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The prevalence of multimorbidity measured by linked healthcare data and its association with mortality in a large longitudinal cohort

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Introduction

Multimorbidity, the co-existence of two or more health conditions, is a growing challenge. It may be measured using health service administrative data via the emerging consensus measure by Barnett. However, the original Barnett was developed using Scottish-specific primary care coding, which restricts its application in other health systems.

Objectives and Approach

The aim was to create and test International Classification of Disease (ICD) coding algorithms for all 40 Barnett conditions.

We evaluated this new measure by:

1. Assessing the prevalence of secondary care multimorbidity in 2001
2. Assessing the association between multimorbidity and mortality rate over 15 years

Participants of the Aberdeen Children of the 1950s cohort (ACONF) were linked to their secondary-care healthcare records and mortality records. Multimorbidity was defined as the presence of two or more of the 40 conditions. The association between multimorbidity and mortality was assessed using Cox proportional hazards regression with adjustment for key covariates.

Results

We combined results of a review of the coding literature with codes used commonly by the National Health Service in Scotland, to apply ICD codes to each Barnett condition.

The ACONF were aged 45 to 51 years in 2001. Of 8,094 members who were alive and linked to Scottish administrative data, 246 (3%) had multimorbidity. There were 629 deaths by 2016 with 83 occurring in the multimorbidity group.

Relative to those without multimorbidity, those with multimorbidity in 2001 had a mortality hazard ratio (HR) of 5.9 (95% CI 4.6-7.4) over 15 years follow-up. This was unchanged when adjusted for age, gender, social class at birth, cognition

at age 7, secondary school type and educational attainment (HR 6.2, 95% CI 4.4-8.5).

Conclusion/Implications

We have created a new version of the influential Barnett measure using ICD codes, which allows for its wider application across health systems. We found that this measure of multimorbidity was associated with greatly increased mortality, indicating it could help predict poor outcome using administrative records.