Life-Course Risk and Protective Factors of Multimorbidity Resilience among Older Adults in Rural China: A Longitudinal Study in Anhui Province before and during COVID-19

Jin Guo[1]; Andrew Wister[2]; Shuzhuo Li[3]

[1] School of Public Policy and Administration, Xi 'an Jiaotong University, China

[2] Gerontology Research Centre, Simon Fraser University, Canada

[3] Center for Aging and Health Research, Xi'an Jiaotong University, China

Introduction

Multimorbidity (the co-occurrence of two or more chronic illnesses) reduces older adults' quality of life. Multimorbidity resilience reflects older adults' ability to cope with, adapt to, and rebound from its adverse effects through mobilizing resources. Wister et al. (2016) developed the *Life-Course Model of Multimorbidity Resilience* (LMMR) based on a review of literature that integrates risk/protective factors, resources, and an understanding of resilience processes in terms of life-course dynamics and then established the multi-domain *Multimorbidity Resilience Index* (MRI) to assess multimorbidity resilience (Wister et al., 2018).

China has a unique culture of filial piety. Support from intergenerational and family relationships has a positive impact on the physical and psychological well-being of the older adults especially in rural areas (Silverstein et al., 2006; Guo et al., 2014). Thus, research into multimorbidity resilience needs to incorporate family characteristics of older adults in rural China.

Furthermore, according to the Life-Course model, a key paradigm in

gerontology, individual advantages and disadvantages are cumulative over their life histories (Angela, 2006). Childhood experiences, especially adverse ones, may have long-term effects on individuals accumulating with age, resulting in lower resilience in later life. However, the influence of these early life-course factors on multimorbidity resilience has yet to be examined.

Over the past several years, the COVID-19 pandemic has harmed older adults worldwide, including in China. Older adults with multimorbidity are the most vulnerable during the COVID-19 pandemic (Shahid et al., 2020). Whether multimorbidity resilience has changed before and during COVID-19 among older adults in rural China remains unknown.

This study revises the MRI referring to the life situations of older adults in rural China establishing *Chinese Multimorbidity Resilience Index* (CMRI) and explores the factors influencing multimorbidity resilience from the perspective of Life-Course theory.

Methods

This study used the seventh and eighth waves of longitudinal data (2018–2021) collected in Anhui, China. Twelve high-prevalence chronic diseases in China were included, which were incorporated in the Longitudinal Study of Generations (LSOG) and other important research by Hermalin (2002). The sample was selected based on self-reported diseases. 945 older adults with two or more chronic diseases were selected, and 1201 (person-year) observations were collected and studied.

The MRI includes functional, social, and psychological domains. It was created

based on a composite (additive) index that used a mapping approach to convert all measures into standard scores ranging from 0-10 according to the characteristics and distribution of different indicators. We slightly modified some items for the sub-dimensions in the social domain of the original MRI to accommodate a family support measure.

A mixed linear model examined the effects of early and later factors on multimorbidity resilience. The model included two survey time points—pre- and post-COVID-19 (2018/2021) to examine the pandemic's impact on multimorbidity resilience.

Results

CMRI demonstrates good reliability and validity. CMRI is negatively correlated with being bedridden due to disease ($r = -0.31$, $p < 0.001$) and experiencing severe illnesses in the past year ($r = -0.21$, $p < 0.001$). In contrast, it positively correlates with the CD-RISC-10 score ($r = 0.47$, $p < 0.001$). The Cronbach's alpha for the total resilience scale is 0.73 for 2018 and 0.81 for 2021.

Multimorbidity resilience was negatively correlated with age ($B = -0.09$, $p < 0.001$) and decreased faster with age after the outbreak of the COVID-19 epidemic ($B = -0.03$, $p < 0.01$). Married older adults have higher multimorbidity resilience ($B = 0.38$, $p < 0.05$). Exposure to hunger was associated with lower multimorbidity resilience when later factors were considered ($B = -0.69$, $p < 0.001$). The older adults who accessed medical resources ($B = 0.22$, $p < 0.05$) had higher multimorbidity resilience, as did those who reported good childhood health status ($B = 0.45$, $p < 0.05$). In addition, this

study verified the relationship between multimorbidity resilience and the number of chronic diseases, exercise frequency, religious beliefs, self-reported health, and economic satisfaction, among other factors.

Conclusions

This study explored ways to measure multimorbidity resilience in older adults in rural China and examined life-course factors' influence on later life resilience. The aging population is an important issue worldwide. Targeted measures supporting multimorbid older adults, especially those who are not currently married and of advanced age, should clarify the impact of early factors and significant life events on their health and well-being. This study will inspire the development of policies from a life-course perspective, encompassing prevention and follow-up treatment, to achieve active and healthy aging.

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