Prevalence of Health Conditions and Predictors of Mortality in Oldest Old Mexican Americans and Non-Hispanic Whites

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ABSTRACT

Background: The oldest old represent a unique group of older adults. This group is rapidly growing worldwide and yet there are gaps in the knowledge related to their health condition. Ethnic differences in disease prevalence and mortality must be understood to better care for the oldest old.

Objective: To compare prevalence of common health conditions and predictors of mortality in oldest old Mexican Americans and non-Hispanic whites.

Methods: This study included 568 community-dwelling Mexican Americans (MA) aged 85 years and older from the Hispanic Established Population for the Epidemiological Study of the Elderly 2004–2005 and 933 non-Hispanic whites (NHW) of the same age from the Health and Retirement Study 2004. Measures included sociodemographic variables, self-reported medical conditions, activities of daily living (ADLs), and instrumental activities of daily living. Logistic regression analysis was used to examine 2-year mortality in both populations.

Results: Heart attack was significantly more prevalent in oldest old NHW compared with MA, regardless of gender. Conversely, diabetes was significantly more prevalent among MA men and women compared with their NHW counterparts. Compared with NHW men, MA men had significantly higher prevalence of cognitive impairment and hypertension. Additionally, prevalence of hip fracture was significantly higher for MA women compared with NHW women. Significant differences in ADL disability were observed only between both groups of women, whereas significant differences in instrumental activities of daily living disability were observed only between men. MA men and women had higher prevalence of obesity compared with NHW. Predictors of 2-year mortality for both ethnic groups included older age, male gender, and ADL disability. Cognitive impairment was a mortality predictor only for NHW. Similarly, lung disease was a predictor only for MA.

Conclusion: Health-related conditions that affect the oldest old vary by gender and ethnicity and entail careful evaluation and monitoring in the clinical setting. Better care requires inclusion of such differences as part of the comprehensive evaluation of the oldest old adults.

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Older adults often have been divided into 3 groups: young old (65–74 years), old old (75–84 years), and oldest old (≥ 85 years). In the United States, the oldest old are the fastest growing group, and account for more than 10% of all adults older than 65. Most epidemiological and intervention studies on aging focus on the young old. Compared with the young old, oldest old adults have unique social, cognitive, psychological, and physical characteristics. Persons 85 years and older are at higher risk of reporting loneliness, of suffering cognitive decline and depression, and of experiencing medical conditions and disability. These unique characteristics make the oldest old an age group that must be studied.
Gender differences among the oldest old have been identified. For example, osteoporosis\(^2\) and urinary incontinence\(^2\) are more prevalent in oldest old women. Also, women have lower mortality rates and are independent for more years compared with men,\(^6\) despite having more medical conditions.\(^5\) Conversely, oldest old men report better quality of life and have lower incidence of dementia and higher education.\(^9\) Gender differences play an important role in the relationship between emotional responses and disability,\(^11\) and affect health care–seeking behaviors,\(^12\) with females being more likely to consult health professionals. Thus, the health profile of older men and women must be described separately.

The literature has shown that prevalence of medical conditions also varies by ethnic group. Examples of ethnic differences include higher prevalence of osteoarthritis in non-Hispanic blacks compared with non-Hispanic whites (NHW),\(^11\) higher prevalence of lupus nephritis in non-Hispanic whites compared with other groups,\(^14\) and higher prevalence of diabetes among Mexican Americans (MA) compared with NHW.\(^15\) Concepts like the “Hispanic Paradox,” where an advantage in mortality is reported in MA despite poorer socioeconomic status and higher rates of morbidity and disability, highlight the importance of identifying ethnic differences in the oldest old population.\(^16\)

The purpose of this study was to identify the prevalence of common medical conditions affecting oldest old MA and NHW, and to identify factors associated with 2-year mortality for both groups from the Hispanic Established Populations for Epidemiologic Studies of the Elderly (H-EPESE) and the Health and Retirement Study (HRS). The primary purpose of the H-EPESE was to estimate the prevalence of key physical and mental health conditions, and functional impairments in older MA so as to compare these estimates with those of other populations, and determine whether certain risk factors for mortality and morbidity operate differently in MA compared with other major ethnic groups.\(^16\) The primary purpose of the HRS was to determine physical and cognitive functioning; retirement plans; family structure and transfers; demographic characteristics; economic characteristics; job history; and attitudes, preferences, and expectations for the future of older Americans.\(^17\)

The current study relates to the main purpose of both studies and provides a comparison in the prevalence of health conditions that affect oldest old populations and their relationship to mortality rates. We expect oldest old MA to have a higher prevalence of cardiovascular conditions, diabetes, cognitive problems, arthritis, and disability compared with NHW based on prior literature.\(^15,18,19\) We also hypothesize that lung disease will be higher in NHW.\(^20\) Given the different presentation of certain diseases by gender, we expect women to have higher prevalence of hip fracture and men to have higher prevalence of cardiovascular conditions. Finally, we hypothesize that there will be a difference in mortality, where MA will have lower mortality rates compared with NHW.

Methods

Sample and Procedures

As stated previously, this cross-sectional study used data from the H-EPESE, a longitudinal study of MA aged 65 and older, residing in Texas, New Mexico, Colorado, Arizona, and California. The H-EPESE used an area probability sample design developed by listing counties in the Southwestern states by the number of individuals needed to cover 90% of all MA. Counties not chosen through this method that were at least 30% MA were added to ensure inclusion in the target population of small counties with a significant MA population. Census tracts and enumeration districts in the counties were subsequently listed by the number of older MA. Three hundred census tracts were selected as primary sampling units and provided clusters for door-to-door screening. In-home interviews were conducted with 3050 subjects. The sampling procedure ensured generalizability to approximately 500,000 older Mexicans Americans living in the Southwest at baseline. Six waves of data were collected between 1993 and 2008. For our study only the fifth wave (2004–2005) was used and 568 persons 85 years and older were included in the analyses. More detailed information on the study is available elsewhere.\(^21\)

The comparison group was selected from the HRS, one of the largest ongoing longitudinal studies that surveys Americans 50 years and older every 2 years. Eleven waves of data have been collected between 1992 and 2008. For this study, we used the 2004 wave and 933 NHW respondents aged 85 and older were included in the analyses. HRS used a national area probability sample of US households with supplemental oversamples of blacks, Hispanics, and residents of Florida. The HRS sample was selected under a multistage area probability sample design. The sample included 4 distinct selection stages. In addition to the core sample, the HRS design included 3 oversamples (blacks, Hispanics, and residents of Florida). Sampling weights are provided on all HRS data sets to compensate for the unequal probabilities of selection between the core and oversample domains. Additional information on the study can be found elsewhere.\(^22\) Because of the differences in study design and sampling techniques, the 993 NHW from the HRS and the 568 MA from the H-EPESE were stratified by gender and prevalence of medical conditions and functional limitations was determined and a confidence interval was estimated for each condition. Comparisons were then made based on the prevalence and confidence interval for each condition between men and women for each survey. Other studies have used similar procedures when comparing populations from different datasets.\(^23,24\)

All participants who died 2 years after the interview were identified through the National Death Index and reports from relatives for both the H-EPESE and the HRS surveys. One hundred twenty participants from the H-EPESE and 162 participants of the HRS were excluded because of missing data on covariates in the surveys.

Measures

The sociodemographic measures included were age (continuous starting at 85), gender, education (continuous in years), and marital status (married versus not married).

Several diseases related to mortality and poor quality of life were selected from both surveys. Table 1 lists all the conditions included and how each one was assessed in both the H-EPESE and the HRS surveys.

Apart from those conditions, body mass index (BMI), measured as the weight in kilograms divided by the height squared, was included for both population groups. For the H-EPESE, weight and height were assessed in each wave and used to calculate an individual’s BMI. For the HRS, weight was measured in every wave. However, starting in 1996 height was measured only in new interviewees and was carried forward from the initial measure for the following waves. We used the World Health Organization cutoff points of BMI to create 4 categories: underweight (BMI < 18.5 kg/m\(^2\)), normal weight (18.5 kg/m\(^2\)–24.9 kg/m\(^2\)), overweight (BMI 25 kg/m\(^2\)–29.9 kg/m\(^2\)), and obesity (BMI ≥ 30 kg/m\(^2\)).\(^25\)

Functional status was measured with activities of daily living (ADLs) and instrumental activities of daily living (IADLs) scales.\(^27\) Six ADL (walking, bathing, dressing, eating, using toilet, transferring) and seven IADL activities (telephone use, driving, shopping, meal preparation, housework, taking medications, and handling money) were included. Subjects were asked if they had difficulty performing any of the activities. Subjects who reported difficulty in 1 or more of the ADL activities were considered ADL disabled, and
those who reported difficulty in 1 or more of the IADL activities were considered IADL disabled.

The follow-up periods for reporting mortality were not identical across the surveys. The follow-up period for HRS was about 2 years and we censored subjects in H-EPESE to match the distribution of follow-up time in the HRS. The average follow-up time for both surveys was 24.3 ± 3.0 months.

Statistical Analysis

Prevalence of conditions with 95% confidence interval was estimated for men and women in both samples separately. Two-year mortality was calculated by the percentage of individuals dead for both surveys separately. Multivariable logistic regression analyses were conducted to estimate the independent effect of covariates on mortality for both studies separately. This model included the following covariates: age, education, gender, marital status, stroke, heart attack, diabetes, hypertension, lung disease, cognitive impairment, and ADL and IADL disability. Arthritis was excluded from both models because its relationship with mortality is dependent on the type of arthritis (ie, rheumatoid versus osteoarthritis) and we cannot determine this from the data available. Hip fracture was also excluded because the low prevalence of hip fracture in groups of both surveys precluded meaningful estimates. Finally, BMI was excluded because of the high prevalence of missing data that made comparisons between BMI categories problematic. All analyses were performed using the SAS 9.2 survey procedures (SAS Institute, Cary, NC) to account for design effects and sample weights. We verified that there was no attenuation of our results owing to low reliability, curvilinearity, and non-normality.

Results

Sociodemographic characteristics, medical conditions, and functional measures are presented in Table 2 for the H-EPESE and the HRS by gender. Education was significantly different between MA and NHW with mean years of education of NHW being almost 3 times larger compared with MA. Moreover, oldest old NHW men had significantly more years of education compared with NHW women; no differences in education were observed between oldest old MA men and women.

Differences were also observed for some medical conditions among the 4 groups. For example, heart attack was more prevalent in oldest old NHW than in oldest old MA, regardless of gender (50.9% versus 27.9% for men and 40.9% versus 23.6% for women). Conversely, diabetes was more prevalent among MA men and women compared with their NHW counterparts (28.8% versus 14.8% for men and 26.5% versus 9.8% for women).

Other differences were observed for only one gender. Among men, cognitive impairment was more prevalent for MA men compared with NHW men (16.3% versus 5.8%); no significant differences were observed for women. Likewise, hypertension was more prevalent in MA men compared with NHW men (51.5% versus 34.3%); however, there was no significant difference for women. In contrast, for women, hip fracture was more prevalent for MA women compared with NHW women (13.2% versus 5.5%); no difference was observed for men.

Analyses of functional status show that ADL disability was significantly different only among women; NHW women had more disability compared with MA women (69% versus 56.5%); IADL disability, however, was significantly different only among men. NHW men reported higher prevalence of IADL disability (95.7%) compared with MA men (79.9%).

When BMI was examined, NHW women had the highest prevalence of underweight (BMI ≤ 18.5 kg/m²) and it was significantly

Table 1: Assessment of Medical Conditions in Both Surveys

<table>
<thead>
<tr>
<th>Condition</th>
<th>Health and Retirement Study</th>
<th>Hispanic Established Population for the Epidemiological Study of the Elderly Health and Retirement Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>Has a doctor ever told you that you have arthritis?</td>
<td>Has a doctor or other health care professional ever told you that you have arthritis or rheumatism?</td>
</tr>
<tr>
<td>Cognitive impairment</td>
<td>Has a doctor or other health care professional ever told you that you had Alzheimer's disease</td>
<td>Has a doctor ever told you that you had Alzheimer's disease or dementia?</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Has a doctor or other health care professional ever told you that you have diabetes or high blood sugar?</td>
<td>Has a doctor ever told you that you have diabetes or high blood sugar?</td>
</tr>
<tr>
<td>Heart attack</td>
<td>Has a doctor ever told you that you had a heart attack, coronary heart disease, angina, congestive heart failure, or other heart problems?</td>
<td>Has a doctor ever told you that you had a heart attack, coronary, or myocardial infarction, or other heart problems?</td>
</tr>
<tr>
<td>Hip fracture</td>
<td>Has a doctor ever told you that you had broken or fractured your hip?</td>
<td>Has a doctor ever told you that you have broken or fractured your hip?</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Has a doctor ever told you that you have high blood pressure?</td>
<td>Has a doctor ever told you that you have high blood pressure or hypertension?</td>
</tr>
<tr>
<td>Lung disease</td>
<td>Has a doctor or other health care professional ever told you that you had emphysema or chronic bronchitis?</td>
<td>Has a doctor ever told you that you have chronic lung disease such as emphysema or chronic bronchitis?</td>
</tr>
<tr>
<td>Stroke</td>
<td>Have you ever been told by a doctor that you had a stroke, blood clot in the brain or brain hemorrhage?</td>
<td>Has a doctor ever told you that you had a stroke?</td>
</tr>
</tbody>
</table>
different from MA women and men of both ethnic groups. However, no differences were observed in the underweight category for men. Conversely, MA men and women had higher prevalence of obesity (BMI ≥ 30 kg/m²) compared with NHW (20.2% versus 5.8% for men and 17.5% versus 8.8% for women).

Mortality was compared for both ethnic groups 24 months after the interview. For the H-EPESE, a total of 53 men and 80 women died in the 2-year period following the interview. For the HRS, a total of 95 men and 128 women died in the same time period. The percentage of mortality was highest for MA women. Comparisons by gender and ethnicity, however, showed no significant differences.

We then analyzed predictors of mortality for both ethnic groups. Table 3 shows that older age, male gender, and ADL disability significantly increased the odds of mortality for both ethnic groups. The odds, however, were always higher for oldest old MA. Cognitive impairment increased the odds of dying only for oldest old NHW and lung disease increased the odds only for oldest old MA.

Also we explored the impact of including BMI in the mortality model, using available data. For both NHW and MA, individuals with obesity had lower odds of mortality compared with normal weight individuals. Underweight MA could not be compared with normal weight individuals owing to missing data. For the other covariates, magnitude and significance was similar to the results presented in Table 3, except for education, which significantly decreased the odds of mortality for NHW and heart attack, which significantly increased the odds of mortality for MA.

Discussion

This study shows that there are differences by gender and ethnicity among the oldest old. Education was significantly higher among NHW compared with MA regardless of gender. Contrary to our initial proposition, heart attack was more prevalent in NHW compared with MA. Stroke, diabetes, and cognitive impairment on the other hand were more prevalent in MA as initially proposed. Also, opposite to our initial hypothesis, ADL disability was more prevalent among NHW not MA. In contrast, IADL disability was more prevalent among oldest old NHW men when compared with MA men and women. Differences observed in the obese categories are striking. When ethnic differences were analyzed for both genders, MA have higher prevalence of obesity compared with NHW. Gender differences are also significant. Age, male gender, and ADL disability were significant predictors of mortality for both ethnic groups.

Compared with the young old and the old old, the literature on the oldest old is limited. Most of the literature related to medical conditions in older adults fails to differentiate between these age categories. Clinical practice and extant literature suggests that the oldest old are different from younger older adults. Mortality risk from conditions like depression, level of physical activity, cognitive function, and even biological processes have been reported to be different among these age groups. There is controversy related to therapeutic interventions because evidence comes from clinical trials that fail to include representative samples of oldest old adults.

In our study, differences observed by ethnicity and gender raise important questions on the disability and mortality profiles that should be established to improve quality of care among the oldest old. The MA population analyzed had a higher prevalence of chronic conditions like diabetes, obesity, and cognitive impairment compared with NHW. Similar findings have been reported previously in studies that did not stratify by age group. Both obesity and diabetes share pathophysiologic pathways and both conditions increase the risk for cognitive decline.

Important implications are derived from the higher prevalence of chronic conditions in relation to medical care of oldest old MA. Studies have reported that in the last decade the risk of functional impairment has increased more than 40% among obese older adults and that overweight and obese older adults tend to live longer. This suggests that oldest old adults and specifically MA adults, will live longer but will be more disabled. Our findings show that NHW men and women have higher rates of ADL disability compared with MA men and women. However, MA men and women had higher rates of obesity compared with NHW.
Health and policy interventions for oldest old adults will have to be tailored to the unique characteristics different ethnic groups have. In our selected sample of NHW, acute conditions like heart attack were more prevalent compared with MA. Because survival curves of different ethnic groups tend to converge after age 85 and all adults older than 85 are covered by Medicare, minority groups may receive similar medical care to NHW and report lower rates of certain acute medical conditions. The higher prevalence of heart attack in NHW can also explain the higher prevalence of ADL disability owing to the severe physical limitations that may follow a heart attack.

Some authors have proposed that there is an epidemiologic paradox among older Hispanics. This paradox states that despite limited access to health services and increased prevalence of chronic conditions, general mortality is lower among MA older adults compared with NHW. This paradox is controversial and alternate explanations have been proposed. Despite this, important mortality differences and health advantages have been demonstrated among older MA. There was no difference in mortality between the 2 samples included in our study; however, similar mortality rates in both groups are determined by different factors. Other important outcomes could have been analyzed, such as decline in physical function, decreased muscle strength, and institutionalization; unfortunately the comparability of such measures in both studies was limited. For example, the H-EPESE uses the Performance-Oriented Mobility Assessment to measure physical function; conversely, HRS uses a breathing test and a hand strength test. Last, the number of institutionalized MA and NHW is not comparable because of the small incidence of institutionalization reported by MA.

In conclusion, there are important differences in disease prevalence among oldest old adults of different ethnic groups. Despite these differences, mortality remained similar and was mainly predicted by demographic and functional covariates. Clinicians and health policy makers should consider this difference when designing programs and treatment plans for oldest old adults and designing prevention plans that are sensitive to gender and ethnic differences. Future studies can complement our findings by including physical measures and determining if there are differences in physical performance over time in oldest old adults of different race/ethnic groups.

### References


