Developing a health-related resilience scale for older adults and associated factors

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1 Introduction

Demographic structures have significantly changed due to the declining birth rate and the aging population. As a result, the current emphasis is on bolstering the recovery, adaptation, and psychological growth of older individuals rather than just offsetting senescence-associated deficits. According to the World Health Organization, resilience is critical for sustaining and enhancing life functions when faced with adversity. Moreover, the Lancet Commission proposes the role of resilience in dementia prevention. However, there is a noticeable lack of consistent measurements or scales to assess resilience. This study, therefore, focuses on developing a resilience scale and exploring its associated factors. Resilience was operationally defined based on the WHO's definition, denoting the ability to maintain or improve the level of functional ability in the face of age-related adversities, including senescence and the imminent reality of death. The scale was developed by referring to the COSMIN guideline.

2 Special characteristics and notable aspects of this study

1) Special characteristics

- ・ The scale development was tailored to address adversity, resilience, and reserve capacity specific to older adults.
- ・ The concept of resilience was constructed from psychosocial and biomedical perspectives.
- ・ To understand resilience's contributing factors realistically, the author adopted a public health approach, including evaluating the everyday experiences of older adults in the community.
- ・ Several cognitive interviews were conducted to reflect the opinions of community-dwelling elderly individuals and long-term care support specialists in the scale development process.

2) Notable aspects of each study

Study 1: Development of resilience scale

Objective: This study aimed to develop a scale that assesses resilience against health-related adversities in older adults. The focus was on contrasting the "Reserve" model, which incorporates cognitive reserves, with a more general "Psychosocial" model.

Methods: Cognitive interviews were held with community-dwelling older adults and long-term care specialists just before initiating the first two surveys. Internet surveys gathered data from 400 participants aged 70 years or over, with 60% being women. Dishonest respondents were filtered out. The initial survey compared the two models to determine the more fitting one. A Confirmatory Factor Analysis (CFA) was performed on 40 candidate items. A secondary survey for other subjects was conducted to refine the chosen model, leading to a CFA on 23 selected items, including five new additional items. A retest was subsequently performed by retesting 17 selected items on a subset of the reliability. The items were sent to a random sample of participants of the second survey (n = 100), and the first 50 returns were used. The study also analyzed Intraclass Correlation Coefficients (ICC) and reviewed the concurrent and convergent validity and internal consistency of the scale.

Results: The first survey (n=349) indicated the superiority of the Reserve model (AIC=321.667) over the Psychosocial model (AIC=565.132). The subsequent survey (n=380) involving the refined Reserve model yielded a 17-item scale (AIC=282.775, GFI=.940, CFI=.952, RMSEA=.046) with four factors: Skills and Wisdom of Experiences, Purpose in Life, Orientation towards Human Relationships, and Conscious Health Management. This scale exhibited strong test-retest reliability (ICC= .933, n=47), internal consistency (Cronbach's α=.881), concurrent validity with existing resilience

measures (r=.573-.633), and convergent validity with functional capacity, psychological well-being, wisdom with age, achievement of integrity, social networks, and health literacy (r=.397-.609).

Discussion: "Skills and Wisdom of Experience" of the Reserve model might be a superordinated factor, with "Activation" and "Natural Pose" being factors in the Psychosocial model.

Study2: Associated factors

Study 2-1: Factors influencing resilience

Objective: The impact of moderate stressors with steeling effects on resilience has been observed. In light of this, the study investigated the experiences and conditions that affect resilience using a cross-sectional methodology.

Methods: Analysis was conducted on the same cohort as in Study 1 using an online survey with 380 participants. Resilience was the dependent variable. Independent variables included factors like the perception of death (including the recent loss of a loved one, decision on a primary care physician, and end-of-life care discussions), feelings of loneliness, depressive states, self-rated health, exercise habits, years of education, household size, medical history, age, and sex. For quartile groups based on resilience scores, chi-square tests were applied to categorical variables and a one-way ANOVA for continuous ones to identify rightward trends. Then, a multiple regression analysis was conducted, adjusting for age and medical history.

Results: Both chi-square tests and the one-way ANOVA detected significant differences in almost all variables except years of education, age, household size, and certain medical conditions, confirming a rightward trend. Multiple regression analysis revealed significant influences on resilience of exercise habits (across sex and in aggregate), feelings of loneliness (across sex and in aggregate), decision on a primary care physician (in aggregate), discussions about end-of-life care (in men and aggregate), and depressive states (in women) ($p<.05$, $p<.001$). The fitness ratio were R^2: aggregate = .439, men = .454, women = .466.

Discussion: The findings highlight specific experiences that steel resilience, with exercise habits, showed the strongest influence, so it may be an important factor in boosting resilience.

Study 2-2: Influence on frailty

Objective: The study investigated the impact of several factors, including resilience, on frailty using a cross-sectional method.

Methods: Online survey data from the same participants as in Study 1 were analyzed (n=380). Frailty was the dependent variable, while resilience, exercise habits, depressive states, years of education, household size, medical history, age, and sex were the independent variables. Initially, the suitability of the "Questionnaire for medical checkup of old-old" for measuring frailty was validated using the chi-square test. Participants were categorized into "frail" or "non-frail" based on the dependent variable, frailty. In the subsequent analysis, chi-square or Fisher's exact tests were applied for categorical variables and t-tests for continuous variables to detect significant trends. A forced entry multiple logistic regression analysis was then executed, adjusting for depressive states, years of education, household size, medical history, age, and sex. The study contrasted Model 2, which incorporated resilience, with Model 1, which excluded it, to assess their impacts on non-frailty.

Results: The chi-square test revealed significant differences across all items in the "Questionnaire for medical checkups of old-old," thus confirming its suitability. Significant differences were identified, except for age and four specific diseases, using the chi-square test, Fisher's exact test, or t-test. The subsequent logistic regression, with all variables incorporated, found that non-frailty in older adults was significantly influenced by exercise habits, years of education, depressive states, and the male sex, with odds ratios ranging from 0.088 to 1.920 in Model 1. In Model 2, resilience emerged as a significant factor with an odds ratio of 2.128. Even though the odds ratios for all significant factors from Model 1 decreased in Model 2,

they remained significant. As shown in the discriminant split table, the discrimination accuracy marginally improved when transitioning from Model 1 to Model 2.

Discussion: Both exercise habits and resilience might influence each other in frailty prevention.

3   General considerations

- Distinguishing Resilience from Similar Concepts: Resilience stands out as a unique concept tied to recovery. In contrast, coping centers not on the outcome's success but on the stress reduction process. Selective Optimization with Compensation theory does not focus on recovery or maintenance during aging but rather on reallocating resources.
- Functional Reserves and Resilience: Individuals may possess reserves of functional capacity. Notably, these reserves, such as cognitive or brain reserves, can bolster the resilience of older people.
- Interconnected Enhancement of Resilience: Instead of viewing the enhancement of resilience in isolation, seeing resilience enhancing together with other activities, like exercise, might bring biological and psychological benefits, and is natural in daily life.
- Resilience's Temporal Significance: Resilience is most beneficial when addressing future challenges rather than present difficulties. For older people, proactive prevention is a better strategy to prepare for forthcoming challenges while in good health.
- Future prospective: With increasing longevity leading to improved cognitive and physical functions of older people, it's plausible to foresee a rise in the number of older adults harnessing their resilience.
- Future research must delve into the resilience of the 'older-old'—those with pronounced disabilities—and their need to sustain activities of daily living.

4   Study Limitations and Future Directions

This study has several limitations to note. Primarily, the participants of the quantitative survey consisted of relatively healthy older adults who willingly participated via an online platform. Additionally, the research was designed as a cross-sectional study, and we could not conduct cognitive assessments. Some of these constraints were a direct result of the COVID-19 pandemic. Subsequent research should address and rectify these limitations.