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A comparative study demonstrated that prevalence figures on multimorbidity require cautious interpretation when drawn from a single database

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Abstract

Objective: We investigated the degree of comparability of the prevalence of chronic diseases and disease combinations in the elderly in two databases comparable with regard to diseases included, sex and age of the patients (65–85 years), and cutoff score for case definition.

Study Design and Setting: One study is based on chart-supported interviews with the primary care physicians within a cohort study of 3,189 multimorbid elderly patients. The second study analyzed claims data from ambulatory care delivered to the multimorbid members of one German Health Insurance (n = 70,031). Multimorbidity was defined by the presence of three or more chronic conditions from an identical list of 46 diseases.

Results: The difference of the median number of chronic conditions was 1 (mean 6.7 vs. 5.7). The prevalences of individual conditions were approximately one-third lower in the claims data, but the relative rank order corresponded well between the two databases. These relatively small prevalence differences cumulate when combinations of chronic conditions are investigated, for example, the prevalence differences between the two databases increased to nearly 100% for triadic combinations and nearly 170% for quartets.

Conclusion: The study shows that conclusions regarding the prevalence of combinations of diseases should be drawn with caution when based on a single database.

Keywords: Multimorbidity; Comorbidity; Chronic disease; Elderly; Prevalence; Epidemiology; Germany

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What is new?

Key findings

- The difference between the prevalence estimates in both databases was statistically significant. The number of chronic conditions was higher in the cohort study (average, 7.0) than that in the claims data study (average, 5.7). Also, the comparability of the rank order for individual chronic conditions (rho, 0.9) and combinations (rho, 0.7) was high. In both studies, the prevalence differences were small for age and sex. Observed-to-expected (O/E) ratios for triads and quartets of disease combinations exceeding a 1.5 cutoff score were very rare.

What this adds to what was known?

- We demonstrated that the relatively small prevalence differences detected when comparing individual chronic conditions cumulate when combinations of chronic conditions are investigated, and this problem grows with the number of chronic conditions under study. In our study, the prevalence differences between the two databases increased to nearly 100% for triadic combinations and nearly 170% for quartets.

What is the implication and what should change now?

- Caution is appropriate when presenting prevalence figures and/or O/E ratios for disease combinations from a single database. When investigating combinations of diseases, which are the essential quality of multimorbidity, small differences in the prevalence for individual diseases increase rapidly toward noncomparability. This study shows that differences in the study design and data source have an important influence on results concerning the prevalence of multimorbidity, even when the population under study and diseases under investigation correspond largely. This is especially the case when several chronic conditions (''multimorbidity patterns'') are investigated.

1. Background

Estimates of the prevalence of multimorbidity in epidemiological studies depend substantially on the following:

1. Case definition: for example, categories of medical nosology vs. inclusion of symptoms, complaints, and/or subjective burden, respectively [1]; their operationalizations, for example, single or grouped *International Classification of Diseases* (ICD) codes, multimorbidity indexes [2], or causes for contact based on the International Classification of Primary Care (ICPC) categories [3]; the number of syndromes included, for example, using open or closed lists, list size, and the cutoff score for multimorbidity (e.g., at least two vs. three [chronic] conditions [4–8]).
2. Methods of case identification [8]: for example, standardized clinical examinations [9], chart review, patient self-reports [10], claims data analysis [11], parallel interviews with physicians and patients [12], or clinical registers [13].
3. Sampling and recruitment strategies: for example, general population vs. general practice population [5] or clinical populations in different medical care settings [4].

As a result, prevalences vary widely across studies, and therefore, reviews come to very general conclusions [8]. In general, prevalence estimates are highest when using a low cutoff point, a long or an open list of syndromes, and data from medical care settings. Little is known, especially, about the relationship between the method of case identification and detected prevalence rates in primary care. One way to increase the evidence on prevalence is to compare different methods of case identification in comparable populations and/or care settings. Only two studies in primary care comparing methods of case identification in the context of multimorbidity are known to the authors. Schram et al. [4] compared the prevalence of the five most frequent chronic conditions in diverse care settings in the Netherlands and reported large frequency and morbidity pattern differences. Fortin et al. compared two Canadian studies on adults older than 25 years of age, a telephone survey of the general population and a chart review based on a sample of patients from general practice. They found higher prevalence rates in the general practice population, especially when using an open list compared with a closed list [5]. Because of great differences between the databases examined in both important studies, conclusions on prevalence remained limited. As our study group has access to two large databases on the prevalence of chronic diseases in the elderly comparable with regard to their (extensive) disease list, country, sex and age of the patients, and cutoff score for case definition, we investigated the degree of comparability of the prevalence of the number of chronic diseases and disease combinations in these two databases and intended to identify explanations for eventual differences in prevalence. The differences in the study population and study design are described in the Methods section and Table 1.

2. Methods

The first study (''MultiCare Cohort Study'' [MC-Cohort]) is based on chart-supported interviews with the