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Gender differences in activity-limiting pain trajectories over a 17-year period in the Mexican Health and Aging Study

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Abstract

Pain increases with age, disproportionately affects women, and is a major contributor to decreased quality of life. Because pain is dynamic, trajectories are important to consider. Few studies have examined longitudinal trajectories of pain, by gender, in Mexico. We used data from 5 waves (over 2001–2018) of the Mexican Health and Aging Study, a nationally representative sample of Mexicans aged 50 years and older. Pain was categorized as self-reported frequent pain that makes it difficult to do usual activities. Latent class mixture models were used to create pain trajectories (n = 9824). The sample was majority female (56.15%), with a mean age of 61.72 years. We identified 2 pain trajectories: low-stable (81.88%) and moderate-increasing (18.12%). Women had 1.75 times the odds of being in the moderate-increasing group compared with men (95% confidence interval = 1.41, 2.17). In addition, having zero years of education was associated with higher odds of being in the moderate-increasing group, compared with having any years of education. Fair/poor self-rated health, obesity, arthritis, elevated depressive symptoms, and falls were positively associated with pain for both trajectory groups. Being married was positively associated with pain in the low-stable group. Insurance status was negatively associated with pain in the low-stable group, but positively associated with pain in the moderate-increasing group. We identified 2 trajectories of activity-limiting pain, among older Mexican adults (50+) over 17 years of follow-up. Understanding gender differences in pain trajectories in later life and the factors associated with trajectory development is crucial to improve quality of life, especially in vulnerable populations.

Keywords: gender differences, Pain, Older adults, Mexico

1. Introduction

Chronic or recurrent pain is a global public health problem[16] that greatly decreases quality of life. Risk factors for pain include older age, female sex/gender, low socioeconomic status, physical inactivity, poor sleep, depression, and comorbidities.[25] Sex differences in pain have been well documented,[14,27] including a greater prevalence of pain among women.[27,42] However, sex

differences in pain severity and pain sensitivity are less clear.[36] Sex differences are likely due to an interaction of biological and psychosocial factors.[4] While sex refers to the biological (anatomy, chromosomal) categorization, gender includes an individual's identity, social influences, and social gender norms.[13]

Pain is difficult to quantify because of its dynamic nature.[16] It is a subjective experience that can be acute or chronic.[12] It can develop as the result of an injury but also may be its own condition, not necessarily a symptom of another disease.[25] Because of this complexity, it may be difficult to characterize chronic pain using population-based survey data. Population-based studies may differ in their case definitions, resulting in variability of findings.[13] Examining trajectories is one way to leverage existing population data to assess the burden of pain. To the best of our knowledge, few longitudinal studies exist which examine pain in low- and middle-income countries (LMICs). This is an important setting to study pain because individuals in LMICs have a larger burden of chronic pain compared with those in high-income countries because of their greater exposure to certain risk factors for pain, including exposure to violence, manual labor, motor vehicle accidents, and obstetric complications.[21]

Mexico provides an interesting context in which to study pain because it is experiencing shifting demographics and disease burdens which are bound to increase the prevalence of pain. Mexico has a rapidly aging population; the proportion of the population of adults aged 60 years and older is projected to triple from 10% in 2017 to 25% by 2050.[3,43] Women will continue to compose a majority of the oldest-old population because of their longer life expectancies.[3] In addition, the disease burden is shifting from

communicable to noncommunicable diseases.[41] In 2017, headache disorders and low back pain were the second and third leading causes of years lived with disability, showing an increase since 2007 of 15.9% and 25.7%, respectively.[20] Another study performed in Mexico between 1990 and 2016 examined the burden of musculoskeletal disorders, a frequent and important cause of chronic pain.[8] They found that the increased burden was due to the aging population, rather than a true increase.[8] They also observed that years lived with disability due to musculoskeletal disorders were 1.3 times higher among women compared with men.[8]

In this article, we will use group-based trajectory modeling to identify latent classes with distinct trajectories of activity-limiting pain. Using this approach, we aim to analyze gender differences in the trajectory of pain using 17 years of data from the Mexican Health and Aging Study (MHAS), a national, longitudinal study of older Mexicans (50+).

2. Methods

2.1. Data

Data come from the MHAS,[46] which started in 2001 (wave 1), with those born in 1951 and older. Follow-up interviews were completed in 2003 (wave 2), 2012 (wave 3), 2015 (wave 4), and 2018 (wave 5). In addition, refresher samples were included in 2012 and 2018 of people born in 1952 to 1962 and 1963 to 1968, respectively. The MHAS has a high response and follow-up rate for all waves, ranging from 85% to 93%, and death is the main cause of attrition.[33] Data on sociodemographic characteristics, health, disability, family background, and economic well-being have been collected in each wave of the MHAS. Direct interviews with the participants are conducted; however, proxy interviews are possible if the respondent is unavailable or unable to complete the interview directly. For this study, we will use only direct interviews because information on pain is not collected through proxy interviews. In addition, we include only individuals who had an observation for pain in wave 1 and wave 2 and those who had complete information on variables at baseline (n = 9824). Our sample size was about 68.4% of the total number of individuals who had a direct interview at wave 1. **Figure 1** displays the sample selection criteria. At baseline, those who were excluded from our analyses were more often female, younger, had 7 or more years of education, married, reported their health as excellent/very good/ good, and did not report arthritis, falls, or at least 1 activity of daily living limitation compared with those who were included ($P < 0.05$).

2.2. Measures

2.2.1. Dependent variable

Self-reported pain is assessed at each wave of the MHAS.[24] Participants are asked "Do you often suffer from pain?" (yes/no). If they respond yes, then they are asked "How the pain is the majority of the time?" (mild/moderate/severe) and "Does the pain limit your usual activities such as chores or your job?" (yes/no). For the purposes of this analysis, as we were interested in pain that impacts daily life, we defined pain as pain that limits the participant's usual activities. Participants were categorized as reporting pain if they responded yes to (1) frequently suffering from pain and (2) that the pain limits their usual activities. Participants were included in the reference group who reported (1) that the pain did not limit usual activities or (2) no pain.
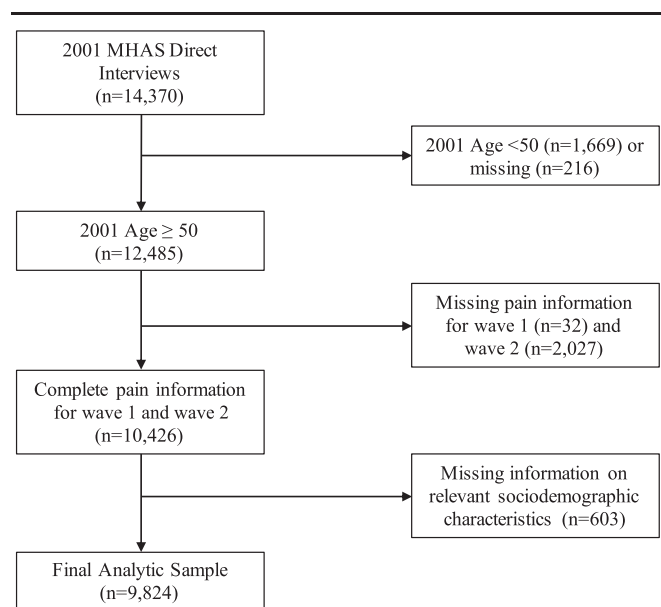
Figure 1. Selection of the analytic sample (n = 9824).

2.2.2. Covariates

Covariates included age (continuous), gender (male or female), education (0 years, 1-6 years, or 7 or more years), marital status (married or not married), self-rated health (excellent/ very good/good or fair/poor), diabetes, obesity, arthritis, depressive symptoms, and falls. Self-rated health was assessed by asking participants "Would you say your health is excellent/very good/good/fair/poor?" Diabetes or arthritis was assessed by asking participants if they had ever been diagnosed by a doctor with either condition. Obesity was categorized using body mass index (BMI), calculated using self-reported height and weight. We used imputed BMI, provided by the MHAS, for those who were missing information on height or weight. Participants were classified as having obesity if their BMI was ≥ 30 kg/m2. Depressive symptoms were assessed using a modified Center for Epidemiologic Studies Depression (CES-D) Scale.[37] Participants were classified as having elevated depression symptoms if they endorsed 5 or more depressive symptoms; if they reported 0 to 4 depressive symptoms, they were classified as having no/low depressive symptoms.[1] This cutoff has been validated using MHAS data.[1] Finally, falls were assessed by asking participants if they had fallen down in the past 2 years.

2.2.3. Analysis

Descriptive statistics were used to calculate baseline characteristics of the sample, by gender. Then, we used latent class mixture models to assess pain trajectories with the Stata user-created procedure "traj."[22] We compared models with 1 to 5 trajectories and tested the significance of functional forms. Model selection was performed by comparing Bayesian information criterion between models. We further assessed model adequacy by examining posterior probabilities of group membership, with 0.70 as the criterion for an adequate fit, and required that each trajectory group have a minimum of 10% of participants.

Baseline measures of gender and education were incorporated into the model as risk factors for group membership. Factors that have time-dependent effects were incorporated into the model as time-

varying covariates that directly contribute to the estimate of pain trajectories. These included marital status, insurance status, self-rated health, diabetes, obesity, arthritis, depressive symptoms, and falls.

Because of the longitudinal nature of the MHAS, attrition is important to consider because participants are lost to follow-up over time. Our modeling approach allows us to account for nonrandom participant attrition (ie, death) by modeling dropout as a function of previous observations.[18] As the basic trajectory model assumes that missing data are missing at random, we included an indicator of mortality and follow-up to indicate which observations are in fact missing at random. Descriptive statistics were used to compare characteristics of trajectory groups, by gender. A sensitivity analysis was performed to evaluate (1) if the number and shapes of trajectories differed by gender and (2) if factors affecting trajectories were consistent by gender. There are no well-established guidelines for determining appropriate sample sizes or procedures for assessing power for the group-based trajectory modeling and latent growth mixture modeling, which are two similar methods that classify people into groups based on their trajectory. However, a number of simulation studies have found that latent growth mixture modeling analyses are likely underpowered for all but the largest data sets (eg, N > 500).[15] Our study has nearly 10 times that sample size, even for the subgroups. With 5 waves of data, we expect reasonable statistical power to include 10 independent variables, although actual simulation was not conducted. Stata 15.1 (StataCorp LLC, College Station, TX) was used for all analyses.

3. Results

3.1. Baseline characteristics

Overall, the sample had a mean age of 61.72 years and was majority female (56.15%). **Table 1** shows the characteristics of our sample, by gender. Our total sample was composed of 9824 individuals providing 26,914 observations. In our sample, women were younger (61.42 vs 62.08), more often reported zero years of education (26.20% vs 20.96%), were more often not married (41.53% vs 16.34%), more often insured (64.70% vs 61.58%), more often rated their health as fair/poor (69.18% vs 56.75%), and reported more health conditions [diabetes (17.66% vs 13.44%), obesity (25.31% vs 18.36%), arthritis (25.36% vs 15.27%), elevated depressive symptom (42.97% vs 24.42%), and falls (43.71% vs 27.48%)] compared with men. For men, the percentage with pain ranged from 14.51% at wave 1 to 15.29% at wave 5. For women, the percentage with pain ranged from 22.97% at wave 1 to 25.01% at wave 5. **Figure 2** displays plots of the probability of pain by trajectory group. Our final model was a two-trajectory model: a quadratic and a linear trajectory. Based on the trajectories displayed in **Figure 2**, group 1 was titled "low-stable" and group 2 was titled "moderate-increasing." Supplementary Table 1 displays the proportion of participants reporting activity-limiting pain at each round, by trajectory group and gender (available at http://links.lww.com/PAIN/B359).

A majority of participants (81.88%) belonged to the low-stable group. **Table 2** displays the characteristics of the sample by

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Table 1

Baseline Characteristics of the sample, by gender (n = 9824).

Baseline (2001) characteristic	Men (n = 4308; 43.85%)	Women (n = 5516; 56.15%)
Age (SD)*	62.08 (9.15)	61.42 (8.92)
Years of education*		
0 y	903 (20.96%)	1445 (26.20%)
1 to 6 y	2382 (55.29%)	2976 (53.95%)
7 or more years	1023 (23.75%)	1095 (19.85%)
Marital status*		
Married	3604 (83.66%)	3225 (58.47%)
Not married	704 (16.34%)	2291 (41.53%)
Insurance status*		
Insured	2653 (61.58%)	3569 (64.70%)
Uninsured	1655 (38.42%)	1947 (35.30%)
Self-rated health*		
Excellent/very good/good	1863 (43.25%)	1700 (30.82%)
Fair/poor	2445 (56.75%)	3816 (69.18%)
Diabetes*		
Yes	579 (13.44%)	974 (17.66%)
No	3729 (86.56%)	4542 (82.34%)
Obesity*		
Yes	791 (18.36%)	1396 (25.31%)
No	3517 (81.64%)	4120 (74.69%)
Arthritis*		
Yes	658 (15.27%)	1399 (25.36%)
No	3650 (84.73%)	4117 (74.64%)
Depressive symptoms*		
Elevated	1052 (24.42%)	2370 (42.97%)
None/low	3256 (75.58%)	3146 (57.03%)
Falls*		
Yes	1184 (27.48%)	2411 (43.71%)
No	3124 (72.52%)	3105 (56.29%)

* P < 0.05.
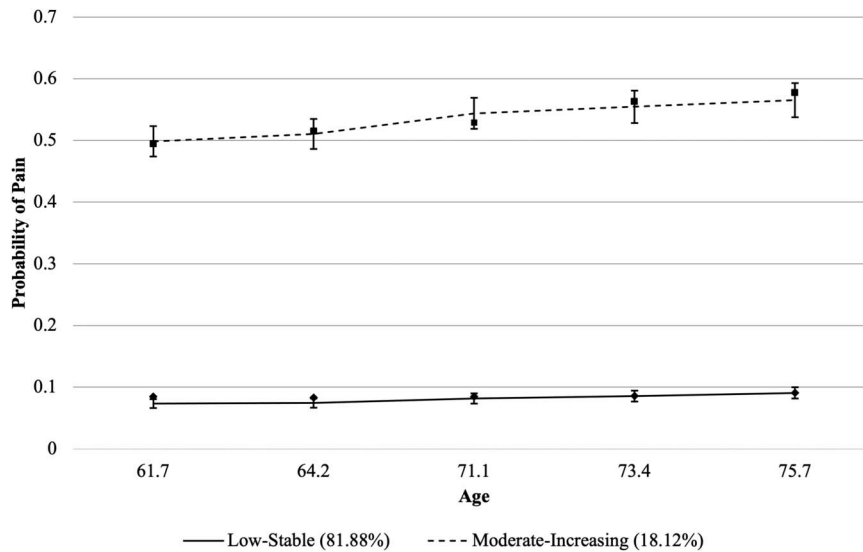
Figure 2. Trajectories of activity-limiting pain among Mexican Health and Aging Study (MHAS) participants from 2001 to 2018 (n = 9824). Dots represent group means at each wave. Age is mean age at each observation of pain.

trajectory group. Those in the moderate-increasing group were more often female (75.39% vs 51.89%), more often reported zero years of education (35.90% vs 21.25%), more often not married (37.30% vs 29.98%), reported their health as fair/poor (78.76% vs 60.41%), and reported more health conditions [diabetes (18.31% vs 15.25%), obesity (27.30% vs 21.15%), arthritis (31.45% vs 18.61%), elevated depressive symptoms (49.55% vs 31.58%), and falls (43.99% vs 34.96%)]. Insurance status did not differ by trajectory group. Dropout probabilities varied by group, ranging from 66.97% to 67.08%. Most of the dropout was due to mortality over the 17 years, and this was similar by group. Overall, 36.30% of those in the low-stable group died by the end of the study period, and 36.29% of those in the moderate-increasing group died by the end of the study period. In addition, the responses of participants who subsequently were alive but unable to complete the interview for health reasons or because of a temporary absence were informed by proxies (approximately 12.64% in the low-stable group and 13.88% in the moderate-increasing group). These respondents effectively were lost to follow-up in the study analysis and were accounted for in the dropout. Other, less common reasons for dropout included subject's refusal and inability to locate the subject at follow-up.

3.2. Risk factors for group membership

Table 3 displays the multinomial portion of latent class mixture models of trajectories of pain, representing risk factors for group membership. Women had 1.75 times the odds of membership in the moderate-increasing group compared with men (95% confidence interval [CI] = 1.41-2.17). Compared with those with 0 years of education, those with 1 to 6 years of education and those with 7 or more years of education had lower odds of membership in the moderate-increasing group (odds ratio = 0.70, 95% CI = 0.56 to 0.87; odds ratio = 0.47, 95% CI = 0.35 to 0.63, respectively).

3.3. Time-varying covariates

The association of time-varying covariates with pain probability over time, by group, is displayed in **Table 4**. For those in the low-stable group, being married, having fair/poor self-rated health,

obesity, arthritis, elevated depressive symptoms, and falls were associated with increased pain, over time, while having insurance was associated with reduced pain over time in this group. For those in the moderate-increasing group, having insurance, fair/poor self-rated health, obesity, arthritis, depressive symptoms, and falls were associated with increased pain over time.

3.4. Sensitivity analyses

The results of our sensitivity analysis are presented in Supplementary Figure 1 and Supplementary Tables 2–4 (available at http://links.lww.com/PAIN/B359). Supplementary Figure 1 displays plots of the probability of pain by trajectory group, for each gender. Both men and women had a two-trajectory model; among men, group 1 was titled "low-stable" and group 2 was titled "moderate-stable," whereas for women, group 1 was titled "low-stable" and group 2 was titled "moderate-increasing." Men showed 2 linear trajectories, while women had both a quadratic and a linear trajectory. Supplementary Table 2 displays characteristics of the sample by trajectory group and gender (available at http://links.lww.com/PAIN/B359).

Among both men and women, having any education was associated with a reduced risk of membership in the moderate-stable and moderate-increasing groups, respectively (Supplementary Table 3, available at http://links.lww.com/PAIN/B359). Some similarities and differences emerged, by gender, in the association of time-varying covariates with pain probability over time (Supplementary Table 4, available at http://links.lww.com/PAIN/B359). Among both men and women, fair/poor self-rated health, arthritis, and elevated depressive symptoms were associated with increased with pain for each group. For men only, being married, having insurance, and having obesity were associated with increased pain in the moderate-stable group. Among men, reporting falls were associated with increased pain in both the low-stable and moderate-stable groups. For women only, being married and reporting falls were associated with increased pain in the low-stable group, while having obesity was associated with increased pain in both the low-stable and moderate-increasing groups.

Baseline characteristics of sample by pain trajectory group (n = 9824).

Baseline (2001) characteristic	Group 1: Low-stable (n = 8044%; 81.88%)	Group 2: Moderate-increasing (n = 1780%; 18.12%)
Age (SD)*	61.60 (9.03)	62.23 (9.01)
Gender*		
Male	3870 (48.11%)	439 (24.61%)
Female	4174 (51.89%)	1342 (75.39%)
Years of education*		
0 y	1709 (21.25%)	639 (35.90%)
1 to 6 y	4410 (54.82%)	948 (53.26%)
7 or more years	1925 (23.93%)	193 (10.84%)
Marital status*		
Married	5713 (71.02%)	1116 (62.70%)
Not married	2331 (28.98%)	664 (37.30%)
Insurance status		
Insured	5093 (63.31%)	1129 (63.43%)
Uninsured	2951 (36.69%)	651 (36.57%)
Self-rated health*		
Excellent/very good/good	3185 (39.59%)	378 (21.24%)
Fair/poor	4859 (60.41%)	1402 (78.76%)
Diabetes*		
Yes	1227 (15.25%)	326 (18.31%)
No	6817 (84.75%)	1454 (81.69%)
Obesity*		
Yes	1701 (21.15%)	486 (27.30%)
No	6343 (78.85%)	1294 (72.70%)
Arthritis*		
Yes	1497 (18.61%)	560 (31.45%)
No	6547 (81.39%)	1220 (68.54%)
Depressive symptoms*		
Elevated	2540 (31.58%)	882 (49.55%)
None/low	5504 (68.42%)	898 (50.45%)
Falls*		
Yes	2812 (34.96%)	783 (43.99%)
No	5232 (65.04%)	997 (56.01%)

* $P < 0.05$.

4. Discussion

Consistent with previous work, we found gender differences in the experience of activity-limiting pain, defined as pain that limits daily activities, among aging Mexicans. Using data from the MHAS, we identified 2 trajectories of activity-limiting pain (low-stable and moderate-increasing), among older Mexican adults aged 50 years and older over 17 years of follow-up.

Women had higher odds than men of being in the moderate-increasing group. In fact, the moderate-increasing group was about 75% female, while gender in the low-stable group was evenly distributed. This finding further solidifies the well-documented larger burden of pain among women.[14,27,42] The results of the sensitivity analysis merit some discussion here. Although health factors were fairly consistent by gender, marital status and insurance status differentially impacted pain, suggesting demographic and socioeconomic factors may be major drivers of the gender differences observed in pain burden. The Lancet Conceptual Framework of the Gender System and Health posits that gender differences in older age may be explained by gender inequalities throughout the life course.[19] These lifelong inequalities form gendered health behaviors and health systems and ultimately result in gender disparities in late life.[19] This dynamic may be especially relevant in Mexico, with traditional gender norms where men are expected to provide for the family while women are responsible for maintaining the household and caring for children.[28] The relationship between marital status and pain is understudied[23]; however, we hypothesize that married men may be under more daily demand as household providers.

Latent class mixture models of trajectories of activity-limiting pain from the Mexican Health and Aging Study (MHAS) (n = 9824)—risk factors for group membership, OR (95% CI).

	Group 1: Low-stable (ref)	Group 2: Moderate-increasing
Gender		
Male		—
Female		1.75 (1.41-2.17)
Education		
0 y		—
1 to 6 y		0.70 (0.56-0.87)
7 or more years		0.47 (0.35-0.63)

CI, confidence interval; OR, odds ratio

Table 4

Latent class mixture models of trajectories of activity-limiting pain from the Mexican Health and Aging Study (MHAS) (n = 9824)—time-varying covariate coefficient estimates, β (SE), by gender.

	Group 1: Low-stable	Group 2: Moderate-increasing
Marital status (married)	0.31 (0.08)*	0.01 (0.08)
Insurance status (yes)	−0.21 (0.09)*	0.25 (0.10)*
Self-rated health (fair/poor)	1.37 (0.14)*	1.13 (0.11)*
Diabetes	−0.06 (0.08)	0.12 (0.09)
Obesity	0.23 (0.08)*	0.43 (0.09)*
Arthritis	1.02 (0.08)*	0.90 (0.09)*
Depressive symptoms	1.22 (0.08)*	1.07 (0.08)*
Falls	0.54 (0.08)*	0.23 (0.08)*

* $P < 0.05$.

This stress may exacerbate existing conditions, and there may be a higher probability for moderate pain expression. On the other hand, women who are married and in the low pain group may not have these underlying pain conditions, but maintaining the household may increase their pain over time. Also, women have a higher burden of health conditions which are associated with pain, including arthritis and depression,[4,14] which may further contribute to this gender disparity in the burden of pain.

Socioeconomic status, including education, is inversely related to pain prevalence.[17,25] Those with low education have a higher likelihood of disabling pain, compared with those with a higher education.[17] In our analyses, we found that having zero years of formal education, compared with having any years of education, was a risk factor for membership in the moderate-increasing group. In our sensitivity analyses, we found no gender differences in the association of education with group membership. Although previous work has not examined the relationship between formal education and limiting pain in Mexico, previous work using data from the MHAS has investigated the relationship between education and health outcomes and found that, in urban areas, having any years of education was associated with better self-rated health and physical functioning.[40]

In examining time-varying covariates, we found that insurance had opposite effects in each trajectory group; in the low-stable group, insurance was negatively associated with pain, while in the moderate-increasing group, having health insurance was positively associated with pain. In 2003, the formal adoption of *Seguro Popular*, a public insurance program for those not enrolled in any health insurance program, reduced the percentage of households without any health care coverage from 58% in 2001 to 13% in 2012.[35] This change represents a substantial increase in access to care. Insurance may have this differing effect because of the nature of health care in addressing different types of pain. Those in the low prevalence group may be accessing preventive care and preventing painful conditions. On the other hand, those in the moderate-increasing group start off with pain. This pain increases over time, and the adoption of insurance may represent treatment for their ongoing health conditions.

Health conditions, except for diabetes, were positively associated with pain in both groups. Self-rated health, obesity, arthritis, elevated depressive symptoms, and falls were positively associated with pain, over time. These findings are consistent with what has been documented in the literature. Poor self-rated health, obesity, and arthritis are associated with pain.[25,29,30] Previous work using data from the English Longitudinal Study of

Aging, a sister study of the MHAS, documented a reciprocal relationship between pain and depression, in which those with either pain or depression were at risk of developing the other condition.[7] Also, falls may result in injurious bone fractures,[5] a known cause of chronic pain.[26] We may not have observed a relationship between diabetes and pain because only a proportion of those with diabetes have diabetic neuropathy, which creates pain that may increase overtime and limit patients' activities.[44]

Previous studies examining pain trajectories in adults have documented a larger number of trajectories, compared with our study, ranging from 3 to 5 trajectories.[2,6,10,11,31,34,38,45] The difference in the number of trajectories may be due to differences in our pain measurement. Most of these studies focused on a specific type of pain, such as musculoskeletal,[2] back,[6,11] or knee pain,[9,31,34,45] while our study was focused on activity-limiting pain. Similar to our study, Rundell et al. examined activity-limiting pain among community-dwelling adults aged 65 years and older in the United States.[38] They found 4 trajectories (low, increasing, decreasing, and high),[38] while in our analyses, we only documented 2 trajectories (low-stable and moderate-increasing). However, the prevalence of older adults with increasing or high probability is fairly similar between our study and theirs. About 19% of our sample was in the moderate-increasing group, while slightly over a quarter of participants in the United States were in the high or increasing trajectory group.[38] The difference in number of trajectories and percent of adults in the increasing or high or probability groups may reflect a difference in study setting because the United States is a high-income country and Mexico is an LMIC. This difference may also be because our sample is younger, aged 50 years and older. Additional longitudinal studies are needed in other LMICs to understand the burden of pain over time among adults residing in these countries.

5. Limitations

There are several limitations of these analyses. First, as we included only individuals with complete pain information at waves 1 and 2, selection bias may have occurred, excluding those individuals who did not survive to wave 2. The space between waves also may have limited our ability to see more nuanced changes in pain, over time, as the years between waves ranged from 2 to 9 years. Also, no information is collected on pain location or treatment, and our self-reported pain measure may be affected

by gender bias. Men may be less willing to report their pain because of social gender norms, where they may be perceived as weak[14,39]; this reluctance could have led to an underreporting of pain among men in our sample. In addition, we were not able to include sleep, a potential confounder, in this analysis, because sleep was only recently added to the MHAS questionnaire in 2015. Finally, all of the information collected in the MHAS is self-report; however, previous work has found that self-reported medical conditions are generally in concordance with medical records.[32] Strengths of this study include a large well-categorized population-based sample and the use of 17 years of longitudinal data.

6. Conclusions

We identified 2 trajectories of activity-limiting pain (low-stable and moderate-increasing), among older Mexican adults aged 50 years and older over 17 years of follow-up. Compared with men, women had larger burden of activity-limiting pain and were more likely to have moderate-increasing pain. Understanding gender differences in pain trajectories in later life and the factors associated with trajectory development is crucial to improving quality of life, particularly among women.

Conflict of interest statement

The authors have no conflicts of interest to declare.

Acknowledgements

Appendix A. Supplemental digital content

Supplemental digital content associated with this article can be found online at http://links.lww.com/PAIN/B359.

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