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The Progression of Disability among Older Adults in Mexico

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Abstract

Purpose—This paper seeks to document the progression of disability in a developing country and to examine gender differences in this process.

Methods—The data come from the Mexican Health and Aging Study (MHAS), a nationally representative sample of older adults. An ordinal logistic regression ($n = 3,283$) is used to measure the progression of disability that considers: 1) no disability, 2) mobility problems, 3) mobility problems with IADLs limitations, 4) mobility problems plus ADLs limitations, 5) combinations of the latter three, and 6) death.

Results—Approximately 43% of the sample remained in the same level of disability after 2 years. The patterns of progression with two disabilities differ for men and women.

Conclusions—Our model reflects the importance of separating ADLs and IADLs in the study of disability progression in Mexico. Varying risk profiles and cultural differences might influence the divergent disability paths followed by each gender.

Keywords

Progression of disability; paths of disablement; older adults; gender differences; MHAS; Mexico

Introduction

Population aging has accelerated in the globe as a result of the fast pace of fertility and mortality declines that were experienced in the last part of the 20th century among the majority of developing countries. Latin America and the Caribbean, and Mexico in particular, are no exception to this aging pattern. Three features have combined to make aging in Mexico of special scientific interest [1]. *First*, rapid aging is occurring compared to

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Conflict of Interest

The authors have no conflict of interest to report.

the pace at which developed countries underwent the aging of their populations. *Second*, aging is occurring when countries are still at low levels of economic development, with large shares of people lacking access to health care and other social services and consequently with low quality of life. *Third*, older adults in developing countries are survivors of infectious and parasitic diseases during childhood and face the burden of non-communicable chronic conditions as they reach adult and old age and especially in rural areas [2].

We know little about how individuals will age in these socioeconomic conditions, since most of our accumulated evidence on the process of aging comes from empirical data from developed countries that have aged before [3–6]. One of the research questions that deserve attention is the progression of disability among older adults, reflecting a main pathway from disease or injury to impairments of body systems followed by functional limitations and eventually disability. More specifically, the patterns of onset and progression of physical limitations during old age are highly unknown. Based on what we know about previous research, several questions emerge for a country like Mexico: compared to other societies that have aged before, are the differences in life cycle exposures such that adults reach old age stronger, more able to endure non-communicable diseases, and with fewer physical limitations? Or does the life cycle of relative deprivation imply that adults arrive weaker to old age and the burden of disability? Alternatively, does the process of mortality selection operate in such way that the survivors to old age are stronger and less frail and disabled in old age? [7]

Each nation, regardless of its level of development, has cultural differences that influence behaviors, attitudes, and social roles for men and women [8]. These differences affect the way men and women complete daily activities, fill roles within the household, and how each reacts or adapts to a potentially different progression of disability [9]. McDonough and Walters [10] present two different theories on the relationship between health and gender: a) differential exposure to a variety of social factors during life lead to alternate health outcomes for men and women; and b) differential vulnerability to exposures result in varying health outcomes for men and women.

Information on developing countries is limited but it is clear that the prevalence of disability and the speed of disability progression vary considerably across societies; the national estimates are not quite comparable to estimates from developed countries [11]. Mexico has faced an aging population and increasing social inequalities almost simultaneously with instability in the social security system and the modification of the pensions and retirement programs [12]. With scarce economic resources and limited access to reliable health services, Mexicans have to depend on familial support. Older adults face social exclusion as families turn to younger generations for economic support and sometimes are forced to continue in the labor market because pensions are significantly low and not enough to provide a good quality of life [13].

Previous research has shown that the speed of aging in Latin America is twice as high as it was in the US and Western Europe [14]. Further, levels of disability, expressed in terms of number of limitations in activities of daily living appear to be lower in Mexico than in the US [15]. Current older adults are survivors of vastly different life courses due to the fact that

both countries are at different stages of their epidemiologic and demographic transitions [16]. However, we still have no knowledge of the progression of disability.

As reliable, longitudinal survey data on aging from developing countries has become increasingly available in recent years, it is now possible to start answering these questions. One topic that can be addressed now is the disablement process among older adults in the context of a developing country such as Mexico. The significance of this research hinges in the rapid pace of aging under similar low-economic development conditions that many countries will endure in the near and medium-term.

Thus, our overarching hypothesis is that because of the socioeconomic and health care conditions that older adults in Mexico experienced over the life course, the disablement process will differ from the one found for developed countries such as the U.S, but the specific direction of the difference is difficult to predict a priori. Because of this expectation, we examine the progression of IADL and ADL disability separately, which differs from what has been the convention for developed countries. We can properly identify a progression of disability for Mexico. Because of the vast difference in the life course trajectories of men and women in Mexico, and based on generalized findings from the literature, we estimate the disablement model stratified by gender. This model will inform the way health care providers establish treatment programs for patients and the way policy-makers allocate health care services and resources.

The objective of this paper is to focus on determining a progression of disability that fits a developing country like Mexico as persons are not only acquiring physical impairments but are also living longer lives with these impairments [17]. The paper has two goals: 1) to ascertain if the progression of disability in Mexico aligns with a progression of physical disablement that has been previously estimated in developed countries but not in developing countries, and 2) to examine gender differences in the stages of this process. We achieve these goals by using data from Mexico that includes two waves of longitudinal information from a large national sample of older adults.

The Disablement Process

Previous research has found that the development of physical disability seems to follow a progression. The disablement process frequently begins with disabilities arising from functions requiring trunk and lower extremity performance (such as mobility). It evolves to include upper extremity performance (such as IADLs), and progresses to include the basic activities of daily living (ADLs). See, for example, Harris and colleagues [18] and Jette and Branch [19].

These transitions from healthy aging to illness and disability are conceptualized and described as the disablement process [5,20–22]. Conceptually, the disablement process model is viewed as a mix of pathologic conditions and impairments which lead to functional limitations in physical and mental actions. In the disablement model, disability is defined as a reduction or loss of function that leads to an individual's difficulty performing tasks that are routine and meaningful. Typically these routines include basic and more complex

activities of daily living (ADLs and IADLs). Mobility, which requires primarily lower body ability, is a key component of most ADL and IADL tasks [23]. Typically, individuals are with disabilities if they are limited or require assistance with any routine ADL, IADL, or mobility tasks [24,25].

Health service researchers have studied the progression from health to disability as well as factors associated with transitions in the disablement process model. In a study of older community-dweller French adults, Barberger-Gateau and colleagues [21] identified a hierarchical structure within the disablement process model. Their findings indicated a consistent hierarchical transition for mobility, IADL, and ADL. The first level of disability includes persons with mobility impairments only. Level II in the progression includes those with impairments in mobility plus a limitation in an IADL. Finally, level III includes those with mobility, IADL, and basic ADL difficulties.

Other researchers studying disability trajectories have identified numerous factors and variables which influence disability [3,5,21,22,26,27]. Barberger-Gateau and colleagues [21] found that, in France, disablement varied by age with older persons having more severe disability. Variation also exists across gender. Both males and females showed similar trajectories from no disability through the three levels; however, women were more likely to have increased levels of disability over time compared to men.

Researchers have shown that cognitive as well as upper and lower body impairments are associated with disability [24]. In that same study, Fauth and colleagues found that higher cognitive function was associated with remaining non-disabled over time, conversely lower Mini-mental State Examination (MMSE) and recall scores were associated with advancement in the disablement process. Likewise, in a longitudinal study of disability trajectories in the United States, researchers found that lower body impairments were independently associated with IADL and ADL disability. Fauth, Zarit, and Malmberg [22] found that physical function accounted for the majority of the effect between impairments and disability. They also found that cognition and depressive symptoms mediated the relationship between impairments and disabilities and the authors were able to identify demographic variables and health status as key factors in the disablement process. In a French study, Pérès, Verret, Alioum, and Barberger-Gateau [5] found that gender (female), older ages, severe impairments, comorbid conditions, lack of social support, living in rural areas, and increased hospital and medication use were linked to lower likelihoods of recovery within the disablement process.

Conversely, factors associated with recovery from disability or with protection against transitions to disability have also been found. For example, researchers have identified that an individual's social support system and their sense of mastery over their environment is important while recovering from a disability [22]. In longitudinal studies of older Mexican-Americans, Peek and colleagues [27] found that an individual's perception of positive health is protective against having disabilities. These protective factors suggest that the process of disablement is preventable, modifiable, and potentially reversible and that disability differs across individuals and across communities. Finally, in a systematic review of disability trends in the U.S., Freedman and colleagues [28] present a compelling evidence for

disability reduction in time. The majority of these trends are associated with lowering prevalence of IADL disability over time [29–31].

Based on the existing literature, we postulate our model for disablement as a progression going from zero disabilities, to one (mobility only), to two (mobility + IADL and mobility + ADL), to three (all), to death. The goal is to establish the order in which the combinations of disabilities will appear in our model. To accomplish that, we propose a model that estimates a progression of disability at follow-up controlling for different covariates at baseline. We include factors that have been found as covariates of changes in disability like education, socioeconomic status, and morbidity [32], as well as health and function variables such as cognition [33], self-rated health [34], and also factors like social support through social networks [35]. All of these variables have been identified as important predictors of disability and in addition to variables like insurance coverage, depressive symptoms, and location size will provide information on transitions of disability over multiple time intervals.

Data and Methods

Sample

Data are from the Mexican Health and Aging Study (MHAS), a nationally representative study of health and aging in Mexicans born in 1951 or earlier. Participants were first interviewed in 2001 in a stratified sample representative of the national population. The MHAS was designed to be comparable to the U.S. Health and Retirement Study (HRS). The baseline data, consisting of 15,186 in-person interviews, were collected in 2001 (with a 92% response rate) [36] with a follow-up in 2003 (with a 93% response rate) [37]. Information from a knowledgeable proxy was obtained for individuals who were unable to complete the interview themselves because of infirmity or cognitive incapacity. The MHAS includes detailed information on IADLs, ADLs, cognition, depression, mobility, as well as a myriad of socioeconomic indicators [38].

Our analysis begins with a sample of 6,373 respondents aged 65 or older. We exclude 2,368 respondents who had missing information in at least one of the 5 ADL components, the 4 IADL components, and the 3 mobility components that we used to generate our dependent variable as it would be extremely difficult to obtain or assume a logical progression of disability when one of the key components is missing. Respondents who were deceased at the 2003 follow-up were included in the analysis if they had disability information at baseline. The sample for our descriptive analysis included 4,005 respondents, representing 63% of the eligible respondents. The included respondents were one year older on average (74 vs. 73 years) and had slightly lower percent of insurance coverage (49% vs. 51%) than the respondents with missing information on disability, thus the results would not vary significantly from our current model.

In constructing the regression model we further excluded 44 subjects who fell in the “other” category of disability (disability in ADL only, disability in IADL only, or disability in ADL and IADL), 171 respondents who were lost to follow-up in 2003, and 507 respondents with

missing information in multiple covariates so Stata 13.1 could not include them in the regression. The sample for the regression analysis included 3,283 respondents.

Measures

Dependent Variable—Our main variable measuring disability in 2003 includes five categories based on the following groups: Respondents with no disability in ADL, IADL, or mobility (= 0); respondents with a disability only in mobility (= 1); respondents with a disability in mobility and IADL but no ADL (= 2); respondents with a disability in mobility and ADL but no IADL (= 3); respondents with a disability in mobility, ADL, and IADL (= 4). All other possible combinations (which include a disability only in ADL, a disability only in IADL, and a disability in both IADL and ADL) are combined as “other” (= 5) due to the small number of respondents in these categories.

Most prior models for developed countries measuring the progression of disability, include only ADLs, only IADLs, or a combination of both [e.g., 39,40]. IADLs focus on community-related activities [41] while ADLs focus on personal care [42]. Decline in IADL might be the precursor of a more severe cognitive or physical limitation [43] thus we model progression in IADLs and ADLs limitations separately. From the 4,005 respondents that had full functional assessments without any missing data for all three ADL, IADL, and mobility scales, 5.4% reported limitations in mobility and IADL and 6.7% reported limitations in mobility and ADL. Additionally, to avoid selection bias due to mortality (302 cases) or sample attrition (171 cases who were lost to follow-up), these cases are included in our analysis with an outcome in the progression of disability (dead = 6 and lost to follow-up = 7).

Three measures of health and function were used to construct the dependent variable. First, we include a modified version of the *Katz Index of Activities of Daily Living* (ADLs), an index that ranges from 0 to 5 and indicates if the respondent needed help to perform any of the following five functions: bathing, dressing, eating, toileting, and transferring in and out of bed [42]. Second, a similar index variable ranging from 0 to 4 was created to indicate if the respondent needed help to perform any of the following Instrumental Activities of Daily Living (IADLs): preparing meals, taking medications, shopping for groceries or clothes, and managing money. And third, the *Rosow-Breslau Functional Health Scale* was also included as a mobility index ranging from 0 to 3 and indicates if the respondent needed help to perform any of the following activities: climb a flight of stairs, walk one-half mile or lift heavy objects [44].

Each activity variable was dichotomized and the respondent was assigned a value of 0 if help was not required. If the respondent received any help to perform these activities a value of 1 was assigned. Additionally, we faced the challenge of coding respondents who answered that they “cannot do” or “does not do” the activity. For ADLs and mobility tasks, respondents who fell in these categories were recoded as 1 if they could not or did not perform these activities and received help from their spouse or someone else to perform these activities, and 0 otherwise. For IADLs, respondents who answered “cannot do” or “does not do” were recoded as 1(disabled) if they could not or did not perform these activities because of a health related problem regardless of their marital status or living

arrangements. In contrast, those respondents who answered “cannot do” or “does not do” but it was not due to a health problem were recoded as 0 (not disabled) because they chose not to perform the activity.

After recoding these three measures of health and function, we created the dependent variable measuring type of disability. If respondents received a value of 1 in any of the ADLs, IADLs or mobility variables, then they were identified as having a disability.

Socioeconomic and Health Covariates—In order to estimate the disablement progression, our main interest is on the state of disability at baseline. This variable is included as a five dichotomous variables measuring: a) no disability (reference category), b) disability in mobility only, c) disability in mobility and IADL, d) disability in mobility and ADL, and e) disability in mobility, ADL, and IADL.

Other covariates were also included in the regression models:

Age: dichotomous variables measuring respondents aged 65–69 (reference category), respondents aged 70–74, and respondents aged 75 or older. *Education*: dichotomous variables measuring no education at all (reference category), 1–5 years of schooling, 6 years of schooling, and more than 6 years of schooling. *Gender*: dichotomous variable (women = 1). *Location size*: dichotomous variables measuring residence in communities under 2,500 inhabitants (reference category), between 2,500 and 14,999 inhabitants, communities between 15,000 and 99,999 inhabitants, and communities of 100,000 inhabitants or more. *Social support*: coded as 1 if the respondents answered “yes” in either one of the questions “do you have neighbors or friends you can count on for daily activities, such as bringing you food if you are sick, or bringing you something from the store?” and “in the last two years, have your (and your spouse’s) children/their spouses/grandchildren spent at least one hour a week helping you with household chores, errands, transportation, etc.?”; 0 otherwise. These questions were combined to consider the respondent’s marital status. A non-married person living alone will only have neighbors to rely on and similarly, a respondent who had no children will rely on his/her spouse and neighbors. *Monthly Income*: dichotomous variables for respondents who were indebted or had no income (reference category), that earned less than 5,000 Mexican Pesos (less than \$380 at current exchange rates), that earned between 5,000 and 9,999 Mexican Pesos (approx. between \$380 and \$760 at current exchange rates), and that earned 10,000 Mexican Pesos or more (over \$760 at current exchange rates). MHAS imputed values [45] were used to avoid missing income values. *Insurance*: dichotomous variable measuring whether the respondents have insurance from any of the public health institutions in Mexico and/or from a private company or not. The cost of health insurance for a person with disabilities varies dramatically depending on the type of disability and it can impact the economy of the respondent’s household by incurring in more out-of-pocket expenditures [46].

Health and function variables include:

Center for Epidemiologic Studies of Depression (CES-D) score: respondents answered an abbreviated version of the original scale [47] with 9 symptoms that include feeling

depressed, feeling that everything was an effort, restless sleep, feeling happy (reversed coded), feeling lonely, feeling that life was enjoyable (reverse coded), feeling sad, feeling tired, and feeling energetic (reverse coded). Each of the 9 symptoms was dichotomized and then added to generate a score (0–9). *Self-rated health*: measured as poor versus all other values (excellent, very good, good, or fair). *Cognition*: Respondents were asked to repeat all the words they could remember from a list of 8 possible words. This exercise was performed three times and we calculated the average score of these tests (immediate verbal recall). Further, later during the interview, the respondent had to repeat these words and a score was obtained (delayed verbal recall). In our analysis, we included an average of the two cognition tests (range 0–8) based on previous work by McArdle, Fisher and Kadlec [48] and by Lei and colleagues [49].

Data Analysis

Descriptive statistics used to characterize the sample were stratified by gender. For the multivariate analysis disability is treated as a polychotomous outcome [50,51]. Following previous work that uses ordinal logistic regression to evaluate health outcomes [52–54], we estimated the two-year progression of disability using this approach.

We computed three ordinal logistic regression models to assess the association of the 2001 (baseline) covariates with the 2003 level of disability. Model 1 includes the levels of disability at baseline which will indicate the starting point of the progression of disability. Model 2 introduces the sociodemographic variables such as age, gender, education, insurance coverage, location size, income, marital status, and social support. Finally, Model 3 adds the health-related variables such as self-rated health, CES-D score, and the average combined verbal recall score.

It is worth noting that several statistical approaches (not shown) were considered to validate the use of an ordinal logistic regression stratified by gender. First, possible confounding issues between the dependent variable and the covariates led us to perform ordinal logistic regressions that had gender as a dichotomous variable and that had gender interacting with disability at baseline. Second, we considered a multinomial logistic regression using “no disability” as our reference group but the progression of the disablement process is not properly characterized with this option. Finally, we performed an ordinal logistic regression excluding one IADL item at a time and another grouping the IADL components into two groups (shopping and preparing meals in one and handling money and taking medications in the other) to establish if gender roles might be influencing our results. In all cases, the results were not significantly different than the ones we present here.

Results

Table 1 presents descriptive characteristics of the respondents aged 65 or older at baseline by gender. Almost 40% of the women included in the analysis did not receive any education compared to almost 36% of the men. Similarly, Around 39% of the men and 35% of the women reported having between 1 and 5 years of education.

Further, women aged 65 or older reported far more zero or negative monthly income at baseline (27.9%) compared to men (19.2%). In contrast, women reported slightly more insurance coverage than men (59.1% vs. 56.3%). Finally, women reported worst self-rated health with 22.1% and higher CES-D score with 4.4 but they also had an average combined verbal recall score 0.3 points higher than men.

The distribution of the baseline cases by level of disability or death at follow-up shows that 44% of the sample remained in the same level of disability. The remaining 56% of the sample shifted between having limitations at baseline to improving at follow-up (27%), from having no disability at baseline to experiencing a limitation or dying at follow-up (30%), or from having some limitation at baseline to having another type of limitation or dying at follow-up (43%).

Table 2 presents the distribution of cases according to the stage of disability at baseline and then at the 2-year follow-up by gender. Forty-seven percent of the males and 39% of the females remained in the same level of disability between waves 1 and 2. Out of the 1,014 males who reported no disability in 2001, 61% remained fully able two years later. For women, 48% of the 779 who reported no disability at baseline remained without any disability at follow-up. Of those who died in 2003, almost one-third of both males and females had disabilities in mobility, ADLs, and IADLs at baseline.

Table 2 also presents the progression of disability for men and women. For men, only 17.8% (3.4%+5.6%+8.8%) of those who reported being dependent in mobility and IADL at baseline either remained at the same level of disability or became dependent in mobility and ADL or in all three. In contrast, 33.4% (8.5%+17.9%+7.0%) of those who reported being dependent in mobility and ADL at baseline either remained at the same level of disability or became dependent in mobility and IADL or in all three in 2003. For women, the parallel figures are 35.6% and 33.2% respectively. Thus, from either starting point with ADL or IADL disability, we find that the state is not fixed and the direction of progression is not always in the same direction.

Table 3 presents an ordinal logistic regression for covariates of the progression of disability at follow-up, stratified by gender. Model 1 introduces baseline disability with dichotomous variables of the different levels of disability. Evidence of a different progression of disability for females (compared to males) can be seen in the reported odds ratios for being dependent in mobility and IADL (7.81) and being dependent in mobility and ADL (4.47). These results differ for men, thus only the progression of disability for men aligns with previous models suggested by Jette and Branch [19] and Harris and colleagues [18].

Model 2 introduces the sociodemographic and economic variables (age, location size, social support, education, income, and insurance). In general, old age (75+) seems to have a bigger impact for both genders than for those aged 65–69, in other words, the older the respondent, the higher s/he will be in the progression of disability. Higher education (7 or more years of education) is associated with a lower level of disablement for females, while living in a semi-urban area (between 15,000 and 99,999 inhabitants) represents a slight benefit for males. The effects of income and being insured are not significant.

Model 3 introduces health-related variables including poor self-rated health, CES-D score, and the combined verbal recall score. Receiving help from neighbors and/or children (social support) is significantly associated with a higher level of disability in the progression of disability for females but not for males. The effects of living in a semi-urban environment remain with an odds ratio of 0.72 for men and the effects of old age also remain with an odds ratio of 1.89 for men and 1.99 for women. All three health-related variables are also statistically significant, with depressive symptoms (odds ratio of 1.07 for men and 1.09 for women) and poor self-rated health (odds ratio of 1.54 for men and 1.64 for women) being linked to a higher level of disability in the progression. Higher average combined verbal recall scores suggest the opposite effect (odds ratio of 0.91 for men and 0.93 for women). The effects of income and health insurance continue to be not statistically significant. Finally, the effect of education is eliminated in this model.

From Table 3, it is clear that the order of the categories in the progression of disability for men aligns with models commonly found in developed countries. In contrast, for women, the middle categories of the progression (limitations in both mobility and IADL and limitations in both mobility and ADL) are reversed. Thus the reverse pattern for men and women obtained in model 1 still remains in models 2 and 3, after all controls are included. It is worth noting that these differences were tested using the “seemingly unrelated estimation” (suest) command and the Hausman test in Stata (not shown). After performing these analyses, there is evidence that the coefficients for men and women are significantly different.

To illustrate the disablement process graphically, Figures 1 and 2 present the predicted probabilities for males and females. The results show that if the respondent indicated being fully able at baseline, a man will have a 68.7% chance of remaining with no disabilities at follow-up. This number is slightly higher (57.6%) for females indicating that they tend to become slightly less disabled with time going against what was previously shown by other authors [19,55–57]. Similarly, once the respondent has reached the point of having all three disabilities, a man has a 41.7% chance of dying at follow-up while a woman has a 22.9% chance of dying, this time consistent with previous literature that indicates that females are more likely to become more disabled than males but live longer [58–60].

Discussion and Conclusions

We used ordinal logistic regression to examine the progression of disability in a sample of older Mexican adults stratified by gender. Several relevant points emerge from the analyses.

First, our results suggest that the progression of disability in Mexico might differ when compared to the progression of disability previously estimated for developed countries. Second, the progression of disability reflects the importance of IADLs and ADLs in the disablement process for older adults in Mexico. Previous research for developed countries has merged ADLs with IADLs [e.g., 39,40], but our results suggest the need to treat them separately.

Third, our results show that for men, the transition between disablement at baseline and at follow-up is consistent with the progression of disability observed in developed countries such that the status of no impairments is followed by mobility impairments, which is followed by IADL impairments, and then ADL impairments. For women, the transition between disablement at baseline and at follow-up begins with a status of no impairments, followed by mobility impairments, followed by ADL impairments, and then IADL impairments. This suggests that the progression of disability previously reported by others [5,21,22,61], may not align with populations of developing countries such as Mexico. Gender differences in limitations in IADLs show that men report greater complications with household-IADLs like housekeeping, cooking, and laundry while women have more difficulties handling money and managing medications [62]. In developed countries the prevalence of IADL disability has been decreasing over the past decade [63]. In Mexico, the population is arriving at old age with a different risk profile determined by their life cycle exposures. Further, cultural and gender interactions in a male-dominated society like Mexico might be affecting the way social networks deal with those who need help to perform IADLs or ADLs thus resulting in heterogeneous outcomes for the disablement processes of men and women [64].

However, variables like health insurance and monthly income were not associated with the progression of disability. In the case of health insurance this might be due to variations in prices, quality of care, out-of-pocket expenditures, and sociodemographic characteristics of the insured that tend to vary dramatically across the Mexican population [65]. In the case of income, inequalities among Mexicans have been a constant since the late 1970s and the differences between urban and rural areas continue to affect economic development in the country [66], therefore the effects, if any, of income on the progression of disability might be muddled by the inclusion of other socioeconomic variables like social support and location size.

Another important contribution of our study in conjunction with the partitioning of IADLs and ADLs is the inclusion of mortality as an outcome. As stated in earlier work on the disablement process, to gain a rich understanding of disablement and the factors associated with it, studies need to extend beyond disability as the final stage of the process [25]. Although we included death as an outcome, our findings present two possibly differing progressions for disablement. First, for older adults the presence of all three disability classifications increases the likelihood of death (Figures 1 and 2). In terms of gender, men had higher predicted probability of death than women. This result confirms national data on gender differences, whereas women live longer on average. A second possibility, and a much needed area of future research, is that approximately 21% of the sample (data not shown) improved from 2001 to 2003 suggesting that the disability state is not absorbent and is reversible, making it worthy of future exploration.

Additional future research is also needed to confirm these findings and further examine the disablement model in developing countries. With the inclusion of a new wave of information in the Mexican Health and Aging Study in 2012, transitions from baseline to an eleven-year follow-up will allow for more in-depth analyses of disablement in Mexico and could provide further evidence of the different progressions for males and females. The new data will also

provide the opportunity to include updated measures of mobility (e.g., upper extremity function) and evaluate how new dimensions of mobility fit in the dynamics of disability.

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References

1. Wong, R.; Palloni, A. Aging in Mexico and Latin America. In: Uhlenberg, P., editor. *International Handbook of Population Aging*. Dordrecht: Springer; 2009. p. 231-252.
2. Águila, E.; Díaz, C.; Manqing-Fu, M.; Kapteyn, A.; Pierson, A. *Living Longer in Mexico: Income Security and Health*. Santa Monica, CA: AARP, RAND Corporation, and Centro Fox; 2011.
3. Femia EE, Zarit S, Johansson B. The Disablement Process in Very Late Life: A Study of the Oldest-old in Sweden. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*. 2001; 56(1):12–23.
4. National Research Council. *Preparing for an Aging World: The Case for Cross-National Research*. Washington, DC: National Academy Press; 2001.
5. Pérès K, Verret C, Alioum A, Barberger-Gateau P. The Disablement Process: Factors Associated with Progression of Disability and Recovery in French Elderly People. *Disability and Rehabilitation*. 2005; 27(5):263–276. [PubMed: 16025753]
6. Van Gool CH, Kempen GIJM, Penninx BWHJ, Deeg DJH, Beekman ATF, Eijk JTMv. Impact of Depression on Disablement in Late Middle Aged and Older Persons: Results From The Longitudinal Aging Study Amsterdam. *Social Science & Medicine*. 2005; 60(1):25–36. [PubMed: 15482864]
7. Gerst-Emerson K, Wong R, Michaels-Obregón 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.
8. Zunzunegui MV, Alvarado BE, Béland F, Vissandjee B. Explaining Health Differences between Men and Women in Later Life: A Cross-City Comparison in Latin America and the Caribbean. *Social Science and Medicine*. 2009; 68(2):235–242. [PubMed: 19036488]
9. Spitzer DL. Engendering Health Disparities. *Canadian Journal of Public Health Revue Canadienne de Sante Publique*. 2005; 96(Suppl 2):S78–S96. [PubMed: 16078557]
10. McDonough P, Walters V. Gender and Health: Reassessing Patterns and Explanations. *Social Science and Medicine*. 2011; 52(4):547–559. [PubMed: 11206652]
11. Elwan, A. *Poverty and Disability: A Survey of the Literature*. Washington, DC: World Bank; 1999.
12. Palloni A, McEniry M. Aging and Health Status of Elderly in Latin America and the Caribbean: Preliminary Findings. *Journal of Cross-Cultural Gerontology*. 2006; 22(3):263–285. [PubMed: 17021957]
13. Comisión Económica para América Latina y el Caribe. *La Protección Social de Cara al Futuro: Acceso, Financiamiento y Solidaridad*. Santiago de Chile: CEPAL y Naciones Unidas; 2006.
14. Palloni A, Pinto-Aguirre G, Peláez M. Demographic and Health Conditions of Ageing in Latin America and the Caribbean. *The International Journal of Epidemiology*. 2002; 31(4):762–771. [PubMed: 12177016]

15. Wong, R.; Gerst, K.; Michaels-Obregón, A. Burden of Aging in Developing Countries: Disability Transitions in Mexico Compared to the United States. Washington, DC: World Bank; 2011.
16. Gerst K, Michaels-Obregón A, Wong R, Palloni A. The Impact of Physical Activity on Disability Incidence among Older Adults in Mexico and the United States. *Journal of Aging Research*. 2011; 2011:1–10.
17. Putnam M. Linking Aging Theory and Disability Models: Increasing the Potential to Explore Aging with Physical Impairment. *The Gerontologist*. 2002; 42(6):799–806. [PubMed: 12451161]
18. Harris T, Kovar MG, Suzman R, Kleinman JC, Feldman JJ. Longitudinal Study of Physical Ability in the Oldest-old. *American Journal of Public Health*. 1989; 79(6):698–702. [PubMed: 2729466]
19. Jette AM, Branch LG. The Framingham Disability Study: II. Physical Disability among the Aging American Journal of Public Health. 1981; 71(11):1211–1216. [PubMed: 7294262]
20. Verbrugge LM, Jette AM. The Disablement Process. *Social Science & Medicine*. 1994; 38(1):1–14. [PubMed: 8146699]
21. Barberger-Gateau P, Rainville C, Letenneur L, Dartigues J-F. A Hierarchical Model of Domains of Disablement in the Elderly: A Longitudinal Approach. *Disability and Rehabilitation*. 2000; 22(7): 308–317. [PubMed: 10877484]
22. Fauth EB, Zarit S, Malmberg B. Mediating Relationships within the Disablement Process Model: A Cross-sectional Study of the Oldest-old. *European Journal of Ageing*. 2008; 5(3):161–179.
23. Graf C. The Lawton Instrumental Activities of Daily Living Scale. *American Journal of Nursing*. 2008; 108(4):52–62. [PubMed: 18367931]
24. Fauth EB, Zarit SH, Malmberg B, Johansson B. Physical, Cognitive, and Psychosocial Variables from the Disablement Process Model Predict Patterns of Independence and The Transition Into Disability for The Oldest-Old. *The Gerontologist*. 2007; 47(5):613–624. [PubMed: 17989403]
25. Peek MK, Patel KV, Ottenbacher KJ. Expanding the Disablement Process Model among Older Mexican Americans. *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences*. 2005; 60(3):334–339.
26. Fauth EB, Gerstorf D, Ram N, Malmberg B. Changes in Depressive Symptoms in the Context of Disablement Processes: Role of Demographic Characteristics, Cognitive Function, Health, and Social Support. *The Journals of Gerontology Series B, Psychological Sciences and Social Sciences*. 2012; 67(2):167–177.
27. Peek MK, Ottenbacher KJ, Markides KS, Ostir GV. Examining the Disablement Process among Older Mexican American Adults. *Social Science & Medicine*. 2003; 57(3):413–425. [PubMed: 12791485]
28. Freedman VA, Martin LG, Schoeni RF. Recent Trends in Disability and Functioning Among Older Adults in the United States: A Systematic Review. *The Journal of the American Medical Association*. 2002; 288(4):3137–3146. [PubMed: 12495394]
29. Waidmann TA, Liu K. Disability Trends among Elderly Persons and Implications for the Future. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*. 2000; 55(5):S298–S307.
30. Schoeni RF, Freedman VA, Wallace RB. Persistent, Consistent, Widespread, and Robust? Another Look at Recent Trends in Old-Age Disability The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences. 2001; 56B(4):S206–S218.
31. Manton KG, Gu X. Changes in the Prevalence of Chronic Disability in the United States Black and Nonblack Population Above Age 65 from 1982 to 1999. *Proceedings of the National Academy of Sciences of the United States of America*. 2001; 98(11):6354–6359. [PubMed: 11344275]
32. Anderson RT, James MK, Miller ME, Worley AS, Longino CF Jr. The Timing of Change: Patterns in Transitions in Functional Status among Elderly Persons. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*. 1998; 53B(1):S17–S27.
33. Royall DR, Palmer R, Chiodo LK, Polk MJ. Normal Rates of Cognitive Change in Successful Aging: The Freedom House Study. *Journal of the Neuropsychological Society*. 2005; 11(7):899–909.
34. Crimmins EM, Saito Y. Getting Better and Getting Worse: Transitions in Functional Status among Older Americans. *Journal of Aging and Health*. 1993; 5(1):3–36.

35. House JS, Landis KR, Umberson D. Social Relationships and Health. *Science*. 1988; 241(4865): 540–545. [PubMed: 3399889]
36. Mexican Health and Aging Study. Data Files and Documentation (Public Use): Wave 1. Mexican Health and Aging Study (MHAS); 2001.
37. Mexican Health and Aging Study. Data Files and Documentation (Public Use): Wave 2. Mexican Health and Aging Study (MHAS); 2003.
38. Wong R, Michaels-Obregón A, Palloni A. Cohort Profile: The Mexican Health and Aging Study (MHAS). *International Journal of Epidemiology*. 2015
39. LaPlante MP. The Classic Measure of Disability in Activities of Daily Living Is Biased by Age but an Expanded IADL/ADL Measure Is Not. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*. 2010; 65B(6):720–732.
40. Spector WD, Fleishman JA. Combining Activities of Daily Living with Instrumental Activities of Daily Living to Measure Functional Disability. *The Journals of Gerontology Series B, Psychological Sciences and Social Sciences*. 1998; 53(1):S46–S57.
41. Lawton MP, Brody EM. Assessment of Older People: Self-Maintaining and Instrumental Activities of Daily Living. *The Gerontologist*. 1969; 9(3 Part 1):179–186. [PubMed: 5349366]
42. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of Illnesses in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function *The Journal of the American Medical Association*. 1963; 185:914–919.
43. Ward G, Jagger C, Harper W. A Review of Instrumental ADL Assessments for Use with Elderly People. *Reviews in Clinical Gerontology*. 1998; 8(1):65–71.
44. Rosow I, Breslau N. A Guttman Health Scale for the Aged. *Journal of Gerontology*. 1966; 21:556–559. [PubMed: 5918309]
45. Wong R, Espinoza M. Imputation of Non-Response on Economic Variables in the Mexican Health and Aging Study (MHAS/ENASEM) 2001. 2004
46. Sesma-Vázquez S, Pérez-Rico R, Sosa-Manzano CL, Gómez-Dantés O. Gastos Catastróficos por Motivos de Salud en México: Magnitud, Distribución y Determinantes. *Salud Pública de México*. 2005; 47(Sup 1):37–46.
47. Radloff LS. The CES-D Scale: A Self-Report Depression Scale for Research in the General Population. *Applied Psychological Measurement*. 1977; 1(3):385–401.
48. McArdle JJ, Fisher GG, Kadlec KM. Latent Variable Analysis of Age Trends of Cognition in the Health and Retirement Study, 1992–2004. *Psychology and Aging*. 2007; 22(3):525–545. [PubMed: 17874952]
49. Lei X, Hu Y, McArdle JJ, Smith JP, Zhao Y. Gender Differences in Cognition among Older Adults in China. *Journal of Human Resources*. 2012; 47(4):951–971. [PubMed: 24347682]
50. Kleinbaum, DG.; Klein, M. *Logistic Regression: A Self-Learning Text*. New York: Springer; 2010.
51. Long, JS. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage Publications, Inc; 1997.
52. Das S, Rahman RM. Application of Ordinal Logistic Regression Analysis in Determining Risk Factors of Child Malnutrition in Bangladesh. *Nutrition Journal*. 2011; 10(124)
53. Walters SJ, Campbell MJ, Lall R. Design and Analysis of Trials with Quality of Life as an Outcome: A Practical Guide. *Journal of Biopharmaceutical Statistics*. 2001; 11(3):155–176. [PubMed: 11725929]
54. Ananth CV, Kleinbaum DG. Regression Models for Ordinal Responses: A Review of Methods and Applications. *International Journal of Epidemiology*. 1997; 26(6):1323–1333. [PubMed: 9447413]
55. Oman D, Reed D, Ferrara A. Do Elderly Women Have More Physical Disability than Men Do? *American Journal of Epidemiology*. 1999; 150(8):834–842. [PubMed: 10522654]
56. Murtagh KN, Hubert HB. Gender Differences in Physical Disability among an Elderly Cohort. *American Journal of Public Health*. 2004; 94(8):1406–1411. [PubMed: 15284051]
57. Ferrucci L, Penninx BW, Leveille SG, Corti MC, Pahor M, Wallace R, Harris TB, Havlik RJ, Guralnik JM. Characteristics of Nondisabled Older Persons Who Perform Poorly in Objective Tests of Lower Extremity Function. *Journal of the American Geriatrics Society*. 2000; 48(9):1102–1110. [PubMed: 10983911]

58. Crimmins EM, Kim JK, Hagedorn A. Life With and Without Disease: Women Experience More of Both. *Journal of Women & Aging*. 2002; 14(1–2):47–59. [PubMed: 12537279]
59. Kandrack M-A, Grant KR, Segall A. Gender Differences in Health Related Behaviour: Some Unanswered Questions. *Social Science & Medicine*. 1991; 32(5):579–590. [PubMed: 2017726]
60. Wray LA, Blaum CS. Explaining the Role of Sex on Disability: A Population-Based Study. *The Gerontologist*. 2001; 41(4):499–510. [PubMed: 11490048]
61. Wahl H-W, Fänge A, Oswald F, Gitlin LN, Iwarsson S. The Home Environment and Disability-Related Outcomes in Aging Individuals: What is the Empirical Evidence? *The Gerontologist*. 2009; 49(3):355–367. [PubMed: 19420315]
62. Millán-Calenti JC, Tubío J, Pita-Fernández S, González-Abraldes I, Lorenzo T, Fernández-Arruti T, Maseda A. Prevalence of Functional Disability in Activities of Daily Living (ADL), Instrumental Activities of Daily Living (IADL) and Associated Factors, as Predictors of Morbidity and Mortality. *Archives of Gerontology and Geriatrics*. 2010; 50(3):306–310. [PubMed: 19520442]
63. Liao Y, McGee DL, Cao G, Cooper RS. Recent Changes in the Health Status of the Older U.S. Population: Findings from the 1984 and 1994 Supplement on Aging. *Journal of the American Geriatrics Society*. 2001; 49(4):443–449. [PubMed: 11347789]
64. Malti-Douglas, F. *Encyclopedia of Sex and Gender*. Detroit: MacMillan; 2007. Patriarchy.
65. Organization for Economic Cooperation and Development. *Reviews of Health Systems: Mexico*. Paris, France: OECD; 2005.
66. Gasparini, L.; Lustig, N. The Rise and Fall of Income Inequality in Latin America. In: Ocampo, JA.; Ros, J., editors. *The Oxford Handbook of Latin American Economics*. Oxford, UK: Oxford University Press; 2011.

Implications for Rehabilitation

- The disablement process involving transitions from mobility impairments to IADL and ADL limitations seen in developed countries differs for older adults in Mexico.
- Cultural differences may influence the progression from non-disabled to becoming disabled in different ways for females in developing countries like Mexico.
- One-fifth of individuals showed greater function and independence over time, suggesting that the disablement process is reversible. This finding highlights the need to focus on improving mobility, ADL, and IADL skills to facilitate successful aging.
- Although disability is often conceptualized as a combination of ADL and IADL limitations, gender differences seen in Mexico indicate the need to separate ADL and IADL when developing approaches to prevent or ameliorate disability

Figure 1. Predicted Probabilities for 2003 Progression of Disability, Men

Source: Author's calculations with data from the Mexican Health and Aging Study [36, 37].

Figure 2. Predicted Probabilities for 2003 Progression of Disability, Women

Source: Author's calculations with data from the Mexican Health and Aging Study [36, 37].

Table 1

Characteristics of the Mexican Health and Aging Study Cohort Aged 65 or Older at Baseline

Characteristic	Males	Females
Sociodemographic and Economic		
<i>Age (%)</i>		
65–69 years old	38.0	39.6
70–74 years old	26.9	27.5
75 years or older	35.1	32.9
<i>Location Size (%)</i>		
Less than 2,500 inhabitants ***	32.5	25.0
Between 2,500 and 14,999 inhabitants	12.6	13.9
Between 15,000 and 99,999 inhabitants	11.5	12.6
100,000 inhabitants or more ***	43.4	48.5
<i>Social Support</i>		
Get help from neighbors and/or children	79.7	80.4
<i>Education (%)</i>		
No education ***	35.5	39.5
No elementary education completed **	38.7	34.5
Elementary education completed	11.5	12.5
More than 6 years of schooling	14.3	13.5
<i>Monthly Income (%)</i>		
Zero or negative income ***	19.2	27.9
Less than 5,000 Mexican Pesos *	64.7	61.3
Between 5,000 and 9,999 Mexican Pesos	10.0	5.9
10,000 Mexican Pesos or more	6.1	4.9
<i>Insurance (%)</i>		
Any coverage	56.3	59.1
Health		
Poor self-rated health (%) **	21.7	22.1
CES-D score (0–9) ***	3.5	4.4
Average combined verbal recall score (0–8)	4.1	4.4
Unweighted Sample Size	1,895	2,110

Note: Weighted data and unweighted sample size totals.

Significance:

*
p .05;**
p .01;

p .001.

Chi-square differences by gender.

Source: Author's calculations with data from the Mexican Health and Aging Study [36].

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Table 2

Transitions between Baseline and 2-year Follow-up by Gender

Progression of Disability at baseline (2001)	Progression of Disability at 2-year follow-up (2003)							Other Options			Number of Subjects
	Gender	No Disability	Mobility Only	Mobility & IADL	Mobility & ADL	All Three	Dead	Lost to Follow-Up	Other Combinations		
No Disability	M	60.8%	22.0%	2.6%	2.2%	0.9%	4.9%	5.6%	1.0%	1,014	
	F	47.7%	28.4%	4.7%	3.5%	5.5%	2.8%	6.5%	0.9%	779	
Mobility Only	M	36.1%	35.5%	8.2%	3.9%	3.5%	7.5%	3.7%	1.6%	556	
	F	33.7%	38.4%	7.5%	6.8%	5.1%	4.8%	3.0%	0.7%	771	
Mobility & IADL	M	25.0%	38.3%	3.4%	5.6%	8.8%	18.9%	0.0%	0.0%	54	
	F	14.6%	37.3%	13.5%	2.0%	20.1%	10.2%	0.1%	2.2%	161	
Mobility & ADL	M	11.3%	39.5%	8.5%	17.9%	7.0%	14.4%	1.4%	0.0%	122	
	F	20.9%	33.7%	6.4%	14.4%	12.4%	6.1%	5.6%	0.5%	145	
All Three	M	2.2%	15.9%	5.2%	5.6%	27.5%	31.1%	12.5%	0.0%	120	
	F	4.5%	21.2%	8.0%	8.0%	23.6%	32.3%	2.4%	0.0%	237	
Other	M	75.4%	11.0%	4.1%	0.0%	0.0%	1.7%	0.4%	7.4%	29	
	F	11.3%	24.3%	0.9%	0.9%	9.8%	11.9%	40.9%	0.0%	17	

Note: Weighted percentages and unweighted totals. Percentages add up to 100% for each row. Unweighted sample size is 4,005 (1,895 males and 2,110 females).

Source: Author's calculations with data from the Mexican Health and Aging Study [36, 37].

Table 3

Odds Ratios for the 2003 Progression of Disability by Gender

Variables	Model 1		Model 2		Odds Ratio		95% C.I.	
	Males	Females	Males	Females	Males	Females	Males	Females
Disability								
<i>At baseline (Ref.: no disability)</i>								
Mobility only	3.07 ***	2.82 ***	2.86 ***	2.52 ***	2.51 ***	2.09 ***	1.98–3.20	1.67–2.62
Mobility and IADL	5.54 ***	7.81 ***	4.57 ***	6.16 ***	3.52 ***	4.58 ***	2.07–5.99	3.14–6.69
Mobility and ADL	7.23 ***	4.47 ***	6.47 ***	3.82 ***	4.79 ***	2.93 ***	3.31–6.93	2.04–4.19
All three	22.30 ***	16.20 ***	19.07 ***	13.20 ***	13.37 ***	8.59 ***	9.00–19.86	6.23–11.85
Socioeconomic Variables								
<i>Age (Ref.: 65–69 years old)</i>								
70–74 years old			1.14	1.29 *	1.12	1.25 *	0.87–1.45	1.01–1.56
75 years or older			2.03 ***	1.96 ***	1.89 ***	1.99 ***	1.48–2.41	1.59–2.47
<i>Location Size (Ref.: less than 2,500 inhabitants)</i>								
Between 2,500 and 14,999 inhabitants			1.02	0.81	1.06	0.87	0.73–1.53	0.59–1.28
Between 15,000 and 99,999 inhabitants			0.67 *	0.75	0.72 *	0.82	0.52–1.00	0.59–1.13
100,000 inhabitants or more			0.80	1.09	0.86	1.23	0.66–1.12	0.94–1.62
<i>Social Support</i>								
Help from neighbors and/or children			0.93	1.23	0.96	1.29 *	0.75–1.24	1.02–1.62
<i>Education (Ref.: no education at all)</i>								
1–5 years of schooling			1.07	1.03	1.14	1.09	0.90–1.43	0.88–1.34
6 years of schooling			1.08	0.78	1.17	0.85	0.83–1.63	0.63–1.16
7 or more years of schooling			0.76	0.64 **	0.89	0.81	0.61–1.31	0.58–1.13
<i>Monthly Income (Ref.: no or negative income)</i>								
Less than 5,000 Mexican Pesos			1.06	0.98	1.07	0.95	0.84–1.37	0.77–1.17

Variables	Model 1		Model 2		Odds Ratio		95% C.I.	
	Males	Females	Males	Females	Males	Females	Males	Females
Between 5,000 and 9,999 Mexican Pesos			0.86	1.03	0.94	0.98	0.63–1.39	0.67–1.44
10,000 Mexican Pesos or more			0.79	0.72	0.78	0.70	0.49–1.23	0.46–1.05
<i>Insurance</i>								
Any Coverage			1.12	0.99	1.19	1.00	0.95–1.49	0.81–1.22
Health and Function Variables								
Poor self-rated health					1.54 ^{***}	1.64 ^{***}	1.19–1.98	1.33–2.03
CES-D score					1.07 ^{**}	1.09 ^{***}	1.03–1.12	1.05–1.13
Combined verbal recall score					0.91 [*]	0.93 [*]	0.85–0.98	0.87–0.99
Cut-off Points								
Cut #1	0.78	0.31	0.86	0.53	0.88	0.67		
Cut #2	2.19	1.94	2.30	2.21	2.35	2.39		
Cut #3	2.45	2.41	2.57	2.69	2.62	2.88		
Cut #4	2.90	2.88	3.03	3.17	3.08	3.37		
Cut #5	3.49	4.01	3.63	4.32	3.69	4.55		
<i>Unweighted N</i>	1,527	1,756	1,527	1,756	1,527	1,756		
<i>Pseudo-R²</i>	0.08	0.07	0.09	0.09	0.10	0.10		

Note: Unweighted results;

* p .05;

** p .01;

*** p .001.

Confidence intervals of models 1 and 2 are omitted for space purposes.

Source: Author's calculations with data from the Mexican Health and Aging Study [36, 37].