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Comparing two measures of multimorbidity in hospitalised patients

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Background

Multimorbidity is recognised as a complex and growing health challenge. Currently there is no “gold standard” multimorbidity measure and few studies have compared measures in hospitalised patients.

Objectives

We aimed to evaluate two published multimorbidity measures in routine hospital episode data in NHS Grampian, Scotland.

Methods

We used the Scottish Morbidity Record (SMR) data for the years 2009-2016. We included all adults admitted to hospital in the Grampian region of Scotland (population 588,100) during 2014. Morbidities were identified from inpatient admissions during the five years prior to admission date in 2014 (ICD-10 codes). Two multimorbidity measures were used: Charlson (Quan 2005), and Tonelli et al (2015); and multimorbidity was defined as ≥ 2 morbidities. Kappa statistics assessed agreement between the two measures in classifying patients as multimorbid. The association between multimorbidity and mortality, readmissions, and length of stay was examined using regression methods with odds ratios (OR) or incidence rate ratios (IRR) calculated as appropriate.

Findings

In 41,545 adults (median age 62 years, 52.6% female), multimorbidity prevalence was 15.1% (95% CI 14.8%-15.5%) using Charlson and 27.4% (27.0%-27.8%) using Tonelli - agreement 85.1% (Kappa 0.57). After adjusting for covariates, multimorbidity was associated with an increased risk of longer length of stay, (Charlson IRR 1.10 (1.03, 1.18; $p=0.005$); Tonelli IRR 1.11 (1.04, 1.18; $p<0.001$)) and readmission (Charlson OR 2.06 (1.94, 2.19; $p<0.001$); Tonelli OR 2.12 (2.01, 2.22; $p<0.001$)). Multimorbidity had a higher risk of mortality when measured using Charlson (Charlson OR 2.71 (2.52, 2.92; $p<0.001$); Tonelli OR (1.84 (1.72, 1.98; $p<0.001$)).

Conclusions

Multimorbidity measures operationalised in hospital episode data identified those at risk of poor outcomes and will be useful for future multimorbidity research and use in secondary care data systems.

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