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# Introductory Chapter: Managing Multiple Chronic Conditions - A Patient-Centered Holistic Approach Rather than Single Disease-Focused Perspective

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## 1. Introduction

A chronic health condition is simply defined as a physical, mental or cognitive disorder that lasts more than one year, requires long-term monitoring and treatment, deteriorates quality of life and causes certain difficulties associated with the physical, cognitive and/or psychological disabilities. We know perfectly well that the prevalence of chronic diseases is increasing rapidly all over the world, especially in low-income countries. It is also a well-proven fact that three-fifths of human deaths worldwide are attributed to four major noncommunicable chronic conditions such as cardiovascular disease (e.g., heart attack, stroke), cancers, chronic lung diseases (e.g., asthma, chronic obstructive pulmonary disease) and diabetes mellitus [1]. Globally, about one-third of all adults suffer from more than one chronic condition. Although there is lack of a precise and consistent term and definition to describe such patients, “multimorbidity”, “multiple chronic conditions” (MCC), and “poly-chronic disease” are the most widely used terms interchangeably [2–4]. Currently, “MCC” is still very popular, easily understood and the most commonly used term in both academic medical literature and non-academic environments worldwide [3].

## 2. Definitions and prevalence of MCC

The term “MCC” refers to the presence of two or more chronic conditions simultaneously in the same individual; however, the number of chronic conditions included in the definition and what constitutes a chronic condition varies greatly among studies in literature [4]. Some authors define MCC as coexisting conditions including diseases, symptoms and risk factors, while others interpret it only as the manifestation of end-organ damage (the endpoints of a disease) as a result of certain risk factors [5]. Therefore, the prevalence rates of MCC which generally range from 9.4–58% for the whole population (from 16–58% in UK studies, 26% in US studies, 20% of Australians and 9.4% in Urban South Asians), are highly heterogeneous and show regional differences across the world [3, 6–8]. In a large study of 25,293 participants from 14 countries (Austria, Germany, Sweden, Spain, Italy,

France, Denmark, Switzerland, Belgium, Israel, Czech Republic, Luxembourg, Slovenia and Estonia), 50% of cases reported having MCC. Among these, it was observed that hypertension was the most common individual chronic condition (49%), followed by arthritis (34%) and high depressive symptoms (31%) [9].

According to more recently published National Health Survey Research report, 27.2% of US adults have multiple chronic diseases, with the highest prevalence in women, non-Hispanic white adults, adults aged 65 and over, and those living in rural areas [10]. Especially older age (up to 95% of the primary care population aged 65 years and older), low socioeconomic status and undesirable modifiable lifestyle factors (unhealthy diet, inadequate fruit and vegetable consumption, obesity, physical inactivity, household air pollution, sleeping other than 7–8 h, current smoking, alcohol use, etc.) have been substantially associated with the development of MCC [11, 12]. Similarly, in a large study using the National Health Insurance database and involving 333,294 patients, Wang et al. identified patients over 65 years of age, male gender, rural residence, low socioeconomic status, psychological disorders and high Charlson comorbidity indices as important risk factors for frequent use of outpatient services [13]. However, according to the data of respondents (n = 201,711) to the 2015 Behavioral Risk Factor Surveillance System, it was observed that more than 60% of adults with MCC were younger than 65 years. Compared with adults 65 years and older with MCC, these younger cases reported higher rates of smoking, obesity, asthma, cognitive impairment, depression, disability, poorer quality of life and poorer access to health care [14].

### **3. The impact of MCC on patients and health care systems**

Both presently and in coming decades, MCC is one of the greatest global health challenges associated with adverse individual outcomes [2, 15]. Global Burden Disease Collaborators demonstrated that MCC contributing to the disease burden in high-income countries include ischemic heart disease, stroke, lung cancer, depression, diabetes, and back and neck pain. Similarly, these diseases are among the top conditions that contribute to mortality and morbidity in low-income and middle-income countries, but also communicable diseases such as diarrhea, HIV/AIDS and malaria play an important role [1]. It has been also well demonstrated that high blood pressure, high fasting glucose, smoking, high total cholesterol and high body mass index are the major global risk factors leading to chronic disease. Furthermore, certain chronic diseases occur more frequently in clusters, with associations of up to three-fold especially in developing countries, due to their high prevalence rates, common risk factors and/or a synergistic association between them (the most strongly associated clusters: Alzheimer's disease/depressive disorders coexisting with stroke, cardiovascular diseases and stroke alongside depression, and cardiovascular diseases/diabetes mellitus accompanying with long-term communicable conditions such as HIV/AIDS and tuberculosis, respectively). As can be understood from these chronic condition relationships, the coexistence of those may be associated with a common causal link, or they may be only weakly related or unrelated without a causal link between each other. It is generally thought that unrelated or poorly correlated diseases may occur together only because of their high prevalence rates throughout the world [3]. On the other hand, some authors mentioned that 'multimorbidity' is an integrated systems state reflecting a feedback of the person's genomic, proteomic, metabolomic, neuroendocrine, immune and bioenergetics networks to an underlying disturbance [16, 17].

Significantly reducing life expectancy with each additional chronic condition and affecting an individual's well-being, quality of life and normal functional

skills, MCC may often lead to the appearance or worsening of depression and other emotional and cognitive disorders [4, 18–21]. Sheridan et al. mentioned that MCC groups including high depressive symptoms may be more disabling than MCC that involve only somatic conditions [9]. Ge et al. demonstrated that MCC associated with reduced self-rated health and health-related quality of life in all age groups whether they were young (21–44 years), middle-aged (45–64 years), or older adults ( $\geq 65$  years) [22]. As a result of different physical, psychosocial, and spiritual challenges, multiple alternative, complementary, unnecessary or inappropriate drug use (multivitamins, multiminerals, nonvitamins or herbs, chiropractic/osteopathic manipulation, massage, movement therapies, mind–body therapies, special diets, and/or acupuncture) for self-care and disease management in patients with MCC lead to an increased risk of polypharmacy (simultaneous use of  $\geq 5$  medications), poor adherence to medications, cost-related nonadherence, adverse drug events, drug–drug interactions and inadequate treatment (underprescribing) [23–27]. Recently, Rahman et al. mentioned that many patients with MCC also demonstrated poor health literacy regarding medication [28]. Thus, in most patients, this complex relationship of multiple disorders is one of the main health problems and priorities worldwide due to a lack of joint guidelines, different screening and prevention requirements, a greater tendency to apply specialists compared to primary care physicians, as well as the increasing frequencies of emergency department presentations, hospitalisations, out of pocket healthcare costs and polypharmacy [3, 12, 29, 30].

#### **4. Unmet needs, challenges and promising opportunities in managing MCC**

Considering MCC in a broader context, due to the increasing proportion of older adults in the population, development of chronic diseases at younger ages and socioeconomic disparities in the distribution of MCC, serious challenges arise in terms of both the clinical management of patients and the organization of health systems [3, 14]. MCC is associated with a significantly greater increase in healthcare costs and resource utilization, doubling with every additional chronic medical condition [12, 31]. It will lead to the gradually increasing health, economic and patient burdens in particular low-income and lower middle-income countries expectedly although most studies and reports until now are from developed countries [3].

MCC is a special situation frequently encountered by global healthcare professionals, especially internists/primary care physicians, neurologists, respiratory/pulmonologists, pain specialists or oncologists, who spend more than three-quarters of their time in the treatment of chronic diseases and direct patient care. As the burden of MCC increases, the risks of unhealthy quality of life, poor physical function, healthcare costs and premature death also increase [32, 33]. Nevertheless, current traditional health systems and basic disease programs, as well as some of the most widely used health repositories (such as the World Health Organization and Global Burden of Disease databases) often adopt a single disease framework and rarely deal with co-occurring chronic diseases as a whole. Thus, the need for multidisciplinary approaches in the management of multiple chronic medical problems, rather than focusing on individual diseases, should be borne in mind by global healthcare professionals, public health professionals, healthcare providers, health policymakers and pharmaceutical industries [34]. Unfortunately, despite efforts in this approach, difficulties have been encountered due to the lack of basic knowledge of the etiology, epidemiology and risk factors of MCC and the variable effectiveness and cost effectiveness of different interventions [2, 4].

Despite the above-mentioned challenges, many comprehensive improvements and innovations (e.g., public awareness campaigns by using multiple channels and with participating well-prepared general practitioners; predicting groups at risk of MCC; development of health systems care guidelines, community based and integrated chronic condition care practices; caring the “complex chronic patient” which is defined by a particular profile presentation of chronicity where socio-economic, cultural and environmental dimensions play an important role; interventions enhancing problem-focused and emotion-focused coping; the self-regulation strategies of selection, optimization, and compensation; team-based care supporting physician-patient-caregiver relationships by healthcare professionals; patient-centered smartphone telemonitoring applications; fixed-dose combination pills/polipill approaches, and health technology applications in low resource environments) have been recommended by health care delivery system and health professionals, in order to prevention and management of MCC [8, 35–45].

## **5. Summary and conclusion**

As the world’s population ages, MCC is becoming increasingly common around the world. Thus, every clinician, whether a general practitioner or a specialist, should become increasingly aware of the clinical relevance and undeniable burden (with higher risk of the inappropriate medication, excessive healthcare utilization, and paying high cost) of multiple physical, cognitive and/or mental chronic condition clusters. However, the transition from a single disease-focused perspective to a patient-centered holistic approach may require spending considerable time and tremendous effort for the health professionals and healthcare providers. It is obvious that there is a growing need for population based research in MCC. Considering current approaches and strategies for screening, care and treatment of MCC, more studies and guidelines are still needed to improve our understanding of MCC, to best address the specific chronic health conditions that constitute MCC, to anticipate and screening groups of people at risk of MCC, as well as to increase potential areas for successful intervention and innovation.

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## References

- [1] GBD 2015 Mortality and Causes of Death Collaborators. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2016;388:1459-1544. doi: 10.1016/S0140-6736(16)31012-1.
- [2] Pearson-Stuttard J, Ezzati M, Gregg EW. Multimorbidity-a defining challenge for health systems. *Lancet Public Health*. 2019;4:e599-e600. doi:10.1016/S2468-2667(19)30222-1
- [3] Hajat C, Stein E. The global burden of multiple chronic conditions: A narrative review. *Prev Med Rep*. 2018;12:284-293. doi:10.1016/j.pmedr.2018.10.008
- [4] Navickas R, Petric VK, Feigl AB, Seychell M. Multimorbidity: What do we know? What should we do? *J Comorb*. 2016;6:4-11. doi: 10.15256/joc.2016.6.72.
- [5] Willadsen TG, Bebe A, Køster-Rasmussen R, Jarbøl DE, Guassora AD, Waldorff FB, Reventlow S, Olivarius Nde F. The role of diseases, risk factors and symptoms in the definition of multimorbidity - a systematic review. *Scand J Prim Health Care*. 2016;34:112-21. doi: 10.3109/02813432.2016.1153242.
- [6] Lim E, Gandhi K, Davis J, Chen JJ. Prevalence of chronic conditions and multimorbidities in a geographically defined geriatric population with diverse races and ethnicities. *J Aging Health*. 2018;30:421-444. doi:10.1177/0898264316680903
- [7] Newman D, Levine E, Kishore SP. Prevalence of multiple chronic conditions in New York State, 2011-2016. *PLoS One*. 2019;14:e0211965. doi:10.1371/journal.pone.0211965
- [8] Cheng C, Inder K, Chan SW. Coping with multiple chronic conditions: An integrative review. *Nurs Health Sci*. 2020;22(3):486-497. doi:10.1111/nhs.12695
- [9] Sheridan PE, Mair CA, Quiñones AR. Associations between prevalent multimorbidity combinations and prospective disability and self-rated health among older adults in Europe. *BMC Geriatr*. 2019;19:198. doi:10.1186/s12877-019-1214-z
- [10] Boersma P, Black LI, Ward BW. Prevalence of multiple chronic conditions among US adults, 2018. *Prev Chronic Dis*. 2020;17:E106. doi: 10.5888/pcd17.200130.
- [11] Adams ML, Grandpre J, Katz DL, Shenson D. Linear association between number of modifiable risk factors and multiple chronic conditions: Results from the Behavioral Risk Factor Surveillance System. *Prev Med*. 2017;105:169-175. doi:10.1016/j.ypmed.2017.09.013
- [12] McPhail SM. Multimorbidity in chronic disease: impact on health care resources and costs. *Risk Manag Healthc Policy*. 2016;9:143-56. doi: 10.2147/RMHP.S97248.
- [13] Wang C, Kuo HC, Cheng SF, Hung JL, Xiong JH, Tang PL. Continuity of care and multiple chronic conditions impact frequent use of outpatient services. *Health Informatics J*. 2020;26(1):318-327. doi:10.1177/1460458218824720
- [14] Adams ML. Differences between younger and older US adults with multiple chronic conditions. *Prev Chronic Dis*. 2017;14:E76. doi: 10.5888/pcd14.160613.
- [15] Porter T, Ong BN, Sanders T. Living with multimorbidity?

- The lived experience of multiple chronic conditions in later life. *Health (London)*. 2020;24:701-718. doi:10.1177/1363459319834997
- [16] Sturmberg JP, Bennett JM, Martin CM, Picard M. 'Multimorbidity' as the manifestation of network disturbances. *J Eval Clin Pract*. 2017;23:199-208. doi: 10.1111/jep.12587.
- [17] Corwin EJ, Brewster G, Dunbar SB, Wells J, Hertzberg V, Holstad M, Song MK, Jones D. The metabolomic underpinnings of symptom burden in patients with multiple chronic conditions. *Biol Res Nurs*. 2020;1099800420958196. doi: 10.1177/1099800420958196.
- [18] Pati S, Swain S, Knottnerus JA, Metsemakers JFM, van den Akker M. Health related quality of life in multimorbidity: a primary-care based study from Odisha, India. *Health Qual Life Outcomes*. 2019;17(1):116. doi:10.1186/s12955-019-1180-3
- [19] Cheng C, Yang CY, Inder K, Chan SW. Illness perceptions, coping strategies, and quality of life in people with multiple chronic conditions. *J Nurs Scholarsh*. 2020;52:145-154. doi:10.1111/jnu.12540
- [20] DuGoff EH, Canudas-Romo V, Buttorff C, Leff B, Anderson GF. Multiple chronic conditions and life expectancy: a life table analysis. *Med Care*. 2014;52:688-694. doi:10.1097/MLR.0000000000000166
- [21] Wilson-Genderson M, Heid AR, Pruchno R. Onset of multiple chronic conditions and depressive symptoms: A life events perspective. *Innov Aging*. 2017;1:igx022. doi:10.1093/geroni/igx022
- [22] Ge L, Ong R, Yap CW, Heng BH. Effects of chronic diseases on health-related quality of life and self-rated health among three adult age groups. *Nurs Health Sci*. 2019;21(2):214-222. doi:10.1111/nhs.12585
- [23] Kadam UT, Roberts I, White S, et al. Conceptualizing multiple drug use in patients with comorbidity and multimorbidity: proposal for standard definitions beyond the term polypharmacy. *J Clin Epidemiol*. 2019;106:98-107. doi:10.1016/j.jclinepi.2018.10.014
- [24] Laba TL, Cheng L, Kolhatkar A, Law MR. Cost-related nonadherence to medicines in people with multiple chronic conditions. *Res Social Adm Pharm*. 2020;16(3):415-421. doi:10.1016/j.sapharm.2019.06.008
- [25] Guisado-Clavero M, Violán C, López-Jimenez T, et al. Medication patterns in older adults with multimorbidity: a cluster analysis of primary care patients. *BMC Fam Pract*. 2019;20:82. doi:10.1186/s12875-019-0969-9
- [26] Falci L, Shi Z, Greenlee H. Multiple chronic conditions and use of complementary and alternative medicine among US adults: Results from the 2012 National Health Interview Survey. *Prev Chronic Dis*. 2016;13:E61. doi:10.5888/pcd13.150501
- [27] Ouellet GM, Ouellet JA, Tinetti ME. Principle of rational prescribing and deprescribing in older adults with multiple chronic conditions. *Ther Adv Drug Saf*. 2018;9:639-652. doi:10.1177/2042098618791371
- [28] Rahman FI, Aziz F, Huque S, Ether SA. Medication understanding and health literacy among patients with multiple chronic conditions: A study conducted in Bangladesh. *J Public Health Res*. 2020;9:1792. doi:10.4081/jphr.2020.1792
- [29] Leppin AL, Montori VM, Gionfriddo MR. Minimally disruptive medicine: A pragmatically

comprehensive model for delivering care to patients with multiple chronic conditions. *Healthcare (Basel)*. 2015;3:50-63. doi:10.3390/healthcare3010050

[30] Mihailoff M, Deb S, Lee JA, Lynn J. The effects of multiple chronic conditions on adult patient readmissions and hospital finances: A management case study. *Inquiry*. 2017;54:46958017729597. doi:10.1177/0046958017729597

[31] Tinetti ME, Green AR, Ouellet J, Rich MW, Boyd C. Caring for patients with multiple chronic conditions [published correction appears in *Ann Intern Med*. 2019 Mar 5;170(5):356]. *Ann Intern Med*. 2019;170(3):199-200. doi:10.7326/M18-3269

[32] Ploeg J, Canesi M, D Fraser K, McAiney C, Kaasalainen S, Maureen M-R, Sinead D, Garland Baird L, Chambers T. Experiences of community-dwelling older adults living with multiple chronic conditions: a qualitative study. *BMJ Open*. 2019;9(3):e023345. doi:10.1136/bmjopen-2018-023345

[33] González-Chica DA, Hill CL, Gill TK, Hay P, Haag D, Stocks N. Individual diseases or clustering of health conditions? Association between multiple chronic diseases and health-related quality of life in adults. *Health Qual Life Outcomes*. 2017;15(1):244. doi:10.1186/s12955-017-0806-6

[34] Egan BM, Sutherland SE, Tilkemeier PL, Davis RA, Rutledge V, Sinopoli A. A cluster-based approach for integrating clinical management of Medicare beneficiaries with multiple chronic conditions. *PLoS One*. 2019;14:e0217696. doi:10.1371/journal.pone.0217696

[35] Powell KR, Deroche C. Predictors and patterns of portal use in patients with multiple chronic conditions.

*Chronic Illn*. 2020;16:275-283. doi:10.1177/1742395318803663

[36] Tinetti M, Dindo L, Smith CD, Blaum C, Costello D, Ouellet G, Rosen J, Hernandez-Bigos K, Geda M, Naik A. Challenges and strategies in patients' health priorities-aligned decision-making for older adults with multiple chronic conditions. *PLoS One*. 2019;14:e0218249. doi: 10.1371/journal.pone.0218249.

[37] Iglesias FH, Celada CA, Navarro CB, et al. Complex care needs in multiple chronic conditions: Population prevalence and characterization in primary care. A study protocol. *Int J Integr Care*. 2018;18:16. doi:10.5334/ijic.3292

[38] Boyd C, Smith CD, Masoudi FA, et al. Decision making for older adults with multiple chronic conditions: Executive summary for the American Geriatrics Society Guiding Principles on the care of older adults with multimorbidity. *J Am Geriatr Soc*. 2019;67(4):665-673. doi:10.1111/jgs.15809

[39] Zhang W, Radhakrishnan K. Evidence on selection, optimization, and compensation strategies to optimize aging with multiple chronic conditions: A literature review. *Geriatr Nurs*. 2018;39:534-542. doi:10.1016/j.gerinurse.2018.02.013

[40] Foo KM, Sundram M, Legido-Quigley H. Facilitators and barriers of managing patients with multiple chronic conditions in the community: a qualitative study. *BMC Public Health*. 2020;20(1):273. doi:10.1186/s12889-020-8375-8

[41] McGilton KS, Vellani S, Yeung L, et al. Identifying and understanding the health and social care needs of older adults with multiple chronic conditions and their caregivers: a scoping review. *BMC Geriatr*. 2018;18:231. doi:10.1186/s12877-018-0925-x



[42] Marengoni A, Fratiglioni L, Onder G. Improving public awareness of multimorbidity. *J Am Med Dir Assoc.* 2017;18:372-373. doi:10.1016/j.jamda.2017.01.010

[43] Riffin C, Van Ness PH, Iannone L, Fried T. Patient and caregiver perspectives on managing multiple health conditions. *J Am Geriatr Soc.* 2018;66:1992-1997. doi:10.1111/jgs.15501

[44] Bretos-Azcona PE, Sánchez-Iriso E, Cabasés Hita JM. Tailoring integrated care services for high-risk patients with multiple chronic conditions: a risk stratification approach using cluster analysis. *BMC Health Serv Res.* 2020;20(1):806. doi:10.1186/s12913-020-05668-7

[45] Sultan M, Kuluski K, McIsaac WJ, Cafazzo JA, Seto E. Turning challenges into design principles: Telemonitoring systems for patients with multiple chronic conditions. *Health Informatics J.* 2019;25:1188-1200. doi:10.1177/1460458217749882