The Severity of Urinary Incontinence Decreases Health-Related Quality of Life among Community-Dwelling Elderly

Sara Aguilar-Navarro, Ana Patricia Navarrete-Reyes,1 Bernardo Horacio Grados-Chavarría,1 Juan Miguel Antonio García-Lara,1 Hélène Amieva,2,3 and José Alberto Ávila-Funes1,2,3

1Department of Geriatrics, Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Mexico City, Mexico. 2Centre de recherche Inserm, U897, and 3Univ Victor Segalen Bordeaux 2, Bordeaux, F-33076 France.

Address correspondence to José Alberto Ávila-Funes, Department of Geriatrics, Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán, Vasco de Quiroga 15, CP 14000, Tlalpan, Distrito Federal, México. Email: avilafunes@live.com.mx

Background. Urinary incontinence (UI) is an important geriatric syndrome that has been associated with a wide range of health-related outcomes. However, UI severity has rarely been examined in the context of a comprehensive geriatric assessment. Therefore, the aim of this study is to examine the association between UI severity and health-related quality of life (QoL) when frequent geriatric issues are taken into account.

Methods. We performed a cross-sectional study of 1,124 participants aged 70 y and older. UI was diagnosed when difficulty with urinary continence was reported, and its severity was assessed through a modified version of the Sandvik Index. Health-related QoL was measured using the SF-36, including its physical and mental component summaries. Multivariate linear regression was performed to determine the association between UI severity and health-related QoL.

Results. Prevalence of UI was 18%, and it was severe in 29.3% of cases. Severely incontinent subjects were older and had worse self-perceived health status, greater disability, and more depressive symptoms in comparison with continent participants or with those affected to a lesser degree. Multivariate regression analysis showed a significant inverse association between the physical component summaries and moderate (B = −4.54) as well as severe UI (B = −6.72). The mental component summaries showed similar results (B = −1.44 and −4.43, respectively).

Conclusions. UI severity is associated with lower QoL scores in both its components. This association appears to be more important as severity increases. UI severity must be evaluated thoroughly in the elderly because of its potential adverse effects on physical and mental health.

Key Words: Quality of Life—Urinary Incontinence—Frailty.
and the other the quantity of urine leakage, into a single score (range 2–8), with higher scores indicating greater UI severity. UI severity was classified as follows: mild UI (2–3 points), moderate UI (4–5 points), and severe UI (6–8 points).

Quality of Life
Health-related QoL was measured using the Medical Outcomes Study 36-item Short Form Healthy Survey questionnaire (SF-36) (21), a 36-item questionnaire assessing health across eight dimensions: physical functioning, role functioning, bodily pain, general health, vitality, role limitations due to emotional problems, mental health, and social functioning. Each item is grouped into dimensions, and every response to the items in each dimension is weighted equally and then summed up and transformed to a 0–100 scale, where higher scores mean better health-related QoL. The scores in the eight dimensions are weighted using factor analysis based on the observed correlation between dimensions to yield the summary component scores, which are constructed so that a score of 50 represents the mean of the general population with a standard deviation (SD) of 10. In this study, this variable was used as continuous for both components.

Covariates
Sociodemographic variables included age (years), sex, educational level (years studied), and socioeconomic status. Participants were asked whether they had a doctor’s diagnosis of the following nine chronic diseases: hypertension, obesity, arthritis, heart disease, dyspepsia, chronic pulmonary obstructive disease, sexual dysfunction, chronic pain, and cancer. Disease presence or absence was defined as the combination of the aforementioned pathologies in a single summed score ranging from 0 to 9, where higher scores indicate more prevalent chronic diseases.

The Mini-Mental Status Examination (MMSE) (22), a global cognitive function screening test exploring memory, orientation in space and time, calculation, language, and word recognition, was used for cognitive assessment. This tool’s scores range from 0 to 30, where higher scores indicate better cognitive function.

Depressive symptoms were assessed using the Center for Epidemiologic Studies-Depression (CES-D) scale (20-item version) (23). This was a categorical variable where a score of 16 or more was considered positive for depressive symptoms.

Physical performance was assessed using the Short Physical Performance Battery, which includes a 4-minute walking speed (m/s), standing balance (tandem, semitandem, and one foot), and the chair-stands tests (time to rise five times in seconds). Scores range from 0 to 12 points,
with lower scores indicating poorer physical performance (24). Body mass index \([\text{BMI} = \text{weight (kg)}/\text{height (m)}^2]\) was also included as a covariate.

Drug prescriptions were recorded and medications related to the presence of UI were clustered as follows: diuretics, angiotensin-converting enzyme inhibitors, psychotropics, analgesics, narcotics, alpha agonists, alpha antagonists, and calcium channel blockers (25). This variable was dichotomized as consuming at least one drug among these groups or none.

Self-reported health perception was also inquired and registered as an ordinal variable (good, fair, and poor). Smoking status and alcohol intake were self-reported and treated as binomial (yes or no) covariates.

Two measurements of disability were considered as covariates: instrumental activities of daily living (IADL) (26) and basic activities of daily living (ADL) (27). For IADL, participants reported their ability to perform eight activities, which were adjusted by sex: using the telephone, shopping, grooming, housekeeping, doing laundry, using transportation, handling medications, and doing finances. For ADL, subjects were asked if they needed help in bathing, dressing, toileting, transferring, and feeding (continence was excluded). In the case of each domain of disability, if participants indicated that they were unable to perform at least one of the activities without help, they were considered as having IADL or ADL disability.

Statistical Analysis

Variables were described using frequencies and proportions or arithmetic means and standard deviations (SD) where appropriate. Chi-squared test or analysis of variance (ANOVA) tests were used according to analyzed variables. Post hoc comparisons between UI severity subgroups were conducted for continuous variables where indicated (Bonferroni’s correction). The association between UI severity and each dominion of QoL was analyzed using linear regression models. In addition, five different multivariate linear regression models were constructed to test the independent association between UI severity and QoL, adjusting for a cluster of potential confounding variables (Model 1: age, sex, economical status, and educational level; Model 2: further adjusted by comorbidity, depressive symptoms, and cognitive performance; Model 3: further adjusted by smoking status, alcohol intake, physical performance, and BMI; Model 4: further adjusted by medication use; and Model 5: further adjusted by ADL and IADL disability). Residual and diagnostic analyses, including studentized residuals, standardized residuals, Cook’s distance, and leverage were performed to check for violation of the assumptions underlying multiple regression analysis. All statistical tests were performed at the .05 level and 95% confidence intervals (CI) were given. Statistical tests were performed using the SPSS software for Windows (SPSS Inc., Chicago, IL, version 16.0).

Results

The sample study included 1,124 subjects. Mean participants’ age was 79.5 years (SD = 7.14) (range 70–104), and 55.8% were women. Comorbid conditions more frequently reported were hypertension (73.2%), arthrosis (51.2%), and dyslipidemia (52.8%). Prevalence of ADL and IADL disability was 10.2% and 46.0%, respectively. With regard to QoL, the mean score for the MCS was 52.2 (SD = 9.88; range 14.96–69.89) and for the PCS was 43.4 (SD = 9.73; range 8.25–63.53). UI prevalence was 18.0%; as expected, participants with UI were older (\(p = .008\)), more frequently women (\(p < .001\)), had worse self-reported health (\(p = .003\)), and were more likely to be disabled for ADL and IADL (\(p = .001\) for both of them) in comparison with nonincontinent ones. In addition, incontinent subjects had more depressive symptoms (\(p < .001\)) and worse physical performance (\(p < .001\)). No differences in comorbidity and medication use were found.

Sociodemographic and health-related characteristics arranged by UI severity degree are shown in Table 1. Among participants with UI, severity subgroup frequencies were 21.5%, 49.2%, and 29.3% for mild, moderate, and severe, respectively. In comparison with other groups, those with severe UI were older (\(p < .001\)), more likely to be female (\(p = .008\)), and more frequently reporting poor self-perceived health status (\(p = .002\)). In addition, severely affected participants reported more depressive symptoms (\(p < .001\)), less alcohol consumption (\(p = .046\)), and lower disability for ADL and IADL. There were no differences among subgroups with regard to BMI, MMSE score, and medication use. The PCS and MCS scores of QoL were lower among those with severe UI in comparison with their continent counterparts and with those with a less severe degree of incontinence.

Tables 2 and 3 show the results of the regression analysis using UI severity as the independent variable. Linear regression analysis demonstrated that UI severity was inversely associated with both components of QoL. Adjusting for potential confounding variables in five consecutive models did not change the results: for the PCS, compared with the nonincontinent group, those with mild (\(B = -1.15\)), moderate (\(B = -4.54\)), and severe UI (\(B = -6.72\)) showed an inverse association with this component’s scores. In the same vein, for the mental component, participants with mild (\(B = -2.00\)), moderate (\(B = -1.44\)), and severe UI (\(B = -4.43\)) showed lower scores when compared with nonincontinent ones. However, the final adjusted model explained less than 20% of the observed variability in the summary of both components of QoL. Residual and diagnostic analyses did not show violation of the assumptions underlying multiple regression analysis.
Table 1. Sociodemographic Characteristics and Health Status of Participants (n = 1,124)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Without UI (82.0%)</th>
<th>Mild UI (3.9%)</th>
<th>Moderate UI (8.8%)</th>
<th>Severe UI (5.3%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y (SD)</td>
<td>78.6 (7.0)a</td>
<td>82.1 (8.2)b</td>
<td>80.5 (7.8)ab</td>
<td>80.7 (7.2)ab</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Women (%)</td>
<td>54.0</td>
<td>76.2</td>
<td>62.5</td>
<td>64.9</td>
<td>.008</td>
</tr>
<tr>
<td>Educational level, y (SD)</td>
<td>7.1 (6.6)</td>
<td>6.6 (4.9)</td>
<td>6.6 (5.4)</td>
<td>7.4 (6.7)</td>
<td>.83</td>
</tr>
<tr>
<td>Smoking status (%)</td>
<td>48.5</td>
<td>40.5</td>
<td>55.2</td>
<td>43.9</td>
<td>.35</td>
</tr>
<tr>
<td>Alcohol intake (%)</td>
<td>47.8</td>
<td>48.3</td>
<td>46.7</td>
<td>21.1</td>
<td>.046</td>
</tr>
<tr>
<td>Poor self-reported health (%)</td>
<td>30.8</td>
<td>54.0</td>
<td>62.5</td>
<td>64.9</td>
<td>.008</td>
</tr>
<tr>
<td>Chronic diseases,* mean (SD)</td>
<td>27.1 (4.3)</td>
<td>26.2 (3.7)</td>
<td>26.6 (4.9)</td>
<td>24.8 (4.37)</td>
<td>.47</td>
</tr>
<tr>
<td>Body mass index, mean (SD)</td>
<td>27.8</td>
<td>51.7</td>
<td>38.2</td>
<td>50.1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Depressive symptoms (%)</td>
<td>24.8 (4.9)</td>
<td>24.2 (4.2)</td>
<td>24.8 (5.7)</td>
<td>23.5 (6.1)</td>
<td>.51</td>
</tr>
<tr>
<td>Drug use*, mean (SD)</td>
<td>3.3 (2.8)</td>
<td>3.9 (3.6)</td>
<td>3.7 (2.7)</td>
<td>3.9 (3.1)</td>
<td>.35</td>
</tr>
<tr>
<td>MMSE, mean (SD)</td>
<td>8.1 (3.4)a</td>
<td>5.6 (4.3)b</td>
<td>7.3 (3.8)ab</td>
<td>6.5 (3.7)c &lt;.001</td>
<td></td>
</tr>
<tr>
<td>PCS SF-36, mean (SD)</td>
<td>44.4 (9.3)</td>
<td>40.8 (10.4)bc</td>
<td>39.2 (9.0)d</td>
<td>36.3 (10.6)bc &lt;.001</td>
<td></td>
</tr>
<tr>
<td>MCS SF-26, mean (SD)</td>
<td>52.9 (9.3)</td>
<td>48.6 (10.8)ab</td>
<td>50.8 (11.7)c</td>
<td>64.7 (12.0)b &lt;.001</td>
<td></td>
</tr>
<tr>
<td>Disability ≥ 1 ADL task (%)</td>
<td>7.9</td>
<td>27.8</td>
<td>15.7</td>
<td>9.7</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Disability ≥ 1 IADL task (%)</td>
<td>42.9</td>
<td>72.2</td>
<td>47.1</td>
<td>67.7</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Note: Chronic diseases: cardiopathy, hypertension, obesity, chronic obstructive pulmonary disease, dyspepsia, sexual dysfunction, arthrosis, chronic pain, and cancer. Drug use: Diuretics, angiotensine-converting enzyme inhibitors, psychotropics, analgesics, narcotics, alpha agonists, alpha antagonists, and calcium channel blockers.

**Discussion**

This study shows that UI severity is negatively associated with QoL in both of its component summaries. This finding is consistent with previously reported information that states that UI affects the patients’ psychosocial and physical domains and that its severity also plays an important role in this matter. To our knowledge, this association had not being described among a Latin American elderly population; however, previous studies have included a proportion of Latin American participants in their samples (28,29).

Considering that a fall of 5–10 points in the SF-36 component summaries suggests a condition that affects health-related QoL (13), our results indicate that participants with severe UI suffer greater repercussions on both component summaries of QoL when compared with those without incontinence or with those with a lesser degree of it, even after the adjustment by possible confounding covariates.

The association between health-related QoL and UI severity has been previously described by several authors in the context of care-seeking behaviors (30) and response to treatment (18). However, although most studies have reported a positive relationship between UI severity and specifically designed measures of QoL for UI, the correlation is frequently not as strong as expected a priori. In 2007, Albo and coworkers in their preoperative assessment of 655 women with UI reported that only modest correlations existed between the patients’ symptom self-assessment and the QoL measures, .46 (.40 to .52) for UDI and .47 (.41 to .53) for IIQ (17). Likewise, Murray and coworkers reported a rather low correlation between UI severity and QoL in the presurgical setting (r < .40); nevertheless, such a correlation increased in the posttreatment setting (r > .70) (18).

When other more general health-related QoL measures are used, the association persists. Recently, Tennstedt and coworkers carried out a study in men and women of different ages and ethnicities and showed that among men, leakage severity was associated with lower PCS score after controlling for race and other possible confounders. In the multivariate models, PCS score was related to socioeconomic status, alcohol intake, smoking status, waist circumference, physical activity level, and several other health conditions. However, the strongest association was shown between severe urine leakage and the PCS score (β = −7.1). In the same study, women with severe UI had scores 3 points less than those of their continent counterparts. In the multivariate model, PCS score was also related with age, alcohol intake, physical activity, waist circumference, and various health-related conditions. Moreover, the effect of severe leakage on the PCS of QoL was similar to that observed for vascular disease and asthma. On the other hand, for the MCS of QoL, both men and women with severe UI had scores 5–6 points less than those of patients without UI (29).

The association between the PCS of QoL and UI severity may be explained by several pathways; a study of elderly
participants with persistent UI after radical retropubic prostatectomy showed that although the majority of patients denied any physical effect (74%), when directly questioned, 26% had restricted or suppressed daily exercise including strolling and 24% had limited their travelling plans (31). UI symptoms have been reported to correlate moderately with impact on physical, social, and travel activities (32), although greater physical impact, change in ADL, and social restrictions have been associated with seeking treatment (33–35). Other studies have shown that patients with UI are more frequently disabled for ADL (9); this last association was also found in our study.

With regard to the association between UI severity and the MCS of QoL, several mechanisms can be proposed to explain it. For example, a study of continent women of different races and ages found that participants associated the following statements with UI: loss of control (14%), anxiety (11%), sleep disturbances (10%), and requirement for a restroom facility nearby (24%), which ultimately contribute to a sense of negative self-perception and a lower ability to carry on with a satisfying social life and may represent mediators of lower health-related QoL on more severely affected incontinent participants when compared with their continent counterparts or with less severely affected subjects (37).

The main limitation of this study is its cross-sectional nature, with the subsequent inability to establish the direction of associations, leaving open the possibility of interchangeable causes and effects, for example, between UI severity and functional impairment. Another limitation is the use of a slightly modified version of the Sandvik Index as the measurements originally used for this Index were not available for the cohort.

Despite its limitations, it should be emphasized that this study has a population-based design and that a detailed adjustment for possible confounders was carried out. It allows recognition of the high prevalence of UI among the Mexican community-dwelling elderly and highlights the need for its early diagnosis, evaluation, and monitoring because as UI severity increases, so does health-related QoL involvement.

In conclusion, this study shows that UI severity was negatively and independently associated with both component summaries of QoL. This result could be extrapolated to other populations in Latin America as values and norms are frequently shared between these countries. Finally, there is a
clear need for prospective studies that evaluate the effect of UI severity on health-related QoL among elderly populations.

FUNDING


CONFLICT OF INTEREST

None.

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