based morphometry. Of 37 AD patients, apathy was assessed with the Neuropsychiatric Inventory, the Apathy Evaluation Scale (AES) and the Apathy Inventory. The results showed that the sub-dimension emotional blunting was associated with decreased GM densities in the anterior cingulate cortex, the left caudate nucleus, the left superior temporal gyrus, the right middle temporal gyrus, right insula and the left lingual gyrus. Furthermore, apathy as defined by the AES was related to decreased GM densities in the left superior frontal gyrus. These data support the evidence that several brain areas, including the prefrontal-sub-cortical areas, are involved in the pathogenesis of apathy and stress the role of neuronal circuits in mediating the different aspects of apathy and in particular the emotional sub-dimension. Further neuroimaging studies are needed to confirm and validate the hypothesis that specific neuroanatomical correlates support the presence of the sub-dimensions of apathy, and to determine its specificity across neuropsychiatric diseases.

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FC03.2

Early and late-life events and salivary cortisol in older persons

Lotte Gerritsen[1]; M Geerlings[1]; A Beekman[2]; D Deeg[2]; B Penninx[2]; H Comijs[2]

[1]*University Medical Center Utrecht, Utrecht, Netherlands;* [2]*VU University Medical Center, Amsterdam, Netherlands*

Background: It has been hypothesized that stressful life events are associated with changes in hypothalamic pituitary adrenal (HPA) axis regulation, which may increase the susceptibility to psychiatric disorders. It has also been suggested that HPA-axis regulation is affected by aging.

However the association between life events and HPA-axis regulation has not been studied in older persons before. Therefore we investigated the association of early and late life events with salivary cortisol levels in older persons.

Methods: Within the Longitudinal Aging Study Amsterdam (LASA) 1,055 participants (47% male), aged 63–93 years, collected saliva within 30 minutes after waking and late in the evening. Early (before age 18 years) and late life events (within 3 years prior to interview) were assessed during a home interview. The associations between life events and cortisol levels were adjusted for demographics, cardiovascular risk factors and depressive symptoms.

Results: Within our study sample, the median morning and evening cortisol levels were 15.0 nmol/L (10–90% 7.4–27.0 nmol/L) and 2.8 nmol/L (10–90% 1.5–6.3 nmol/L) respectively. Persons who reported early life events showed lower levels of log-transformed morning cortisol (B = –0.10; 95%CI –0.17 to –0.04) and flattened diurnal variability of cortisol (B = –1.06; 95%CI –2.05 to –0.08). Persons who reported two or more late life events showed higher levels of log-transformed morning cortisol (B = 0.10; 95%CI 0.02 to 0.18) and higher diurnal variability (B = 1.19; 95%CI 0.05 to 2.33). No associations were found with evening cortisol.

Conclusion: The results of this large population-based study of older persons suggest a differential association of early and late life events with HPA-axis regulation; early life events were associated with a relative hypo-secretion of morning cortisol and flattened diurnal variability, while late life events were associated with elevated secretion of morning cortisol and high diurnal variability of cortisol. Future studies should determine to what extent these results can explain individual susceptibility to psychiatric disorders.

FC03.3

Establishment of the plasma biomarkers for the pre-symptomatic detection of AD: Australian Imaging, Biomarker and Lifestyle (AIBL) Flagship Study of Ageing

Veer Gupta[1]; J Lui[1]; K Ruyck[1]; J Foster[1]; K Taddei[1]; B Brown[1]; M Rodrigues[1]; D Ames[2]; V Ward[1]; T Taddei[1]; L Qiao[2]; M Colin[2]; R Martins[1]

[1]*Edith Cowan University, Perth, WA, Australia;* [2]*The University of Melbourne, Parkville, VIC, Australia*

Purpose: Alzheimer's disease (AD) is among the most frightening consequences of old age. The development of valid and reliable biomarkers for AD is essential in recognizing the disease in its pre-symptomatic stage. The ideal biomarker for AD should be reliable, reproducible, noninvasive, quick, easy and inexpensive. Amyloid beta (Aβ) and Apolipoprotein E (APOE) have emerged as potential AD biomarkers. Our approach involved the Australian Imaging, Biomarkers and Lifestyle study of ageing (AIBL) volunteers who were categorized into four groups, namely non memory complainers (NMC), Memory Complainers (MC), Mild Cognitive impairment individuals (MCI) and Alzheimer's disease patients (AD).

Methods: AIBL participants across two cities in Australia underwent PET amyloid brain imaging, and their blood plasma samples were collected and analysed for the levels of APOE and two isoforms Aβ-40 and Aβ-42 using APOE4/PAN APOE ELISA kits and INNO-BIA Aβ detection kits respectively. Neuropsychological assessment data along with the dietary and lifestyle habits of the participants were also monitored, which helped to get a complete picture.

Results: MCI showed significantly higher levels of Aβ-42 that subsequently caused the increase of Aβ-42/Aβ-40 ratio when compared with NMC and MC. However, APOE levels appeared to be lower in MCI and AD participants when compared to NMC and MC groups. Interestingly, when these participants were categorized according to their APOE genotypes, the levels of APOE appeared to be least in E4/E4 participants, a known genetic risk factor for AD.

Conclusions: The above results are the outcome of the baseline data, which has provided valuable information on links between cognitive function, brain amyloid burden, biomarkers, and lifestyle. An 18-month follow up study on AIBL cohort is expected to provide a better correlation between Aβ, APOE and AD. The future research yield from

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AIBL cohort involves the development of techniques for early detection of AD and identification of lifestyle targets that may delay onset of AD.

FC03.4

The relation between neuropsychiatric symptoms and cerebrospinal fluid markers for Alzheimer's disease in subjects with mild cognitive impairment

Inez Ramakers[1]; F Verhey[1]; P Scheltens[2]; M Tsolaki[3]; H Hampel[5]; K Bürger[4]; T Pirttila[6]; H Soininen[6]; M Olde Rikkert[7]; M Verbeek[7]; L Spiru[8]; K Blennow[9]; P Visser[1]

[1]MUMC, Maastricht, Netherlands; [2]VUMC, Amsterdam, Netherlands; [3]Papanicolaore General Hospital, Thessaloniki, Greece; [4]Ludwig-Maximilian University, Munich, Germany; [5]Trinity Centre for Health Sciences, Dublin, Ireland; [6]University Hospital of Kuopio, Kuopio, Finland; [7]Radboud University Medical Centre, Nijmegen, Netherlands; [8]University of Medicine and Pharmacy, Bucharest, Romania; [9]Göteborg University, Mölndal, Sweden

Introduction: Neuropsychiatric symptoms are common in subjects with mild cognitive impairment (MCI). However, it is unclear whether these symptoms are caused by underlying AD pathology. The aim of the present study was to investigate the relation between neuropsychiatric symptoms and cerebrospinal fluid (CSF) markers for AD in subjects with MCI.
Methods: Subjects with MCI (n = 74) were selected from the European memory clinic based DESCRIPA study. Mean age of the subjects was 70 years, 50% were female, and the mean MMSE score was 26. Biomarkers measured were the levels of β-amyloid (1–42) protein (Aβ42), phosphorylated tau (p-tau), total tau (t-tau), and the ratio of p-tau and Aβ42 in the CSF. We dichotomized Aβ42 as present if concentrations were below the 10th percentile, and p-tau and t-tau if concentrations were above the 90th percentile. Neuropsychiatric symptoms were measured with the NeuroPsychiatric Inventory (NPI). A neuropsychiatric symptom was scored present if the domain score was one or more.
Results: Forty-eight subjects (65%) had one or more neuropsychiatric symptoms. Most commonly reported were depression (n = 16, 22%), apathy (n = 21, 28%), and irritability (n = 20, 27%). Binary logistic regression analyses, corrected for age, showed no significant association between any of the CSF parameters and the presence of depression, apathy or irritability. Also Spearman correlation analyses between CSF markers and the NPI-total score were not significant ($p > 0.30$). Similar results were found for the domain scores of depression, apathy and irritability ($p > 0.10$).
Discussion: There is no association between neuropsychiatric symptoms and CSF markers for AD in subjects with MCI. This implies that in subjects with MCI these symptoms are not caused by underlying AD pathology in the brain. Therefore neuropsychiatric symptoms in subjects with MCI should not be understood as a manifestation of AD.

FC03.5

White matter hyperintensities, medial temporal lobe atrophy, cortical atrophy and response to electroconvulsive therapy in depressed elderly

Max Stek[1]; M Oudega[1]; E Exel[1]; M Wattjes[1]; H Comijs[1]; P Scheltens[1]; F Barkhof[1]; P Eikelenboom[1]; A Craen[2]; A Beekman[1]

[1]GGZ inGeest/VUmc, Amsterdam, Netherlands; [2]LUMC, Leiden, Netherlands

Background: Electroconvulsive therapy is an important treatment option in depressed elderly patients. Structural abnormalities in the brain may influence therapeutic response, though this association has never been studied systematically.
Objective: To assess whether white matter hyperintensities, medial temporal lobe atrophy or general cortical atrophy predict poor response to electroconvulsive therapy in depressed elderly patients with respect to mood and cognition.
Design: In a naturalistic clinical cohort of 81 elderly patients with DSM-IV-diagnosed unipolar depression, white matter hyperintensities, medial temporal lobe atrophy and general cortical atrophy were measured on magnetic resonance images with validated rating scales. Response to electroconvulsive therapy was determined as mean decrease in percentages using the Montgomery-Åsberg Depression Rating Scale (MADRS) and remission was defined as a total score below 10 on the MADRS. Cognition was measured before, during and after ECT with the Mini Mental State Examination (MMSE).
Results: The mean percentages decrease in MADRS scores were significantly lower in patients with severe medial temporal lobe atrophy compared to those without (–37.9% vs. –66.2%, $p < 0.01$). Cox proportional hazards ratios showed significant differences in time to remission after electroconvulsive therapy between patients with moderate to severe medial temporal lobe atrophy and patients without or with some medial temporal lobe atrophy (p for trend 0.01). In addition, no

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differences in MADRS score were found for white matter hyperintensities or general cortical atrophy. MMSE figures decreased more during ECT in patients with white matter hyperintensities, but were restored after treatment.
Conclusions: Medial temporal lobe atrophy, but not white matter hyperintensities or general cortical atrophy, predicts a poor response to electroconvulsive therapy in depressed elderly patients. These findings suggest that assessing medial temporal lobe atrophy could predict response to electroconvulsive therapy.

FC03.6

The degree of left anterior temporal atrophy predicts the rate of naming decline in primary progressive aphasia

Mathieu Vandenbulcke[1]; N Nelissen[2]; R Vandenberghe[2]

[1]*University Hospital Leuven KUL, Leuven, Belgium;* [2]*University Hospital Leuven KUL, Leuven, Belgium*

Background: The longitudinal course of Primary Progressive Aphasia (PPA) is difficult to predict in individual cases.
Objective: To determine if the rate of progression of anomia within the first year of follow-up can be predicted from initial structural MRI.
Methods: 18 patients with PPA and 15 matched controls underwent neuropsychological assessment and structural MRI at time of inclusion and one year later. Confrontation naming was assessed with the Aachen Aphasie Test. For all PPA patients, we calculated a Z-score of change for the confrontation naming scores based on the mean change and SD of controls. If the Z-score of change over time exceeded 1.96, the patient was classified as a rapid decliner. To determine the predictive value of structural MRI, we used voxel-based morphometry (SPM02) and compared rapid decliners with the remaining PPA patients using a two-sample t-test.
Results: Significant progression of naming impairment was present in 6 patients. These patients were classified as rapid decliners. Disease duration did not differ between rapid decliners and the other PPA subjects (3.3 years and 3.9 years respectively, Student's t-test = –0.45; p = 0.7). Left anterior temporal lobe atrophy at time of inclusion was predictive of naming decline: Gray matter volume of the left anterior temporal lobe was significantly lower in patients who declined on picture naming over the next year compared to patients who did not (–30, –4, –46, Z = 4.04, ext. 2398, corr. $P < 0.001$). The four patients with the lowest anterior temporal volumes also had significant single word comprehension impairment at time of inclusion.
Conclusion: In PPA the degree of left anterior temporal atrophy is predictive of a more aggressive disease course.

FC03.7

Association of multi-modality neuroimaging features with cognitive function in mild cognitive impairment and Alzheimer's disease

Huali Wang[1]; H Yuan[2]; M Su[3]; Y Zhu[1]; J Liao[2]; M Zhang[1]; X Yu[1]

[1]*Peking University Institute of Mental Health, Beijing, China;* [2]*Peking University Third Hospital, Beijing, China;* [3]*University of California, Irvine, CA, United States*

Objective: To investigate the association of multi-modality neuroimaging features and cognitive function in mild cognitive impairment (MCI) and Alzheimer's disease (AD).
Methods: Only subjects with normal-appearing white matter screened on T2 weighted MR images were included in this study. Nine individuals with amnestic MCI (aMCI), fifteen patients with mild probable AD, and eleven age-controlled cognitively normal controls (NC) were recruited. All participants were administered with mini-mental status examination (MMSE) and Cognitive assessment screening instrument (CASI) to assess general cognitive function. With a 3.0-T MR system, 3-D high-resolution anatomical images and DTI images were acquired. Optimized voxel-based morphometry (VBM) was employed to examine the relationship between changes of grey matter volumes and cognitive function. With a ROI-based approach, values of fractional anisotropy (FA) and mean apparent diffusivity coefficient (ADC) were measured as indicators of white matter microstructural alterations and used for correlation analysis.
Results: The scores of MMSE and CASI were correlated with the volumetric changes in such areas as temporal, frontal and parietal lobes, and cingulate gyrus and hippocampal gyrus ($p < 0.001$). The scores of MMSE and CASI were positively correlated with FA values, and negatively with ADC values in the white-matter-affected regions including temporal, frontal, and parietal lobes, cingulate gyrus, and parahippocampal gyrus ($P < 0.05$).
Conclusion: In the transition from aMCI to mild AD, cognitive decline was associated with the atrophy and white matter microstructural

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alterations in temporal, frontal, and parietal lobes, cingulate gyrus, and parahippocampal gyrus. Multimodality imaging technique may provide more evidence on elucidating the brain mechanism of cognitive impairment in old age.

FC04.1

Benefit of integrative psychotherapeutic nursing home programme for multiple psychiatric symptoms and caregiver burden after six months follow-up: A randomised controlled trial

Ton Bakker; H Duivenvoorden; J Van der Lee; M Olde Rikkert; A Beekman; M Ribbe

Argos Zorggroep, Schiedam, Netherlands

Background: In dementia patients the prevalence of multiple psychiatric symptoms (MPSs) is about 80%. MPSs have many negative effects on both patients and caregivers. Psychotropic drugs treatment is widespread in usual nursing home care (UC) in spite of limited effects and harmful side effects. Therefore, we developed and tested a tailor-made integrative psychotherapeutic programme (IRR).
Objective: To estimate the long term benefit of integrative psychotherapeutic nursing home programme (IRR) compared with usual care (UC) on multiple psychiatric symptoms (MPSs) and caregiver burden in dementia patients.
Design: Open RCT with a parallel group design
Setting: Nursing home
Intervention: IRR consisted of a clinical, tailor-made integrative psychotherapeutic programme (IRR) focused on MPSs of the patient as well as on burden of the caregiver.

UC comprised multidisciplinary home care, day treatment, mental healthcare and admission.
Patients: N = 168 (81 IRR; 87 UC). Patients had to meet DSM IV classification of dementia or amnestic disorders or other cognitive disorders. Additional inclusion criteria were: MMSE > 18 and < 27; Barthel Index (BI) > 5 and < 19; Neuropsychiatric Inventory (NPI) > 3.
Measurements: Primary outcome variable: change in MPSs after six months follow-up with NPI. Secondary outcome variables: Caregiver burden and competence by NPI-emotional distress, Caregiver burden, and Caregiver Competence List. Assessments after intake (T1); after six months follow-up (T3).
Statistics: Intention to treat-analysis on RRs (incl. NNTs) and complete cases analysis (CC) on ORs based on percentages of improved patients and caregivers (> 0.5 sd of baseline value).
Results: IRR showed a significant positive effect on NPI-cluster hyperactivity (RR 2.64; 95% CI: 1.26 to 5.53; NNT: 4.07). For patients who fully completed IRR the results were more pronounced with significant ORs of 2.80 on number of NPI-symptoms and 3.46 on NPI-sum-severity; in IRR up to 76% of patients improved. Regarding caregiver burden, competence of caregiver turned out to be significantly beneficial in IRR (RR 2.23; 95% CI: 1.07 to 4.62; NNT 5.07). In complete cases analysis the ORs of percentages of improved caregivers were significant in favour of IRR on emotional distress, general burden and competence (range ORs: 2.40 to 4.18) with high percentages of improved caregivers up to 71%.
Conclusion: This is one of the first RCT that addressed integrative psychotherapeutic interventions (IRR) on multiple psychiatric symptoms in dementia patients as well as caregiver burden. In long term on both outcome variables IRR was more beneficial than UC. The NNTs were relatively small and the percentages of clinically relevant improved patients and caregivers were high. Moreover, looking at patients and caregivers who fully completed the IRR programme, the benefit substantially increased.

FC04.2

Involving service users in older people's mental health services

Susan Mary Benbow

Staffordshire University, Stafford, United Kingdom

Introduction: The NHS Plan (Department of Health, 2000) aimed to increase user involvement (and public participation) in health care, stating: "for the first time patients will have a real say in the NHS. They will have new powers and more influence over the way the NHS works". Since then, a number of policy documents have reinforced this shift toward greater patient choice, greater patient influence in services at all levels, more personalised health and social care and stronger public involvement in the National Health Service in the United Kingdom (e.g. Department of Health, 1999; Department of Health, 2002; Department of Health, 2005a; Department of Health, 2005b; Department of Health, 2006).

Wallcraft, Read & Sweeney (2003) looked in detail at the user movement in mental health services, but their document is remarkable in omitting the issue of involving older people in mental health services and issues related to them. Diversity is seen in terms of gender and

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ethnicity, with age absent. This is probably because the mental health user movement developed in relation to general psychiatry services and the experiences of working aged adults. Thus if user involvement is a minority activity (Tait & Lester, 2005) that minority activity is focused on adult mental health services. There are probably a number of reasons for this: old age psychiatry (or alternatively older people's mental health, geriatric psychiatry or psychogeriatrics) is a relatively young specialty (Benbow & Jolley, 2006). Also there are particular challenges in involving older adults (e.g. concurrent physical health problems, possible cognitive impairment). For these reasons our knowledge about user involvement in old age psychiatry has been, until recently, very limited.

This presentation addresses different ways in which users and carers have been involved in older people's mental health and looks to the future.

Methods: The author has been involved in three different initiatives that involved service users:

1. The Faculty of Old Age Psychiatry at the Royal College of Psychiatrists set up a 'Consumer Group' that has had a national voice within the specialty.
2. Patient journeys were used in service improvement work by members of the West Midlands Older People's Mental Health Collaborative.
3. Work at Staffordshire University has involved service users in higher education.

Results:

1. The Consumer group enabled service users to raise issues of concern with the Faculty of Old Age Psychiatry and to comment on the Faculty's work.
2. Patient journeys were used by Collaborative teams to highlight areas for service improvement work, and these were then addressed by project teams.
3. Both service user-teachers and students evaluated a user/carer led teaching module highly, showing that users can be powerful and effective teachers and find the experience of teaching a positive experience.

Conclusions: The involvement of service users in older people's mental health services can introduce a powerful and positive voice. It is important that users have opportunities to influence both the services (at all levels) and the professionals who provide those services. The methodologies described here offer possible ways of doing this.

FC04.3

Knowledge translation tools for seniors' mental health

D Conn[2]; J Le Clair[3]; Kimberley Wilson[1]; S Helsdingen[1]

[1]CCSMH, Toronto, ON, Canada; [2]Baycrest, Toronto, ON, Canada; [3]Queen's University, Kingston, ON, Canada

In 2005 the Canadian Coalition for Seniors' Mental Health received funding from the Public Health Agency of Canada to develop national, multi-disciplinary evidence based guidelines on the assessment and treatment of mental illness in seniors. Four Guidelines were created, focusing on depression, delirium, suicide prevention, and mental illness in long term care homes. Since their release over 40,000 copies have been disseminated across Canada and worldwide, and the CCSMH have been focused on the implementation of the guideline recommendations into practice and policy.

With additional funding from the Public Health Agency of Canada, the CCSMH formed seven pilot projects using a variety of strategies to improve uptake of the guidelines. This included the creation of knowledge translation products as tools to facilitate implementation. Based directly on the guideline recommendations pocket guides for physicians, training packages including an interactive case-based DVD, adaptations of the guidelines to palliative care settings, and module based tele-educational sessions were created with consultation from project teams and the original Guideline authors. The CCSMH also created a tool to highlight the successful strategies in the pilot projects to assist others with the task of guideline implementation based on the lessons learned from the seven pilot sites.

The four Guidelines are also informing new guides for seniors and families, which will translate the information in the guidelines to a target new audience. Released in April 2009, these Guides help seniors and families to understand the guideline topics and to empower them to understand their own risk factors, illness and options for medical and psychosocial care, based on the most current evidence.

The goal of this session is to provide participants with innovative examples in guideline implementation and knowledge translation in seniors' mental health.

FC04.4

Psychiatric services for the 'old' old

Brian Draper; L Low

University of NSW, Sydney, NSW, Australia

Background: Few studies have examined mental health service delivery for persons aged over 85 years, often described as the 'old' old. This

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is a rapidly increasing age group where the style of psychiatric intervention is likely to differ from 'young' old age groups by requiring increased attention to geriatric syndromes, frailty, medical comorbidity, and functional status.
Aims: To compare mental health service provision in Australia to persons aged 85 years and over with service delivery to persons aged 65–84 years and those aged less than 65 years.
Methods: We examined mental health service delivery data for 2001/02 to 2005/06 from two publicly available Australian datasets, the National Hospital Morbidity database and Medicare Australia, in terms of age, gender, diagnoses, and treatment rates in community, specialist psychiatric inpatient and general hospital settings.
Results: Specialist psychiatric services in the community per annum per 1000 persons declined with age in women (age 20–64, 191.87; age 65–74, 68.84; age 75–84, 41.02; age 85+, 14.76) and men (age 20–64, 137.28; age 65–74, 43.24; age 75–84, 25.28; age 85+, 11.84). However women over 85 years received psychiatric home visits at 472% of the rate received by women under 65, and men over 85 received home visits at 377% the rate of men under 65. The annual hospital separation rate per 1000 persons for specialist psychiatric care was lowest in the 'old' old (4.18 for men, 6.98 for women) in comparison to other age groups, but for inpatient non-specialised psychiatric care was highest in the 'old' old (15.85 for men, 14.27 for women) in comparison to other age groups. The most common primary diagnosis resulting in specialised psychiatric hospitalisation was depression (3.2. 4.6 and 3.2 separations per 1000 persons per annum for 65–74 year olds, 75–84 year olds and 85 and over respectively), making up more than 70% of all psychiatric hospitalisations that received specialist care. The rate of separations per 1000 was higher for non-specialised than specialised care for dementia, delirium and other organic disorders, anxiety disorders and other mental and behavioural disorders in each age group over 65 years with the highest rates in those aged 85 years and over. The average length of stay (ALOS) for specialised psychiatric separations was similar for young old and old-old; however, for non-specialised separations ALOS increased in old-old. ALOS was lower in non-specialised than specialised psychiatric separations for all diagnostic groups examined in all older age groups. The proportion of specialist hospital separations with involuntary treatment was highest in 65–74 year olds (21.1%), intermediate in 85+ (19.6%) and lowest in 75–84 year olds (16.2%). Persons aged 85 years and above received the lowest rate of ECT compared to 65–84 years olds and 20–64 years old.
Conclusion: Mental health service delivery to the 'old' old is distinctly different from that provided to the 'young' old and younger adults being provided to a large extent in general hospital and residential settings. A consultation liaison style of mental health service delivery would be best suited for this pattern of care needs.

FC04.5

Special care units for people with dementia

Claudia Lai[1]; J Yeung[2]; V Mok[3]; I Chi[4]
[1]The Hong Kong Polytechnic University, Hong Kong, SAR PR China; [2]Nethersole Ho Miu Ling Hospital, Hong Kong, SAR PR China; [3]The Chinese University of Hong Kong, Hong Kong, SAR PR China; [4]University of Southern California, Los Angeles, CA, United States

Background: The behavioural problems of people with dementia are considered one of the most challenging issues in caring. Special Care Units (SCUs) have flourished since the 1980s with the aim of taking care of dementia patients, usually those with Alzheimer's disease, and in particular those with behavioural problems. Published results that evaluated the outcomes of SCUs have been conflicting. Because the establishment of an SCU necessitates resource allocation, a review of current evidence of the effectiveness of SCUs is crucial.
Objective: To evaluate the outcomes of SCU care in managing behavioural problems in patients with dementia through a systematic review of the literature.
Methods: Searches: The trials were identified from a search of the Specialized Register of the Cochrane Dementia and Cognitive Improvement Group (CDCIG), The Cochrane Library, MEDLINE, EMBASE, PsycINFO and CINAHL using the search terms: Special Care Units or SCUs. The CDCIG Specialized Register contains records from major healthcare databases including MEDLINE, EMBASE, CINAHL, PsycINFO, CENTRAL, and LILACS as well as many ongoing trial databases and grey literature sources. Selection criteria: All randomized controlled trials (RCTs) in which the outcomes of SCUs were compared against traditional nursing units (nursing homes, skilled nursing facilities) were included. Data collection and analysis: Two reviewing authors independently read the full reports of the potentially eligible studies and selected those that met the inclusion criteria. Discrepancies were resolved by discussions between the two reviewing authors. Final consensus was reached with input from a third member of the team when necessary.

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Results: No RCTs meeting the selection criteria were identified and non-RCTs were reviewed using the same protocol and criteria. Eight non-RCTs fulfilled the criteria for inclusion. Due to the lack of retrievable data, only the results of five studies could be analysed. In analysing the effect on agitation, there were small but statistically significant improvements that favoured the SCU group over time. For the effect on use of physical restraint, small but significant differences favouring SCU care were also observed at 6 and 12 months. In terms of mood and affect, the control group was significantly more depressed than the SCU group at 3 months. There was only one observation that favoured the control group. A small but significant effect favouring traditional nursing home care was observed at 6 months in the use of psychotropic medications. However, all of the results of the outcomes came only from a single study except for "physical restraint use" at 6 months, which included data from two studies. In addition, selection bias is a major confounding factor in non-RCTs. One of the non-RCTs reviewed accounts for almost all of the positive outcomes of SCUs, and the authors noted that the SCU and the control groups were not equivalent to begin with.

Conclusion: There are no identified RCTs investigating the effects of SCUs in managing agitated behaviour and the data from the five non-RCTs available revealed no strong evidence indicating SCUs to be superior to non-SCU in managing agitation in patients with dementia. Further studies are required in order to obtain a better, evidence-based answer.

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FC04.7

Improving geriatric mental health services in emergency departments

Angelina Yau; J Sadavoy; J Quinlan; J Tam

Mount Sinai Hospital, Toronto, ON, Canada

Introduction: To face the growing demands of seniors with mental health and behavioural issues presenting to the fast-paced Emergency Departments (ED), it is important to have effective, interdisciplinary management strategies. This project aimed to develop an evidence-based geriatric mental health (GMH) program for the ED that includes screening tools, process re-design, decision algorithm, knowledge building, cultural elements adaptation and elder-friendly ED environment to better serve this vulnerable population of seniors.

Methods: The project performed an assessment of current practices in the EDs, reviewed utilization patterns, conducted Emergency staff surveys and interviewed key stakeholders in addition to a comprehensive literature review of latest studies and best practices. A multidisciplinary committee of medical and clinical experts was recruited to strategize and develop an actionable, SMART-approached (specific, measurable, attainable, realistic, and timely) ED-GMH Program. Subsequently, the committee based on the newly designed program developed an e-learning education module for clinical and medical staff. A pilot was then planned with ED management teams of two academic hospitals in Toronto to test out the Program.

Results: The project found that Emergency Departments are currently facing a few key challenges: (1) lack of standardized senior MH&A assessment tools, processes and documentation, (2) ineffective communication between ED staff and between ED external partners, (3) lack of psychogeriatric training, (4) suboptimal follow-up process and resources, and (5) lack of an elder-friendly environment.

Moreover, nurturing a senior-focused philosophy that adapted with culturally sensitive elements to be embraced by the entire ED interdisciplinary team was also found to be a critical foundation to sustain any effective tool and process redesign.

These findings led to the development of the C.A.R.E. (Change to a different lens to recognize geriatric cognition, mood and behaviour, Assumption busting, Risk & recording, Environment) philosophy to support the newly designed ED-GMH Program, which emphasizes key roles and responsibilities, process steps, decision points, standardized assessment tools, records and an effective interdisciplinary communication process. Subsequently, based on the new program design, an e-learning education program with voiceover was developed. The education program contains a 2-hour clinical version and a 45-minute medical version.

The ED-GMH Program will be piloted for two months until the end of May 2009 in two Emergency Departments in Toronto.

An evaluation tool was also developed. It aims to measure outcomes of this new ED-GMH Program three months post-pilot. The results will help to further improve the new program and to prepare for a full implementation to other EDs in Toronto and beyond.

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Conclusion: With enhanced knowledge and skill sets, and a clear road map with service delivery tools and processes for Emergency staff, the project aims to improve the ED experience for seniors with behavioural and mental health issues. The ultimate goal is to offer an effective management scheme in the Emergency Department to recognize, manage and prevent geriatric delirium, as well as dementia and depression.

FC05.1

The AIBL study: Baseline data from a multi-centre, prospective longitudinal study of ageing in 1100 volunteers

David Ames[1]; C Rowe[2]; C Masters[3]; R Martins[4]; C Szoeke[5]; P Hudson[6]; A Milner[6]; K Ellis[7]

[1]National Ageing Research Institute, Melbourne, VIC, Australia; [2]Austin Health, Melbourne, VIC, Australia; [3]Mental Health Research Institute and Centre for Neurosciences, Melbourne, VIC, Australia; [4]Edith Cowan University, Perth, WA, Australia; [5]CSIRO, Melbourne, VIC, Australia; [6]Neurosciences Australia, Melbourne, VIC, Australia; [7]University of Melbourne, Melbourne, VIC, Australia

The Australian Imaging Biomarkers and Lifestyle Flagship Study of Ageing (AIBL) is a three-year prospective longitudinal study of more than 1100 volunteers from a cross-section of Australia's elderly population. The cohort comprises 1112 volunteers aged over 60 years [211 patients with AD (mean age 78.0 + 8.6 years), 133 patients with MCI (mean age 75.7 + 7.6 years), and 768 healthy volunteers (HV; 70.0 + 7.0 years)]. At baseline, volunteers completed lifestyle questionnaires and underwent comprehensive clinical and neuropsychology assessment. An 80ml blood sample was provided for clinical pathology, biomarker analysis, and storage in liquid nitrogen. 286 participants received a [C-11] PIB-PET scan (a measure of in vivo amyloid) and an MRI scan. In addition, 100 received scans of body composition (DEXA) and 91 participated in actigraph monitoring of activity levels. AD patients performed worse on all neuropsychological measures compared to both HV and MCI groups, and MCI patients showed greater impairment than HVs (all $p < 0.05$). Neuroimaging subgroup results revealed a significant difference between groups in the PiB+ve volunteers (98% of AD patients, 64% of MCI patients and 29% of HVs). HVs with an apolipoprotein-E (ApoE) $\varepsilon 4$ allele were significantly more likely to be PiB+ve than ApoE $\varepsilon 4$ negative HVs (49% compared to 21%, respectively). Cross sectional analysis of baseline data will reveal links between cognition, brain amyloid burden, structural brain changes, biomarkers, and lifestyle. An 18-month follow-up will reveal risk factors associated with cognitive decline and identify early diagnostic indicators of AD. These findings will assist development of techniques to identify factors that may delay onset of AD, and provide a cohort suitable for early intervention studies.

FC05.2

A randomized control trial of a brain preservation diet in preventing cognitive decline in non-demented old age hostel residents

Timothy Kwok; L Lam

The Chinese university of Hong Kong, Hong Kong, SAR PR China

Diets low in saturated fat and salt, high in oily fish, fruit and vegetables are associated with reduced risk of dementia. It is also important to ensure adequate fluid intake in older people, as dehydration is a risk factor of delirium. In order to show a causative role of diet in dementia, a randomized controlled trial is required.

435 non-demented subjects in 14 old age hostels in Hong Kong were recruited in 2006. Most old age hostel residents were independent in basic activities of daily living. Clustered randomization was performed by hostels. In total, 208 subjects in 6 hostels were assigned to have dietetic interventions and 227 subjects in 8 hostels were assigned to control group. The dietetic interventions by a trained dietician included regular small group activities at the hostels to promote the healthy diet as highlighted above and adjustment of hostel menu. The frequency of dietetic intervention was once in three weeks in the first year, and once in five weeks in the second year.

At baseline, the average age of all subjects was 83 years. 53.8% and 58.5% of intervention group and control group subjects had a clinical dementia rating (CDR) of 0.5. The remaining had a CDR of 0. CDR was performed by trained occupational therapists blinded to group assignment. Food intakes were estimated by 24-hour recall in cognitively normal older subjects and by food record in the cognitively impaired (CDR = 0.5). There were no significant group differences except that there were more male subjects, less hypertensive subjects and lower fish intakes in the intervention group. Dietary assessments were repeated at 4th, 8th, 12th and 24th month. CDR was repeated at 24th month. The

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primary outcome was cognitive decline as defined by an increase in CDR score.

At 24th month, 20 intervention group and 19 control group subjects had died, and 14 and 19 subjects dropped out respectively. 14 subjects in the intervention group (8.8%) and 25 subjects in the control group (17.9%) became demented (CDR 1 or more) (P = 0.0885, Fisher exact test). Intervention group subjects were significantly less likely to have cognitive decline as indicated by an increase in CDR scores (18.8% versus 31.0% in control group, P = 0.009 Chi square test). On logistic regression, after adjusting for sex and hypertension at baseline, the difference was similarly significant.

At 4th and 12th month, the intervention group significantly improved in the proportion of subjects reaching the targets for fruits, fish and water, but the changes were no longer significant at 24th month. At 24th month, there was significant group difference in changes in fish intake and urinary sodium:potassium ratio, with the control group decreasing in fish intakes because of less provision by hostels, and the intervention group increasing in urinary sodium. The other dietary changes and weight changes were not significantly different between the groups.

It was concluded that dietetic intervention significantly improved the quality of diet in the first year, but the effect was not sustained in the second year. The intervention was however effective in preventing cognitive decline in non-demented old age hostel residents.

FC05.3

Effects of Chinese style mind body exercise on cognitive function: A randomized control trial in Chinese persons with no clinical dementia

Linda Lam[1]; V Lui[1]; C Tam[1]; H Chiu[1]; W Chan[2]

[1]Chinese University of Hong Kong, Hong Kong, SAR PR China; [2]Department of Health, Hong Kong, SAR PR China

Background: Dementia is a major health problem in late life. For the past decades, pharmacological interventions have been the main focus of research. With increasing understanding of the complexity of factors affecting late life cognition and dementia, potential of non-pharmacological interventions are increasingly recognized. Among putative protective lifestyle factors, physical exercise is recognized as beneficial for preserving cognition. However, the modality and intensity of physical exercise that may offer optimal help on cognition remains to be clarified.

Methods: The present study reports the preliminary findings of a randomized control trial (RCT) on the effects of Chinese style mind-body exercise (24-form simplified Tai Chi) on cognitive function in a group of Chinese older adults without clinical dementia. 120 subjects with either Clinical Dementia Rating (CDR) of 0 or 0.5 were matched with age, educational level and CDR. They were randomized into an intervention (I) group (n = 60) and a control exercise (C) (n = 60) group. Both groups were offered an exercise intervention package. The I group was taught with 24 forms simplified Tai Chi over 4 to 6 weeks; the C group was taught control relaxation exercise in the same period. Subjects were advised to practice the exercise for 30 minutes per day with a frequency of not less than 3 days per week. Cognitive assessments were conducted at baseline and 4 months. Participants were assessed with Chinese versions of mini-mental state examination (MMSE), Alzheimer's disease assessment scale – cognitive subscale (ADAS-Cog), and category verbal fluency tests (CVFT).

Results: At 4 months follow up, both I and C groups showed significant improvements in ADAS-Cog, list learning delay recall tests and subjective cognitive complaints (paired t-tests, $p < 0.005$). I group also showed improvements in MMSE and CVFT tests (paired t-tests, $p < 0.05$). The magnitude of change in delayed recall test was significantly better in I group (Mann-Whitney U test, $p = 0.046$).

Conclusions: Although learning effects needs to be considered, it is possible that physical exercise is able to offer positive benefits in cognitive function. The modality of exercise may be important in modulating specific cognitive abilities. Long term follow up will be needed to further evaluate the potential of exercise intervention on prevention of dementia.

FC05.4

Spousal bereavement as a risk factor for cognitive decline in late life: The Cache County Study

Hochang Lee[1]; H Shao[2]; P Zandi[2]; C Lyketsos[1]; M Norton[3]

[1]Johns Hopkins University School of Medicine, Baltimore, MD, United States; [2]The Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, United States; [3]Utah State University, Logan, UT, United States

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Background: Spousal bereavement is among the most stressful of all late life events and leaves profound emotional and physical sequelae on the surviving spouse. Several studies have reported negative effect of spousal bereavement on mental and physical health, but few studies have examined its impact on the cognitive function of the surviving spouse.
Methods: The Cache County Study of Memory, Health and Aging was a population-based cohort study that enrolled 5092 persons age 65 and older. The study examined them based on a revised Modified Mini-Mental State Examination (3MS) collected at baseline, 3 year, and 7 year follow-up. Among those who were married (n = 2378; mean age: 73.04 + 5.51; female: 47.5%) at baseline, we estimated the association between death of spouse during the follow-up and 3MS scores over time using random effects modeling stratified by gender.
Results: Of 2378 married participants at baseline, 421 participants experienced spousal bereavement during the follow-up. After adjusting for age, education, APO-E4 allele, and depression, greater cognitive decline (coef. = –0.262; z = –3.32; p = 0.001; 95% CI [–0.415, –0.107]) on the 3MS relative to baseline was associated with spousal bereavement among female participants, but not among male participants (coef. = –0.175; z = 12.55, p = 0.121; 95% CI [–0.396, 0.046]).
Conclusions: Spousal bereavement is associated with accelerated cognitive decline among female elders, but not among male elders. Future study should investigate the behavioral or physiological mechanism underlying this relationship.

FC05.5

Secular trends in cognitive performance in relation to prediction of dementia

Simona Sacuiu[1]; D Gustafson[2]; X Guo[2]; S Ostling[1]; B Johansson[3]; I Skoog[2]

[1]Sahlgrenska University Hospital, Gothenburg, Sweden; [2]University of Gothenburg, Gothenburg, Sweden; [3]University of Gothenburg, Gothenburg, Sweden

Background: During 20th century, later born cohorts have improved in cognitive performance and also have gained in lifespan compared to earlier born cohorts. Meanwhile aging is the main risk factor for the development of dementia. We investigated differences in cognitive performance at baseline between two cohorts of non-demented 70-year-olds born 1901–02 and 1930, followed by subsequent prediction of dementia at 5-year follow-up.
Methods: Two representative cohorts of non-demented 70-year-olds from Gothenburg, Sweden, living in private households and in institutions, were examined psychiatrically in 1971–1972 (n = 382) and in 2000–2001 (n = 564). The cohorts were followed to age 75 years for the outcome of dementia. Cognition was evaluated psychometrically at each examination by testing short-term memory and attention (Digit Span forward and backward), perceptual speed (Identical Forms), verbal ability (Synonyms), and visuospatial (Block Design) and logical reasoning (Figure Classification). Dementia diagnosis required the presence of severe disorientation for time or place or severe memory impairment according to the psychiatric examination. The diagnosis of dementia at baseline in the cohort born 1930 was also made according to the DSM-III-R criteria and the observed agreement between dementia diagnoses was 78.6% (kappa 0.726). For those lost to follow-up, dementia diagnosis was based on medical records.
Results: Forty-three individuals developed dementia between 70 and 75 years (19 (4.4%) in cohort 1901–02 versus 24 (5.0%) in cohort 1930, p = 0.751). Mortality rate was considerably lower in cohort 1930 than in cohort 1901–02 (4.3 versus 15.7, p < 0.001). The cohort 1930 performed better on all psychometric tests at baseline compared to cohort 1901–02. All non-memory psychometric tests predicted dementia in cohort 1901–02, except the Digit Span tests, but none predicted dementia in cohort 1930.
Conclusions: Preliminary analyses suggest that it might be difficult to detect predictors of dementia in later born cohorts using certain non-memory psychometric tests.

FC05.6

Apathy as a risk of cognitive decline and dementia

Vorapun Senanarong[1]; K Harnphadongkit[1]; S Wannasaeng[1]; N Poungvarin[1]; O Chawalparit[1]; A Raksathapat[1]; S Udompanthurak[1]; J Cummings[2]

[1]Mahidol University, Bangkok, Thailand; [2]UCLA, LA, CA, United States

Objectives: To identify factors to predict apathy in Thai elders dwelling in the community.
Materials & Methods: 1999 Thai elders in the community near Siriraj Hospital in Bangkok, Thailand were assessed into 3 groups: mild cognitive impairment (MCI, using modified Petersen criteria), dementia, and no dementia no MCI. History questionnaire, physical examination,

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neuropsychological test, blood test, and magnetic resonance imaging (MRI) of the brain were offered to this cohort. Then T test and Chi square test analysis were used to identify the factors differentiating elders with and those without apathy. The receiver operating characteristic curve (ROC) was plotted for predicting factors of apathy.

Results: Among 1999 care records, 1951 had data enough to evaluate for apathy. 318 elders had blood tests and 223 had MRI of the brain. In this cohort, 129 (6.61%) had apathy. Nineteen (24.1%) dementia, 37 (8.9%) MCI, and 73 (5%) non case had apathy ($p<0.001$). Mean age of apathy subjects was 70.61 (7.31) and of those without apathy was 69.42 (6.66) ($p = 0.077$). Mean Thai mental state examination (TMSE) of the apathy group was 23.94 (5.37) and of the non-apathy group was 26.25 (3.34) ($p<0.001$). Mean Thai activity of daily living (ADL) score in the apathy group was 2.27 (4.24), and the non-apathy group was 0.71 (2.09) ($p<0.001$). Body weight had a trend to predict apathy (56.25 (12.58) kgms in apathy, 58.53 (11.10) kgms in non-apathy, $p = 0.051$). Systolic blood pressure differed between the 2 groups (136.06 (19.97) mmHg in apathy, 140.73 (20.00) mmHg in non-apathy, $p = 0.011$). History of arthritis was a significant difference between the 2 groups (36 (28.1%) in apathy, 341 (18.8%) in non-apathy, $p = 0.031$). Blood cholesterol, triglyceride, hemoglobin, white blood cell count, B12, homocysteine, serum free thyroxine, and serum folate levels were not different between the 2 groups. From the brain MRI, there was no difference in global cortical atrophy score, white matter lesions by Scheltens scores, and number of small and large vessel infarction between the 2 groups. However, left medial temporal atrophy score was significant higher in the apathy group (1.83 (0.92) in apathy, and 1.41 (0.95), $p = 0.039$). The area under the curve of ROC of systolic BP, TMSE, and Thai ADL as risks for apathy was 0.578, 0.637, and 0.628 accordingly. Logistic regression analysis revealed only diagnostic group (MCI, dementia, non case) was a significantly predicting factor for apathy.

Conclusion: Elders with apathy had lower systolic BP, poorer daily function, and poorer cognition performance. Left MTA atrophy and cognitive status were significant different factors between apathy and non-apathy elders. Further study of apathy as a risk of dementia was needed.

FC06.1

Dementia time to death: A review of brought forward time after dementia diagnosis

Henry Brodaty[1]; K Seeher[2]; L Gibson[2]

[1]University of New South Wales, Sydney, NSW, Australia; [2]Prince of Wales Hospital, Randwick, NSW, Australia

Background: Dementia shortens life expectancy and is among the leading causes of death in the elderly. Age, male gender, dementia type and severity have been linked to decreased survival time. However, life expectancy in general as well as survival time after dementia diagnosis appear to be increasing, perhaps reflecting temporal trends such as earlier diagnosis or differences in management. Life expectancy with dementia has a direct impact on rates of dementia prevalence and service needs, and is a common question posed by families and patients. The answer varies with patient age and other factors. To put a raw figure of years of life expectancy into perspective, it is useful to consider how many years the time of death has been brought forward.

Aims: The aims of this review were to determine the brought forward time and predictors of mortality, specifically age, gender, dementia type and severity and calendar year.

Method: We performed a systematic literature review on survival time with dementia using Medline, Pre-Medline, Embase, CINAHL, PsycInfo and the Cochrane Database of Systematic Reviews. Papers were included if they reported mean or median survival time from diagnosis or other relevant data so that survival time from diagnosis could be estimated. The reported survival times were then compared to the estimated life expectancy in the adequate general population. We compared two epochs, (prior to and after widespread introduction of cholinestersase inhibitors, i.e. 1985–1997 and 1998–2008).

Results: All 39 papers included in this review emanated from the United States and Europe. The impact of dying from dementia decreased with increasing age, e.g. patients diagnosed when aged 60–64 years had 67.7 years of life expectancy, which brought forward their time of death by 13.11 years; i.e. they lost 16.2% of life expectancy. For patients aged 75–79 and 90+ at diagnosis the brought forward years were 4.95 and 0.5, and they lost 5.7% and 0.5% of life expectancy respectively. Survival time in AD tended to be longer as compared to other types of dementia. Male gender was associated with shorter survival. However, women experienced a greater loss in terms of their life expectancy as compared to men. Overall, increased disease severity was associated with shorter survival. Data on temporal effects of study epoch were inconclusive and confounded by different mean ages. The review was limited by

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various deficiencies and problems in reporting such as insufficient descriptions of samples, inconsistent terminology, under-reporting of survival time itself or non-age matched control groups.
Conclusion: Brought forward time of death for dementia patients is influenced by patient age and gender and type and severity of dementia, as well as temporal effects. Recommendations for future research methods are proposed.

FC06.2

The cost effectiveness of donepezil in the treatment of Alzheimer's disease in the UK: Estimates based on updated evidence and microsimulation techniques

Denis Getsios[1]; S Blume[3]; J Ishak[2]; G Maclaine[4]

[1]United BioSource Corporation, Halifax, NS, Canada; [2]United BioSource Corporation, Montreal, QC, Canada; [3]United BioSource Corporation, Bethesda, MD, United States; [4]Eisai Global Medical & Marketing Services, Hatfield, United Kingdom

Based on recommendations from the National Institute for Health and Clinical Excellence (NICE), the UK has restricted treatment of Alzheimer's disease (AD) with cholinesterase inhibitors, on cost-effectiveness grounds, to patients with moderate cognitive decline. As the model and analyses used to inform the NICE recommendation have been much criticized, we sought to overcome the limitations of existing models and produce updated estimates of the cost-effectiveness of treating AD in the UK with donepezil 10 mg using the most recent available data.
Methods: A discrete event simulation was developed which predicts progression of AD through correlated changes in cognition, behavioral disturbances and function. Patient-level data from eight randomized placebo-controlled donepezil trials and a seven-year follow-up registry provided the basis for modeling longitudinal outcomes. Individuals in the simulation are assigned unique demographic and clinical characteristics and then followed for 10 years with severity of disease tracked on continuous scales. Patient mix and costs were developed from UK-specific literature. Costs of care were based on UK practice patterns, and varied by severity of disease and location of care, ranging from £649 per month for patients with very mild disease (MMSE 25 to 26) living in the community, to £2,645 for patients living in institutions. The cost of donepezil 10mg was £3.18 per day, and persistence with treatment was based on published UK data. Quality adjusted life years (QALYs) were calculated based on equations that accounted for disease severity on multiple scales and other relevant patient characteristics, with separate equations used to predict QALYs for patients and for caregivers. All costs are reported in 2007 British pounds, and outcomes discounted at 3.5%. Analyses were run for severity subgroups to evaluate outcomes in each sub-population. Disease severity was defined based on MMSE ranges: mild AD (MMSE 20 to 26), moderate AD (MMSE 10 to 20) and severe AD (MMSE below 10).
Results: Over 10 years, treatment of all patients with mild to moderate disease reduces overall direct medical costs by an average of over £1,400 per patient. When unpaid caregiver time is also taken into consideration, savings increase to over £4,000 per patient. Compared to untreated patients, patients on donepezil experience a discounted gain in QALYs averaging 0.12, with their caregivers gaining on average 0.01 QALYs. Furthermore, treated patients maintain MMSE scores above 10 for over 5 months longer than untreated patients, and spend over 2 months longer living in the community. Savings are considerably larger when treatment is initiated during milder stages of the disease (MMSE 20 to 26), averaging almost £3,700 in direct medical costs and over £6,800 in total societal costs. This is in large part due to an almost 30% increase in the average delay to placement of patients within institutions. For patients starting treatment with MMSE scores between 10 and 20, savings are more modest, averaging £470 and £2,460 from healthcare and societal perspectives respectively. QALY gains are comparable, but somewhat smaller when treatment starts after MMSE falls below 20. Results are most sensitive to estimates of patient care costs, rates of institutionalization in the UK and persistence with therapy. In one way sensitivity analyses, however, donepezil was predicted to lead to savings in most cases, as was also the situation with probabilistic sensitivity analyses.
Conclusions: Donepezil leads to health benefits and cost savings when used to treat mild to moderately severe patients with AD in the UK. Contrary to analyses used to inform the decision by NICE in the UK to recommend restriction of treatment to patients with moderate disease, our simulations indicate that both benefits and savings are greatest when treatment is started while patients are still in the mild stages of AD.

FC06.3

Screening and treatment of Alzheimer's disease with donepezil: Cost-effectiveness estimates for the UK

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Denis Getsios[1]; S Blume[3]; J Ishak[2]; G Maclaine[4]

[1]United BioSource Corporation, Halifax, NS, Canada; [2]United BioSource Corporation, Montreal, QC, Canada; [3]United BioSource Corporation, Bethesda, MD, United States; [4]Eisai Global Medical & Marketing Services, Hatfield, United Kingdom

Earlier diagnosis and treatment of Alzheimer's disease (AD) may delay onset of disease progression and improve patient and caregiver quality of life, but the costs of screening patients need to be evaluated. This study estimates the cost-effectiveness of screening patients in the UK who report subjective memory complaints and treating those diagnosed with AD with donepezil 10 mg.

Methods: A model, programmed as a discrete event simulation was developed. Patient-level data from eight randomized placebo-controlled donepezil trials and a seven-year follow-up registry were used to model correlated longitudinal rates of change and treatment effects in cognition, behavior, and function over time. Simulated individuals were followed for 10 years starting from presentation to their general practitioner with subjective memory complaints. AD prevalence data, including estimates of diagnosed and undiagnosed dementia and the delay between onset of symptoms and diagnosis of disease were based on UK estimates. The frequency of subjective memory complaints amongst individuals with and without dementia was based on a recently published meta-analysis. Screening was estimated to cost £450 per patient with dementia and £294 per patient without dementia, and only individuals between the ages of 65 and 100 were assumed to undergo screening. Costs of care were based on UK practice patterns, and varied by severity of disease and location of care, ranging from £649 per month for patients with mild disease living in the community to £2,645 for patients living in institutions. The cost of donepezil 10mg was £3.18 per day. All outcomes were discounted at 3.5% per annum.

Results: Seventeen patients need to be screened to diagnose one patient with AD with screening costing an average of £5,100 per patient diagnosed with Alzheimer's disease. Compared to a scenario with no screening or pharmacologic treatment, screening reduces overall medical costs by an average of £2,500 per patient, even after accounting for the costs of screening and donepezil. When the costs of caregiver time are considered, savings total over £4,400 per patient. Health benefits are also substantial. Patients screened and treated with donepezil spend an average of almost 5 months less with MMSE scores below 10, almost 2 months less with significant behavioral disturbances, and over 3 months longer living in the community. On average, patient quality adjusted life years (QALYs) improve by 0.18, while caregivers experience a more modest increase, averaging 0.02 QALYs. Screening also leads to savings and health gains when compared to a scenario where treatment with donepezil is initiated upon diagnosis in the absence of screening. Compared to delayed treatment in the absence of screening, screening reduces the societal cost of AD by over £3,000 per patient, and increases patient QALYs by an average of 0.12. Results are sensitive to estimates of patient care costs and estimates of the difference in subjective memory complaint reporting rates amongst individuals with and without dementia. Nevertheless, in probabilistic sensitivity analyses, screening dominates no treatment in 63% of replications, and results in cost per discounted QALY estimates below £30,000 in 86% of replications.

Conclusion: Although screening has significant upfront costs, identifying and treating AD patients early results in overall cost savings and QALY benefits compared to no treatment, and larger QALY benefits than treatment following delayed diagnosis without screening.

FC06.4

The effect of a high-intensity functional exercise program on activities of daily living: A randomized controlled trial in residential care facilities

H Littbrand[1]; L Lundin-Olsson[2]; Yngve Gustafson[1]; E Rosendahl[3]

[1]Geriatric Medicine, Umea, Sweden; [2]Physiotherapy, Umea, Sweden; [3]Division of Health and Rehabilitation, Lulea, Sweden

Objective: To evaluate whether a high-intensity functional weight-bearing exercise program reduces dependency in activities of daily living (ADL) among older people living in residential care facilities, focusing on people with dementia.

Method: Randomized, controlled trial performed in nine residential care facilities.

One hundred and ninety-one older people dependent in ADL and with a Mini-Mental State Examination score $\geq$ 10 were randomized to either a high-intensity functional weight-bearing exercise program or a control activity, comprising 29 sessions over 3 months. One

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hundred (52%) of the participants had a diagnosed dementia disorder. The Barthel ADL Index (0–20 version) was measured at baseline and at follow-up at 3 months (directly after the intervention) and at 6 months with intention-to-treat analyses.

Results: There were no statistically significant differences between the groups regarding overall ADL performance. Analyses for each item revealed that a lower proportion of participants in the exercise group had deteriorated regarding indoor mobility at 3 months (exercise 4% versus control 16%, P = .010) and 6 months (8% versus 20%, P = .029). Among people with dementia, there was a significant difference in overall ADL performance in favor of the exercise group at 3 months (mean difference 1.1, P = .029), but not at 6 months.

No significant differences were observed in applicability of the high-intensity functional weight-bearing exercise program when comparing participants with dementia and participants without dementia.

Conclusion: A high-intensity functional weight-bearing exercise program seems to reduce disability regarding indoor mobility for older people living in residential care facilities. The program does not appear to have an overall effect on ADL. However, among people with dementia the exercise program may have an overall effect on ADL but continuous training may be needed to maintain that effect.

FC06.5

Improvement of cognitive impairment by shunt surgery in patients with idiopathic normal pressure hydrocephalus: Evidence from SINPHONI

Hiroaki Kazui[1]; E Mori[2]; M Ishikawa[3]; M Hashimoto[4]; N Kuwana[5]; M Takeda[1]

[1]*Osaka University Graduate School of Medicine, Suita, Japan;* [2]*Tohoku University Graduate School of Medicine, Sendai, Japan;* [3]*Rakuwakai Otowa Hospital, Kyoto, Japan;* [4]*Noto General Hospital, Nanao, Japan;* [5]*Hokubu Kyosai Hospital, Yokosuka, Japan*

Idiopathic normal pressure hydrocephalus (iNPH) is considered as a treatable syndrome of the classical triad of gait disturbance, cognitive impairment, and urinary disturbance. However, previous studies have shown a wide range of response rates to the shunt surgery. In addition, it is more difficult to improve cognitive impairment than gait disturbance. Magnetic resonance imaging (MRI) findings of enlarged sylvian fissures together with ventriculomegaly and tight high-convexity and medial subarachnoid space are well-known as the characteristic features of iNPH and the features can be observed before the triad symptoms emerged in patients with iNPH. However, the effect of the characteristic MRI features on the shunt surgery still remains to be determined. We conducted a multicenter prospective study (Study of Idiopathic Normal Pressure Hydrocephalus on Neurological Improvement: SINPHONI) between 2004 and 2006 to demonstrate therapeutic outcome of the shunt surgery. The inclusion criteria for the patients were (1) at the age of between 60 and 85 years, (2) having at least one of the triad symptoms; gait disturbance, cognitive impairment, and urinary disturbance, which are measurable on the iNPH Grading Scale (iNPHGS), (3) having the MRI features of iNPH mentioned above, (4) having no other disorders causing ventriculomegaly, (5) having normal CSF content and pressure. In this study, 100 patients (74.5 ± 5.1 years, 58 men and 42 women) with possible iNPH were recruited. They received a ventriculo-peritoneal shunt surgery with an adjustable valve and were observed for a year following the surgery. Each of the triad symptoms was separately evaluated with the iNPHGS. Cognitive impairment was also evaluated with the Mini-Mental State Examination (MMSE). In addition, the overall functions in social or daily life were evaluated with the modified Rankin Scale (mRS). These evaluations were repeated at baseline and at 3, 6, and 12 months after the shunt surgery. In the case that there were missing data at any follow-up time point, the data were imputed using the "last observation carried forward". The scores on the iNPHGS, MMSE, and mRS were significantly improved at 12 months (Wilcoxon test) (Table). The one-year improvement rates were 56.0% on the cognitive (Figures 1 and 2), 68.0% on the gait, and 58.0% on the urinary scores of the iNPHGS and 69.0% on the mRS. The number of patients without objective cognitive impairment (iNPHGS cognitive score ≤1) increased from 20 at baseline to 51 at 12 months (Figure 1). 37 (46.0%) out of 80 patients with iNPHGS cognitive score >1 at baseline improved their cognitive function and achieved the iNPHGS cognitive score 1 or less at 12 months. The number of patients with the MMSE score >23 increased from 48 at baseline to 63 at 12 months. There were 25 (48.0%) out of 52 patients with the MMSE score <24 at baseline whose MMSE score was improved to more than 24 at 12 months. Shunt surgery improved cognitive impairment in approximately half of the iNPH patients. In addition, objective cognitive impairment disappeared after the shunt surgery in half of the iNPH patients.

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FC06.6

Does serotonin augmentation have any effect on cognition and activities of daily living in Alzheimer's dementia? A double-blind, placebo-controlled clinical trial

Arash Mowla

Bushehr University of Medical Sciences, Bushehr, Iran

Objective: Recent studies suggest that cholinergic dysfunction does not provide a complete account of age-related cognitive deficits, and other neuronal systems like monoaminergic hypofunction are involved. In several studies, selective serotonin reuptake inhibitors demonstrated promotion in neurogenesis in the hippocampus and enhanced memory and cognition. The aim of this study is to survey the effect of serotonin augmentation on cognition and activities of daily living in patients with Alzheimer's disease.

Method: The trial was designed as a 12-week randomized, placebo-controlled, double-blind study. One hundred twenty-two patients aged 55 to 85 years with mild-to-moderate Alzheimer's dementia were randomly allocated in 1 of the 3 treatment groups: fluoxetine plus rivastigmine, rivastigmine alone, or placebo group. Efficacy measures comprised assessments of cognition, activities of daily living, and global functioning. Hamilton Depression Scale also was used to assess changes in mood throughout the study.

Result: Fluoxetine plus rivastigmine and rivastigmine groups demonstrated improvement on measures of cognitive and memory without any significant difference; however, the former group did better in their activities of daily living and global functioning. Patients taking placebo had significant deterioration in all the efficacy measures. Patients taking rivastigmine or rivastigmine plus fluoxetine had improvements in Hamilton Depression Scale without significant differences.

Conclusions: Concomitant use of selective serotonin-enhancing agents and acetyl cholinesterase inhibitors can provide greater benefit in activities of daily living and global functioning in patients with cognitive impairment. Because our study is preliminary, larger double-blind studies are needed to confirm the results.

FC06.7

Effects of physical exercise on physical functions and ADL among people with dementia: A systematic review of randomized controlled trials

H Littbrand[1]; M Stenvall[1]; E Rosendahl[2]

[1]Umeå University, Umeå, Sweden; [2]Luleå University of Technology, Luleå, Sweden

Objective: The aim of the systematic review was to evaluate physical exercise among people with dementia, regarding the applicability (attendance, achieved exercise intensity, adverse events) and the effects on physical functions (gait, balance, mobility, muscle strength) and activities of daily living (ADL).

Methods: Published randomized controlled trials were identified in PubMed, Cinahl, AMED, The Cochrane Library, and in reference lists. According to pre-defined criteria, two authors independently reviewed studies for inclusion, rated methodological quality, and extracted data. Statistical pooling could not be performed due to differences in types of exercise interventions.

Results: Six exercise studies among people with a diagnosed dementia disease were included. Most studies were performed in residential care facilities and among people with Alzheimer's disease. Number of participants ranged from 12 to 134, mean age from 74 to 87 years, and the proportion of women from 53% to 84%. Two studies evaluated walking exercise and four studies evaluated combined exercise programs, i.e. programs including more than one exercise modality. The frequency and duration of the interventions differed substantially between studies. Mean attendance of the exercise interventions was reported in two studies; 33% and 80%. Only one study reported data on adverse events and no study reported data on achieved exercise intensity.

Three studies reached "moderate" methodological quality and three "low". In the studies with moderate quality, two reported positive effects. One of these studies reported effects on ADL and gait ability after a combined functional weight-bearing exercise program in group and the other study reported an effect on gait after walking exercise performed individually.

Conclusion: Exercise programs seem to be applicable for use among people with dementia and may have important effects for this group. However, more studies, with high methodological quality and data on both applicability and effects, are needed among people with different types of dementia diseases and in different settings.

FC07.1

Effects of a high-intensity functional exercise program on depressive symptoms and psychological wellbeing among older people living in residential care facilities: A randomized controlled trial

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M Conradsson[1]; H Littbrand[1]; N Lindelöf[1]; Y Gustafson[1]; E Rosendahl[2]

[1]*Umeå University, Umeå, Sweden;* [2]*Luleå University of Technology, Luleå, Sweden*

Objectives: To evaluate the effects of a high-intensity functional weight-bearing exercise program on depressive symptoms and psychological wellbeing among older people dependent in activities of daily living (ADL) and living in residential care facilities.
Method: Randomized controlled study. A high-intensity functional weight-bearing exercise program was compared to a control activity. Outcome measures were Geriatric Depression Scale-15 (GDS-15) and Philadelphia Geriatric Centre Morale Scale (PGCMS), assessed at baseline, 3 and 6 months. Participants were 191 older people, aged between 65 and 100 years, dependent in ADL and with Mini Mental State Examination scores between 10 and 30. One hundred (52%) of the participants had a diagnosed dementia disorder. The exercise intervention and the control activity were performed in groups, and sessions were held five times each two weeks during 3 months, for a total of 29 times.
Results: At baseline, mean ± SD (range) for GDS was 4.4 ± 3.2 (0–14), and for PGCMS it was 11.0 ± 3.5 (2–17). Thirty-seven percent were considered to have symptoms of depression (GDS > 4), and 63% had decreased psychological wellbeing (PGCMS < 13). At 3- and 6-month follow-up, there were no significant differences in GDS or PGCMS between the exercise and the control group.
Conclusion: A high-intensity functional weight-bearing exercise program did not influence depressive symptoms or psychological wellbeing among older people dependent in ADL and living in residential care facilities. An individualized and multifactorial intervention may be needed to influence depressive symptoms or psychological wellbeing in this group of older people.

FC07.2

Gender differences in depressive symptoms of aging Chinese in urban Jiangsu in China

Aimei Guo[1]; D Lai[2]

[1]*Nanjing Normal University, Nanjing, China;* [2]*University of Calgary, Calgary, AB, Canada*

Objective: Previous research has consistently called attention to the gender differences in depressive symptoms in the elderly population. However, few of the findings have addressed the potential factors underlying the gender differences. With the growth of the aging population in China, issues related to gender differences and mental health have emerged as an important research focus, although limited research has been conducted to examine the gender differences in depression in the elderly Chinese in China. This study aimed to examine gender differences in depressive symptoms among older Chinese
Method: The data were based upon a survey with 497 randomly selected aging Chinese 60 years or older in Jiangsu, China. A Chinese version of the 15-item Geriatric Depression Scale was used to measure depressive symptoms. Hierarchical multiple regression analysis was used and the total number of depressive symptoms were reported as the dependent variable. When performing the hierarchical multiple regression analysis, the effect of gender was tested by first entering the socio-demographic and physical health variables in the hierarchical multiple regression model, followed by the gender variable. Separate multiple regression analysis was also conducted with the two gender groups, with all the independent variables included in the regression at the same time using the entered method. Finally, the presence of each of the depressive symptoms in the GDS-SF was treated as a dependent variable in separate hierarchical logistic regression analysis, with the socio-demographic variable and the physical related variables included first, using the forward entered method, followed by the gender variable.
Results: Gender differences in depressive symptoms were identified in this study, demonstrating better mental health among men than women. Depressive symptoms correlated with lower levels of education, financial inadequacy, lower levels of satisfaction toward housing, higher levels of worry, and poorer physical health. When controlled for other confounding factors, the effect of gender was not significant. Gender differences were most likely attributed to women's less favourable status in education level, living arrangement, housing condition, and social support.
Discussion: The findings indicate that the gender difference is reflective of the effects of other socio-demographic factors on mental health. To further examine the reasons for the gender differences by testing each of the depressive symptoms, this study has found that gender correlated with only a small number of symptoms. The less favourable access to education and limited financial resources of older women are some of the accumulated inequitable outcomes that are likely to result in a higher level of worry and therefore poorer mental health. The gender differences could be due to the socio-economic context in China. The findings identified could be the reference points to determine the types of prevention and interventions that should be focused on by related services.

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FC07.3

Depression in relation to purpose in life among a very old population: A 5 year following up study

Pia Hedberg[1]; C Brulin[3]; Y Gustafson[2]

[1]*Umeå University, Umeå, Sweden;* [2]*Nursing, Umeå, Sweden;* [3]*Department of Community Medicine and Rehabilitation, Geriatric Medicine, Umeå, Sweden*

Background: Purpose or meaning in life has been discussed by philosophers for hundreds of years and has been reported to be associated with depression. It has been suggested that purpose in life (PIL) can serve as a protection against depression in young and middle aged people but no longitudinal studies have been performed among very old people.
Objectives: The aim of the present study was to investigate the relationship between purpose in life and depression and further investigate whether purpose in life can serve as a protection from developing depression among very old men and women in a 5 year follow up study.
Methods: The cross-sectional study included 189 participants (120 women and 69 men) 85–103 years of age who were living in a county in northern Sweden. In the prospective study those who had not been diagnosed as depressed at baseline were included in the 5 year follow up study (n = 78). The dependent variable was depression assessed with the Geriatric Depression Scale (GDS-15), the Organic Brain Syndrome Scale (OBS-Scale) and the Montgomery-Asberg Depression Rating Scale (MADRS) and DSM-IV criteria were used. Purpose in Life was assessed with the PIL test.
Results: In the cross-sectional study preformed 2000–2002, 40 out of 189 (21.2%) were depressed and those with depression had significant lower PIL scores compared to those without depression (mean score 107 vs. 99, p = 0.014). After 5 years 78 out of 87 without depression at baseline were possible to assess for depression. Twenty-one (26.9%) had developed depression and their mean PIL score at baseline was 106, SD ±17.4, compared to those who had not developed depression (PIL score 108, SD ±16, p = 0.750). When using multivariate logistic regression analysis controlling for possible confounders we found no association between purpose in life and the risk of developing depression after 5 years.
Conclusions: The result shows a significant relationship between purpose in life and depression in the cross-sectional study. However, it seems that purpose in life does not serve as a protection for the risk of developing depression among very old people.

FC07.4

Adapting interpersonal psychotherapy for older adults at risk for suicide

Marnin Heisel[1]; P Duberstein[2]; N Talbot[2]; D King[2]; X Tu[2]

[1]*The University of Western Ontario, London, ON, Canada;* [2]*University of Rochester Medical Center, Rochester, NY, United States*

Older adults have high rates of suicide and employ lethal means of self-harm. Despite the high prevalence of suicide among older adults, a paucity of research exists investigating focused interventions targeting suicide ideation, a key risk factor for late-life suicide. The present study reports on findings of an uncontrolled pre-post-treatment study, funded by the American Foundation for Suicide Prevention, to adapt and pilot test a 16-week course of individual Interpersonal Psychotherapy (IPT) for older outpatients at elevated risk for suicide. Preliminary findings support the feasibility, tolerability, and safety of the adapted intervention (Heisel, Duberstein, Talbot, King, & Tu, in press). Participants experienced significant pre- to post-treatment reductions in suicide ideation and in the presence and severity of depressive symptoms, and improvement in psychological well-being. The present study extends preliminary findings to a larger sample and reports on 3-month follow-up assessments.

FC07.5

Continuing treatment of depression in the elderly: A systematic review and meta-analysis of double-blind randomized controlled trials with antidepressants

Rob Kok

Parnassia Psychiatric Institute, The Hague, Netherlands

Background: The efficacy of short term treatment with antidepressants in the elderly has been established in many reviews.
Method: In this systematic review and meta-analysis of continuation and maintenance treatment in the elderly, we pooled data from 8 double-blind RCTs with 925 participating patients.
Results: The NNT for antidepressants to prevent one additional relapse or recurrence was 3.6 (95% CI; 2.8–4.8). The OR of 0.27 (95% CI 0.18–0.40) for relapse or recurrence using antidepressants compared with placebo is in accordance with a previous review in adult patients including a minority of elderly patients, where continuation

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of antidepressant treatment resulted in an OR of 0.30 (95% CI 0.22–0.38), compared with treatment discontinuation.

In the 5 studies that provide drop out data, 14 out of 330 patients (4.2%) using an antidepressant dropped out due to side effects compared with 17 out of 330 patients (5.2%) using a placebo.

Conclusion: Continuing treatment with antidepressants in elderly patients is efficacious compared with placebo in preventing relapses and recurrences. The NNT is comparable with adult patients.

FC07.6

Changes in cognitive function during unilateral and bilateral ECT in elderly depressed patients

Daniel O'Connor[1]; B Gardner[2]; B Eppingstall[1]; D Tofler[1]

[1]*Monash University, Melbourne, VIC, Australia;* [2]*Wantirna Hospital, Melbourne, VIC, Australia*

ECT is an effective treatment of severe depression but is associated with changes in concentration and new learning that are largely reversible but can still be distressing and hazardous. Risk factors include age, pre-existing cognitive impairment, high energy stimulation and bilateral ECT. Now that ECT is individualized, differences between unilateral (UL) and bilateral (BL) ECT might be reduced. We compared patients aged 65+ given UL (n = 47) and bitemporal BL (n = 16) after the 1st or 2nd treatments (Time 1) and after the 5th or 6th treatments (Time 2) using brief tests of verbal, immediate and delayed verbal, and autobiographical memory. This approach was chosen to include as many severely depressed patients as possible. Differences between UL and BL were non-significant, suggesting that modern ECT techniques mitigate the risk of cognitive impairment in this vulnerable group

FC07.7

Disability, death wishes and depression in elderly Europeans: Data from the EURODEP Consortium

Margda Waern[1]; S Ostling[1]; A Braam[2]; A Eurodep Consortium[2]

[1]*Univ of Gothenburg, Gothenburg, Sweden;* [2]*Free University, Amsterdam, Netherlands*

Aim: Physical illness is associated with both depression and suicidal behaviour. The association between functional disability and suicidality is less clear. The aim was to examine the relationship between functional disability and death wishes in elderly Europeans and to investigate whether functional disability is independently associated with death wishes.

Methods: Secondary analysis of pooled data from 11 European population studies in persons aged 65 years and above with a total of 16,487 respondents (6,727 men and 9,760 women). Level of functional disability was trichotomised (none, intermediate, high) at each participating centre. Measures of 12 depressive symptoms (0/1) were summed to create the EURO-D score, yielding an overall measure of depressive symptom burden. A person was considered to have death wishes if the death wish/suicidal ideation item of the EURO-D scale was endorsed. Odds ratios for death wishes associated with functional disability were calculated in a logistic regression model. The final model was adjusted for age, sex, study site and EURO-D score.

Results: Death wishes were present in 3.6% of those with no functional disability, in 7.2% of those with intermediate disability and in 15.4% of those with a high degree of disability. Proportions with death wishes increased with increasing level of disability in most study centres. High degree of functional disability was associated with death wishes (OR = 1.3, 95% CI 1.1–1.6) even after adjustment for EURO-D score.

Conclusions: Functional disability was associated with death wishes, and the relationship was independent of depression. Physicians who care for elderly persons need to be aware of this association.

FC08.1

Neuropsychiatric symptoms in demented and non-demented community-dwelling elderly Nigerians

O Baiyewu[1]; K Lane[3]; F Unverzagt[3]; A Ogunniyi[4]; V Smith-Gamble[2]; O Gureje[1]; K Hall[2]; H Hendrie[2]

[1]*College of Medicine, University of Ibadan, Ibadan, Nigeria;* [2]*Indiana University School of Medicine, Indianapolis, IN, United States;* [3]*Indiana University School of Medicine, Indianapolis, IN, United States;* [4]*College of Medicine, University of Ibadan, Ibadan, Nigeria*

Background: Few studies have examined the neuropsychiatric status of patients with dementia and cognitive impairment in the developing world

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despite the fact that current demographic trends suggest urgent need for such studies.
Objective: To assess the level of neuropsychiatric symptoms in community dwelling individuals with dementia, cognitive impairment no dementia and normals.
Methods: Nigerian subjects were from the Indianapolis-Ibadan Dementia Research Project. Diagnoses were made based on individual clinical examination with physical and neurological examination, modified CERAD neuropsychological battery, and structured informant interview for history, symptoms, and daily function. Subjects with stable diagnoses of Cognitive Impairment No Dementia (CIND) and Normal Cognition (NC) in two consecutive evaluations in 2001 and 2004, and those diagnosed with Dementia (D) in 2001 were included in the analysis. In 2004, subjects were assessed with the Mini-mental State Examination (MMSE) while their caregivers were given the Blessed Dementia Scale and Neuropsychiatric Inventory (NPI).
Statistical Analysis: NPI frequency scores were compared across the three diagnostic groups using Fisher's exact test with pairwise contrasts between each diagnostic group adjusted for multiple comparisons using Sidak's formula. NPI severity and distress scores, MMSE total score, and Blessed scores were compared across the three diagnostic groups using one-way ANOVA with follow-up contrasts examined using Tukey's multiple comparison tests. Pearson correlation coefficients were calculated between NPI severity scores, MMSE scores, and Blessed scores within diagnostic group.
Result: There were 108 subjects (21 NC, 53 CIND, and 34 D) in the analysis. The diagnostic groups differed significantly on presence (prevalence) of Depression (NC 10%, CIND 45%, D 44%, one-way $p < .01$; significant pairwise contrasts: CIND > NC, D > NC) and Hallucinations (NC 0%, CIND 0%, D 12%, oneway $p < .01$). The diagnostic groups differed significantly on average caregiver overall distress ratings (oneway $p < .05$; significant pairwise contrasts: D > NC) and distress related to Hallucinations (oneway $p < .01$; significant pairwise contrasts: D > NC, D > CIND) and Aberrant Behavior (oneway $p < .05$; significant pairwise contrasts: D > CIND). NPI severity scores correlated significantly with the Blessed Dementia Rating in NC ($r = 0.49$, $p < 0.05$) and CIND ($r = 0.28$, $p < 0.05$). NPI distress scores correlated significantly with the Blessed Dementia Rating in D ($r = 0.35$, $p < 0.05$).
Conclusion: Significant neuropsychiatric symptomatology and caregiver distress is present among cognitively impaired persons in this community-based study of older adults in a developing country.
Acknowledgement: Supported by grant RO1AG09956 of the National Institute of Aging

FC08.2

Changes between 1982 and 2000 in the prevalence of behavioral symptoms and psychotropic drug treatment among old people with cognitive impairment in geriatric care

Hugo Lövheim[1]; P Sandman[2]; S Karlsson[2]; Y Gustafson[1]

[1]Umeå University, Umeå, Sweden; [2]Umeå University, Umeå, Sweden

Background: People with a dementia disorder often live in institutional care facilities, even more so when the dementia disorder becomes severe or complicated by various behavioral disturbances. The aim of the present study was to analyze and compare the one-week prevalence of various behavioral symptoms and psychotropic drug treatment among people with cognitive impairment living in institutional care, in two large, comparable samples from 1982 and 2000.
Method: A comparison was made between two cross-sectional samples, collected in 1982 and 2000 respectively, comprising 3404 participants with cognitive impairment living in geriatric care units in the county of Västerbotten, Sweden. Behavioral symptoms were measured using the Multi-Dimensional Dementia Assessment Scale (MDDAS) and cognition using Gottfries' cognitive scale.
Results: Eight out of 25 behavioral symptoms had become less common, and six more common, after controlling for demographical changes. Regressive behavior, resistance to care and passiveness became less common, while certain aberrant motor behaviors showed an increased prevalence. Antidepressant drug use increased from 6.8% to 43.2%, antipsychotic drug use decreased from 38.0% to 26.2% and anxiolytics, hypnotic and sedative drug use increased from 12.7% to 38.5%.
Conclusion: One-week prevalence of regressive symptoms and resistance to care had decreased and there were signs of a generally increased activity level among old people with cognitive impairment living in institutional geriatric care in 2000 compared to 1982. These changes may be an effect of the extensive changes in pharmacological treatments and in the organization of institutional geriatric care.

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FC08.3

Dementia care in Poland

Wojciech Rachel

Jagiellonian University, Cracow, Poland

With the lengthening of the average life expectancy in Poland, the population over 65 years of age is growing, reaching a value of about four million people (of 38 million citizens). Among the growing number of elderly people are patients with dementia, including Alzheimer's type (about 250,000).We can expect that in 2020, 24% of Polish citizens will be over 60 years old. In Poland there are few official preventive policies regarding the care of the elderly. Nowadays, due to economic factors, there is a paucity of propositions to improve their care. Moreover, there is a reduction in access to preexisting services for seniors, and the lack of cooperation between the health sector and the social services sector produces a decrease in quality of the established services. In contrast to the strong trend across the European Union, Poland has decreased hiring in the sector of caregivers/healthcare workers. Many public organizations pertaining to the care and health of the elderly are supported by outdated governmental systems, which now encounter financial problems in free market economics. Current programs are mainly composed of general hospital care, care from health and social workers outside the hospital, and care at home. There is a lack of adequate resources in psychogeriatrics departments, daily home care, specialized housing, and caregiver support. The burden of care of Alzheimer's patients in Poland is in great part on the family. Most often (60%), the spouse is responsible for providing care, despite lacking necessary skills and frequently suffering from medical problems him or herself. The result of this system in which increasing numbers of caretakers come from within the family circle is decreased quality of care for the elderly and decreased quality of life for all.

FC08.4

An innovative group music therapy using percussion instruments with familiar music to reduce anxiety and agitated behaviors of older adults with dementia in nursing homes: A randomized controlled trial

Huei-chuan Sung[1]; W Lee[2]; T Li[3]; W Roger[4]

[1]Tzu Chi College of Technology & Tzu Chi University, Hualien, Taiwan; [2]Tzu Chi College of Technology, Hualien, Taiwan; [3]National Dong-Hwa University, Hualien, Taiwan; [4]University of Sheffield, Sheffield, United Kingdom

Anxiety and agitated behaviors are common symptoms in older adults with dementia and have been reported by nursing home staff as challenging care problems. Anxiety and agitated behaviors in those with dementia are typically managed with the use of psychotropic medications or physical restraints, but these treatments may cause adverse effects. Therefore, development of effective non-pharmacological interventions for managing these symptoms in this population is vital. One such approach is use of music. Studies consistently reported that music therapy has beneficial effects on behavioral and psychological problems of those with dementia; however, some of these studies have methodological limitations. Little is known about the effect of a group music therapy using percussion instruments with familiar music on those with dementia. This study used a randomized controlled trial design to evaluate the effect of a group music therapy using percussion instruments with familiar music on anxiety, agitated behaviors, and salivary cortisol level of Taiwanese older adults with dementia in a nursing home. Sixty eligible older adults with dementia were randomized and assigned to the experimental group or control group using simple random sampling method. Thirty participants in the experimental group received a 30-minute group music therapy in the afternoon twice a week for six weeks. The participants were asked to follow the instructor to move their body, extremities, and hand-held percussion instruments with the participants' familiar music, which were Taiwanese songs from the 1950–1970s with pleasant moderate rhythm and tempo. Thirty participants in the control group received usual standard care with no music therapy. All participants were assessed for anxiety using Rating of Anxiety in Dementia (RAID) and agitated behaviors using Cohen-Mansfield Agitation Inventory (CMAI) at baseline and week 6. Saliva was also collected before and after the group music therapy session. Only 27 participants in experimental group and 28 in the control group completed the study due to hospitalizations and relocations. ANCOVA result indicated that the mean anxiety score was significantly reduced in the experimental group after receiving six weeks of group music therapy compared to that of the control group while controlling for pre-test score and cognitive level ($p < .01$). The agitated behaviors of the experimental group were decreased significantly after receiving the group music therapy; however, the reduction of agitated behaviors between two

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groups was not significantly different ($p > .05$). The mean salivary cortisol of the experimental group was reduced after receiving the group music therapy session at post-test at week 6; whereas the mean salivary cortisol of the control group was slightly increased at post-test. The mean difference of the salivary cortisol between groups was significantly different ($p < .05$). Group music therapy using percussion instruments with familiar music can be an effective intervention for reducing anxiety, agitated behaviors, and salivary cortisol level; consequently, reduction of these symptoms can alleviate caregivers' burden. An innovative group music therapy can be used as an accessible non-pharmacological care approach and incorporated into daily activity programs to improve the quality of life of older adults with dementia in nursing homes.

FC08.5

Validity of the Severe Impairment Battery short version

Roland Wetzels[1]; J de Jonghe[2]; A Mulders[1]; S Zuidema[1]; R Koopmans[1]

[1]UMC Radboud, Nijmegen, Netherlands; [2]Medical Center Alkmaar, Alkmaar, Netherlands

Aim: To examine cognitive function as measured with the Severe Impairment Battery short version (SIB-S) in nursing home patients with moderate to severe dementia, to evaluate construct validity of the SIB-S, and to examine potential floor effects for the SIB-S.
Methods: Cross-sectional comparison of cognitive measures, dementia severity and functional dependency.
Results: A total of 290 patients were included, of whom 264 had complete SIB-S protocols. Internal consistency of the SIB-S was very high (Cronbach's alpha = .97). Principle components analysis produced 3 factors, the first factor explaining more than 50% of common score variance. Semantic memory items loaded highly on the first factor. Total SIB-S scores were associated with cognitive impairment (SIB-S – MMSE rho = .91, $p < .001$), and with functional dependency (SIB-S – ADL scale rho = –.61, $P<.001$). SIB-S total scores differentiated between dementia severity as measured with the Global Deterioration Scale ($F = 164.6$ df:3,260, $P < .001$). Comparisons of SIB-S total score variance across patients with moderate to severe dementia and patients with below or above average Mini Mental State Exam scores, support the lack of strong floor effects in the SIB-S test.
Conclusion: In this first study examining an independently administered SIB-S, the scale proved to be a homogeneous and valid measure of cognitive impairment, particularly semantic memory loss. This short scale can be used to assess moderate to severely demented patients who may find it difficult to complete the traditional, lengthier neuropsychological tests.

FC08.6

Quality of life, neuropsychiatric symptoms, and psychotropic medication in Dutch nursing home patients with dementia

Roland Wetzels[1]; S Zuidema[1]; F Verhey[2]; R Koopmans[1]

[1]UMC Radboud, Nijmegen, Netherlands; [2]Academic Hospital Maastricht, Maastricht, Netherlands

Introduction: To assess the contribution of neuropsychiatric symptoms (NPS), psychotropic medication and patients' characteristics to quality of life (QoL) in a large group of nursing home patients with dementia.
Methods: All patients with dementia residing on 14 dementia special care units in nine Dutch nursing homes were included in this study provided they met the inclusion criteria. Quality of life was assessed with the Qualidem. NPS were assessed with the Neuropsychiatric Inventory Nursing-Home version (NPI-NH). Severity of dementia was assessed with the Global Deterioration Scale (GDS), and cognitive functioning with the Severe Impairment Battery-short version (SIB-s). Functional status was assessed using the ADL-scale (LTCF section G) from the Minimum Dataset – Resident Assessment Instrument (InterRAI). Psychotropic medication was classified as present or absent using the Anatomical Therapeutical Chemical classification and grouped into antipsychotics, anxiolytics, hypnotics, antidepressants, antiepileptic, anti-dementia medication, and any psychotropic medication.

Bivariate correlations were calculated to determine which variables have an association with QoL. A Bonferroni-corrected alpha level was set at .003. Multivariate linear regression models were performed to analyze relations with QoL. Analysis was performed for GDS4–6 and GDS7 separately, as the Qualidem permits severe dementia to be analyzed separately. Since NPI symptoms have the propensity to cluster, NPI-NH factors were used to analyze the relationship with QoL instead of individual NPI symptoms.
Results: 288 dementia patients were included, of which 76% were female. Average age was 84

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(SD 7.1 range) years. 38.6% of patients suffered from Alzheimer's dementia, 10.4% from vascular dementia, 6.2% had mixed dementia, and 44.6% had other dementia diagnosis. 70% of patients had severe to very severe cognitive decline (GDS stage 6 or 7); average SIB-s was 26/50 (SD17.3 range 0–50). Any psychotropic medication was used in 60.3% of patients; 27.2% of patients used 2 or more psychotropics; anti-dementia medication was rarely used (4.5%); antipsychotics medication was prescribed most often (32.4%). NPI-NH factor agitation, NPI-NH factor depression, NPI-NH factor psychosis, and NPI-NH factor psychomotor agitation, SIB-s total score and psychotropic medication use, were significant predictors of QoL explaining 49% of the variance. NPI-NH factors agitation and depression were the strongest predictors. Individual medication groups did not contribute significantly to the model.

Conclusion: This is the first large study with dementia patients in nursing homes to show that NPS influence QoL, besides cognition and psychotropic medication use. These results confirm that NPS have a major impact on QoL, as measured with NPI factors, and stress more and serious efforts to (re)evaluate pharmacological intervention and should focus attention more at psychosocial interventions of NPS.

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