

Occurrence, determinants and outcomes of multimorbidity in primary care

Citation for published version (APA):

Pati, S. (2023). *Occurrence, determinants and outcomes of multimorbidity in primary care: the Indian landscape*. [Doctoral Thesis, Maastricht University]. Maastricht University. <https://doi.org/10.26481/dis.20230628sp>

Document status and date:

Published: 01/01/2023

DOI:

[10.26481/dis.20230628sp](https://doi.org/10.26481/dis.20230628sp)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Impact

This thesis provides the first ever report on magnitude of multimorbidity and its impact in an Indian primary care population. On a fundamental level, the studies contribute to the available epidemiological knowledgebase on multimorbidity and overall imply for better recognition and appreciation of multimorbidity as a health care issue of concern. The following sections succinctly describe the impact of our study findings on patient management and clinical practice, primary care services, health care planning and policy, health research and finally the broader societal impact.

Patient management and clinical practice

The observed high prevalence of multimorbidity with its outcomes - impaired functional ability, higher medication use, greater health care consultations, poorer quality of life and mental wellbeing possess considerable implications for patient management and clinical practice.¹⁻⁶

The higher number of prescribed and consumed medicines (polypharmacy)

seen in multimorbidity is concerning. Polypharmacy increases the chances of adverse events, lower treatment adherence and worsens quality of life.^{7,8} Especially in geriatric patients, it may exacerbate existing conditions and lead to hospital admission. Treating physicians should consider individual patients' challenges related to polypharmacy and decide how to balance clinical priorities with the potential benefits and risks of multiple treatments while ensuring therapeutic compliance.

Further, the observed functional limitation along with multiple health care visits and hospitalization can cumulatively impose substantial treatment burden on patients and their caregivers. The tasks of taking and managing multiple medications, scheduling and attending physician consultations, monitoring health, performing self-care, and modifying lifestyle behaviours demand constant effort of patients and their caregivers; thus, impacting their everyday life and wellbeing and inflicting commensurate financial burden. Physicians must take cognizance of the imposed treatment burden and financial impact and attempt minimizing the same through judicious therapeutic planning.^{3,4}

As observed, chronic disease count coupled with illness severity predict better quality of wellbeing for patients than simple count alone in multimorbidity. Thus, physicians may consider include severity (elicited through functional limitations) along with the number of coexisting conditions while undertaking burden assessment of multimorbidity. Moreover, given certain multimorbidity groups leading to poorer quality of life, practitioners should include patient reported outcomes like functional ability and self-rated health to evaluate and improve the quality of multimorbidity care plans.

Our findings identified some distinct clusters of multimorbidity with differential impact, encompassing concordant and discordant combinations. For both patients and practitioners, managing concordant clusters with cohesive care plan is potentially simpler than dealing with discordant cluster with non-synergistic, and sometimes conflicting treatment strategies. As the evidence base for therapeutic management of such multimorbidity groups is yet to be available, it merits careful consideration. At any point of time, there may be a single condition that dominates the clinical picture in a patient with multimorbidity, but over time this often changes. Thus, while managing these patients, majority therapeutic decisions may have to be made within a single-disease premises, but decision making will often require balancing competing considerations. In this regard, general practitioners may need to hone their clinical and decision-making competencies. With the recent COVID-19 pandemic, it is even more important for general practitioners to be appropriately

trained for frontline management of patients with COVID-19 and coexisting chronic illness.

Primary care services delivery

With increasing numbers of individuals presenting to primary care with multimorbidity, health care personnel working in these settings will have an absolutely fundamental role in providing care and treatment for these patients.⁹ ¹¹From the viewpoint of primary health care, disease-specific guidelines are not adequate for managing patients with multimorbidity. Simply adding or collating the individual standard treatment guidelines may not be appropriate to meet the care complexities of multimorbid patients and might thereby compromise the quality of care. Since, accommodating all possible clusters of multimorbidity into current guidelines is quite indomitable, a pragmatic approach could be to expand the standard protocols by incorporating adapted guidelines for most commonly occurring and severe clusters. By doing so, at least for frequently impacting disease combinations, optimal care could be offered.

As generalists, primary care teams will need to adopt a more systematic approach in how they elicit medical histories, carry out diagnosis and treatment planning, and the provisioning of appropriate routine care for these patients. This requires greater and active involvement of allied health care personnel like psychologist, physiotherapist and nurses. In the absence of electronic health records, patient follow up is a challenge. During the recent COVID-19 pandemic, the country resorted to digital technology enabled contact-less health care consultation. This transformative change should be harnessed for establishing digital health records and primary care patient database. It will not only enable physicians with real-time health records for monitoring also improve communication between primary and secondary care, by linking and sharing data with referral facilities when a patient gets hospitalised for any complications.

Health care planning and policy

The emerging scenario of multimorbidity poses both challenges and opportunities for health care services configuration and organisation.¹²⁻¹⁵ Since we found a majority of patients do visit public primary care for their chronic disease care needs, public health system must start appreciating multimorbidity as a health care issue necessitating a paradigm shift from problem-orientated to goal-orientated care approach.

The Government of India recently launched the ambitious National Health Protection Mission. This scheme has two main pillars: strengthening of universal comprehensive primary health care and a health insurance scheme to reduce catastrophic out-of-pocket health spending. In this direction, the primary health care centres are being reimaged as Health and Wellness Centres (HWC) for disease management, and prevention and health promotion where in the services of psychologist and physiotherapist along with physicians and nurses are being provisioned. It is necessary that the health care workforce for the HWCs be oriented to recognise multimorbidity and accordingly plan and deliver coordinated and collaborative care.

With the onset of COVID-19, when the attention of primary care shifted to managing pandemic, it is even more important to deliver both acute episodic and chronic slow-paced care in harmony for multimorbidity management.¹⁶⁻¹⁸ The care of patients with multimorbidity and COVID can be complex and may involve multiple specialists who separately liaise with the primary care team. Towards this, a hub and spoke model with primary care being at the fulcrum and linking with the secondary or referral care could be explored. Tele-medicine has emerged as a feasible alternative for patient care and training on COVID-19 management for physicians. The same technology can now be weaved into inter-professional training on different domains of multimorbidity for general practitioners.

Both the concordant and discordant multimorbidity need concurrent and coordinated management. Particularly the coexistence of physical-mental clusters calls for Screening for psychological distress and mental health in those having physical and vice versa. Given the poorer physical and mental health in patients older than 50 years, functional amalgamation of three vertically implemented three national programs – mental health, non-communicable disease and geriatric care programs at the primary care facility. The presence of chronic infectious diseases along with NCDs (TB and Diabetes) necessitates a bidirectional dialogue between these tropical disease elimination program and NCD control program. The higher health care resource use and associated financial burden for patients with multimorbidity should at least ensure financial protection in the socially and economically deprived population.

Research impact

The findings while providing first ever landscape of multimorbidity, also reveals the research in this field in India is in its infancy, especially in primary care settings,

where research for recognizing and managing patients with multimorbidity must be carried out.¹⁶⁻¹⁸

Multimorbidity has suffered scientifically from being seen as a random assortment of diseases, making it difficult to address. We found some obvious clusters (e.g., diabetes and hypertension); with well-established pathological mechanisms, while there are some other combinations (diabetes and arthritis) which may not logically follow previous biomedical research but need additional identification and follow-on mechanistic exploration.

Future research, preferably through primary care cohort, are needed to understand possible aetiology and evolution of the multimorbidity groups, trajectory, clinical impact and the financial implications of these associations to predict health care needs and reduce the adverse health impacts in patients. Towards this, setting of primary care patient registry is an essential prerequisite. Even though age is a well-known determinant of multimorbidity, the variety of patterns reported in the younger age group necessitates future research to identify the biomarkers or linking factors. At the same time, the higher prevalence in women deserve further elucidation of the role of gender as a risk factor.¹⁹⁻²³

People living with multimorbidity are found to have a greater treatment burden. Similarly, primary care physicians must manage these patients in everyday general practice. It is unclear how they cope with this burden. Future studies should qualitatively explore the experience of managing multimorbidity from the perspective of patients as well as physicians. Given the global challenges of health care access and treatment adherence during COVID-19, future studies must specifically explore the impact of the pandemic on multimorbidity management.

As the prevalence of multimorbidity might be higher in specialty care and hospital settings, the feasibility and applicability of our MAQ-PC tool may be assessed to estimate multimorbidity in their outpatients and in-patients. Moreover, researchers in South Asia and other similar countries may consider adopting and adapting the MAQ-PC to investigate the magnitude of multimorbidity in respective primary care settings for a comparable estimate across LMICs.

Primary care practice in India offers a promising and feasible setting to lead multimorbidity research with longitudinal studies. Thus, primary care trials integrating horizontal integration of vertically implemented control programs in the HWCs could provide useful insights for pragmatic management of multimorbidity in the context of primary care in India as well as LMICs.

Societal impact

The findings further imply the potential inequities in public and private primary health care settings given the emerging burden of multimorbidity in Indian context. Targeted policies for health system planning should focus on workforce training, quality improvement strategies, development of clinical guidelines and quality indicators about multimorbidity in primary care. Disadvantaged individuals with the same levels of multimorbidity require stronger financial protection. Investigating the occurrence of multimorbidity in deprived populations would lead to a better understanding of equity dimension of multimorbidity in future.

Own professional growth and recognition

Delving into multimorbidity, a hitherto unexplored terrain for LMICs was a challenge as well as opportunity to grow and flourish for my own career as well. It not only brought me the much-valued recognition of being the first researcher to explore multimorbidity, also created a research and knowledge movement around multimorbidity in India, South Asia and LMICs. The MAQ-PC tool developed has been adapted in different countries that include Ethiopia, Pakistan and Malaysia and India. Many studies (though limited to small population and settings) have been initiated in this last five decades. Further, now I am a member of the Brazilian Group on multimorbidity, Global Burden of Diseases Collaborative group and Multimorbidity Research Network, India. The findings have already been presented in International, and National level platforms like Annual Conference of WONCA, WONCA International Conference at Abu Dhabi and New Delhi. The publications stemming from different collaborators have catalysed the research community of practice for multimorbidity. I did receive grant from the MRC-UK to develop core research capacity around multimorbidity which involves partner countries namely Brazil and UK. Now many aspirants are into multimorbidity as their doctoral thesis. I have become reviewer of journals like the Lancet, The Lancet Global Health and Journal of Multimorbidity and comorbidity and fostered collaboration with the World Health Survey group of World Health Organization. In recognition of my prolific contributions, I became a fellow of the Indian Public Health Association, FRSPH, FAMS and received the highest scientific honours by the State Science Academy and my lecture was on multimorbidity. The Academy of Medical Sciences had invited me to deliver the keynote address on multimorbidity and Oration at State Pharmacology Conference on polypharmacy and multimorbidity. Till date my publications on multimorbidity are which include journals like The Lancet, BMC

Medicine, The Lancet Healthy Longevity and PLOS ONE. I was conferred with prestigious DEVI award, Arya women achiever award, and TIMES power women award all citing my maiden research on multimorbidity for India. Recently as per the analysis of Elsevier group, I am ranked as the second most influential public health researcher in the country and feature among the top 2 percentile researchers globally. Very recently, I was a co-author for a Nature Review disease primer where in ten researchers from seven countries spanned across five continents jointly published a synthesis of multimorbidity. Presently I am expanding my research to study the interplay of COVID-19 risk, progression and outcomes with multimorbidity.

Reference

1. Skou ST, Mair FS, Fortin M, Guthrie B, Nunes BP, Miranda JJ, Boyd CM, Pati S, Mtenga S, Smith SM. Multimorbidity. *Nature Reviews Disease Primers*. 2022 Jul 14;8(1):1-22.
2. Pati S, Bhattacharya S, Swain S. Prevalence and patterns of multimorbidity among human immunodeficiency virus positive people in Odisha, India: an exploratory study. *Journal of Clinical and Diagnostic Research: JCDR*. 2017 Jun;11(6):LC10.
3. du Vaure CB, Ravaud P, Baron G, Barnes C, Gilberg S, Boutron I. Potential workload in applying clinical practice guidelines for patients with chronic conditions and multimorbidity: a systematic analysis. *BMJ open*. 2016 Mar 1;6(3):e010119.
4. Uhlig K, Leff B, Kent D, Dy S, Brunnhuber K, Burgers JS, Greenfield S, Guyatt G, High K, Leipzig R, Mulrow C. A framework for crafting clinical practice guidelines that are relevant to the care and management of people with multimorbidity. *Journal of general internal medicine*. 2014 Apr;29(4):670-9.
5. Goodman RA, Ling SM, Briss PA, Parrish RG, Salive ME, Finke BS. Multimorbidity patterns in the United States: implications for research and clinical practice. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences*. 2016 Feb 1;71(2):215-20.
6. Campbell-Scherer D. Multimorbidity: a challenge for evidence-based medicine. *BMJ Evidence-Based Medicine*. 2010 Dec 1;15(6):165-6.
7. Mannucci PM, Nobili A. Multimorbidity and polypharmacy in the elderly: lessons from REPOSI. *Internal and emergency medicine*. 2014 Oct;9(7):723-34.

8. Aggarwal P, Woolford SJ, Patel HP. Multi-morbidity and polypharmacy in older people: challenges and opportunities for clinical practice. *Geriatrics*. 2020 Oct 28;5(4):85.
9. Wallace E, Salisbury C, Guthrie B, Lewis C, Fahey T, Smith SM. Managing patients with multimorbidity in primary care. *BMJ*. 2015 Jan 20;350.
10. Violan C, Foguet-Boreu Q, Flores-Mateo G, Salisbury C, Blom J, Freitag M, Glynn L, Muth C, Valderas JM. Prevalence, determinants and patterns of multimorbidity in primary care: a systematic review of observational studies. *PloS one*. 2014 Jul 21;9(7):e102149.
11. Mercer SW, Smith SM, Wyke S, O'Dowd T, Watt GC. Multimorbidity in primary care: developing the research agenda. *Family practice*. 2009 Apr 1;26(2):79-80.
12. Glynn LG, Valderas JM, Healy P, Burke E, Newell J, Gillespie P, Murphy AW. The prevalence of multimorbidity in primary care and its effect on health care utilization and cost. *Family practice*. 2011 Oct 1;28(5):516-23.
13. Smith SM, Wallace E, O'Dowd T, Fortin M. Interventions for improving outcomes in patients with multimorbidity in primary care and community settings. *Cochrane Database of Systematic Reviews*. 2016(3).
14. Fortin M, Bravo G, Hudon C, Lapointe L, Dubois MF, Almirall J. Psychological distress and multimorbidity in primary care. *The Annals of Family Medicine*. 2006 Sep 1;4(5):417-22.
15. Agborsangaya CB, Lau D, Lahtinen M, Cooke T, Johnson JA. Health-related quality of life and healthcare utilization in multimorbidity: results of a cross-sectional survey. *Quality of life Research*. 2013 May;22(4):791-9.
16. Lai AG, Pasea L, Banerjee A, Denaxas S, Katsoulis M, Chang WH, Williams B, Pillay D, Noursadeghi M, Linch D, Hughes D. Estimating excess mortality in people with cancer and multimorbidity in the COVID-19 emergency. *MedRxiv*. 2020 Jan 1.
17. Lai FT, Huang L, Chui CS, Wan EY, Li X, Wong CK, Chan EW, Ma T, Lum DH, Leung JC, Luo H. Multimorbidity and adverse events of special interest associated with Covid-19 vaccines in Hong Kong. *Nature communications*. 2022 Jan 20;13(1):1-8.
18. Fernández-Niño JA, Guerra-Gómez JA, Idrovo AJ. Multimorbidity patterns among COVID-19 deaths: proposal for the construction of etiological models.

Addendum

- Revista Panamericana de Salud Pública. 2020;44.
19. Ramond-Roquin A, Fortin M. Towards increased visibility of multimorbidity research. *Journal of Comorbidity*. 2016;6:42-5.
 20. Lewis C, Wallace E, Kyne L, Cullen W, Smith SM. Training doctors to manage patients with multimorbidity: a systematic review. *Journal of Comorbidity*. 2016;6:85-94.
 21. Prazeres F, Santiago L. The Knowledge, Awareness, and Practices of Portuguese General Practitioners Regarding Multimorbidity and its Management: Qualitative Perspectives from Open-Ended Questions. *Int J Environ Res Public Health*. 2016;13(11).
 22. Ong BN, Richardson JC, Porter T, Grime J. Exploring the relationship between multimorbidity, resilience and social connectedness across the lifecourse. *Health (London)*. May 2014;18(3):302-318.
 23. Dambha-Miller H, Simpson G, Hobson L, et al. Integrated primary care and social services for older adults with multimorbidity in England: a scoping review. *BMC Geriatr* 2021;21(1):674. doi: 10.1186/s12877-021-02618-8