

Trajectories of frailty and related factors of elderly people in Mexico

(Long abstract)

Abstract

Introduction. This study aimed to identify the different trajectories of frailty and factors related to frailty among older adults over time. Frailty is an indicator of health status in old age and a common clinical syndrome in older adults that carries an increased risk for poor health outcomes including falls, incident disability, hospitalization and mortality. **Methods:** Data were obtained from a four-wave panel composed of older Mexican adults from 2001 to 2015 (N = 1661) of the Mexican Health and Aging Study. Frailty was defined as the accumulation of deficits using a frailty index. A multilevel analysis, using hierarchical models, was applied to know the changes of trajectories of frailty and what factors are related with it. **Results:** Being female, older, being widowhood and having a lower level of education were risk factors for having a high frailty index and lower financial satisfaction, smoking and drinking alcohol have negative effects.

Introduction

The increase in life expectancy is related with the demographic and epidemiological transitions and it is an indicator of health in the modern societies. The aging of the population is one the greatest challenges in the world and mainly for economics and health reasons. The current concern of governments is in health costs of ageing populations. The last decades, research has been focused on the health conditions of older people. One condition is the frailty, which is very complex because there is not a unique criterion that defines with precision it.

The frailty is an indicator of health status, highly age associated, and a common clinical syndrome in older adults that carries an increased risk for poor health outcomes including falls, incident disability, hospitalization and mortality. Rockwood and Mitnitski (2007) define frailty as the accumulation of deficits, which can be symptoms, signs, diseases, disabilities or laboratory, radiographic or electrocardiographic abnormalities (Searle et al, 2009). The objective of this study is explored the different trajectories of frailty index and factors related to frailty among older adults over time in Mexico.

Theoretical Focus

The social and behavioral scientist are studying the aging process considering cumulative disadvantage, financial accumulation and stress accumulation. However, those perspectives are limited because of they are focused on microlevel processes. Therefore, we use cumulative inequality theory that help us understand multiple level of relationship between individuals and their environments. This theory specifies how life course trajectories are influenced by early and accumulated inequalities but can be modified by available resources, perceived trajectories and human agency).

Ferraro, Shippee, and Schafer (cited in Ferraro and Shippee, 2009) articulated five axioms of CI theory. Axioms:

1. Social systems generate inequality, which is manifested over the life course through demographic and developmental processes.
2. Disadvantage increases exposure to risk, but advantage increases exposure to opportunity.
3. Life course trajectories are shaped by the accumulation of risk, available resources, and human agency.
4. The perception of life trajectories influences subsequent trajectories.
5. Cumulative inequality may lead to premature mortality; therefore, nonrandom selection may give the appearance of decreasing inequality in later life.

This perspective will help us to understand because trajectories of frailty are different in and between persons. To know how the aging process is related with individual, social, contextual and environmental contexts is important.

Methods

Data were analyzed from the Mexican Health and Aging Study (MHAS), a longitudinal survey. It was first launched in 2001 and was subsequently followed up in three waves in 2003, 2012 and 2015. We analyzed four wave data, which encompassed data from a total of 1,661 individuals who were 66 years or older in 2001. To identify different trajectories of frailty, data from study subjects with sufficient numbers of observed time points was needed. Therefore, only those who had been successfully interviewed at three or more waves were included in the analysis.

The definition of frailty used in the current study was that used by Rockwood and Mitnitski, frailty index, the principle is to count deficits in health. We constructed a frailty index from baseline data and included 40 variables. We will model cohort-specific trajectories in frailty among community older than 65 years. Deficits included fell into the following categories: self-rated health status, medically diagnosed conditions, depression, falls and fractures in the past 2 years, hearing and vision impairments, medical symptoms during the past 2, years, and limitations in activities of daily living and in instrumental activities of daily living, health problems before age 10, cognitive measures, and living alone.

The analyzed MHAS database contained sample weights which were incorporated into statistical procedures using Stata, version 13. Techniques of multilevel growth curve analyses were used to examine simultaneous changes in frailty index.

Results

Frailty index varies across all occasions (waves: 2001, 2003, 2012, 2015) and of individuals, the variable that changes over time is the age. For a better interpretation of the parameter of the frailty index, the age is centered with respect to the initial age of the first round, 65 years. Table 1 presents the results of the adjustments of the null model of linear growth curves for the P80 + frailty index in 2015.

Table 1. Estimates for the multilevel model of frailty index

	Estimate	SE	<i>P</i>
Constant (β_0)	0.1524	.0026	***
Initial Age (β_1)	0.0020	.0001	***
Variance between individuals (σ_{u0}^2)	0.0046	.0002	***
Variance intra individuals (σ_e^2)	0.0059	.0001	***
Log-likelihood	6303.19		
% Variability between individuals	43.81%		

* p<.05; ** p<.01; *** p<.001

The mean predictive value of the frailty index is 0.1524 at age 65, that is, this population on average has approximately six deficits, diseases and health symptoms, and a significant increase with age. The variance among individuals in the frailty index is estimated at 0.0046 and the intraindividual variance estimated at 0.0059. After adjusting for the linear trend of age, the

correlation between any values of frailty values for the same individual is estimated as $0.0046 / (0.0046 + 0.0059) = 0.4381$. This means that 43.81% of the total residual variance in the frailty index is due to differences between individuals.

The table 2 shows us like being female, older, being widowhood and having a lower level of education increase of risks for having a high frailty index and lower financial satisfaction, smoking and drinking alcohol have negative effects.

Table 2. Effects for the multilevel model of frailty index

Variable	Effect	p
Centered age at 65 years	+	***
Women (ref. Men)	+	***
Marital situation (ref. Married)		
Single	+	
Separated/Divorced	+	
Widow	+	**
Years of schooling (ref. >6 years)		
0 years	+	***
1-5 years	+	***
6 years	+	**
More urbanized (ref. less urbanized)	+	
Smoking	-	**
Drinking	-	**
Laboral situation (ref. Work)		
Not work	+	**
Housework	+	**
Self-perception of economic situation		
Excellent or very good	-	**
Good	-	**
Regular	-	**

* p<.05; ** p<.01; *** p<.001

References

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