A concordance of self-reported and performance-based assessments of mobility as a mortality predictor for older Mexican Americans

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Aim: To assess the efficacy in mortality prediction of a concordance of performance-based (timed 10-foot walk; performance-oriented mobility assessment [POMA]) and self-rated (reported ability to walk across a small room with no help from people or devices; activities of daily living [ADL]) assessments of mobility for Mexican Americans aged 75 years and older.

Methods: A longitudinal study of 2069 participants aged 75 years and older from the Hispanic Established Population for the Epidemiological Study of the Elderly wave 5 (June 2004 to January 2006) and wave 6 (February 2007 to February 2008) was carried out. Sociodemographic variables, performance-based (timed 10-foot walk) and self-rated assessments (reported ability to walk across a small room without the help of any people or devices) of mobility, and mortality data were obtained.

Results: The ADL/POMA concordance assessment showed a prevalence of the “positively concordant” group (completed the walk and reported being able to walk, ADL and POMA both positive), followed by the “pessimist,” “optimist,” and “negatively concordant” groups at 80.09%, 10.50%, 3.78% and 5.63%, respectively. Logistic regression analyses showed that “negatively concordant” was a critical mortality predictor (OR 4.80; 95% CI 2.59–8.90) followed by “pessimist” (OR 1.94; 95% CI 1.12–3.36) as compared with the reference group, “positively concordant.”

Conclusion: The ADL/POMA concordance is an effective predictor of mortality for older Mexican Americans in the Hispanic Established Population for the Epidemiological Study of the Elderly. Geriatr Gerontol Int 2016; ••: ••–••.

Keywords: activities of daily living, mortality, older Mexican Americans, performance-based assessments, performance-oriented mobility assessment, self-rated assessments.

Introduction

How to best measure physical impairments could prove a primary issue in gerontology given that older adults tend to judge their well-being in terms of their independence. Measurements of physical disability include performance-based and self-reported assessments, both of which supply valid results, despite their contrasting methods, according to previous researchers.1–4 Furthermore, these two types of measurement have yielded results that help predict cognitive impairment, depression and self-efficacy.5 In general, performance-based (performance-oriented mobility assessment [POMA]) and self-reported assessments (activities of daily living [ADL]) of mobility are strong predictors of health-related events, especially disability and mortality.6

Performance-based assessments of physical impairments provide a direct standard of the physical capability of respondents, with trained personnel directly observing and measuring walking, transferring, and other basic daily life activities using specially designed equipment. Performance-based assessments include an objective and realistic standard known as POMA.
POMA consists of standing with one’s feet together side by side, or one in front of the other, without losing balance; standing on one leg for a particular period; sitting down and getting up from a chair repeatedly; and bending over and picking up an object, such as a pencil. Furthermore, POMA assesses grip strength using a dynamometer, and times walking across a measured distance.

By contrast, self-rated assessments of disability rely on the reports of the respondents themselves. Older adults are asked, “Do you need help from another person or special equipment or a device for walking across a small room?” Respondents judge themselves and answer according to their own standards without a test walk. Other basic ADL assessed include bathing, grooming, dressing, eating, getting from bed to a chair and using the toilet. One limitation of self-rated assessments is a potential discord between beliefs about abilities to carry out physically and actual capabilities. Thus, self-rated assessments of physical impairments could be considered subjective.

POMA can be considered a more objective observation of functional disability given that ADL measures are relatively affected by culture, language and sociodemographic characteristics. ADL could provide a better assessment of disability given that it allows respondents to consider a given physical limitation a disability based on their own subjective perceptions within their own sociocultural contexts.

Although much research has assessed the relationship between performance-based assessments of functional disability and self-rated disability measurements, few studies have sought to compare these two measurements directly given their distinct standards and measurement methods. Therefore, rather than directly comparing the two, assessing a concordance between them could be an alternative way to compare their effectiveness, such as in their ability to predict mortality. Based on previous research, walking disability has been chosen as the area in which to assess the concordance between performance-based and self-reported measurements, because it is the only question that the POMA and ADL scales have in common.

Furthermore, few studies have compared performance-based and self-reported assessments of mobility in terms of their ability to predict mortality among older adults, older Mexican Americans in particular. Previous research involving Mexican Americans aged 65 years and older has suggested that these two measurements of physical disability related to walking tend to be generally concordant, but to offer different predictions: performance-based mobility disability as a predictor of mortality, and self-assessment of walking impairments as a predictor of the disablement process.

The objective of the present research was to assess the concordance in mortality prediction of POMA (timed 10-foot walk) and ADL (reported ability to walk across a small room without help) for Mexican Americans aged 75 years and older. We also investigated the relationships between self-rated versus performance-based walking assessments as predictors of mortality. We hypothesized that as an objective measure of physical function, performance-based assessment of mobility would better predict mortality. However, we reasoned that self-reported assessments of mobility could show a comparable ability to predict mortality.

Methods

Study population

Data from baseline to wave 5 (2004–2005) and wave 6 (2007) of the Hispanic Established Population for the Epidemiological Study of the Elderly (EPESE) were used in the analysis. The Hispanic EPESE was originally a longitudinal study of 3050 Mexican Americans aged 65 years and older residing in southwestern states (Texas, New Mexico, Colorado, Arizona and California). The sample population was selected from these five southwestern states using area probability sampling procedures beginning in 1993 to make the study generalizable to the approximately 500 000 older Mexican Americans residing in the southwest. Its measures included ADL, POMA and sociodemographic information beginning in wave 5, relying on face-to-face interviews to gather this information.

Measures

Mortality

Mortality information was derived from wave 5 to wave 6 of the Hispanic EPESE, categorized by survival status as a dependent variable. All sample participants were alive at wave 5 (2004–2005), and mortality status was assessed in wave 6 (February 2007 to February 2008) in 2007.

Performance-based and self-reported measurements: Walking disability

Walking disability was chosen as the point of concordance between performance-based and self-reported measurements, because it was the only question that the POMA and ADL scales had in common. Because of the differences in the respective standards of POMA and ADL, there is no way to compare these two precisely. The performance-based standard continuously measures time, speed and strength; in contrast, the self-reported disability assessment elicits such categorical self-assessments as “need help,” “don’t need help” or “unable to do.” Therefore, in order to establish the
categorical concordance variable, this analysis centers its comparison on the POMA question indicating whether the respondent completed the walk or refused.

**ADL/POMA concordance**

Table 1 shows the figures for ADL and POMA from the Hispanic EPESE wave 5 (2004–2005). The three possible answers for ADL were “cannot walk,” “can walk with other’s or device’s help” and “can walk.” A dichotomous division was derived from the “can walk” and “cannot walk” categories. POMA respondents were similarly divided into two categories: “completed walk” and “could not complete walk.” The “could not complete walk” category included those who had attempted, but failed, to complete the timed 10-foot walk as a result of severe physical impairment.

Based on these two measurements, we discerned the association between ADL and POMA, defining their concordance according to four categories: “positively concordant,” “optimist,” “negatively concordant” and “pessimist,” as shown in Table 2. 13 Optimists were those who reported being able to walk, but could not actually complete the walk. Pessimists were those who completed the walk although they had reported themselves unable to do so. Positively concordant people were those who completed the walk and reported being able to walk, so that ADL and POMA were positive. “Negatively concordant” respondents were those who were unable to complete the walk and correctly reported that inability. Thus, both measurements were negative. 13 Table 2 represents the ADL and POMA concordance categories.

**Covariates**

Sociodemographic variables included age (≤80 = 0, >80 = 1), sex (men = 0, women = 1), years of formal education (continuous), nativity (USA-born = 0, Mexico-born = 1), language of interview (English = 0, Spanish = 1), marital status (married = 0, not married = 1), annual household income (≥$15 000 = 0, <$15 000 = 1) and living arrangements (living alone = 0, living in a household with two or more people = 1).

**Statistical analysis**

The Statistical Analysis System version 9.2 (SAS; SAS Institute, Cary, NC, USA) was used in the present analysis. The selected alpha level for statistical significance was 0.05. Descriptive statistics examined the concordance between performance-based and self-reported measurements for Mexican Americans aged 75 years and older. A logistic regression analysis was used to determine whether a concordance between performance-based and self-rated assessments of mobility disability was associated with mortality status at wave 6 after adjusting for age and sex, education, nativity, language of interview, marital status, annual household income, and living arrangements.

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**Table 1** Comparisons between performance-oriented mobility assessment and activities of daily living questions of the Hispanic Established Population for the Epidemiological Study of the Elderly

<table>
<thead>
<tr>
<th>Questions</th>
<th>ADL</th>
<th>POMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>POMA</td>
<td></td>
<td></td>
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<tr>
<td>Now we are going to observe how you normally walk. If you use a cane or other walking aid and would feel more comfortable with it, then you may use it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Completed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Refused (.) Missing/NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At the present time, do you need help from another person or special equipment or a device for:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Walking across a small room</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Need help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Don’t need help</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Unable to do</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Refused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ADL, activities of daily living; NA, not available; POMA, performance-oriented mobility assessment.

| Table 2 Activities of daily living/performance-oriented mobility assessment concordance |
|-----------------------------------------------|-----------------------------------------------|
| ADL Can walk | ADL Cannot walk |
| POMA Completed walk | Positively concordant  |
| POMA Could not complete walk | Optimist |
| POMA Completed walk | Pessimist |
| POMA Could not complete walk | Negatively concordant |

ADL, activities of daily living; POMA, performance-oriented mobility assessment.
Hypothesis

We hypothesized that the negatively concordant and optimistic respondents would have higher mortality (reference = positively concordant). We reasoned that a concordance between performance-based and self-reported measurements in predicting mortality would provide further information about the validity of these assessments for older populations. Therefore, we hypothesized that a concordance between these two measurements should be an apt predictor of mortality. Furthermore, we hypothesized that as an objective measure of physical function, performance-based assessment of mobility would perform better in predicting mortality than self-reported measurements, but that self-reported measurements might perform better than expected, and could be comparable in predictive ability with the performance-based assessment.

Results

Table 3 represents the overall sample characteristics of the Hispanic Established Population for the Epidemiological Study of the Elderly wave 5 by sex (2004–2005). Of the 2069 participant interviews, 1742 were carried out in person, and 327 (15.8%) were carried out by proxy, typically by a close family member. The mean age was 81.9 years, 38.5% were men and 61.5% were women. Approximately 44% were foreign-born, and approximately 80% were interviewed in Spanish. Two-thirds of the men were married, as compared with just 27.3% of the women. Years of education and household income were quite low. Finally, 34.4% of the women and 18.2% of the men reported living alone. In addition, Table 3 shows the numbers and percentage of participants who reported limitations in ADL and in POMA by sex. Significant differences emerged by sex in both ADL and POMA results, with women significantly more likely to report ADL and POMA limitations than men.

Table 4 represents the frequency of ADL/POMA concordance descriptive statistics of Hispanic EPESE wave 5 (2004–2005). The respective prevalence of the “positively concordant” (completed the walk and reported being able to walk, ADL and POMA both positive), “pessimist” (completed the walk, but reported being unable), “optimist” (reported being able to walk, but could not actually complete the walk), and “negatively concordant” (neither completed the walk nor reported being able to do so) groups were 80.09%,
10.50%, 3.78% and 5.63%, respectively. Respondents unable to complete the POMA were excluded from the concordance analyses.

Table 5 shows the logistic regression of mortality (wave 5–6) prediction for POMA, ADL limitation and the POMA/ADL concordance. All models were adjusted for age and sex, education, nativity, language of interview, marital status, household income, and living arrangements. Model 1 showed an odds ratio of POMA as a predictor of mortality of 2.46 (95% CI 1.43–4.23). Model 2 showed an odds ratio of ADL as a predictor of mortality of 3.69 (95% CI 2.68–5.08). In model 3, where POMA and ADL limitations were combined, the predictive odds ratio of POMA was non-significant at 1.65 (95% CI 0.91–2.98), whereas that of ADL was significant at 2.40 (95% CI 1.48–3.88). In model 4, the ADL/POMA concordance, “negative concordant,” emerged as a critical predictor of mortality (OR 4.80; 95% CI 2.59–8.90) followed by “pessimist” (OR 1.94; 95% CI 1.12–3.36), as compared with the reference group of “positively concordant.” However, the mortality predictive odds ratio of “optimist” was small and non-significant (OR 0.59; 95% CI 0.14–2.52).

Table 4  Activities of daily living/performance-oriented mobility assessment concordance descriptive from Hispanic Established Population for the Epidemiological Study of the Elderly participants at wave 5, 2004–2005 (n = 1562)

<table>
<thead>
<tr>
<th>Performance-based assessments (POMA)</th>
<th>Self-reported assessments (ADL)</th>
<th>Cannot walk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed walk</td>
<td>Positively concordant 1251 (80.09%)</td>
<td>Pessimist 164 (10.50%)</td>
</tr>
<tr>
<td>Could not completed walk</td>
<td>Optimist 59 (3.78%)</td>
<td>Negatively concordant 88 (5.63%)</td>
</tr>
</tbody>
</table>

ADL, activities of daily living; POMA, performance-oriented mobility assessment.

Table 5  Logistic regression of mortality (wave 5–6) on categories of performance-oriented mobility assessment, activities of daily living limitation and activities of daily living/performance-oriented mobility assessment concordance

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 1407</td>
<td>n = 1783</td>
<td>n = 1407</td>
<td>n = 1407</td>
</tr>
<tr>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>POMA limitation</td>
<td>2.46 (1.43–4.23)</td>
<td>1.65 (0.91–2.98)</td>
<td>3.69 (2.68–5.08)</td>
</tr>
<tr>
<td>ADL limitation</td>
<td>1.00</td>
<td>1.94 (1.12–3.36)</td>
<td>0.59 (0.14–2.52)</td>
</tr>
</tbody>
</table>

ADL/POMA Concordance

Positive concordant
Pessimist
Optimist
Negative concordant

All models: controlled for age and sex, education, nativity, language of interview, marital status, annual household income, and living arrangement. ADL, activities of daily living; POMA, performance-oriented mobility assessment.

Discussions

The objective of the present research was to assess the utility in mortality prediction of a concordance between performance-based and self-rated assessments for Mexican Americans aged 75 years and older. Participants who were negatively concordant or pessimists tended to die earlier, as compared with their positively concordant counterparts. We also compared self-rated versus performance-based walking assessments as predictors of mortality. We hypothesized that as an objective measure of physical function, performance-based assessment of mobility would perform better in predicting mortality. However, we also reasoned that self-reported assessment of mobility would show a better-than-expected and perhaps comparable ability to predict mortality.

Previous research showed that performance-based assessments are good predictors of major health outcomes, such as disability15,16 and mortality.17 Furthermore, past research has shown that the performance-based measure of walking might be a better mortality predictor than ADL for older Mexican Americans aged...
Measuring mobility is a key aspect of gerontology, as mobility problems can predict disability and health. For older adults, physical mobility limitations increase the risk of morbidity and mortality as well as dependence on others. The ability or inability to walk a short distance without help might predict future disability and mortality. Both performance-based and self-rated assessments show efficacy in mortality prediction, and each measure conveys useful information about mobile functioning in older adults.

Comparing the performance of the two measurements in predicting mortality could provide further information as to the validity of these assessments for this population and could show whether a more easily administered measure, such as ADL, could be an acceptable alternative to relatively less easily applicable performance-based measures, such as POMA. However, a direct empirical comparison is impossible given the differences in the standards of the two methods. Therefore, a concordance of these two measurements might be useful in predicting future disability, hospitalization risk and mortality in the older population, particularly in the clinical setting, and could be helpful in long-term care and preventive support for older adults in nursing homes by informing preventive intervention decisions.

In conclusion, the concordance of performance-based and self-rated assessments derived from the present study showed that Mexican Americans aged 75 years and older who were negatively concordant or pessimists were much more likely to die as compared with participants who were positively concordant. Furthermore, self-reported assessments of mobility showed a better-than-expected and comparable ability to predict mortality as compared with performance-based walking assessments.

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Disclosure statement

The authors declare no conflict of interest.
References


