Pricing End-of-Life Care: The Impact of Disability Trajectory and Gender Differences in China

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Introduction. As China's population continues to age, the number of elderly individuals with disabilities is growing steadily. By 2023, the population aged 60 and above reached 297 million, accounting for 21.1% of the total population, among which disabled elderly accounted for approximately one-fifth, totaling around 50 million. The disabled or semi-disabled state of elderly individuals inevitably leads to increased care and medical costs, with end-of-life costs potentially constituting a significant portion of these costs. However, research on how disability trajectories affect the end-of-life costs of the elderly remains limited. Most existing studies analyze the relationship between health status and end-of-life costs from a static perspective. By examining the impact of disability trajectories on end-of-life costs dynamically, this study contributes theoretical and practical insights into intervening in elderly disability and reducing the burden of end-of-life care. Additionally, examining gender differences in disability trajectories and end-of-life costs may provide valuable guidance in promoting gender equality.

Objectives. This study explores the relationship between disability trajectory changes and end-of-life costs, comprising total end-of-life care costs, care costs in the month before death, and medical costs in the year before death, and the gender differences in these relationships among older adults. End-of-life care here refers to complete dependence on others for care prior to death. Longitudinal data are used to classify the types of end-of-life disability trajectories among older adults in China. Then, the study examines how changes in these trajectories relate to end-of-life costs and whether gender differences exist within these relationships.

Data. The analysis is based on data from six waves of the nationally representative "Chinese Longitudinal Healthy Longevity Survey (CLHLS)," conducted in 2002, 2005, 2008, 2011, 2014, and 2018. Since information on end-of-life costs for deceased older adults was only collected starting from the 2005 wave, the study focused on individuals who were first surveyed in 2002 or later and who passed away before the 2018 survey. A total of 65,613 older adults were interviewed between 2002 and 2018, with 27,839 of them passing away during this period. As the data on end-of-life costs were reported by next of kin, some responses were lost or incomplete, leaving a final valid sample of 13,008 individuals for the analysis.

Methods. Group-based trajectory modeling was employed to identify groups with statistically similar patterns of decline in activities of daily living. For the total cost of end-of-life care, the cost of care in the month before death, and the medical costs in the

year prior to death, 27.68%, 27.14%, and 12.42% of respondents, respectively, incurred no costs. To examine the relationship between disability trajectory type and end-of-life care costs, the Tobit model was applied, with end-of-life costs logarithmically transformed. To explore gender differences in disability trajectories and care costs, the study also incorporated interaction effects between disability trajectory type and gender. Sensitivity analysis was conducted using an ordinal logit model.

Results. **First,** the end-of-life disability trajectories of Chinese older adults can be categorized into three types: basic self-care, rapid disability, and slow disability. On average, individuals in the basic self-care group are completely dependent on others for about nine days before death, those in the rapid disability group for approximately three months, and those in the slow disability group for eight to nine months. These findings highlight that families caring for older adults with slow-progressing disabilities face the greatest burden and are in the most urgent need of support. **Second,** disability plays a crucial role in driving up end-of-life costs. The lowest costs are incurred by individuals who remain mostly self-sufficient. In terms of total end-of-life care costs and the care costs incurred in the month before death, the ranking from highest to lowest is: slow disability, rapid disability, and basic self-care. Similarly, medical costs in the year before death follow this order: rapid disability, slow disability, and basic self-care. **Third,** female older adults in the basic self-care group face higher total end-of-life care costs and care costs in the month before death compared to their male counterparts. However, no significant gender differences are observed in the slow or rapid disability groups. **Fourth,** there is no significant gender difference in medical costs during the year before death. However, sensitivity analysis using the ordinal logit model—which distinguished between various levels of end-of-life costs (no costs, RMB 1-1,000, RMB 1,000-5,000, and RMB 5,000 or more)—revealed that women in the slow and rapid disability groups were more likely to incur no or low healthcare costs (below RMB 1,000). In contrast, men in these categories were more likely to incur high medical costs (RMB 5,000 or more). This indicates that healthcare for female older adults is more likely to be unmet or insufficiently addressed.

Conclusion and Discussions. Disability trajectories are significantly associated with end-of-life costs, and there are subtle gender inequalities in these relationships. Female older adults, despite living longer and often being in poorer health, do not receive significantly higher end-of-life care than their male counterparts. This highlights a potential gap, where women in greater need of care may not receive it due to financial constraints. The lack of clear gender differences in total end-of-life costs may, in fact, reflect another manifestation of gender inequality.

Preliminary Results

We found that the disability trajectory of end-of-life are significant associated with end-of-life cost, but gender differences in such relationships are not obvious. Our main results are presented in Figure1, Table 1, Table 2 and Table 3 below.

Figure1 Types of disability trajectories for Chinese older adults at the end-of-life

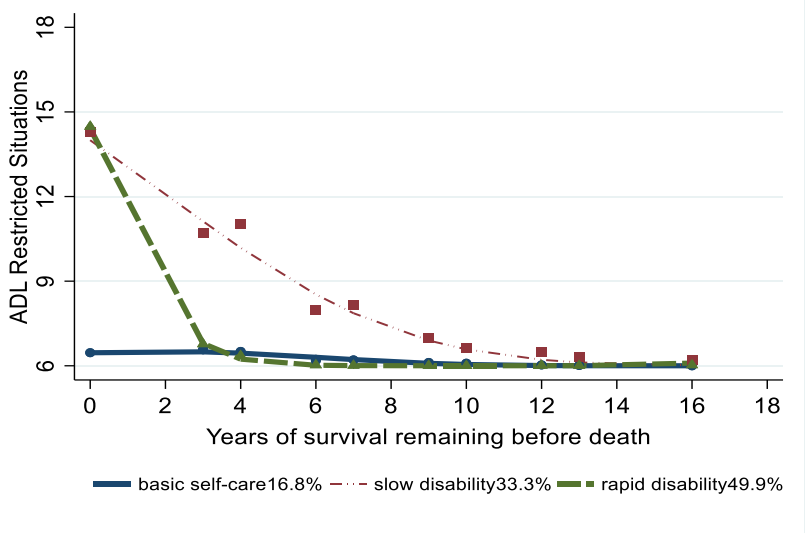

Table 1 Tobit model of disability trajectory and end-of-life cost and its gender differences

Variables	Total care cost		Care cost for last month		Medical cost for last year	
Age at death	-.024***	-.024***	-.021***	-.021***	-.060***	-.060***
	(.005)	(.005)	(.005)	(.005)	(.003)	(.003)
Education	.021	.02	.034*	.034*	.066***	.066***
	(.017)	(.017)	(.016)	(.016)	(.011)	(.011)
Income before death	.15***	.15***	.103***	.104***	.181***	.181***
(ln+1)	(.021)	(.021)	(.019)	(.019)	(.014)	(.014)
Terminal marital status						
(Ref: without spouse）						
Married	.333**	.332**	.276*	.275*	.600***	.600***
	(.122)	(.122)	(.114)	(.114)	(.082)	(.082)
Residence(urban)						
Rural	-.069	-.064	-.167*	-.164*	-.483***	-.484***
	(.09)	(.089)	(.083)	(.083)	(.06)	(.06)
Gender (Male)						
Female	.092	.920***	-.050	.403	-.119	-.173
	(.097)	(.226)	(.09)	(.207)	(.065)	(.143)
Disability trajectory						
(Ref: basic self-care)						
Slow disability	5.023***	5.499***	3.851***	4.031***	2.147***	2.158***
	(.138)	(.214)	(.126)	(.196)	(.089)	(.138)
Rapid disability	4.749***	5.271***	3.719***	4.033***	2.248***	2.198***
	(.125)	(.181)	(.114)	(.165)	(.08)	(.114)
Disability trajectory*Gender						
Slow disability*Female		-.906**		-.390		.002
		(.277)		(.254)		(.179)
Rapid disability*Gender		-1.005***		-.605**		.094
		(.248)		(.228)		(.159)
Constants	1.485**	1.048*	2.504***	2.267***	9.007***	9.035***
	(.511)	(.523)	(.475)	(.485)	(.342)	(.348)
Pseudo R^2	.026	.027	.019	.02	.026	.026

Note: *** *p*<.001, ** *p*<.01, * *p*<.05

Table 2 Marginal effects analysis of the interaction between type of disability trajectory and

gender in the elderly (Tobit model)

Marginal effects	Total care cost	Care cost for last month	Medical cost for last year
Types			
Basic self-care	0.663***	1.359***	4.747***
Slow disability	5.689***	5.210***	6.894***
Rapid disability	5.412***	5.079***	6.996***
Types*Gender			
Basic self-care Male	0.188	1.163***	4.847***
Basic self-care Female	1.107***	1.566***	4.674***
Slow disability Male	5.687***	5.194***	7.005***
Slow disability Female	5.700***	5.208***	6.834***
Rapid disability Male	5.459***	5.196***	7.045***
Rapid disability Female	5.373***	4.995***	6.966***
Marginal Prediction Difference			
Basic self-care (Female-Male)	0.364***	0.403+	-0.173
Slow disability (Female-Male)	0.010	0.013	-.0.171
Rapid disability (Female-Male)	-0.059	-0.201+	-0.079

Note: *** *p*<.001, ** *p*<.01, * *p*<.05，+*p*<0.1

Table 3 Marginal effects analysis of the interaction between type of disability trajectory and gender in the elderly- Prediction Difference (Female-Male) **(Ologit model)**

Marginal effects	Total care cost	Care cost for last month	Medical cost for last year
Prediction Difference (Female-Male)			
No costs incurred			
Basic self-care	-0.086***	-0.047*	-0.001
Slow disability	0.004	0.001	0.013**
Rapid disability	-0.002	0.020*	0.007+
RMB 1-1000			
Basic self-care	0.036***	0.022*	-0.000
Slow disability	0.003	0.001	0.025*
Rapid disability	-0.010	0.009*	0.013+
RMB 1001-5000			
Basic self-care	0.035***	0.021*	0.001
Slow disability	-0.002	-0.001	-0.001
Rapid disability	0.001	-0.019*	-0.001+
RMB 5000 and above			
Basic self-care	0.015***	0.004*	0.001
Slow disability	-0.005	-0.001	-0.037*
Rapid disability	0002	-0.011*	-0.019+

Note: *** *p*<.001, ** *p*<.01, * *p*<.05