

DEPRIVATION AND COGNITIVE DYSFUNCTION

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Centre for Ageing Research
and Development in Ireland

RESEARCH BRIEF

Research Briefing paper

This research briefing paper represents the findings from a project funded under CARDI's 2013 data-mining funding programme. The paper includes key findings from the funded research team and additional information collated by CARDI. The full report can be downloaded from www.cardi.ie

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Deprivation and cognitive dysfunction

Extensive research has found that socio-economic status is closely linked with health. Generally, the lower one's socio-economic position, the greater the risk of morbidity and mortality. Few studies have examined the relationship between socio-economic status at the area-level and health outcomes, especially in older adults. In order to better understand the links, CARDI funded a project led by Professor Helene McNulty, University of Ulster which sought to investigate the relationship between measures of socio-economic deprivation and clinical and lifestyle risk factors for disease, using cognitive dysfunction as a focus. The study used data from the Trinity, Ulster and Department of Agriculture (TUDA) Ageing Cohort Study, an investigation of approximately 2,000 older people in Northern Ireland (NI) and 3,000 in the Republic of Ireland (ROI).

This research brief presents a summary of findings from the full report *Socio-economic deprivation and risk of age-related cognitive dysfunction: results from the TUDA Ageing Cohort Study* (McNulty et al., 2014).

Key Findings

- ▶ Greater socio-economic deprivation was associated with significantly lower cognitive performance and higher levels of both anxiety and depression (McNulty et al., 2014).
- ▶ The two strongest predictors of early cognitive dysfunction in older adults were advancing age and lower age of completing formal education (McNulty et al., 2014).
- ▶ After controlling for age and age of finishing education, area deprivation significantly predicts cognitive dysfunction (McNulty et al., 2014).
- ▶ Higher rates of depression and anxiety also predicted cognitive dysfunction (McNulty et al., 2014).
- ▶ Neither gender, body-mass index (BMI) nor smoking status were found to be significant predictors of cognitive dysfunction in ageing (McNulty et al., 2014).

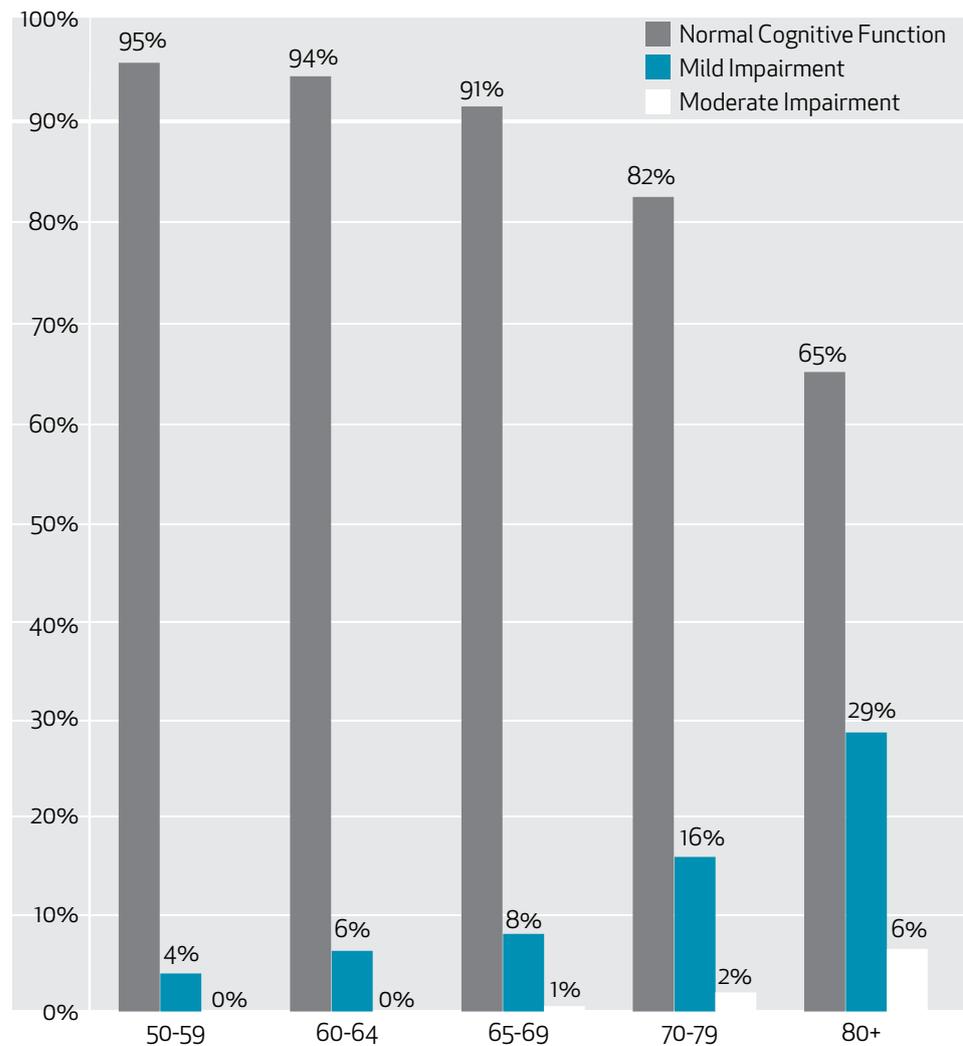
Prevalence of cognitive dysfunction

Cognitive dysfunction is a common disease of ageing, describing a spectrum of disability ranging from mild cognitive impairment to dementia.

The criteria for a mild cognitive impairment diagnosis are that there is a subjective memory complaint, objective memory impairment, intact functional domains and that the patient is not demented (Petersen, 2011). A mild cognitive impairment patient experiences memory decline to a greater extent than would be expected for normal ageing, but does not fit the currently defined clinical criteria for dementia.

The Irish Longitudinal Study on Ageing (TILDA) used the Mini-Mental State Exam (MMSE)¹ to test survey respondents for cognitive impairment. A score of 26-30 was considered normal cognitive function, 20-25 was mild cognitive impairment while below 20 was moderate impairment. People with more severe impairment, including those with dementia, were not included in the TILDA sample. The results are presented in Figure 1 below which shows that cognitive impairment rises sharply with age. Of adults aged 80 and over, 35% have cognitive impairment compared to 4% of adults aged between 50 and 64.

Figure 1: Cognitive function in TILDA by age TILDA, 2011



1. The MMSE is an internationally recognised 30-point questionnaire that is used to screen for cognitive problems.

Cahill et al. (2012) estimate that there are currently 41,740 people with dementia in ROI. Around 26,104 of these people live at home in the community, while 14,266 live in various public and private long-stay facilities across the country. The research suggests that 63% of all residents in long-stay care have dementia (Cahill, O'Shea, & Pierce, 2012). These figures are predicted to rise substantially with the ageing population. Cahill et al. (2012) predicts that there will be 67,493 people with dementia in 2021 (a 63% increase 2006-2021) and 140,580 people in 2041 (a 240% increase 2006-2041).

The NI strategy for dementia published in 2011 estimates that there are 19,000 people with dementia, fewer than 1,000 of whom are younger than 65 and this figure is predicted to rise to around 60,000 by 2051 which would represent a 215% increase (DHSSPS, 2011).

Methodology

The project used data emerging from the TUDA Ageing Cohort Study. This is a North-South study involving 5,186 older people recruited from GP clinics in NI and outpatient clinics at St James' Hospital, Dublin and sampled between 2008 and 2012. The TUDA study is part of a larger cross-border research initiative: the National Nutritional Phenotype Database project funded by the Irish Department of Agriculture, Food and the Marine and Health Research Board; Food Institutional Research Measure (FIRM) Initiative and the Northern Ireland Department for Employment and Learning (DEL) and the Cross-Border Research and Development Funding Programme "Strengthening the all-Island Research Base". The TUDA study represents an all-Ireland investigation of clinical, drug, nutritional, metabolic and genetic factors in the development of three common diseases of ageing ie, cardiovascular disease, osteoporosis and dementia.

McNulty et al. (2014) used geo-referencing and regional census data to generate socio-economic profiles of the base population in both jurisdictions. This enabled the researchers to profile 5,048 older adults from the TUDA cohort by socio-economic deprivation status which was then linked with the geographical area where participants lived for comparison with the general population. The socio-economic profile data was then linked with the health data from the TUDA study in order to examine the associations between socio-economic measures and cognitive health, assessed using the MMSE.

Research findings

Using data from the TUDA study, McNulty et al. (2014) found that greater socio-economic deprivation was associated with poorer cognitive function, fewer years spent in education, an increasing prevalence of depression and anxiety as well as adverse lifestyle factors such as a higher body-mass index (BMI), lower physical activity and higher smoking rates.

After controlling for the effect of age significantly higher scores for depression and anxiety were reported in women. There were no gender differences in reported participation in physical activity or in current smoking, though men were more likely to have smoked in the past and had a higher BMI than women. Neither gender, body-mass index (BMI) nor smoking status were found to be significant predictors of cognitive dysfunction in ageing.

A decline in cognitive function was associated with increasing age while age of completing education was found to be strongly associated with both cognitive function (positively) and area deprivation (negatively). This shows that the longer time spent in education, the lower the risk of developing cognitive dysfunction in later life and a lower chance of living in a deprived area.

The strongest predictors of early cognitive dysfunction in older adults in NI and ROI were:

1. Advancing age
2. Younger age of completing education

After controlling for these predictors, area deprivation was found to significantly predict cognitive dysfunction. This shows that living in an area with greater socio-economic deprivation can have an impact on early cognitive dysfunction separate from the impact of advancing age and a younger age of completing education.

The findings suggest that there is a high risk sub-cohort of older people in areas of greatest socio-economic deprivation across the island of Ireland, notably the 20% most deprived areas North and South among whom cognitive dysfunction is most likely to develop.

Education and cognitive dysfunction

It has been well-established that a younger age of completing formal education is a significant predictor of cognitive dysfunction (McNulty et al., 2014). However, lifelong learning and using cognitive skills throughout the life course may have a protective effect against dysfunction in addition to formal education.

Recent findings from the Mayo Clinic Study of Aging indicate that “lifetime intellectual enrichment” (starting early with education, in mid-life with a stimulating career and later in life with cognitive activity) may help older men and women to preserve cognitive skills. In the study of 2,000 men and women aged in their 70s and 80s, education and employment were the most important factors in retaining cognitive skills later in life. However, mid and later-life cognitive activity contributed to retention of cognitive skills with ageing. The researchers conclude that “Lifetime intellectual enrichment might delay the onset of cognitive impairment and be used as a successful preventive intervention to reduce the impending dementia epidemic” (Vemuri, et al., 2014).

Greater exposure to education has previously been shown to reduce the risk of dementia. A large 2010 study into the effect of education on dementia and brain pathology showed that while more education did not protect individuals from developing neurodegenerative and vascular neuropathology by the time they died, it did appear to mitigate the impact of pathology on the clinical expression of dementia before death (Brayne, et al., 2010).

Research using the English Longitudinal Study on Ageing (ELSA) published in 2014 showed that higher education, no functional impairment, fewer depressive symptoms, no diabetes, and Internet/E-mail use predicted better performance in a delayed recall test (Xavier, et al., 2014).

Clearly while education is not a cure or total protection from the effects of cognitive dysfunction or dementia, learning new skills in later life is a factor that plays an important part.

Policy in ROI

The Department of Education and Skills has a dedicated Social Inclusion Unit which is responsible for developing and promoting a response to tackling educational disadvantage from pre-school through to second-level education (3 to 18 years). The *Better Outcomes, Brighter Futures* policy framework for children and young people notes that 9.7% of young people leave school early. The Department of Education and Skills, Department of Children and Youth Affairs and Tusla (the Child and Family Agency) have been allocated responsibility for implementing strategies to improve school engagement and reduce incidences of suspensions, expulsions and early school-leaving (Department of Children and Youth Affairs, 2014).

Healthy Ireland: A Framework for Improved Health and Wellbeing 2013-2025 cites reducing health inequalities as a central goal. In particular, it seeks to address the wider social determinants of health or “the circumstances in which people are born, grow, live, work and age”. There are four targets in reducing health inequalities:

- ▶ Reduce inequalities in health status
- ▶ Increase retention rates of pupils in second-level schools
- ▶ Reduce the percentage of people at risk of poverty and unmet need for medical care
- ▶ Increase self-reported happiness and well-being across socio-economic groups.

Equity is one of the central ethical principles of the framework and it notes the importance of early childhood intervention in addressing inequalities (Department of Health, 2013).

Vemuri et al. (2014) note that opportunities for learning later in life can have an impact on cognitive dysfunction. The *National Positive Ageing Strategy* in ROI aims to promote access to a wide range of opportunities for continued learning and education for older people, including affordability for disadvantaged older age groups. The strategy notes that the share of adult learners (those aged 40 years and over) in ROI is one of the lowest in the EU at less than 0.5% of those in education (Department of Health, 2013).

Policy in NI

Sure Start is a government-led programme in NI which aims to offer support to parents from pregnancy onwards and give young children under four from the most disadvantaged areas the best possible start in life. The core services of the programme are outreach and home visiting, family support, primary and community healthcare and advice, good quality play, learning and childcare experiences for children, and group and home-based support (NI Direct, 2014).

In NI, higher education, further education and vocational training are the responsibility of the Department for Employment and Learning. The Department aims to provide education and training services on an all-age basis while recognising that learning new skills through participation in further or higher education, vocational learning and essential skills courses can contribute positively to good mental and physical health (Department for Employment and Learning, 2014).

Fit and Well – Changing Lives: A Ten Year Public Health Strategic Framework for Northern Ireland 2012-2022 was published for consultation in 2012. It notes the existence of a gap in health between those who live in more affluent circumstances and those whose circumstances are deprived. It is proposed that the second priority of the framework should be “Creating opportunities, tackling disadvantage and improving health and well-being” (DHSSPS, 2012).

The draft *Active Ageing Strategy 2014-2020* was published for consultation in 2014. It noted that NI had the highest level of adults in the UK with no formal qualifications. It stated that Further Education Colleges in NI had older people’s champions who improve reach-out and communications on education topics to older people. The plan in the strategy is for the Department of Employment and Learning, in conjunction with Office of First Minister and Deputy First Minister (OFMDFM), to explore how further education opportunities can be promoted among “older workers”. There is no mention of how older people who are not in employment might be afforded better opportunities for education and skills development (OFMDFM, 2014).

Policy implications

Identifying at-risk groups using research such as the TUDA cohort study can enable future evidence-based strategies and health promotion activities to be targeted at these groups. It can also help policymakers to plan the use of resources so that cognitive dysfunction and dementia can be diagnosed early and interventions can be made when and where they are most effective (McNulty et al., 2014).

As the McNulty et al. (2014) research shows, the lower one's socio-economic position, the higher the risk of developing cognitive dysfunction. Thus effecting policy change in this area requires a systemic effort to address socio-economic inequalities. The solution is not simply increasing the incomes of the poorest older people, as the problem has its roots in earlier life and has many dimensions, including poor health, low levels of education and social exclusion (CARDI, 2014).

In terms of policies in ROI and NI, it is important to note that the most effective interventions will be those made at early stages of the life cycle – ensuring equality of access to a good standard of education and addressing health inequalities and socio-economic disadvantage in early childhood. This demonstrates the importance of viewing ageing as a process that is relevant to all age groups.

Conclusion

The McNulty et al. (2014) research has identified a high risk sub-cohort of older people in areas of greatest socio-economic deprivation across the island of Ireland among whom cognitive dysfunction is most likely to develop. In order to address the imbalance it is important that policymakers implement strategies to tackle inequalities throughout the life course.

People in socio-economically deprived areas tend to finish education at an earlier age, which then increases the risk of cognitive dysfunction in later life. Findings from the TUDA study indicate the need for over-arching strategies to promote the importance of education (both at an early age, formal education and training later in life) and to channel resources towards improving educational opportunities in areas of greater deprivation, not just to develop skills for employment, but also to promote education for health and well-being (McNulty et al., 2014).

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