Complex Multimorbidity and Healthcare Expenditure among Adults and Elderly in India

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1. Introduction

The global health landscape has shifted dramatically from a focus on communicable diseases to non-communicable diseases (NCDs). This is driven by aging populations, urbanization, and lifestyle changes. As people live longer, they face a higher risk of multiple chronic conditions, a phenomenon known as multimorbidity. The Academy of Medical Sciences describes multimorbidity as the simultaneous presence of two or more chronic ailments, which may include chronic non-communicable diseases, mental health disorders, or chronic infectious diseases (Academy of Medical Sciences, 2018). While some individuals may have multiple conditions with little effect on their health, others experience severe health challenges. This has led to the proposal of another concept known as 'complex multimorbidity,'. As chronic conditions that occur in different body systems often compete for treatment, whereas those within the same body system are more likely to have complementary treatment approaches (Piette & Kerr, 2006; Harrison et al., 2016). Pharmacists are particularly concerned with the potential for adverse drug interactions and the implications of managing numerous prescriptions simultaneously. From the viewpoint of healthcare planners, complex multimorbidity is seen through the lens of healthcare provision and resource allocation. Planners recognize that patients with complex needs often require coordinated care involving multiple specialists across different healthcare settings.

In India at present geriatric care is limited to a handful of geriatricians (Sinha et al., 2021). Most of the care provided to the elderly is fragmented and patients with multimorbidity are expected to visit different specialists, who in their busy clinics have no time to review the ongoing prescriptions of patients with multimorbidity and this often leads to polypharmacy and prescription of 2–3 medications of the same class. This problem is further compounded by over the counter medications. Hence, multimorbidity among the elderly is associated with increased number of hospital visits, over-prescription of medications, increase treatment cost and

increased burden on the families. There is almost an exponential relationship between the number of chronic conditions a person has and the associated healthcare costs, which arise from increased service utilization (Wolff et al., 2002; Skou et al., 2022). This heightened use of healthcare often leads to more hospital admissions and longer hospital stays. Consequently, this significant reliance on healthcare resources results in higher direct costs, contributing to rising overall healthcare expenditures (Hwang et al., 2001; La et al., 2002; Lee et al., 2015).

Given the fragmented and overburdened healthcare system in India, understanding the impact of multimorbidity especially complex multimorbidity on out-of-pocket (OOP) health expenditures is critical to quantify the financial burden on elderly population. The purpose of this study is to determine demographic, social, and health-related drivers of multimorbidity, as well as the economic impact, particularly concerning financial strain.

2. Data and Methods

2.1. Data

This study uses data from Wave 1 of the Longitudinal Aging Study in India (LASI), a nationally representative panel survey conducted in 2017–2018. LASI, harmonized with global aging studies like the U.S. HRS, collects detailed information on the health, economic, and social well-being of Indians aged 45+, along with their spouses. Conducted by the MoHFW, IIPS, and partner institutions, the survey used a multistage stratified area probability design to sample over 72,000 individuals across all Indian states and union territories.

For this study, we extracted individual level variables covering demographics, education, wealth quintile, chronic diseases, tobacco behaviour, self-rated health, and expenditure.

2.2. Statistical Analysis

The primary independent variable - morbidity status, was categorize into four groups: (1) No morbidity, (2) Single morbidity, (3) Non-complex multimorbidity (≥2 chronic conditions), and (4) Complex multimorbidity (chronic conditions affecting ≥3 body systems, classified using ICD-11 chapters). The outcome variable was annual out-of-pocket health expenditure (OOPE), calculated as the sum of inpatient, outpatient, and medication costs minus any reimbursements.

A multinomial logistic regression model was used to identify socio-economic correlates of the different morbidity categories.

To analyze the association between morbidity and OOPE, a two-part model was employed. The first part used a logit model to estimate the probability of incurring any OOPE. The second part used a Generalized Linear Model (GLM) with a gamma distribution and log-link to model the level of expenditure among those with positive costs.

3. Results

Results indicate that 21% of the elderly population has complex multimorbidity, whereas prevalence of non-complex multimorbidity was estimated to be 22.7%. Kerala (42.6%), Punjab (39.2%), and Andaman & Nicobar Islands (31.6%) report the highest rates of complex multimorbidity, suggesting advanced epidemiological transition. In contrast, states like Nagaland (4.4%), Arunachal Pradesh (9.7%), and Meghalaya (8.7%) show the lowest prevalence.

Multinomial logistic regression revealed key factors influencing multimorbidity patterns in India. Age demonstrated the strongest association, with adults ≥75 years having 14 times higher risk of complex multimorbidity than those <44. Socioeconomic factors showed paradoxical effects: the wealthiest quintile had 3.8 times higher Complex multimorbidity risk than the poorest suggesting overutilization of healthcare. Furthermore, people with higher education had a higher risk of complex and nom complex multimorbidity than those with no education. This could be because the study based on self-reported objective health measures, which demand for a certain level of health literacy to respond. Self-rated health showed that people with very poor health are associated with a 42-fold increase in complex multimorbidity risk. Those living in urban area were found out to have a higher risk of CMM than their rural counterpart. Tobacco use showed a complex effect with former users having a higher risk than current users across all morbidity categories.

The two-part model revealed that while CMM did not affect the initial decision to seek care, it was associated with a 27.1% increase in OOPE among those who incurred health costs.

4. Conclusion

In India, a sizable fraction of older adults suffer from not only multimorbidity, but complex multimorbidity. The findings of the study underscore that complex multimorbidity directly escalates financial burden, highlighting the urgent need for integrated care models to manage complex chronic conditions and protect elderly households from catastrophic health expenditures.

5. References

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