

MULTIMORBIDITY - A PUBLIC HEALTH CHALLENGE

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Received: 04.06.2025.

Accepted: 10.07.2025.

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ABSTRACT

Multimorbidity has been identified as one of the major health care concerns of the 21st century. Multimorbidity represents a major public health challenge in both developing and developed countries of the world. Although multimorbidity is considered a health problem of the elderly, a significant number of young and middle-aged people also have multimorbidity. Multimorbidity has a major impact on individuals and negatively affects quality of life, significantly increases the risk of disability and mortality, complicates the treatment process, poses a risk of repeated hospitalization, prolonged hospital stay, polypharmacy and adverse events, increases the use and costs of health care, and represents a significant economic burden on the individual, family and health system. Managing multimorbidity requires a multidisciplinary team to formulate active measures to improve health outcomes and quality of life of multimorbid patients, as well as comprehensive and coordinated health care for these patients. Due to the aging population and the consequent increase in multimorbidity and health service utilization in the future, health systems should prioritize improving the management of multimorbid patients. This would significantly increase the efficiency of health care and improve health outcomes and quality of life for patients with multimorbidity.

Keywords: Multimorbidity, implications, public health.



DOI: 10.2478/eabr-2025-0006



INTRODUCTION

With increasing life expectancy and aging of the population, the burden of chronic noncommunicable diseases (NCDs) on society is a growing public health challenge worldwide (1). The problem of NCDs is of great importance not only because these diseases are leading causes of morbidity, work disability, disability and premature mortality, diseases of long-term health surveillance and care that require effective and increasingly expensive methods of diagnosis, treatment and rehabilitation, diseases that have socio-economic consequences for the family, community and society, but also because they have a multifactorial etiology and arise as a result of complex interactions between individuals and the environment in which they live (2,3). Individual characteristics (such as gender, ethnicity, genetic predisposition, lifestyle, etc.) together with socio-economic determinants and environmental conditions (such as income, education, living conditions, and work conditions) determine differences in the exposure and susceptibility of individuals to the development of NCDs (4).

With the increasing burden of NCDs, multimorbidity, or "the simultaneous presence of two or more chronic diseases/conditions," is among the greatest challenges facing modern medicine and healthcare systems today (5). Multimorbidity has been identified as one of the major concerns of the healthcare system in the 21st century (6) and represents a major public health challenge in both developing and developed countries of the world (7).

Although multimorbidity is considered a health problem of older adults, a significant number of young and middle-aged people also have multimorbidity (8).

Multimorbidity has a major impact on individuals and negatively affects quality of life, significantly increases the risk of disability and mortality, complicates the treatment process, poses a risk of repeated hospitalization, prolonged hospital stay, polypharmacy and adverse events, increases the use and costs of health care, and represents a significant economic burden on the health system (9,10).

The presence of multiple morbidity is strongly correlated with a decline in functional abilities and mental well-being, as well as an increased risk of developing disability (11). One of the consequences of treating patients with multimorbidity is the need for the simultaneous administration of numerous medications (polypharmacy), which further impairs the quality of life of patients, increasing the risk of developing unwanted side effects and adverse drug reactions and their interactions, as well as drug-disease interactions. Instead of a highly specialized but isolated approach, which is used to treat a single disease, patients with multimorbidity need a complex and structured care plan. This has a serious impact on disease management, healthcare utilization and costs.

The aim of the review was to examine factors associated with multimorbidity, as well as the consequences of

multimorbidity. This may be particularly important for health systems and health decision-makers in improving health outcomes and quality of life in multimorbid patients.

PREVALENCE OF MULTIMORBIDITY

The prevalence of multimorbidity has been found to vary widely across studies, from approximately 20–30% when considering the entire population to 98% in studies focusing only on older adults (12).

Determining the prevalence of multimorbidity is of great importance, both from the perspective of assessing the impact of multimorbidity on public health and for assessing the health care needs of patients with multimorbidity. The complex nature of multimorbidity as well as inconsistencies in the conceptualization and definition of multimorbidity pose great difficulties in its research. The different clinical entities, multimorbidity and comorbidity, continue to be used interchangeably. While multimorbidity is defined as the simultaneous occurrence of two or more chronic diseases, comorbidity is perceived as the occurrence of other health conditions in addition to the primary disease. Also, the number of diseases used as cut-off points, the combination of diseases and the measures of multimorbidity vary across studies (13).

Thus, variations in the prevalence of multimorbidity are due to differences in data sources, study populations and the number and types of chronic conditions counted to define multimorbidity (14).

When it comes to research on multimorbidity, it is evident that most research has been conducted in Western countries, although there are also studies investigating multimorbidity in other parts of the world (15).

Data from different studies show that the prevalence of multimorbidity varies across countries around the world. Although multimorbidity is present in most high-income countries, it is increasingly prevalent in low- and middle-income countries. This ratio is 38% in high-income countries compared to 30% in low- and middle-income countries (16).

Studies conducted in high-income countries have reported a higher prevalence of multimorbidity among older populations, but there is a lack of evidence from underdeveloped and developing countries on the prevalence of multimorbidity among younger age groups and those living in socioeconomically disadvantaged areas. Also in these countries, models of care are focused on single diseases rather than multimorbidities (17).

The problem is further compounded by the fact that most health care systems in these countries are fragmented and at the same time infrastructurally designed to address individual chronic conditions. In addition, the management of infectious diseases is a major concern in these countries. Another problem is the inadequate financing of the health care system,



with low coverage of health services and limited access to health insurance, especially for patients with multimorbidity and the elderly (18).

While the focus of multimorbidity research in highly developed countries is on multimorbidity of noncommunicable diseases, in underdeveloped countries the focus of research is on multimorbidity of noncommunicable and infectious diseases simultaneously. The patterns of multimorbidity in these countries are combinations of two concurrent infectious and noncommunicable diseases, three concurrent infectious and noncommunicable diseases, and sex-specific combinations of infectious and noncommunicable diseases. The most common dyads that occurred were HIV and hypertension in 23.3% and acid peptic disease and hypertension in 18.2%, while the most common triads were HIV, hypertension, and diabetes with a frequency of 63%, followed by HIV, tuberculosis, and diabetes with a frequency of 26.6% (19).

Other studies have also shown that chronic conditions tend to cluster into so-called multimorbidity patterns. A study conducted in Brazil identified three patterns: cardiopulmonary pattern, musculoskeletal pattern, and vascular-metabolic pattern. Roseline et al. found that participants aged 60 years and older from the Swedish National Health and Care Study clustered into six multimorbid patterns: psychiatric disorders (5.87%), cardiovascular diseases (6.27%), metabolic and sleep disorders (10.67%), sensory impairments and cancer (11.87%), musculoskeletal, respiratory, and gastrointestinal diseases (15.78%), and nonspecific (49.56%), (20,21).

Other studies have also examined patterns of chronic disease association. Some chronic conditions have been found to be more likely to cluster into certain clusters than others due to biological, behavioral, or environmental factors. The results of the studies also show that the cardiorespiratory pattern of multimorbidity (angina, asthma, and COPD) is the most prevalent, followed by the metabolic pattern (diabetes, obesity, and hypertension) and the mental-articular pattern (arthritis and depression). Understanding the common risk factors and pathophysiological pathways of these patterns could lead to the development of pharmacological or behavioral interventions that target more than one condition simultaneously, thereby reducing polypharmacy and the burden of treatment in this population (22).

Factors associated with multimorbidity

When it comes to factors associated with multimorbidity, it can be noted that it is strongly associated with several sociodemographic factors. Age and living in poor socioeconomic conditions are established risk factors for multimorbidity (23).

In addition, many studies have found that women have a higher risk of multimorbidity than men. The reason for this is most likely the longer life expectancy of women compared

to men, as well as gender differences in the use of health care (24).

Other studies also show that the prevalence of multimorbidity increases with age, that multimorbidity correlates with poor socioeconomic status, that it is more prevalent in women than in men, and that the number of associated diseases, as a determinant, is a more significant indicator of the use of health services than the type and severity of the disease itself (25).

Studies have reported a nearly double prevalence of multimorbidity among women than men, among the population aged 50 years and over, among the unemployed, and among those in the lowest wealth quintile (26).

Studies have shown that multimorbidity is inversely associated with economic status, with lower economic status having higher multimorbidity compared with higher socioeconomic status (27).

Studies examining the relationship between socioeconomic deprivation, education level, or income have shown that lower education levels are associated with an increased risk of multimorbidity, while another study found that four times as many people with the lowest incomes have multiple diseases compared to those with the highest incomes. Other studies have shown that multimorbidity occurs a full decade earlier in those from socioeconomically poorer backgrounds (28).

Similarly, some studies suggest that there is an inverse relationship between education and multimorbidity. Significantly lower odds of multimorbidity have been reported among people with a university education compared with those with no formal education. Marital status has also been identified as a factor accounting for differences in the prevalence of multimorbidity. Studies have shown that widows and those patients who were recently divorced had higher odds of multimorbidity compared with those who were currently married or living with a partner (29).

The association between literacy and multimorbidity has been inconsistent, with some studies finding lower levels of multimorbidity in illiterate people (30) but also one study reporting higher levels of multimorbidity in illiterate people (31).

Also, a large number of lifestyle factors, such as smoking, alcohol intake, reduced physical activity and poor diet, are associated with the development of multimorbidity, but it remains unclear which factors are most important, making it difficult to draw firm conclusions (32).

A Canadian study involving 1196 participants examined the association between lifestyle factors such as smoking, alcohol, physical activity, and fruit and vegetable consumption and found that smoking was the most important factor, but also reported that the presence of combinations of



unhealthy lifestyles (e.g., smoking and physical inactivity) increased the risk of multimorbidity (33).

The Chinese longitudinal health study showed that low levels of physical activity were associated with an increased risk of multimorbidity (34).

A recent Australian study with 53,867 participants aged 45–64 years showed that predictors of multimorbidity were smoking in men and age, body mass index, and chicken and red meat intake in both sexes, but that other behavioral factors such as physical activity, alcohol consumption, and sleep duration were also important (35).

A study from India of 699,686 women showed that women who smoked or chewed tobacco had a higher risk, and those who used multiple tobacco products had an 87% higher risk of developing multimorbidity (36).

Data from the US National Health and Nutrition Examination Survey suggest that sedentary behavior is associated with multimorbidity (37).

A study conducted in Iran reported higher odds of multimorbidity for obese participants, those with low physical activity, and those who consumed alcohol and cigarettes more frequently (38).

Smoking was associated with an increased likelihood of multimorbidity among middle-aged and older participants in an Australian study and among men (39), but not among women in a Canadian study (40), but a decreased likelihood of multimorbidity in a South African study (41).

Other studies have also shown that people who lead an active lifestyle (13.3%) have significantly lower multimorbidity compared with those who lead a sedentary lifestyle (23.2%), (42).

Studies have also shown that people with multimorbidity have a decrease in physical functioning, quality of life, and the presence of psychological distress. Depression was the most significant and more common in women (22.4%) compared with men (9.3%) (43).

It was also found that the results of both physical and mental components were significantly lower in women and educated patients with multimorbidity (44).

Lack of control over one's life has also been implicated in the development of multimorbidity. Lack of control can exacerbate anxiety by promoting chronic stress responses and increase the risk of unhealthy behaviors such as smoking. The interaction of "stress" and multimorbidity has only just begun to be explored and has been associated with increased hospitalizations and mortality (45).

Although there is growing evidence about the social determinants of multimorbidity, more research is needed to understand which factors or combinations of factors are most

important to target. A key gap concerns knowledge about the determinants of different patterns of multimorbidity, especially in developing countries (46).

CONSEQUENCES OF MULTIMORBIDITY

Some studies have reported a positive association between multimorbidity and health care utilization. Findings from Switzerland showed that the average number of consultations was 15.7 among multimorbid individuals per year compared with 4.4 in a non-multimorbid sample (47).

Evidence from 16 European countries shows that the number of chronic diseases is associated with higher use of hospital care in primary and secondary settings (48).

A study from India, with participants aged 18 years and older, found that the odds of visiting public health facilities were highest among participants aged 70 years and older and among female patients with multimorbidity. The highest odds of visiting private health facilities were reported among those with high incomes. In addition, the largest percentage of patients visiting private healthcare facilities are those with single morbidity compared to those with multimorbidity (49).

Being multimorbid corresponds to more than double the number of contacts compared to a non-multimorbid sample. On average, multimorbid elderly people had 36 contacts with doctors per year. About 20% of multimorbid elderly people had one contact with a doctor every week. The number of contacts per year varied greatly depending on the individual chronic conditions and their combinations in multimorbidity patterns, a study of a sample of patients in Germany showed (50).

Compared with those with a single health condition, people with multiple chronic conditions are more likely to suffer from higher rates of unplanned hospital admissions and readmissions, as well as increased use of emergency services. Also, where out-of-pocket payments for health care are high, multimorbidities place even greater financial pressure on households and can be drivers of repeated health disasters (51).

Many individuals with multimorbidity become economically and socially dependent on their support networks and communities. Also, due to the complexity of multimorbidity care, patients are prescribed multiple medications, which increases their risk of drug interactions. Subsequently, they also develop poor medication adherence (52).

Another significant challenge for public health, health care systems, health care providers, and individuals living with multimorbidity is polypharmacy, or the multiple use of medications used to treat these conditions. Thus, multimorbidity and polypharmacy are often strongly associated (53).

Living with multimorbidity and polypharmacy can create significant challenges, including increased risk of drug interactions, barriers to self-care and self-management, reduced



quality of life, higher health care costs, and difficulties in accessing health services for this population. Polypharmacy also carries the potential for inappropriate or problematic prescribing (54).

In several studies of multimorbidity and polypharmacy, the reported prevalence of multimorbidity (defined as two or more conditions) has ranged from 4.8% to 93.1%, while the reported prevalence of polypharmacy (defined as five or more medications) has ranged from 2.6% to 86.6%. These significant ranges in prevalence are partly due to methodological heterogeneity and the lack of a consistent operational definition for these two concepts (55).

However, despite the high and increasing prevalence of multimorbidity in the population and numerous adverse health outcomes, there are still no clearly defined guidelines for the management of these patients (56).

People with multimorbidity typically have high levels of unmet health care needs and often do not receive appropriate care and treatment (57).

Most health care systems and public health policies focus on treating individual diseases, resulting in fragmentation of care and a lack of continuity and comprehensiveness in the management of multiple diseases (58).

Also, most clinical trials and academic research that inform public policy often exclude multimorbid individuals from analysis and instead focus on predicting risk factors for individual diseases. Adapting health care systems to address multiple chronic conditions is a major challenge, and effective prevention and control measures are essential to reducing the burden of multimorbidity (59).

The treatment of multimorbidity aims to improve patient outcomes. Health-related quality of life is considered a key outcome in multimorbidity research. Many observational studies have consistently shown that multimorbidity is associated with poor quality of life and psychological well-being across the lifespan (60).

Some studies suggest that this negative association of multimorbidity with quality of life is stronger in younger individuals, which some suggest may be a consequence of biographical disruption related to social disruption, and cultural experience and self-identity, in younger people (61).

GLOBAL BARRIERS AND OPPORTUNITIES FOR MANAGING MULTIMORBIDITY

The process of detecting and diagnosing multimorbidity is a significant and serious task from the perspective of both the patient and the clinician, and therefore requires a more than simplistic approach (62).

As multimorbidity is the coexistence of two chronic conditions, diagnosing multimorbidity in clinical practice is rarely a problem as the clinician and patient usually agree

which conditions are currently active or relevant. What is more difficult is deciding when multimorbidity is severe enough to require special attention, management or a shift to more palliative approaches to care (63).

From this perspective, the National Institute for Health and Care Excellence (NICE) guidance on multimorbidity recommends that clinicians actively consider whether a patient requires an approach that specifically takes multimorbidity into account (64).

Such a patient-centered approach is essential to ensure that health care is tailored to the individual (65).

Patient-centered health care must be balanced with disease management and future risk. Anticipating poor health outcomes and limited life expectancy is an important strategy in identifying patients with multimorbidity who require a different approach within the framework of health care delivery (66).

From the patient and clinical perspective, multimorbidity may be present but not problematic, and the diagnostic challenge is the identification of multimorbidity that requires a specific approach that goes beyond the treatment of individual conditions (67).

Most clinical practice guidelines and health care organizations focus on the management of individual diseases (68).

Treatment of multimorbidity requires an appropriate balance between a focus on a single disease and multimorbidity. Multimorbidity requires health care that is both patient- and family-centered, prioritizing what is most important to the individual and their caregivers, providing a service that is aligned with patients' values and priorities (69).

From the patient perspective, managing multimorbidity is doubly challenging, as they must cope with the burden of disease and the burden of treatment (70).

Patient-level barriers include lower health literacy and self-efficacy to navigate the health care system, treatment burden, fragmentation and suboptimal care coordination, limited social resources to support self-management (e.g., family support, employment, and community support), environmental factors (e.g., living in rural areas far from health services or living in unsafe areas to engage in outdoor physical activity); or inadequate financial protection to cover health or related costs (71).

System-level barriers include availability, appropriateness, and access to services. Personal and health system barriers can combine to limit access to treatment (72).

The challenges that have emerged in existing trials of multimorbid interventions show that interventions for multimorbidity have been largely designed within well-established health care delivery structures with strong primary care



networks in rich countries, while there have been few interventions in the developing world (73).

Barriers for low-income countries are expected to be magnified and exacerbated in settings characterized by weak, fragmented, and acutely focused health care delivery systems (74).

Such pressures affect families as well as overburdened health systems and require community-level responses to reduce the burden on health services while ensuring universal access to free health care for people with multimorbidity (75).

Structural changes will be necessary to effectively prevent multimorbidity and limit its progression. Targeting interventions at the early determinants of multimorbidity, including socioeconomic deprivation and lower levels of education, and the social determinants of health, particularly poverty reduction, could lead to the prevention of multimorbidity. Given the challenges of managing multimorbidity, potential interventions are likely to be complex and multifaceted if they are to respond to the diverse needs of the individual (76).

CONCLUSION

Multimorbidity is becoming more common, driven by changes in lifestyle risk factors, particularly physical inactivity and obesity, and an aging population that partly reflects improved survival from acute and chronic conditions. The expected increase in the prevalence of chronic conditions further intensifies the problem. Advances in public health and clinical medicine have enabled people to live longer. While increased life expectancy is an important achievement, there is now a need to ensure that health-related life expectancy (quality of life) is extended along with this life expectancy (quantity of life). Findings from various studies provide evidence that targeted interventions and policies are needed to address the growing burden of multimorbidity. Currently, clinical management is largely focused on individual diseases, and more attention should be paid to multimorbidity, as it requires coordinated, continuous and comprehensive medical care. Managing multimorbidity requires a multidisciplinary team to formulate active measures to improve health outcomes and quality of life of multimorbid patients, as well as comprehensive and coordinated health care for these patients. Due to the aging population and the consequent increase in multimorbidity and health service utilization in the future, health systems should prioritize improving the management of multimorbid patients. This would significantly increase the efficiency of health care and improve health outcomes and quality of life for patients with multimorbidity.

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