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Multimorbidity research: where one size does not fit all

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Timeframes and frequency are important considerations when defining chronic conditions for multimorbidity research

Heterogeneity in definitions of multimorbidity—the coexistence of several chronic disorders[1]—varies widely and is a recognised problem, affecting the transferability and comparability of studies. Many articles have highlighted the heterogeneous nature of multimorbidity definitions and the related difficulties in comparing studies. Discussions on how to define multimorbidity often focus on the threshold minimum number of conditions (eg, two or more, three or more), or the types of conditions to be included. Several empirical analyses and systematic reviews have shown how these decisions might affect estimates of multimorbidity, and how the impacts of these decisions vary across age, socioeconomic, and ethnic groups.[2–4] Less emphasis has been placed on investigating differences in how specific chronic conditions are identified.

The Academy of Medical Sciences defines a chronic condition as "a physical non-communicable disease of long duration, such as a cardiovascular disease or cancer; a mental health condition of long duration, such as a mood disorder or dementia; an infectious disease of long duration, such as HIV or hepatitis C."[5] Some conditions, however, might meet the criterion but also present as an acute episode (eg, anxiety), or might not be chronic (eg, gastritis). Medical records—and particularly how they are coded—can make it difficult to distinguish between acute presentations and chronic conditions; a distinction that has implications for resource use and planning.

In their paper, Beaney and colleagues deal with this technical question within multimorbidity research, with implications from the viewpoint of inequality (doi:10.1136/bmjmed-2022-000474).[6] Using a sample of primary care electronic health records from the Clinical Practice Research Datalink Aurum database of adults registered at general practices in England on 1 January 2020, the authors determined the impact of timeframes used in defining long term conditions on the prevalence of multimorbidity, and whether prevalence differed by sociodemographic factors. The authors defined multimorbidity as two or more diseases from a list of 212 chronic conditions, and they calculated the prevalence of multimorbidity when a single code ever recorded denoted the existence of all the conditions. Crucially, they identified 37 conditions that have both acute and chronic presentations. For these conditions they also calculated and compared the prevalence of multimorbidity using four alternative definitions based on the number of codes required to be present within a certain timeframe.

The study found that the prevalence of multimorbidity changed substantially depending on the timeframe used for identifying patients chronically affected by any of the 37 conditions: 73.9% for a single code ever reported; 55.2% for at least two codes in three months; 52.5% for two codes in 12 months; 41.4% for three codes in 12 months; and 42.7% for one code in the past 12 months. These changes in prevalence by definition were not uniform across different sociodemographic groups. Among those who had multimorbidity when using the single code definition, those who were younger, from less deprived areas, and from a minority ethnic group, were more likely to be classified as not having multimorbidity under the alternative definitions. Different patterns for reduction in the number of long term conditions were observed under the alternative definitions—for example, the most deprived group showed greater reductions than the least deprived group.

A major strength of this study was that all code lists and analysis scripts were available for replication. The appendices included the impact of the different definitions on individual conditions, which provided additional insights into the specific conditions driving changes in prevalence. This study used electronic health record data from general practices in England: this choice could be more or less relevant depending on the source and context of the data. For example, disease registry data or secondary care records might more consistently record only chronic presentations. In settings where out-of-pocket healthcare expenditure is more common, repeat recording criteria could substantially increase the risk of bias among some population subgroups. As with all studies using health records, recording of codes is influenced by many factors, such as practitioners' behaviour, healthcare incentives, pre-existing conditions, and propensity of patients to seek care, introducing another layer of potential bias.

This study provides food for thought on what could be seen as a dry methodological detail. If, depending on the definition of a chronic condition, some socioeconomic or minority ethnic groups are less likely to be categorised as having multimorbidity than others, is this a true reflection of disease burden, or does it say more about the wider context in terms of access to healthcare, recording practices, and propensity to seek care? And what question is it that needs to be answered? As researchers we need to think carefully about the biases that are introduced under our definitions and what these might stem from. Further research could consider a theory based social

inequalities framework to explore what might be driving these sociodemographic differences in reclassification, such as biases in recording, or, in some populations, unmet need or over-diagnosis. Stigma and institutional discrimination are other possible contributors to biases in estimates—for example, the under-detection of mental health conditions in primary care datasets despite the known association between multiple conditions and prevalent and incident mental health conditions.[7 8] As with the use of appropriate terms for multiple morbidity, listening to patients is important to understand their experiences and priorities.[9]

This paper highlights that definitions of multimorbidity should be multidimensional to reflect clinical complexity, timeframes, and disease pathways simultaneously. A key factor is to flexibly adapt definitions based on the intended use of the analysis and to understand the combined impact on crucial operational outcomes, such as economic impact, productivity, workforce, and resource planning, as well as long term and social care needs. Statistical clustering of conditions is one approach being applied within multimorbidity research,[10] but this might not be enough, and multimorbidity definitions will require causal and clinical reasoning behind them, grounded in priorities of those with lived experience.[11] Embracing the complexity of the phenotype can provide novel insights into this challenging problem.

Beaney and colleagues' study emphasises that it is not necessarily that one definition is always correct or that reclassification of multimorbidity status under one definition compared with another is appropriate. This study is a reminder of an essential research principle: the importance of adopting definitions, data, and methods that are appropriate to a specific context and the research question being answered. One size does not fit all—in multimorbidity research at least.[12] This heterogeneity does not actually hamper a cohesive evidence base. Instead, clear justification of decisions, alongside open source code lists and analysis scripts can facilitate transparency, comparability, and further exploration.

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