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Changing definitions altered multimorbidity prevalence, but not burden associations, in a musculoskeletal population

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Abstract

Objectives: The inclusion of musculoskeletal conditions within multimorbidity research is inconsistent, and working-age populations are largely ignored. We aimed to: (1) estimate multimorbidity prevalence among working-age individuals with a range of musculoskeletal conditions; and (2) better understand the implications of decisions about the number and range of conditions constituting multimorbidity on the strength of associations between multimorbidity and burden (e.g., health status and health care utilization).

Study Design and Setting: Using data from the Australian National Health Survey 2007–08, the associations between burden measures and three ways of operationalizing multimorbidity (survey, policy, and research based) within the working-age (18–64 years) musculoskeletal population were estimated using multiple logistic regression (age and gender adjusted).

Results: Depending on definition, from 20.2% to 75.4% of working-age individuals with musculoskeletal conditions have multimorbidity. Irrespective of definition, multimorbidity was associated with increased likelihood of subjective health burden, pain or musculoskeletal medicines use, nonmusculoskeletal specialist and pharmacist (advice only) consultations, and reduced likelihood of not consulting health professionals. A group with intermediate health outcomes was considered multimorbid by some, but not all definitions. With the restrictive policy and research multimorbidity definitions, this intermediate group is included within the reference population (i.e., are considered nonmultimorbid). This worsens the reference group's apparent health status thereby leveling the comparative burden between those with and without multimorbidity. Consequently, dichotomous cut points lead to similar associations with burden measures despite the increasingly restrictive multimorbidity definitions used.

Conclusions: All multimorbidity definitions were associated with burden among the working-age musculoskeletal population. However, dichotomous cut points obscure the gradient of increased burden associated with restrictive definitions.

Keywords: Multimorbidity; Musculoskeletal conditions; Quality of life; Health care utilization; Burden of disease; Self-rated health; Health status

1. Introduction

The importance of coexisting chronic conditions (termed multimorbidity [1], or in the context of an index condition, comorbidity [2]) is increasingly recognized because multimorbidity magnifies health care expenditure [3], health care service usage [4,5], polypharmacy, and mortality rates [6]; reduces functional status and quality of life [7–12]; and contributes to adverse events [12]. Multimorbidity prevalence varies substantially across studies, ranging from 12% to 95% [3,7,13–22]. Factors contributing to this variation include differences in geographical settings, populations sampled, and data collection methods [17,23].

There is currently no "gold standard" definition for multimorbidity (or comorbidity). The definition selected depends on its suitability for the sample population, outcome of interest, or the data available [7,11,22,24]. Complex scale–based measures of coexistent conditions that include weightings of severity [25–28] or physical

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What is new?

Key findings

- The estimate of prevalence of multimorbidity in the working-age Australian population with musculoskeletal conditions varies greatly with how multimorbidity is defined (i.e., with the survey, policy, and research definitions).
- Irrespective of definition, multimorbidity adds to subjective health burden and health care utilization.

What this adds to what was known?

- The strength of associations between multimorbidity and burden is relatively consistent with these different multimorbidity operational definitions (establishing convergent validity).
- However, an inherent limitation of dichotomous cut points is that they "level associations" and obscure the gradient of increased burden associated with the more restrictive definitions.
- The degree of burden added by multimorbidity escalates with each increasingly restrictive operational definition; however, this is illustrated only when the reference group is fixed to those considered not multimorbid by any definition (examined here).

What is the implication and what should change now?

- It is important to be aware of this "leveling of association" with burden measures when comparing different definitions of multimorbidity based on simple counts.

functioning [29,30] potentially require intensive training time or labor to implement, access to clinical notes [24], and researcher decisions about presence of conditions are still partly subjective [7]. Data on duration, time-course, or severity of disease are often limited, which precludes weighting on these factors [23]. Therefore, multimorbidity is often pragmatically operationalized by simply summing the number of coexisting chronic diseases [11,31,32]. In addition, the minimum number (nominal threshold) and range (operational definition) of conditions that constitute multimorbidity contribute to the heterogeneity in prevalence observed across study populations [11,18,23,33–35].

Multimorbidity operationalized by condition count can include all conditions reported individually [11,36] or categorized by affected organs or systems [17,23]; the range of chronic conditions reported may be unlimited, or limited to a prespecified list of conditions. Even within a single data set, the definition used ("survey" [37], "policy" [38], and "research based" [35]) to operationalize multimorbidity greatly influences prevalence estimates (Lowe et al. submitted and [34]). However, it is unclear whether the strength of associations between these multimorbidity operational definitions and burden (e.g., health status and health care utilization) similarly varies. Examination of how well multimorbidity based on simple counts encapsulate associated health burden is needed to establish convergent validity of these multimorbidity definitions and to better understand the implications of decisions about the range of conditions included.

Working-age people with musculoskeletal (MSK) conditions are an appropriate policy-relevant and clinically important population to determine the additional subjective health and health care utilization burden that can be attributed to the presence of multimorbidity. MSK are highly prevalent and therefore a likely component of multimorbidity [7,21,39]. MSK are demonstrably burdensome; they impact on quality of life [40], complexity of medication regimens [41], and ability to continue paid employment [16,42]. Problematically, multimorbidity research tends to include MSK in an inconsistent and selective manner (e.g., restricted to osteoarthritis [43]; fibromyalgia and rheumatic conditions [21,44]) or within vaguely described or broadly encapsulating categories (e.g., inclusive of arthritis, joint disorders, or painful conditions not otherwise described [7,12]). Furthermore, multimorbidity research typically focuses on older people; however, similar to MSK, multimorbidity is not simply a process of aging [7,19,22]. Consequently, little is known about the additional subjective burden of multimorbidity among working-age people with MSK [10].

To address this, we used data from the Australian National Health Survey, to answer the following questions. Among working-age (18–64 years) people with any MSK:

1. Is each multimorbidity definition associated with additional burden across a range of subjective health and health care utilization measures? (i.e., establish convergent validity)
2. Do these observed associations vary according to the multimorbidity definition used?

2. Materials and methods

Data were sourced from the Australian Bureau of Statistics (ABS) National Health Survey 2007-08 [National Health Survey (NHS) 07-08] [37]. The ABS conducts NHS on a regular, approximately triennial basis. This secondary analysis uses data from a survey that took place during the period of August 2007 to June 2008. Previous surveys were conducted in 1977–78, 1983, 1989–90, 1995, 2001 and 2004–05. Confidentialized unit record files, released by the ABS since 2001, enable researchers to conduct detailed analysis of the survey data. For this