

Multimorbidity and the inequalities of global ageing: a cross-sectional study of 28 countries using the World Health Surveys

Sara Afshar¹, Paul J Roderick¹, Allan G Hill², Borislav D Dimitrov¹ and Paul Kowal^{3,4}

¹Academic Unit of Primary Care and Population Sciences, Faculty of Medicine, University of Southampton, Southampton General Hospital, Southampton, SO16 6YD, UK

²Academic Unit of Social Statistics & Demography, Faculty of Social & Human Sciences, University of Southampton, UK

³University of Newcastle Research Centre for Gender, Health and Ageing, Newcastle NSW Australia

⁴World Health Organization's Study on global AGEing and adult health (SAGE), Geneva, Switzerland, kowalp@who.int

Corresponding Author: sa2706@soton.ac.uk

Multimorbidity, as the “the coexistence of two or more chronic diseases” in one individual, is increasing in prevalence globally. The aim of the study was to compare the prevalence of multimorbidity across LMICs and HICs, as well as stratified by age and SES. Chronic disease data from 28 countries of the World Health Survey (2003) was extracted and inter-country socioeconomic differences were examined using gross domestic product (GDP). Regression analyses were applied to examine associations of SES with multimorbidity by region and by age. The mean world standardized prevalence was 7.8% (95% CI, 7.79% - 7.83%). A positive but non-linear relationship was found between country GDP and multimorbidity prevalence. Higher SES was significantly associated with a decreased risk of multimorbidity in the all-region analyses. Multimorbidity is a global phenomenon. Policy makers worldwide need to address these health inequalities, and support the complex service needs of a growing multimorbid population.

Keywords: *Multimorbidity; Ageing; Health inequalities; Epidemiological transition; adult health*

Introduction

Multimorbidity, as the “the coexistence of two or more chronic diseases” in one individual, is increasing in prevalence globally; the trend is linked to both the epidemiologic and demographic transitions, with a shift towards chronic disease burden and a rise in ageing populations. ^{1,2} In high-income countries (HICs), multimorbidity is frequently found to be associated with lower socioeconomic status (SES). ^{3,4} Research on multimorbidity in low- and middle-income countries (LMICs) is sparse. The aim of the study was to compare the prevalence of multimorbidity across LMICs and HICs, as also stratified by age and SES.

Methods

Using the World Health Survey (2003) data, 28 countries were selected with $\geq 90\%$ response rate for six (self-reported) doctor-diagnosed morbidities. A single variable on multimorbidity was constructed based on the co-occurrence of two or more (≥ 2) chronic conditions.⁵ Comparison was made to Wave 1 of the English Longitudinal Survey of Ageing (ELSA) using the same six chronic conditions and also an expanded set of 15 chronic conditions to simultaneously examine different contours of multimorbidity. Inter-country socioeconomic differences were examined using gross domestic product (GDP) per capita from the 2003 United Nations Statistical Division. Prevalence estimates were age-standardised to the WHO Population Standard to account for differences in population structures. Post-stratification weights were applied to country data and individual countries were weighted by sample size to produce regional estimates. Individual socioeconomic status was defined by the highest level of education. Logistic regression was used to examine age-, sex- and country- adjusted associations of SES with multimorbidity by region and also stratified at age of 55 years.

Results

The mean world standardized prevalence was 7.8% (95% CI, 7.79% - 7.83%). A positive but non-linear relationship was found between both country GDP and multimorbidity prevalence, as well as country income group and multimorbidity prevalence. Prevalence increased from 8.3% (95% CI 8.2 – 8.4) for 6 conditions to 22.4% (95% CI 21.7 – 23.12) for 15 conditions using ELSA data.

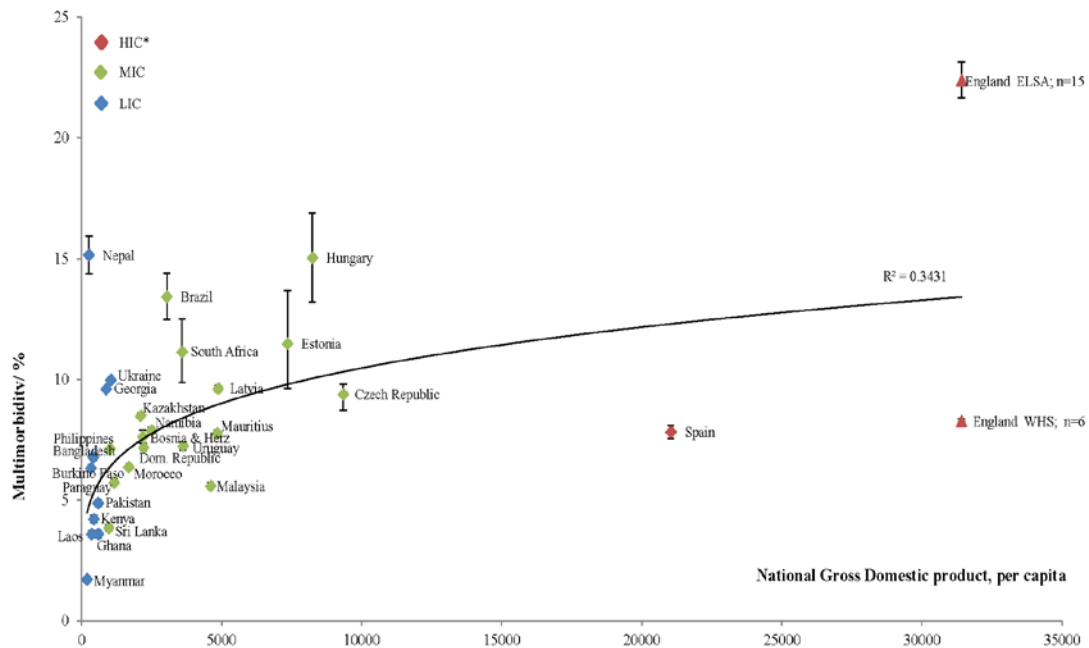


Figure 1: World Standardised Multimorbidity Prevalence by GDP across World Health Survey Countries (n=28) and England, ELSA in 2003 (with confidence intervals)

Notes: *HIC high income group; MIC middle income group; LIC low income group. Income groups are based on national estimates of 2001 GNI per capita, calculated using the World Bank Atlas method, and reported in the ‘World Development Report 2003.’

Multimorbidity prevalence increased with age across all countries and regions. Younger adults had a steeper SES gradient of multimorbidity, compared to older adults. When applying multivariable models, higher SES was significantly associated with a decreased risk of multimorbidity in the all-region analyses (see Table 1). The lowest SES category was significantly associated with a higher risk of multimorbidity in South Asia and Western Europe; and higher SES categories were significantly associated with a decreased risk of multimorbidity in South Asia and Western Europe.

	Multivariate			
	Socioeconomic Status (AOR) [§]			
	Less than primary	primary	secondary	higher
Africa	1.21	1.00	0.87	0.79
Central & South America	1.09	1.00	0.83*	0.81
Eastern Europe & Central Asia	1.00	1.00	0.95	0.89
South Asia	1.22*	1.00	0.68***	0.58**
South East Asia	1.06	1.00	0.76	0.99
Western Europe	1.3**	1.00	0.69***	0.37***
All regions (MV adjusted for region)	1.08*	1.00	0.81***	0.75***

Table 1: Effect of age, sex and socioeconomic status on multimorbidity: multivariate analysis Notes: * p-value <0.05; ** < 0.01; *** <0.001; [§] Regional multivariate analyses adjusted for age, sex and country. All regions multivariate analysis adjusted for age, sex, country and region

Conclusion/ Implications:

This is the first study to describe global patterns of multimorbidity and to compare prevalence across different countries. Multimorbidity is a global phenomenon not just affecting older adults in HICs. Whilst prevalence is very sensitive to definitions and number of conditions included, differential prevalence patterns between low- and middle-income countries and high-income countries suggest that there are wide inequalities. Results show a negative socioeconomic gradient in multimorbidity across all regions. Policy makers and health service planners worldwide need to address these health inequalities, and support the complex health service needs of a growing, multimorbid population.

References

- 1 Omran A. The epidemiologic transition: a theory of the epidemiology of population change. 1971. *Milbank Quarterly*; **83**(4): 731-57.
- 2 *Preparing for an Aging World: The Case for Cross-National Research*: The National Academies Press; 2001.
- 3 Barnett K, Mercer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet* 9836; **380**(9836): 37-43.
- 4 Uijen AA and Van de Lisdonk EH, *Multimorbidity in primary care: prevalence and trend over the last 20 years*. *Eur. J. Gen. Pract.*, 2008. **14** (S1), **28–32**.
- 5 Almirall J, Fortin M. The coexistence of terms to describe the presence of multiple concurrent diseases. *Journal of Comorbidity* 2013; **3**(1): **4–9**

Competing interests

The authors declare that they do not have competing interests.

Acknowledgements

We would like to thank Scott Harris and Kandala Ngianga for their support during the analysis of the data.

Funding

The World Health Study was funded by World Health Organization and the US National Institutes of Health.