

Farr@Aberdeen Research Theme: Resilience (leveraged funding)

Multimorbidity: prevalence, risk factors and resilience in a large Scottish birth cohort

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Background and hypothesis

Multimorbidity is a growing healthcare challenge. There is a need for better understanding of the prevalence of multimorbidity, the early and later life factors associated with multimorbidity and resilience to its effects.

The aim of this research is to understand the prevalence of multimorbidity and the factors associated with both its development and resilience to its effects. The work uses the Scottish Aberdeen Children of the 1950s (ACONF) cohort and an Australian cohort (Diamond) for comparison. Multimorbidity is measured from patient self-report (ACONF and Diamond) and additionally using linked secondary care administrative data (ACONF only).

Methodology

A systematic review was conducted to assess how best to define and measure resilience in those with disease and a further review was conducted to assess how to define and measure multimorbidity.

ACONF contains early life variables (including birth social class, cognition and education). In 2001 7,183 responded to a follow-up postal questionnaire providing information on wellbeing, function and self-reported health conditions. The cohort is currently being linked to death records and secondary care discharge records by the electronic Data Research and Innovation Service (eDRIS) of National Services Scotland Information Services Division (ISD).

Diamond is cross-sectional with information on 12 physical diseases and 2 mental health conditions as well as a range of wellbeing and socio-economic measures.

The first part of the PhD has examined self-reported multimorbidity prevalence in ACONF and Diamond. There was assessment of the association between birth social class and cognition with multimorbidity (ACONF only). In both cohorts, resilience was measured on the basis of those who self-report good health or wellbeing despite having multimorbidity. The next part of the PhD (commencing March 2017) will use linked secondary care records to assess the prevalence of multimorbidity in ACONF (in 2001 and in 2016). Additionally the association of birth social class and childhood cognition with multimorbidity and the mortality rate of those with multimorbidity will be investigated.

Results

Key results so far:

- Social class at birth is associated with self-reported multimorbidity in later life. Childhood cognition scores are weakly associated with self-reported multimorbidity. These associations are lessened with higher educational attainment
- Resilience prevalence varies by measurement method but is lower in those with mental health conditions compared to physical disease only.

Conclusions

Results indicate the importance of early childhood factors in the development of later life disease and the role of educational attainment in reducing their impact. Mental health has a particular negative impact upon the prevalence of resilience in those with multimorbidity.

Impact

Results so far have been presented at the European Public Health conference in Vienna (2016) and will be presented at the World Congress of Public Health in Melbourne in April 2017.

Next steps

To conduct the analysis using multimorbidity from linked healthcare data and compare and contrast results. To prepare further work for publication and dissemination.

Technical terms and abbreviations

- Multimorbidity: the coexistence of two or more health conditions in an individual
- Resilience: positive outcomes in the face of adversity (multimorbidity)
- ACONF: Aberdeen Children of the 1950s. 12,150 individuals born in Aberdeen, UK between 1950-1956 who have been followed-up since 1962
- Diamond: a postal survey conducted in primary care in Victoria, Australia (n=7,526) in 2005

Publications

Johnston, MC., Porteous, T., Crilly, MA., Burton, CD., Elliott, A., Iversen, L., McArdle, K., Murray, A., Phillips, LH. & Black, C. (2015). 'Physical disease and resilient outcomes: a systematic review of resilience definitions and study methods'. *Psychosomatics*, vol 56, no. 2, pp. 168-180.

DOI: [10.1016/J.PSYM.2014.10.005](https://doi.org/10.1016/J.PSYM.2014.10.005)

Johnston, MC., Marks, A., Crilly, MA., Prescott, GJ., Robertson, LM. & Black, C. (2015). 'Charlson index scores from administrative data and case-note review compared favourably in a renal disease cohort'. *European Journal of Public Health*

Health, vol 25, no. 3, pp. 391-396. DOI: [10.1093/EURPUB/CKU238](https://doi.org/10.1093/EURPUB/CKU238)

Crilly, MA., Johnston, M. & Black, C. (2014). 'Relationship of EQ-5D quality of life with the presence of co-morbidity and extra-articular features in patients with rheumatoid arthritis'. *Quality of Life Research*, vol 23, no. 5, pp. 1435-1443. DOI: [10.1007/S11136-013-0597-0](https://doi.org/10.1007/S11136-013-0597-0)

Life-course Determinants of Resilience to Cognitive Ageing: Empirical Evidence and Policy Implications

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Funder: University of Aberdeen: *Pathways to a healthy Life* funded PhD
Studentship and a Roland Sutton 1 year Post-doctoral Fellowship
(£58,000)

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The number of people living with dementia worldwide is currently estimated at 47 million and this number is predicted to triple by 2050 (Prince et al. 2015). There is currently no disease modifying treatment for diseases that cause dementia and dementia related care is costly and complex. Understanding the life-course determinants of resilience to brain ageing could significantly reduce the burden of cognitive impairment and dementia on individuals and societies at large.

Our systematic literature review identified the knowledge gap whereby the early-life determinants of resilience to brain ageing have not been sufficiently explored (Chapko et al. 2016). We showed that those with low birth weight and/or born pre-term performed significantly worse on childhood intelligence tests as well as mid-life logical memory and digit symbol tests compared to the normal group within the Generation Scotland subsample of Aberdeen Children of the 1950s. In another study we found that childhood cognitive abilities at age 11 had almost twice the protective effect on the triad of impairment in late-life, compared with the influence of mid-life occupational profile within the Aberdeen Birth Cohort of 1936 (Chapko et al. 2016).

Overall, these and other findings based on the Aberdeen Birth Cohorts further emphasize the importance of healthy pregnancy and successful brain development throughout childhood on cognitive ageing. A major implication of this work is that studies and/or programs should consider a life-course perspective (with a focus on early-life) to accurately assess and to improve the brain health of older adults (Chapko 2015).

Publications:

Chapko D, Staff RT, McNeil CJ, Whalley LJ, Black C, Murray AD 2016. Late life deficits in cognitive, physical and emotional functions, childhood intelligence and occupational profile: A life-course examination of the Aberdeen 1936 Birth Cohort (ABC1936). *Age and Ageing*, 45(4):486-493. DOI: [10.1093/AGEING/AFW061](https://doi.org/10.1093/AGEING/AFW061)

Chapko D, McCormack R, Black C, Staff RT, Murray AD. Life-course determinants of cognitive reserve (CR) in cognitive aging and dementia – a systematic literature review. Under review.

Chapko, Dorota. 2015. Early childhood development and skills across the life-course through the lens of the developing brain. Health, nutrition, and population discussion paper. Washington, D.C.: World Bank Group.
<http://documents.worldbank.org/curated/en/473541467990943450/Early-childhood-development-and-skills-across-the-life-course-through-the-lens-of-the-developing-brain>

Multimorbidity in secondary care: prevalence and outcomes

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Multimorbidity, the coexistence of two or more chronic diseases in the same individual, has been identified as a major health challenge, associated with higher mortality, reduced functional status and increased use of health services. In Scotland multimorbidity is common, and most people with a long-term disorder are multimorbid. Most of the existing published studies focus on primary care or general populations, with few studies investigating multimorbidity in hospitalised patients.

Using anonymised hospital episode data linked with death registry data, we will identify all adults admitted to hospital in 2014 in Grampian (approx. 60,000) and evaluate how well measures identify people with multimorbidity, and describe the burden of multimorbidity in these patients. We will follow-up the cohort for one year to investigate the effect of multimorbidity on mortality, length of hospital stay, and readmissions to hospital.

The linked data will be analysed within the joint NHS Grampian and University of Aberdeen Grampian Data Safe Haven (DaSH) to ensure secure processing. By understanding multimorbidity in a hospitalised population, the findings of this study will help hospital planners, and clinicians, plan health care services for people with multimorbidity. There will also be of direct benefit locally, by enhancing NHS Grampian's data systems.