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Understanding the Patterns of Multimorbidity

As our population ages and medical care improves, the number of patients living with more than one chronic health condition (the definition of multimorbidity) is increasing substantially. Data for the population of Olmsted County, Minnesota (the location of Mayo Clinic in Rochester), from 2005 to 2010 show that about 23% of all persons in the population had 2 or more conditions and 5% had 5 or more chronic conditions.[1] Not surprisingly, the prevalence estimates of multimorbidity increase with age. Among older US patients on Medicare, the prevalence of multimorbidity was 62% at ages 65 to 74 years and 82% at ages 85 years and older.[2] Multimorbidity is associated with many adverse health outcomes, including poor quality of life, lower functional status, and higher rates of hospital admissions.[3,4] Caring for patients with multimorbidity can prove challenging to clinicians, especially general practitioners, because clinical practice guidelines traditionally focus on single conditions.[2] Comparisons of existing guidelines show that most address the issue of comorbidities but few provide guidance for patients with specific multiple conditions. Thus, there is a need for increased understanding of which diseases cluster together most frequently and, ultimately, which disease clusters have the greatest impact on important patient outcomes.

In this issue of Mayo Clinic Proceedings, Zemedikun et al[5] address the problem of how to identify clusters of chronic conditions. They take advantage of a unique resource, the UK Biobank population, a large collection that consists of more than 500,000 people from across the United Kingdom who volunteered to participate during the years 2006 to 2010. All participants were between the ages of 40 and 69 years at the time of enrollment. The authors conducted a cross-sectional analysis of participant-reported medical conditions collected at the time of enrollment into the UK Biobank. They selected 36 conditions based on prior publications and a list of chronic conditions that require the most attention from primary care physicians. They utilized a 2-step analysis of these 36 conditions by first conducting a cluster analysis to identify conditions that clustered together, followed by an analysis within each cluster to describe the specific conditions that appeared together most commonly. This analysis method has been applied only once before to an analysis of multimorbidity.[6]

The authors found 3 major clusters in these data. The first cluster included myocardial infarction and angina, a dyad of conditions that are known to co-occur and that have actionable management guidelines currently implemented in clinical practice.[7] The second cluster identified in this data set included 26 conditions that centered on diabetes and included cardiovascular, musculoskeletal, respiratory, and neurodegenerative diseases. These associations are also supported by good clinical evidence. The American Association of Clinical Endocrinologists has integrated diabetes care and addressed numerous comorbid conditions such as hypertension, nephropathy, retinopathy, obesity, and obstructive sleep apnea.[8] Lastly, the third cluster had a large number of associations between conditions, with asthma, depression, and cancer having 12, 9, and 9 associations, respectively. Within the third cluster, the strongest association was between depression and anxiety. Again, there is recognition of the importance of depression,[9] asthma, and cancer with comorbid health conditions.

These findings provide continued guidance for clinicians because many struggle with patients with multimorbidity. How a physician approaches a patient with many chronic illnesses remains challenging as more clinicians strive to improve care and improve clinical quality metrics within their practice. Physicians should use empiric evidence to focus on those illnesses that have the biggest influence and impact on overall health. Few clinicians would argue about prioritizing coronary artery disease, diabetes, depression, asthma, and cancer care as primary objectives of medical care. Established treatment guidelines exist for these common and important conditions. It is unclear, however, how these clusters of conditions interact to cause worse health outcomes. In addition, it is unclear how treatment and

management of single conditions impact the long-term health outcomes of patients with other co-occurring chronic conditions. Identifying the most common clusters of multimorbidity is an important first step in understanding these key clinical questions. As researchers and clinicians attempt to understand multimorbidity in a broader sense, there is great opportunity to understand how treating a single illness may affect other comorbid illnesses. In particular, large-scale clinical research and epidemiological studies are necessary to understand how adherence to clinical guidelines impacts health outcomes in the real world of health care delivery to complex patients. Some researchers are beginning to tackle these important questions. In particular, Tinetti et al are leading many of these efforts. For example, in a cohort study of 8578 patients with 2 or more chronic illnesses, they found similar survival in patients who adhered to individual illness guidelines when compared with the findings from the randomized trials.[10] Studies like that of Tinetti et al offer the opportunity to substantially improve the clinical care of patients living with multimorbidity.

In summary, our aging population ensures that providing effective clinical care for patients with multimorbidity will remain a primary concern for many years to come. Research is therefore urgently needed to identify the most important multimorbidity patterns, to understand how these patterns impact long-term health outcomes, and to identify the most effective therapies for treating these complex patients. Zemedikun et al have added to the increasing body of knowledge in this area through their study of multimorbidity patterns in a large biobank population.

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