



RESEARCH

INFORMATION

Multimorbidity, polypharmacy and dementia: a complementary study in two Scottish datasets



AIMS

After the age of 65 years, most people have more than one condition (known as multimorbidity) and take multiple medicines (polypharmacy). We already know that 4 out of 5 people with dementia have at least two other conditions, and that having multimorbidity with dementia can worsen outcomes. It is unclear whether multimorbidity and polypharmacy increase the risk of developing dementia.

This project aimed:

1. To explore whether multimorbidity and polypharmacy were linked to increased dementia diagnosis in Scotland
2. To provide results that improve our understanding of the overlap between dementia and multimorbidity at different ages, and help guide care and resource allocation.



KEY FINDINGS

- People aged over 50 years who take multiple medicines have an elevated risk of dementia
- This link is stronger in younger age groups. This suggests that as people get older, it matters less that they have other conditions. No matter how many medicines they take, their age becomes the biggest risk factor for dementia
- There is no significant link between having multimorbidity and having dementia recorded on death certificate. This will be explored in future research using a more accurate marker of dementia diagnosis
- The findings emphasise the importance of acknowledging and managing co-existing conditions for older people's brain health.





WHAT DID THE STUDY INVOLVE?

The study involved statistical analysis of two sources of information:

- 1) NHS Scotland prescription and death certificate records from 1,225,894 people aged over 50 years
 - The analysis explored the link between people's number of prescribed medicines in 2009 and their risk of having dementia, as recorded on their death certificate, over 8.5 years
 - This research built on a project which had already been discussed and approved by the Farr Institute Scotland's Public Panel

The NHS dataset is very large but has limited information, so an additional study was used to add detail:

- 2) Data from the Lothian Birth Cohort 1936, which is a research project following 1,091 older adults.
 - Analyses in this dataset explored the relationship between having multimorbidity and the subsequent risk of dying with dementia over an average of ten years' follow-up.



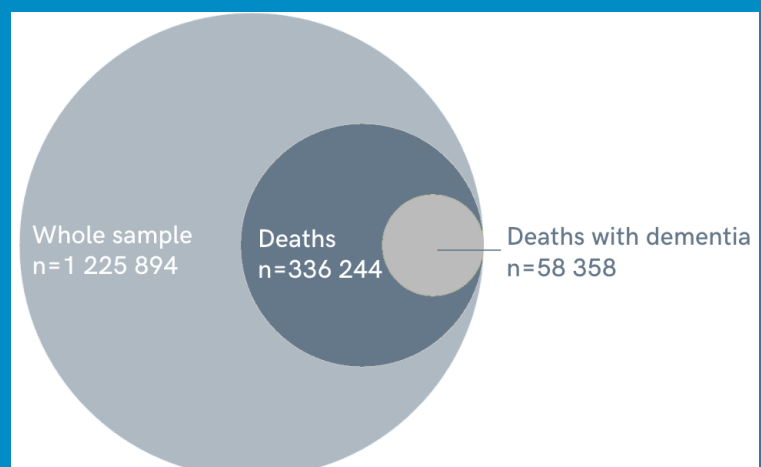
WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

NHS Scotland study

- During the 8.5 years of follow-up, 58 358 people died with dementia listed on their death certificate
- People taking more medicines were more likely to die with dementia, but the link weakened as people got older
- This dataset did not include information about diagnoses other than dementia.

Dementia deaths from National Records of Scotland data, 2009 to 2017

In this graphic, "Whole sample" refers to everyone in Scotland aged 50 years and over who received at least one prescription in the first three months of 2009. The number of deaths are those that occurred between 2009 and 2017.





WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

In the NHS Scotland study:

With each additional medicine prescribed, the link with dementia (according to death certificate) was as follows:

50-64 year-olds: 7.5% increased risk

65-79 year-olds: 4.3% increased risk

Over 80 year-olds: 0.9% increased risk

All people aged over 50 years combined: 2.7% increased risk

NHS Scotland study (continued)

In this study, the only available marker of dementia diagnosis was whether it appeared on a person's death certificate. We know that looking at death certificates do not capture everyone who has dementia because it is sometimes not seen as relevant to the cause of death. Therefore, this is probably an under-estimate of the true number of people with dementia. We cannot currently match every clinical NHS dementia diagnosis to other data in Scotland to provide an accurate count of who has dementia in the whole population.

Lothian Birth Cohort 1936 study

- In this study, the analyses found that people with multimorbidity did not have an elevated risk of dying with dementia
- This contrasts with the findings from the NHS study. This may be because the Lothian Birth Cohort's measure of dementia was not accurate enough, or because the cohort is healthier than the general population and older than the NHS cohort.
- Using a new way of finding dementia diagnoses in this study will allow for future, more detailed, explorations than those possible in the NHS data.



WHAT IMPACT COULD THE FINDINGS HAVE?

- This was the first long-term study of polypharmacy using NHS data from the whole of Scotland. It gives us new information about real patients that complements what is learned in smaller, organised research cohorts
- The findings highlight the potential impact of multimorbidity and polypharmacy on people's risk of dementia
- This will be useful for clinicians and patients when they aim to prevent or delay dementia at an individual level, especially in middle-aged people
- [Brain Health Scotland](#) (funded by the Scottish Government and Alzheimer Scotland) promotes healthy behaviours to prevent or delay dementia where possible. This study adds further evidence to inform these nationwide policies.



HOW WILL THE OUTCOMES BE DISSEMINATED?

The results have already been presented to researchers and clinicians in Edinburgh, and at the following international conferences:

- World Congress of Gerontology and Geriatrics 2022 (oral presentation)
- Alzheimer's Association International Conference 2022 (poster presentation)
- Nordic Congress of Gerontology 2021 (oral presentation)

Following further analysis, the results will be included in two research papers, one using the NHS data and the other, the Lothian Birth Cohort data. The papers will be submitted for scientific publication, with accompanying lay summaries for public dissemination.

The outcomes will also be incorporated into future work that will use a Patient and Public Involvement approach to explore multimorbidity and dementia from the perspective of people with dementia and their carers.



CONCLUSION

There are close links between physical health and medication use with dementia in older people, although some evidence is conflicting. For example, we are not sure whether multimorbidity and polypharmacy contribute to dementia separately or together.

The findings pose more questions on this topic, on which the following work is ongoing:

- Examining dementia in the Lothian Birth Cohort according to more precise NHS records
- Exploring changes in anxiety and depression in the Lothian Birth Cohort
- Aiming to link accurate NHS dementia diagnoses with other NHS records at Scotland-wide level, to allow more detailed analyses.

To optimise brain health, we must pay attention to people's overall physical health. This project has provided new information on this topic to improve patient care and guide future research.



RESEARCH TEAM & CONTACT

 **NAME** Lucy Stirland
Global Brain Health Institute,
University of California San Francisco

 lucy.stirland@gbhi.org

Additional Information

Dr Stirland completed this Clinical Lectureship and finished her specialist training in Old Age Psychiatry in August 2022. She is now an Atlantic Fellow for Equity in Brain Health at the Global Brain Health Institute, University of California San Francisco, USA