

## A Markov Model for the Elderly Disability Transition and Related Factors in China

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**Abstract :** Background: As one of typical case for the developing countries who are stepping into the aging times globally, more and more older people in China might face the problem of which they could not maintain normal life due to the functional disability. While the government take efforts to build long-term care system and further carry out related policies for the core concept, there is still lack of strong evidence to evaluating the profile of disability states in the elderly population and its transition rate. It has been proved that disability is a dynamic condition of the person rather than irreversible so it means possible to intervene timely on them who might be in a risk of severe disability. Objective: The aim of this study was to depict the picture of the disability transferring status of the older people in China, and then find out individual characteristics that change the state of disability to provide theory basis for disability prevention and early intervention among elderly people. Methods: Data for this study came from the 2011 baseline survey and the 2013 follow-up survey of the China Health and Retirement Longitudinal Study (CHARLS). Normal ADL function, 1~2 ADLs disability, 3 or above ADLs disability and death were defined from state 1 to state 4. Multi-state Markov model was applied and the four-state homogeneous model with discrete states and discrete times from two visits follow-up data was constructed to explore factors for various progressive stages. We modeled the effect of explanatory variables on the rates of transition by using a proportional intensities model with covariate, such as gender. Result: In the total sample, state 2 constituent ratio is nearly about 17.0%, while state 3 proportion is blow the former, accounting for 8.5%. Moreover, ADL disability statistics difference is not obvious between two years. About half of the state 2 in 2011 improved to become normal in 2013 even though they get elder. However, state 3 transferred into the proportion of death increased obviously, closed to the proportion back to state 2 or normal functions. From the estimated intensities, we see the older people are eleven times as likely to develop at 1~2 ADLs disability than dying. After disability onset (state 2), progression to state 3 is 30% more likely than recovery. Once in state 3, a mean of 0.76 years is spent before death or recovery. In this model, a typical person in state 2 has a probability of 0.5 of disability-free one year from now while the moderate disabled or above has a probability of 0.14 being dead. Conclusion: On the long-term care cost considerations, preventive programs for delay the disability progression of the elderly could be adopted based on the current disabled state and main factors of each stage. And in general terms, those focusing elderly individuals who are moderate or above disabled should go first.

**Keywords :** Markov model, elderly people, disability, transition intensity

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