

Abstracts from the 7th Canadian Conference on Dementia (CCD) held in Vancouver, October 2013

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ORAL PRESENTATIONS FROM THE 7TH CANADIAN CONFERENCE ON DEMENTIA (CCD) HELD IN VANCOUVER, OCTOBER 2013

Drugs Associated with Increased Risk of Incident Delirium in Long-Term Care Facilities

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Objectives: To assess the association between medication use and the incidence of delirium among residents residing in long-term care facilities (LTCFs).

Methods: This study was completed as part of a larger multisite, prospective observational study conducted within 7 LTCFs in Quebec. Delirium was assessed via nurse interviews, chart review, and weekly resident assessments for up to 24 weeks using the Confusion Assessment Method. Data were collected pertaining to both molecule and dose of all prescribed medications taken by residents on each day of study. Drugs were categorized by level of cholinergic activity both categorically (anticholinergic drugs, drugs with anticholinergic side effects, agents with published evidence of association with delirium, medications whose indication is either for or associated with delirium) and by the Anticholinergic Cognitive Burden (ACB) Scale. The study cohort was analyzed using a nested-case control method, with each incident case of delirium (the date of which was assigned as the index date) matched to up to 33 controls by institution and study time. Residents were defined as being currently exposed to a drug if they had taken the medication in the 28 days leading up to the index date. The rate ratio (RR) of delirium associated with current and new use of medications was estimated using conditional logistic regression, adjusting for age, sex, dementia severity, time since institutionalization, Charlson Co-morbidity Index score, documentation of a new medical problem or hospital visit, number of drugs

being taken, and the number of environmental risk factors for delirium exposed to at the index date.

Results: The study cohort included 279 residents, of whom 83 were classified as having incident delirium. Cases were more likely than controls to have a chart diagnosis of dementia, have a lower Mini-Mental State Examination (MMSE) score, and to be exposed to more environmental risk factors. The adjusted risk of current medication use for the group of drugs categorized as having anticholinergic side effects was (RR, 3.16; 95% CI, 1.8–5.4). More specifically, current exposure to antidepressants and antipsychotic medications was associated with an elevated risk of delirium (RR, 2.53; 95% CI, 1.4–4.6) and (RR, 2.53; 95% CI, 1.6–4.1), respectively. The risk associated with specific antipsychotic drugs did not seem to be related to their associated ACB score. Among antidepressant drugs, exclusive exposure to tricyclics, selective serotonin reuptake inhibitors, and venlafaxine (the only serotonin-norepinephrine reuptake inhibitor under study) was found to be associated with incident delirium (RR, 7.27; 95% CI, 1.2–44.4), (RR, 2.18; 95% CI, 1.1–4.3), and (RR, 6.88; 95% CI, 1.9–24.3), respectively. No association was found between incident delirium and use of medications within other drug categories. An overall trend showing a positive association between total ACB score for all medications currently being taken and delirium was found but it was not statistically significant.

Conclusions: Current use of antipsychotic medications and antidepressants appears to be associated with the incidence of delirium among residents residing in LTCFs after adjusting for the emergence of new medical conditions. These findings should be verified by future research.

Asymmetric Right Frontal Grey Matter Atrophy in Delusional Mild Cognitive Impairment Patients

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Background: Previous research suggests there are distinct neuroanatomical correlates of delusions in patients with dementia, with asymmetric grey matter atrophy more severe in the right hemisphere of the brain. Few studies have explored the morphological differences in grey matter between mild cognitive impairment (MCI) patients who develop delusions and patients who don't. The Alzheimer's Disease Neuroimaging Initiative (ADNI) is an international collaboration which provides access to curated structural neuroimaging data for research purposes. With a defined subset of the ADNI data, we conducted voxel-based morphometry (VBM) to characterize the atrophy patterns associated with the development of delusions in MCI. We hypothesized that MCI patients with delusions will have greater grey matter atrophy in the right hemisphere, specifically the right frontal areas since these areas are involved in non-verbal inhibitory executive control. Atrophy in these areas may compromise the inhibitory/monitoring function of the right hemisphere, and when combined with asymmetric neuropathology in the left hemisphere, will allow certain delusional subtypes to appear.

Methods: With data from ADNI, we conducted a cross-sectional analysis with 29 delusional MCI patients diagnosed at baseline, and 29 matched non-delusional MCI patients diagnosed at baseline. 1.5 Tesla T1 pre-processed MRI images from the central ADNI server were matched based on time since baseline psychiatric diagnosis of MCI, age, sex, education, and global cognitive functioning score. Registered images were segmented with standard tissue probability maps. Resulting grey matter images were processed through Diffeomorphic Anatomical Registration Through Exponentiated Lie Algebra (DARTEL) to create a study-specific template. Individual grey matter images were normalized in Montreal Neurological Institute space to this template. Images were smoothed with an isotropic Gaussian kernel at 5 mm full-width half maximum. The modulated images were entered into a general linear model for a two-sample *t*-test, with statistical independence and unequal variance assumed. Total intracranial volume was a global variable for proportional scaling normalization. All VBM was completed using statistical parametric mapping (SPM 8) software.

Results: The majority of prominent grey matter differences, in decreasing levels of significance, were observed in the right hemispheric insula (cluster size = 39), precentral gyrus (10), and inferior frontal gyrus (13). Smaller significant differences were observed in the left hemisphere. Fifteen suprathreshold voxel clusters were detected in total at the $p < .001$ uncorrected threshold; of these 15 clusters, nine were in the right cerebral hemisphere.

Conclusions: Consistent with our prediction, greater right frontal hemisphere grey matter atrophy was observed in MCI patients with delusions, compared to patients without delusions. This supports our hypothesis that delusional MCI patients may suffer from increased right grey matter atrophy, leading to loss of executive inhibition and consequent psychiatric symptoms. In the future, we plan to investigate subtypes of delusions and their neuroanatomical correlates, as well as longitudinal MCI analyses correlating delusions with rapidity of clinical deterioration.

Alzheimer's and the Effect of Artistic Occupations on Cognitive Reserve

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Background: Cognitive reserve in Alzheimer's disease (AD) is characterized by the ability to withstand the cognitive deficits of the disease relative to the degree of pathological damage to the brain. Activities or practices that can add to this reserve should be encouraged. The effect of artistic ability on cognitive reserve has not been explored in AD patients.

Hypothesis: Artistic AD/mild cognitive impairment (MCI) patients with similar cognitive performances to non-artistic AD/MCI patients will show greater deterioration of the hippocampus. This greater deterioration of the hippocampus will result in larger radial width of the temporal horn (rWTH) measurements despite similar cognitive performance. This pathological damage has been resisted by increased cognitive reserve from artistic backgrounds.

Methods: rWTH has been accurately and reliably found to be larger in AD and MCI patients in previous studies. Imaging from 13 AD/MCI patients with artistic occupations and 13 AD/MCI matched patients with non-artistic occupations was obtained from a retrospective hospital database. The patients were individually matched based on age, sex, years of education, and disease severity based on cognitive scores. The 26 AD/MCI patients had their rWTH compared from CTs/MRIs using Analyze 9.0.

Results: For artistic AD/MCI patients the average rWTH was 5.9 mm and 6.6 mm for left and right rWTHs, respectively. For non-artistic AD/MCI patients the average rWTH was 4.9 mm and 4.55 mm for left and right rWTHs, respectively. In a one tailed paired *t*-test, artistic AD/MCI patients had significantly larger rWTH measurements than non-artistic controls for right rWTH ($p = .034$), as well as average rWTH ($p = .029$) and largest rWTH ($p = .039$). Measurements for left rWTH were not significant ($p = .064$). This reflects previous

studies, which show that right rWTH is more sensitive than left rWTH in AD/MCI patients.

Conclusion: Since larger neuropathological deterioration occurred in the artistic AD/MCI patients despite similar cognitive scores, artistic ability/exposure can be considered a factor that increases cognitive reserve. Artistic activities should be recommended to AD/MCI patients, along with other current treatments, to enhance cognitive reserve and increase the quality of life for AD/MCI patients.

Culture Change and Unstructured Activity in Person-Centred, Long-Term Care: Findings from a Critical Ethnography

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Background: The quest to address institutional boredom is fundamental to the success of person-centred (PCC) long-term care (LTC). Highlighting key findings from my recently completed interdisciplinary doctoral dissertation (University of British Columbia, March 2013), this presentation will consider the practical implications of focusing on the therapeutic potential of everyday activities to better enhance residents' sense of well-being and feelings of social inclusion.

Objective: The purpose of my ethnographic study was to obtain an on-the-ground understanding of a PCC philosophy of care in LTC. My study was particularly concerned with how the culture of care was experienced by residents and direct carers in a facility located in Western Canada.

Methods: To this end, I spent over 12 months in the field learning from residents, their families, staff, and administrators about the successes and challenges they encountered as the organization endeavoured to create positive culture change, integrating a person-centred philosophy (theory) into everyday care (practice). After locating data generation and data analysis in the literatures of PCC and personhood theory (Kitwood; McLean; Sabat), my study undertook a critical ethnographic approach (Madison; Kincheloe & McLaren) that was informed by critical theory (Levinas; Foucault), feminist methodology (Bartlett & O'Connor; Twigg), and Foucauldian gerontology (Katz; Powell & Biggs). I employed multiple qualitative research methods—participant observation, individual interviews, group interviews, organizational and policy document reviews, dementia care mapping, and researcher-produced photographs—to access the experiences, values, and understandings of the social worlds of the people who live and work in Cedar Grove.

Discussion: Significant findings revealed that residents maintain a deep desire to engage in meaningful everyday activities, activities they once enjoyed and which they perceive to give their life meaning. My study found that a lack of access to seemingly mundane, everyday activities significantly impeded residents' social inclusion and impacted their overall well-being. Examples of this type of everyday activity differed according to a resident's personal preferences and his or her physical and cognitive abilities and might range from reading the newspaper and chatting over coffee to sweeping the floor or enjoying the sensory appreciation of a vase of flowers. My presentation will address how an organization's attempt to create a more holistic approach to care, one that continues to position the person at its centre, might be better supported by addressing the imperative to balance structured activities (crafts, music programs, etc.) and self-directed, unstructured activities of the type mentioned above. I will argue that the positive transformation of LTC, notably for residents of special care units, requires stakeholders to address and revalue the long periods of time between organized activity and care.

Montreal Cognitive Assessment (MoCA) Performance in Cognitively Normal Participants in a Canadian Population-Based Study

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Background: The Montreal Cognitive Assessment (MoCA) is a validated tool in clinic-based settings that can discriminate between normal cognition and mild cognitive impairment (MCI) or dementia (cut-off of 26 or higher, with a 1 point adjustment for low education). However, there are limited data on MoCA performance in a population-based setting. A previous population-based study from Texas (Rosetti *et al.*; 2011) found that two-thirds of 6,253 participants scored below the previously validated cut-off. To assess MoCA performance in cognitively normal persons, we used population-based data from Canada to derive norms and to determine the influence of age, sex, and education level.

Methods: Between 1/2011–6/2012 we performed the MoCA in 829 community-dwelling, stroke- and dementia-free participants from the Prospective Urban Rural Epidemiological (PURE) study. Participants were 40–79 years old and were recruited from pre-specified postal code regions centred around four Canadian cities and adjacent rural regions: Vancouver, Ottawa, Hamilton, and Quebec City. Participants

also completed questionnaires on memory and cognitive symptoms, and instrumental activities of daily living (IADL): finances, shopping, laundry, organizing and taking medications, and driving ability. After excluding eight participants who reported moderate or greater difficulties with IADL due to memory complaints, there were 821 for analysis. Linear mixed models were used to determine whether MoCA score varied by age, sex or education (as fixed effects), with recruitment site as a random effect. Education was dichotomized as post-secondary vs. no post-secondary.

Results: Mean age was 58.3±8.0 years. The overall mean MoCA score was 26.8 (SD 2.4), incorporating a 1 point adjustment for post-secondary education, and 27% had a score of 25 points or lower. There was a linear decrease in MoCA with advancing age ($p < .001$). In the final multivariable model, MoCA score was 0.67 points lower for every 10 year increase in age (95% CI 0.47 to 0.87), 0.46 points lower in men than in women (95% CI 0.14 to 0.78) and 1.43 points lower in persons without post-secondary education compared to those with post-secondary education (95% CI 1.09 to 1.77). Persons reporting moderate or severe cognitive symptoms without cognitive disabilities ($n = 183/821$, 22%) had slightly lower mean MoCA (26.46±2.57) than persons with mild or no cognitive symptoms (26.86±2.30; $p = .05$ by t -test). However, the multivariable model results were essentially unchanged in a sensitivity analysis excluding persons with moderate or severe cognitive symptoms. Individual 95% prediction limits for each age decade and sex and education category will be provided.

Conclusions: In a Canadian population-based setting we found that 27% of stroke- and dementia-free persons score below the previously validated cut-off for MCI or dementia; however, this prevalence was only half that previously reported from the southern U.S. These findings suggest that local normative data are needed to interpret MoCA performance. More Canadian data are needed in the elderly (≥ 80 years old). The clinical relevance of low MoCA performance in persons that are asymptomatic or have subjective cognitive decline requires further investigation.

Frailty in Relation to Late-Life Cognition: Initial Results from the Honolulu-Asian Aging Study

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Background: Frailty has been related to cognitive decline, incident mild cognitive impairment, and dementia. In most health-related databases, frailty can be operationalized using a frailty index, based on the accumulation of deficits approach. To examine the relationship between frailty and cognition in older Japanese American men, frailty index scores were generated from data collected in the Honolulu-Asian Aging Study (HAAS).

Methods: 1,818 male subjects aged 71–93 at baseline were included in this study. Cognitive function was measured at each wave of the HAAS using the Cognitive Abilities Screening Instrument (CASI). A frailty index (FI) score was calculated for each participant at baseline, using 44 dichotomized health deficits.

Results: At baseline, the average FI for this study population was 0.13 (SD = 0.09; maximum = 0.56). A multivariate Poisson regression model was developed to examine the association between baseline frailty and future cognition, measured at a subsequent wave of the study (5 years later), while controlling for age, education, and baseline CASI score. Frailty was significantly associated with CASI scores at follow-up ($R^2 = -0.568$, 95% CI = 0.325–0.811, $p < .001$), indicating that each increment of the frailty index was associated with a 1.7% mean decrease in the CASI score 5 years later.

Conclusions: Quantifying frailty with a frailty index may be useful in understanding the relationship between frailty and cognitive decline in aging. Future work will examine the dynamics of frailty and cognition, as well as the relationship between frailty and Alzheimer's disease and other dementia diagnoses.