In 2015, dementia cost the United States of America alone $226 billion; by 2050, this cost is projected to rise to $1.1 trillion (1). An often underappreciated cost of dementia is the impact upon informal caregivers for dementia patients. Dementia caregiving is associated with heightened stress and increased depression (2). There is emerging evidence that dementia caregiving may impact upon central nervous system activity in informal caregivers (3); this may exacerbate the physiological effects of ageing (see Figure 1). We examined the cognitive neurobiology and mental well-being of dementia caregivers, as well as interventions targeting stress and the caregiving role.

2. Aims of the Study

Aims: (1) Systematically evaluate the literature for evidence of the effects of dementia caregiving on biomarkers of stress. (2) Examine stress, depression and cognitive performance in an Irish cohort of caregivers for family members with dementia. (3) Examine whether carer interventions can impact on the chronic stress on neurocognitive performance.

Hypotheses: (1) Dementia caregiving is associated with heightened biomarkers of stress and worsened mental health. (2) Carer interventions are associated with an attenuation of this effect.

3. Methods

Systematic review

Systematic review: We searched PsychINFO, ScienceDirect, Web of Knowledge, PubMed, Scopus and Cinahl for quantitative studies published in English that examined biomarkers of stress in dementia caregivers. Studies were assessed for inclusion in the systematic review (see Figure 2 for flowchart of study evaluation). We examined studies assessing biomarkers of stress in dementia caregivers, as well as interventions to reduce stress biomarkers. The systematic review was registered on 28/05/2015 at the following link: http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015020828

Figure 2: Flowchart of studies evaluated

Caregiver assessment & intervention

Family dementia caregivers (N = 31) were recruited via the Memory Clinic at St. Finbarr’s Hospital, Cork. Caregiving were providing at least 10 hours of unpaid care per week to a relative with dementia. Controls (N = 18) were recruited from the community.

Exclusion criteria: serious health problems, taking a medication that would confound the aims of the study, participation in a trial involving experimental drugs in the last 30 days.

A subset of participants (N = 7) completed both a carer training program (CTP) and MBSR program. Each program was provided by an experienced instructor and lasted approximately 2 months.

Stress and mental health: Stress was assessed using the Cohen Perceived Stress Scale (PSS). Depression was assessed using the Beck Depression Inventory (BDI). Neurocognitive performance: Participants completed the paired associates learning task (PAL), rapid visual information processing (RPV), simple reaction time and figure 3: CANTAB spatial span tests from the CANTAB platform (see Figure 3).

4. Results

Stress and mental health in caregivers

Dementia caregivers reported significantly higher stress than non-caregivers, F(1,35) = 5.69, p = .02, ηp² = .14 (see Figure 5).

Depression: Dementia caregivers reported higher depression than non-caregivers, a marginally significant effect, F(1,32) = 3.72, p = .06, ηp² = .11 (see Figure 6).

Neurocognition

Caregivers made significantly more errors on the Paired Associates Learning (PAL) test, 8 patterns; F(1,37) = 5.18, p = .03, ηp² = .12 (see Figure 7a), but made fewer errors post-intervention, F(1,38) = 3.07, p = .08, ηp² = .08 (see Figure 7b). There were no differences between caregivers and controls in spatial memory performance or simple reaction time, and these were not affected by MBSR or CTP.

5. Discussion & conclusions

• Dementia caregiving is associated with heightened levels of cortisol and self-reported stress, as well as poorer memory and sustained attention performance. This likely interacts with depressive symptoms and may underpin a possible cognitive neurobiology of caregiving.
• Both MBSR and carer training programs for dementia caregivers may attenuate the impact of chronic stress.
• A comprehensive physiological phenotype of dementia caregiving is required to better understand the mechanisms of these effects.

6. Acknowledgements & Disclosure

The APC Microbiome Institute is a research centre funded by Science Foundation Ireland (SFI), through the Irish Government’s National Development Plan. The authors and their work were supported by SFI (grant numbers SFI/12/R/R2272), by the Health Research Board (HRB) through Health Research Awards (grants no HRA-PO-3-14-647; GC, TGD, PK, ANG, DWK) and by the Health Service Executive (HSE Hafn/G/2015/2015). The Centre has conducted studies in collaboration with several companies including GSK, Pfizer, Wyeth and Mead Johnson. We acknowledge the school of medicine TRAP program for providing seed funding for this project and the Strategic Research Fund for purchase of CANTAB software licences.

7. References