The Effect of Migration Between Mexico and the US on Disability: A Pooled Cohort Analysis

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Short abstract:

We have inadequate understanding of how migration influences disability risk in older adults. This is a methodologically challenging question because, although the ideal comparison would be migrants to non-migrants, careful accounting for confounding by factors that influence migration is required. Using harmonized data from the Mexican Health and Aging Study (MHAS) and the US Health and Retirement Study (HRS), we estimated the effect of migration status (ever migrant vs non-migrant) on Activities of Daily Living (ADL) and Instrumental ADL (IADL) disability (any impairments). Our sample included 16,747 participants from MHAS who never migrated and 2,479 participants, either MHAS return migrants to Mexico or Mexican-born HRS participants living in the US. Selective migration was accounted for through inverse probability weighting. After adjusting for age, sex, birth year, parental education and IPTW, migrants had more disability in ADL and IADL compared to non-migrants. Childhood SES and predictors of migration did not explain the higher disability burden in migrants.

Extended Abstract

Introduction

Compared to non-Latino whites Americans, Mexican Americans have lower educational attainment and socioeconomic status.[1-3] Despite the presence of many risk factors, Mexican Americans in the US experience unexpectedly similar or improved prevalence of diverse health outcomes compared to US born non-Latino whites.[4-7] This paradox may be explained by the effect of selective migration. To appropriately address this, studies must include data from both the US and Mexico in order to compare health outcomes between non-migrants in Mexico and migrants (both migrants to the US who remain in the US and those who return to Mexico). This will help better understand the effect of migration on health.

Disability is an important health indicator in older adults that may also be influenced by selective migration. The literature to date has evaluated disability either by comparing US non-Latino white Americans to Mexicans-American in the US[8] or by comparing US non-Latino white Americans to Mexicans in Mexico. These studies have reported lower disability progression in Mexicans.[9-11] Moreover, a study comparing different migrant status reported better ADL status for individuals living in Mexico, and for return-migrants to Mexico, compared to Mexicans in the US.[12] However, stratifying by return migration may bias estimated effects of migrating since it is a post-exposure variable.

The objective of this study was thus to investigate the effect of migration status on disability, by comparing individuals from the Health and Retirement Study (HRS) and the Mexican Health and Aging Study (MHAS). The studies include comparable populations of individuals aged 50 years and older with available migration and health information, providing a good setting for this analysis. We will also address potential bias due to selective migration by applying inverse probability weights that account for selective migration from Mexico to the US.

Methods

Study population: HRS and MHAS are two nationally representative cohorts which enrolled individuals aged 50+ and their spouses, similarly designed to facilitate comparison. The two studies include similar measures of sociodemographic, behavioral, and health factors. From HRS, we selected 924 Mexican-born migrants living in the US and seen anytime between 2000 and 2012. For MHAS, we selected 16,747 Mexicans living in Mexico who never migrated to the US and 1,555 Mexicans living in Mexico who migrated to the US and returned back to Mexico, who participated in the 2001, 2003, or 2012 waves.

Assessment of migration and disability measures: Migration is our predictor of interest which we categorized either as non-migrant (in Mexico) vs ever migrant (U.S. residing migrant or return migrants to Mexico). Measures of disability are our outcome of interest. We used Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL) at the time of first interview participant, which could have occurred at either one of the 3 study visits taking place in 2000/2001, 2002/2003 and 2012. Two different disability outcomes were evaluated: ADL disability including bathing or showering, dressing,

eating, getting in/out of bed and walking across the room; and IADL disability including managing money, taking medication, shopping and preparing hot meals. Outcomes (IADL and ADL) were operationalized as binary, at least one limitation in activity versus no limitations.

Statistical analysis: Participants' baseline characteristics (i.e. at time of their first visit) were compared based on migration status using analysis of variance (ANOVA) and $\chi 2$ tests to assess differences in means and proportions, respectively. Prevalence of ADL and IADL disability was also described according to migration status.

The associations between migration status and disability (IADL/ADL) were evaluated using logistic regression. Model 1 was adjusted for age, sex and year of birth. Model 2 was additionally adjusted for maternal and paternal education. Finally, analyses were weighted using a propensity to migrate score (inverse probability weighting) to account for selective migration and adjust for time-varying confounders in model 3. The propensity score included educational attainment, age at first job, age at first smoking, and age of marital status.

Results

Description of participants' characteristics is provided in Table 1. Compared to non-migrants, migrants were older at time of disability measurement. Migrants were more commonly male than non-migrants and migrants had more education, were taller and had higher parental education. Moreover, migrants started to smoke earlier and were older at time of first job. Before accounting for any covariates, migrants had a higher prevalence of ADL and IADL disability than non-migrants (Figure 1).

In age, gender and year of birth adjusted model 1, migrants had worse IADL (OR=1.26 (1.07 – 1.48)) and ADL disability (OR=1.71 (1.51 – 1.95)) than non-migrants. Estimates became stronger after adjustment for parental education. After applying inverse probability weighting for the probability to migrate, estimates were attenuated such that migration was still associated with higher ADL and IADL disability, though borderline significant for IADL (OR=1.18 (1.00 – 1.39)).

Discussion

This study evidenced higher disability in ADL and IADL for Mexican migrants compared to non-migrants in Mexico, which was not explained by childhood SES, or selectors into migration. Further analyses are needed to understand the impact of return migration, since it is a post-exposure variable (post migration to the US). Indeed, they may differ regarding important SES factors and health outcomes. Moreover, previous analyses did not fully account for life course variables that may have influenced migration, and also be influenced by migration. In this work, we thus accounted for selective migration by creating and weighting for life course predictors coming before migration.

Table 1: Baseline characteristics according to migration status

	Never migrants N=16,747	Migrants N=2,479	P-value
Baseline age (at 1st interview), years	60.6 (9.0)	61.7 (8.9)	**< 0.01**
Male	7324 (43.7)	1694 (68.3)	**< 0.01**
Education, years	5.3 (4.8)	5.5 (4.6)	**0.02**
Mother education			**< 0.01**
None	7611 (45.5)	1015 (40.9)	
Some primary	4504 (26.9)	694 (28.0)	
Primary	1445 (8.6)	268 (10.8)	
More than primary	663 (4.0)	209 (8.3)	
Father education			**< 0.01**
None	6453 (38.5)	937 (37.8)	
Some primary	4779 (28.5)	672 (27.1)	
Primary	1550 (9.3)	255 (10.3)	
More than primary	1048 (6.3)	223 (9.0)	
Height, m^2	1.60 (0.1)	1.64 (0.1)	**< 0.01**
Marital status (Age at first marriage), years	24.1 (10.7)	24.5 (7.9)	0.14
Smoking status (Age at first smoking), years	20.5 (9.4)	19.4 (9.7)	**< 0.01**
Employment status (Age at first job), years	17.2 (10.0)	25.4 (16.9)	**< 0.01**

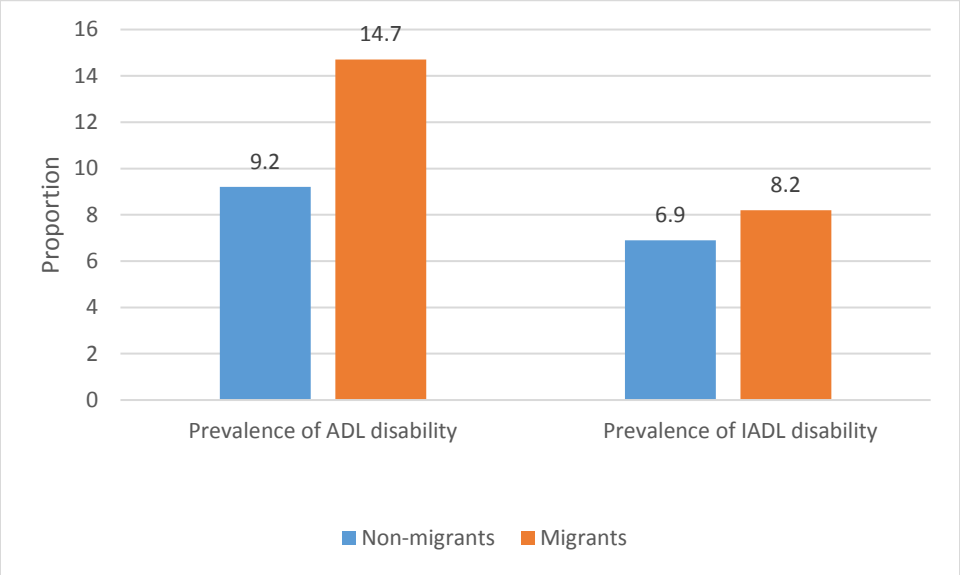

Figure 1: Prevalence of ADL and IADL disability by migration status

Table 2: Associations of migration with baseline ADL and IADL disability

	Model 1 OR (95%CI)	**Model 2** OR (95%CI)	**Model 3** OR (95%CI)
ADL disability			
Non migrants	Ref	Ref	Ref
Migrants	1.67 (1.47 – 1.90)	1.72 (1.50 – 1.95)	1.53 (1.35 – 1.74)
IADL disability			
Non migrants	Ref	Ref	Ref
Migrants	1.24 (1.05 – 1.46)	1.27 (1.08 – 1.50)	1.18 (1.00 – 1.38)

Model 1 is adjusted for age at baseline, sex and birth year.
Model 2 is adjusted for age at baseline, sex, birth year and parental education.
Model 3 is adjusted for age at baseline, sex, birth year, parental education, and IPTWs.

Reference

1. U.S. Census Bureau. 2014. Table 1: Educational Attainment of the Population 18 year ao, by age, sex, race, and Hispanic Origin: 2014. Current Population Survey 2014: Annual Social and Economic Supplement. Retrieved from http://www.census.gov/hhes/socdemo/education/data/cps/2014/tables.html.
2. Braveman PA, Cubbin C, Egerter S, et al. Socioeconomic status in health research: one size does not fit all. *Jama.* 2005;294(22):2879-2888.
3. Goldman N, Pebley AR, Creighton MJ, Teruel GM, Rubalcava LN, Chung C. The consequences of migration to the United States for short-term changes in the health of Mexican immigrants. *Demography.* 2014;51(4):1159-1173.
4. Mayeda ER, Glymour MM, Quesenberry CP, Whitmer RA. Inequalities in dementia incidence between six racial and ethnic groups over 14 years. *Alzheimer's & dementia : the journal of the Alzheimer's Association.* 2016;12(3):216-224.
5. Eschbach K, Ostir GV, Patel KV, Markides KS, Goodwin JS. Neighborhood context and mortality among older Mexican Americans: is there a barrio advantage? *American journal of public health.* 2004;94(10):1807-1812.

6. Haan MN, Mungas DM, Gonzalez HM, Ortiz TA, Acharya A, Jagust WJ. Prevalence of dementia in older latinos: the influence of type 2 diabetes mellitus, stroke and genetic factors. *Journal of the American Geriatrics Society.* 2003;51(2):169-177.
7. Palloni A, Arias E. Paradox lost: explaining the Hispanic adult mortality advantage. *Demography.* 2004;41(3):385-415.
8. Thomson EF, Nuru-Jeter A, Richardson D, Raza F, Minkler M. The Hispanic Paradox and older adults' disabilities: is there a healthy migrant effect? *Int J Environ Res Public Health.* 2013;10(5):1786-1814.
9. Hong I, Reistetter TA, Diaz-Venegas C, Michaels-Obregon A, Wong R. Cross-national health comparisons using the Rasch model: findings from the 2012 US Health and Retirement Study and the 2012 Mexican Health and Aging Study. *Qual Life Res.* 2018;27(9):2431-2441.
10. Gerst-Emerson K, Wong R, Michaels-Obregon A, Palloni A. Cross-National Differences in Disability Among Elders: Transitions in Disability in Mexico and the United States. *The journals of gerontology Series B, Psychological sciences and social sciences.* 2015;70(5):759-768.
11. Diaz-Venegas C, Reistetter TA, Wong R. Differences in the Progression of Disability: A U.S.-Mexico Comparison. *The journals of gerontology Series B, Psychological sciences and social sciences.* 2018;73(5):913-922.
12. Aguila E, Escarce J, Leng M, Morales L. Health status and behavioral risk factors in older adult Mexicans and Mexican immigrants to the United States. *Journal of aging and health.* 2013;25(1):136-158.