Poorer population health and widening health inequalities in a multi-ethnic Asian population four years after COVID-19: a comparative cross-sectional study

EPH179

Ling Jie CHENG [1,2], Xun LI [3], Yiyun SHOU [4,5,6], Mythily SUBRAMANIAM [4,7,8], Nick BANSBACK [4,9], Nan LUO [4]

[1] National Perinatal Epidemiology Unit, Nuffield Department of Women's and Reproductive Health, University of Oxford, Oxford, United Kingdom; [2] Alice Lee Centre for Nursing Studies, Yong Loo Lin School of Medicine, National University of Singapore, Singapore; [3] School of Engineering, Computing, and Mathematics, Oxford Brookes University, Oxford, England, United Kingdom; [4] Saw Swee Hock School of Public Health, National University of Singapore, Singapore; [5] Lloyd's Register Foundation Institute for the Public Understanding of Risk, National University of Singapore, Singapore; [6] School of Medicine and Psychology, Australian National University, Canberra, Australia; [7] Research Division, Institute of Mental Health, Singapore; [8] Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore; [9] School of Population and Public Health, University of British Columbia, Vancouver, BC, Canada

BACKGROUND & AIMS

- The COVID-19 pandemic may have lasting effects on population health through long COVID, prolonged psychological distress, and increased mortality among vulnerable groups.
- Previous studies documented poorer health-related quality of life (HRQoL) during the acute phase of the pandemic, particularly for mental health among younger adults and lower socioeconomic groups.
- However, whether these differences persist in post-pandemic periods remains unknown.
- No studies have compared population-level HRQoL between pre-pandemic and post-pandemic periods or quantified differences in health inequality between these periods.
- To compare overall and dimension-specific EQ-5D-5L health outcomes, subgroup variation, and changes in health inequality between pre-pandemic (2018) and post-pandemic (2024) samples in Singapore.

METHODS

- Two independent, nationally representative, probability-sampled surveys of Singapore residents aged ≥21 years: pre-pandemic (2018, n=600, computer-assisted interviewing) and post-pandemic (2024, n=1,769, self-administered electronic questionnaires).
- The 2024 survey oversampled younger adults; age-specific weights were applied to restore population representativeness.
- EQ-5D-5L index scores calculated using the Singapore 2025 value set (range: −0.85 to 1.00).
- Multivariable linear regression estimated associations between survey period and EQ-5D-5L index scores, adjusting for age, sex, ethnicity, education, housing type, household income, marital status, employment status, and chronic conditions.
- Prespecified interaction analyses tested whether age modified the survey period–anxiety/depression association, and whether income modified the survey period–usual activities association.
- Inequality of opportunity (IOp) with Shapley decomposition quantified the proportion of health variation attributable to circumstances beyond individual control.
- Erreygers concentration indices assessed income-related health gradients.
- Sensitivity analyses: multiple imputation, continuous age specification, age-matching by random case deletion, and sample size matching.
- All analyses used Stata 18.0, with two-sided tests at α=0.05.

RESULTS

Overall:

- Mean EQ-5D-5L index declined from 0.95 (2018) to 0.93 (2024); adjusted β=−0.014 (95% CI −0.024 to −0.004, p=0.004).

Anxiety/depression:

- Prevalence ↑ from 17.2% to 24.3% (adj. OR 1.65); largest increase in ages 21–44 (p_interaction=0.025).

Usual activities:

- Problems ↑ from 3.5% to 6.9% (adj. OR 2.14); concentrated in lowest income group (p_interaction=0.038).

Health Inequality:

- IOp doubled (5.5%→12.2%); income-related inequality ↑ 5.1× (Erreygers CI: +0.005→+0.028, p=0.004).

Key shifts in inequality contributors (Shapley decomposition):

- Chronic conditions: 57.3% (2018) → 39.0% (2024)
- Employment status: 0.8% (2018) → 27.9% (2024)
- Income: 3.7% (2018) → 12.2% (2024)
- Age: 25.6% (2018) → 3.2% (2024)

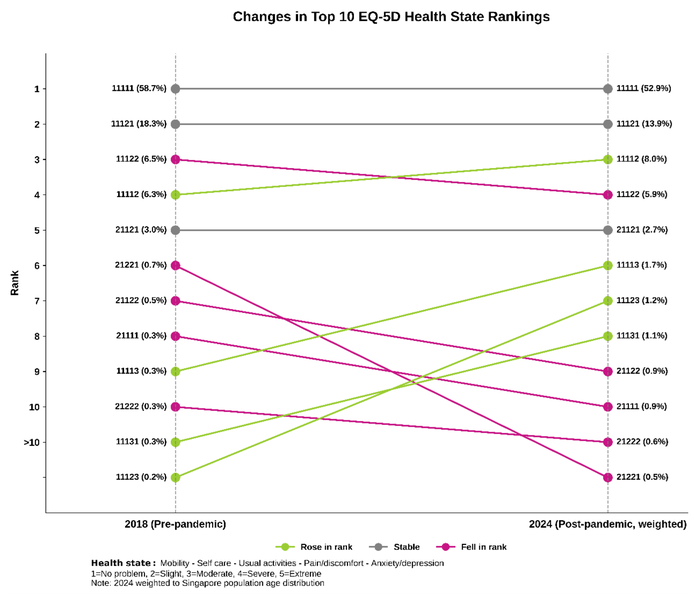

Figure 1. Changes in Top 10 EQ-5D Health State Rankings

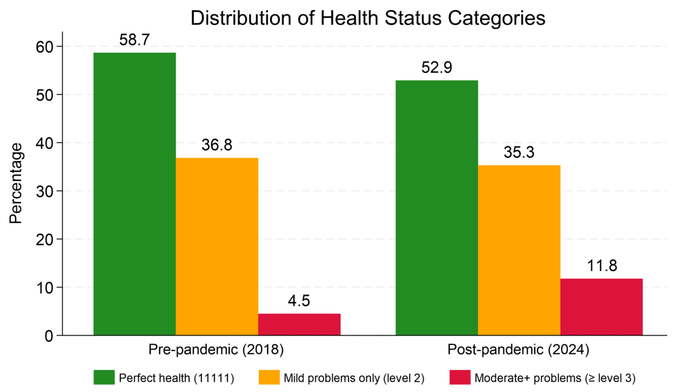

Figure 2. Distribution of Health Status Categories

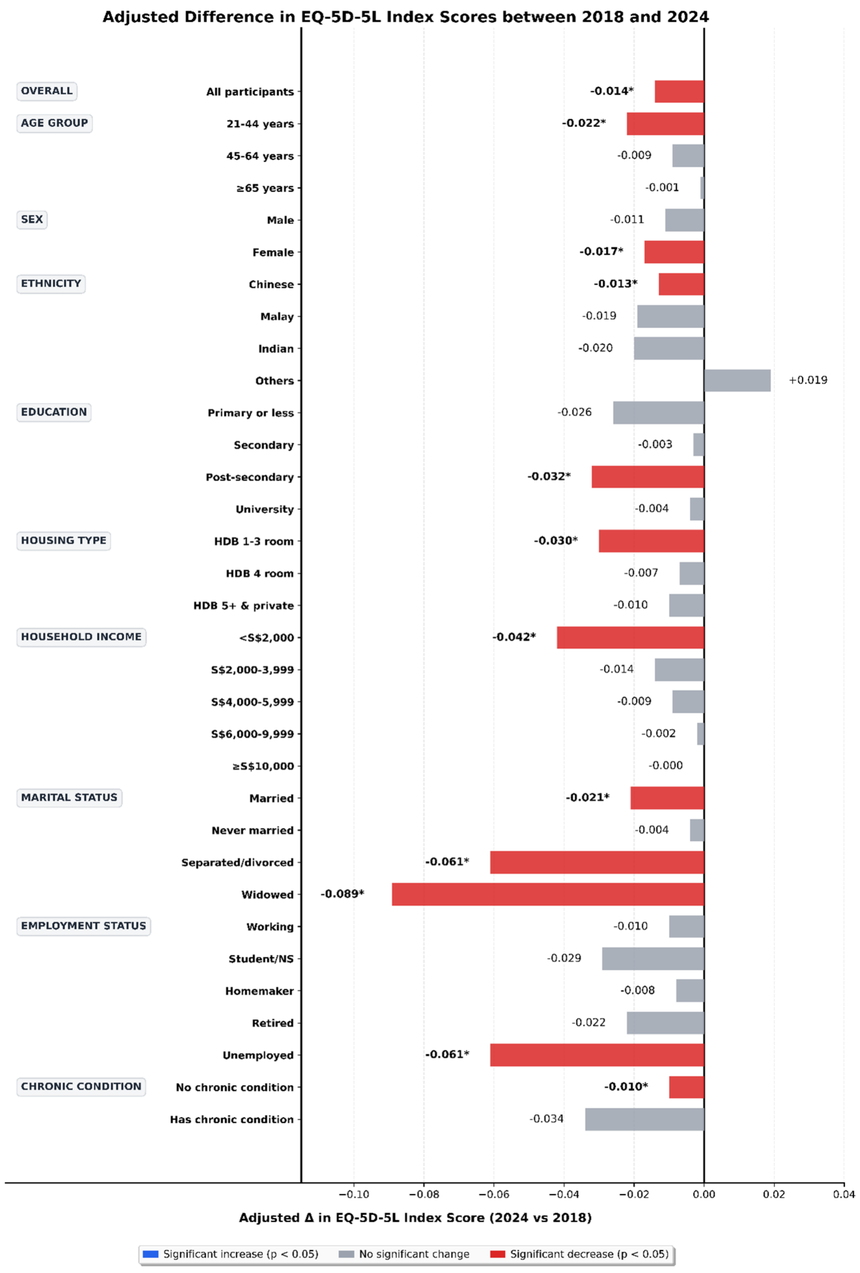

Figure 3. Adjusted Difference in EQ-5D-5L Index Scores (2024 vs 2018)

CONCLUSIONS

- Population health in Singapore was poorer in 2024 than in 2018, primarily due to more prevalent anxiety/depression (24.3% vs 17.2%) and functional limitations in usual activities (6.9% vs 3.5%).
- Two distinct mechanisms suggested: functional impairments affecting usual activities in lower socioeconomic groups, consistent with long COVID-19, and mental health deterioration primarily affecting younger adults.
- Widening health inequalities highlight the need for targeted mental health services, post-COVID-19 rehabilitation, and policies addressing socioeconomic determinants of health.

CONTACT INFORMATION

X: @JeremyChengLJ

Email Address:
cheng.lingjie@nus.edu.sg

Funding: National University of Singapore Developmental Grant. The views expressed are those of the authors and do not necessarily reflect the views of the funding organization.