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Original Article

Validation of the Mexican Spanish Adaptation of the Short Form of the Urogenital Distress Inventory, Incontinence Impact Questionnaire and the Severity Index in Elderly Women from Nursing Homes in the Metropolitan Area of Guadalajara, Mexico

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SUMMARY

Background: Assessing the quality of life in older adults with urinary incontinence (UI) can help to identify critical points that improve their living conditions. The Urogenital Distress Inventory (UDI-6), the Incontinence Impact Questionnaire (IIQ-7) in its short version and the Incontinence Severity Index questionnaire (*ISI*) need to be validated to evaluate the quality of life in elderly women with UI from nursing homes of Mexico.
Methods: Women > 60 years (n = 317) from nursing homes in Guadalajara, Mexico, were included. Patients with neurological, cognitive, visual, and illiterate impairments were excluded. The participants were interviewed to gather their general data, and Spanish versions of the IIQ-7, the Mexican adaptation UDI-6, and the ISI were applied. The medians and confidence intervals (CI) of the scores was obtained. Spearman's correlation with questionnaires UDI-6 and IIQ-7 was performed by *ISI* level and among women who used diapers and women who did not use diapers. Internal consistency analysis was obtained with Cronbach's α from UDI-6, IIQ-7 and *ISI*. IBM-SPSS version 25 was used.
Results: The very severe *ISI* was related to highest scores of UDI-6 (59.9 $\pm$ 16.3) and IIQ-7 (69.12 $\pm$ 20.27.5) and the slight level *ISI* with low scores UDI-6 (24.4 $\pm$ 12.9) and IIQ-7 (18.05 $\pm$ 17.44). An internal consistency (Cronbach's α) was for the IIQ-7, UDI-6 and *ISI* values of 0.866, 0.745, and 0.596, respectively. Spearman's correlation between UDI-6 and IIQ-7 showed a rho of 0.639 ($p < 0.0001$).
Conclusion: The Mexican Spanish Adaptation of the UDI-6 and IIQ-7 (short form) showed good reliability in elderly women from nursing homes in Mexico.

1. Introduction

Overall, life expectancy has increased due to scientific and technological advances. In Mexico, men live an average of 71.2 years and women an average of 77.98 years. Moreover, a reduction in the fertility rate was observed from 2.7 to 2.08 children per woman, in the last 20 years. Demographic figures, in adults over 60 years old, are estimated to rise from 15.2 million in 2020 to 33.4 million by 2050. Currently, older women survive longer than older men, with a difference of one million cases and it is estimated to reach 4 million in 30 years.[1]

The inversion of the population pyramid is evident, which shows demand for support for older adults, including services such as the existence of nursing homes or living quarters.[2] There are currently about 893 nursing homes across the country, which increase the demand in support and care services.[1] It is uncommon for the geriatric population to attend nursing homes by their own decision.[3] Most of the time, they are taken and confined by their relatives, which sometimes reach abandonment.[3] Even though many of them require close monitoring and occasionally special care for their incapacity for independent living.[4] Older adults have a high frequency of co-morbidities, among which are urinary incontinence (UI). However, it is considered an independent factor to enter nursing home.[5]

UI is a frequent gerontological syndrome in women that has a high cost due to the need for trained personnel, treatment, and supplies such as diapers, change of clothes, cleaning materials, among others.[6] The presence of this syndrome and the stay in nursing homes mainly affects the patient's quality of life, and sedentary behavior.[6–8] The elderly in nursing homes tend to lose the quality of life, which requires adequate strategies to achieve improvement.[9]

Assessing the quality of life in older adults with UI can help to identify critical points that improve their living conditions, especially

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in nursing homes of Mexico.

There are several instruments for evaluating the quality of life in patients with UI; none of them are validated for the Mexican population. In this study, the adaptation of the questionnaires Urogenital Distress Inventory (UDI-6) and Incontinence Impact Questionnaire (IIQ-7) were considered in their short Spanish versions mainly due to their efficacy, timing, and comfort for the patients.[10]

The UDI-6 determines the presence and degree of UI and the IIQ-7 the quality of life of patients with UI. Both questionnaires contribute to the better understanding of the living conditions of patients with UI.[10]

The Mexican validation or the adaptation of UDI-6 and IIQ-7 allows us to recognize the conditions of the patients with UI in nursing homes and have a valuable, easy, and reproducible tool that health staff, caregivers, and relatives can use. The factors considered in the validation were the Incontinence Severity Index (*ISI*) of UI and the use of diapers.

The objective of the present study was to validate the UDI-6, IIQ-7 and *ISI* Spanish version questionnaires for Mexican population by the severity of UI, as well as the quality of life by elderly women who live in nursing homes in the metropolitan area (MA) of Guadalajara, Jalisco, Mexico.

2. Materials and methods

2.1. Study design and population

From 2017 to 2019, the current cross-sectional study was approved by the Ethics and Research Committee of the Civil Hospital "Fray Antonio Alcalde". The Instituto Jalisciense de Asistencia Social (IJAS) authorized and provided information on the nursing homes of the MA in Guadalajara. Private nursing homes of the MA were also included. Verbal consent was obtained to participate in the study from elderly women, family members, or caregivers.

Participants were women over 60 years old, living in the MA and who agreed to participate (n = 372). Patients with neurological, cognitive, visual, and illiterate impairments were excluded.

The characteristics, objectives and conditions of the study were explained, and the authors invited, verbally, women residents from the nursing homes to participate. In an isolated room, they were interviewed and asked about their general data, present co-morbidities and smoking. Later, the instruments Spanish version of IIQ-7 and adaptation UDI-6, as well as the *ISI*, were applied.

2.2. Measure

2.2.1. Type of incontinence (Urogenital Distress Inventory Short Form (UDI-6))

Patients were classified with the Stress Urinary Incontinence (SUI) test, which has a level of evidence grade A and evaluated six questions through a Likert scale. The scores were interpreted as follows: question 2, presence of Urge UI (UUI); question 3 effort UI; both positive questions such as mixed incontinence (MUI). UDI-6 scores were rated proportionally with 100 base.[11]

2.2.2. Quality life (Incontinence Impact Questionnaire-7 (IIQ-7))

This questionnaire measures the quality of life of elderly women with UI within four domains concerning the role (question 1), physical (questions 2 and 4), social (questions 3 and 5), and emotional limitation (questions 6 and 7). The scores were obtained with a Likert scale of 0 to 3, with a maximum of 21 points. The IIQ-7 was standardized on a scale of 0 to 100. A higher score meant a worse quality of life.[12]

2.2.3. Adaptation of UDI-6, IIQ-7 and ISI

The UDI-6 and IIQ-7 questionnaires were authorized by Dr. Uebersax JS and Dr. Jean Wyman (1995) and adapted from the Spanish version by Bouallalene-Jaramillo K, Bagur-Calafat MC, Girabent-Farrés M,[10,11] in question 2 of the UDI-6 "sink" was changed for "bathroom". The *ISI* had to be slightly adapted since the population of older women should not leave nursing homes.

2.2.4. Grade of severity ISI

The severity of the UI was evaluated with the *ISI*, which consists of two questions. The score indicated the degree of severity of the UI, slight 1 to 2, moderate 3 to 6, severe 7 to 10 and very severe 11 to 12. The absence of UI had a score of 0. A higher *ISI* score indicated greater severity.[13,14]

2.2.5. ISI translation

The IIQ-7 and UDI-6 tests were taken from the Spanish versions.[10,11] The *ISI* translation was performed by three translators, two of them expert translators from Spanish to English and a native speaker. The three versions were united into one.

2.3. Statistical analysis

The medians and confidence intervals (CI) were obtained from the scores of UDI-6, IIQ-7 and *ISI*. Spearman correlation between UDI-6 and IIQ-7 was performed with and without patients who used diapers or *ISI* level. Reliability analysis was obtained with Cronbach's α from questionnaires IIQ-7, UDI-6 and *ISI*. Factorial analysis was performed for each test and the correspondence was evaluated with Bland-Altman. Mann-Whitney U test or $\chi 2$ was used to compare the differences and $p < 0.05$ was considered statistically significant. IBM SPSS Statistics for Windows version 25 version was used for statistical analysis.

3. Results

Of 372 patients, 317 (85.21%) were selected, the rest had dementia or were inability to answer the questionnaires. The mean $\pm$ SD of the age was 79.4 ± 8.49 (60–110), of which 9.8% were smokers, 10.7% hypertension, 9.5% diabetes mellitus type II, 8.2% skeletal muscle pain, 7.6% arthritis, 4.7% asthma or bronchitis, 2.8% thrombosis, 2.5% thyroid, 2.5% irritable bowel syndrome, 1.3% breast cancer, and 6.1% other diseases. No differences were found in the general data, neither in the *ISI*, UDI-6 and IIQ-7 scores by MA (Table 1).

The internal consistency was assessed with Cronbach's α, obtaining for the IIQ-7, UDI-6 and *ISI* values of 0.866, 0.745, and 0.596, respectively.

Reliability in women with and without diaper usage on the IIQ-7 scale was similar (0.856 and 0.841), but in the case of UDI-6 it was lower with the population using diaper 0.679 compared with those who did not use 0.735.

The factorial analysis for the UDI-6 showed low correlation between the questions (< 0.450), a borderline KMNO (0.734) with a significant Chi-square value ($\chi 2 = 276.8$, $p < 0.001$).

In the factorial analysis for the IIQ-7, most of the correlations were low, but mean correlations were observed between question 2 with question 3 and 5 ($r = 0.678$). However, only one component was identified that explained 56.6% of the total variance.

Factorial analysis for *ISI* indicated low correlations between the two items, however; a low KMNO (0.500) was observed with a sig-

Table 1
General data.

General data	Metropolitan Area (MA)			
	Guadalajara	Zapopan	Tlajomulco/Tonalá	Tlaquepaque
Age (yr)				
60–69	16	7	9	6
70–79	47	29	20	22
80–89	51	38	10	17
> 90	27	15	2	1
Smoker	9	11	7	4
Diseases				
Diabetes (Type II)	19	5	4	2
Hypertension	15	9	4	6
Musculoskeletal	13	8	8	2
Arthritis	12	5	4	3
Asthma/bronchitis	7	5	1	2
Inflammatory bowel	5	2	1	0
Migraine	4	2	0	0
Thyroid	4	1	2	1
Thrombosis	3	4	1	1
Breast cancer	0	1	1	2
Other diseases	12	8	2	2
Without	45	38	13	24
ISI				
Slight	33	25	13	10
Moderate	54	34	15	26
Severe	34	24	7	9
Very severe	20	6	6	1
Severity index (ISI)	(5, 4–6)	(5, 3–6)	(5, 3–6)	(4, 4–5)
UDI-6 score	(39, 28–50)	(38, 25–50)	(39, 22–50)	(39, 26–50)
QII-7 score	(43, 29–57)	(33, 14–52)	(42, 26–57)	(43, 29–54)

n = 317 (median, confidence interval).

nificant Chi-square value ($\chi 2 = 74.9$, $p < 0.001$). A correspondence (Bland-Altman) was observed between the UDI-6 and the IIQ-7, with a tendency to overestimate by UDI-6 at low scores (20 to 40%) and an overestimation by IIQ-7 in scores from 40 to 60%.

Spearman correlation between the instruments of IIQ-7 and UDI-6 showed a rho of 0.642 ($p < 0.0001$), distributed by *ISI* (Figure 1) and by diaper use (Figure 2).

The prevalence of UI was 95.9% (47/49) with diaper use and 70.5% (189/268) without the use of it. In the distribution of the type of UI by age group it was found that the UI was higher in the 70 to 79 years old group with 18.6%, while the SUI and MUI were higher in the patients > 90 years old with 24.4% and 37.8 % respectively ($p < 0.0001$).

The comparison of *ISI* with IIQ-7 showed the highest scores in the level very severe *ISI* compared with slight ($p < 0.0001$) in the categories physical and social roles and the emotional limitation of IIQ-7 (Table 2). Regarding *ISI*, the very severe level had the highest score compared to the slight level in each question of UDI-6 (Table 3).

In patients who did not use diaper in the age group of 60–69 years, the *ISI* score had a median, CI of 4, 3–5 and this increased gradually until it reached to 5, 4–6 ($p < 0.01$) with the over 90 years group. No differences in severity were found by age group in patients who used a diaper. The *ISI* score (median, CI) was found higher in the group that used a diaper with 6, 5–7 and lower in the one that did not use a diaper of 5, 4–6 ($p < 0.0001$) (Table 4).

The medians (CI) of scores of IIQ-7 were compared with and

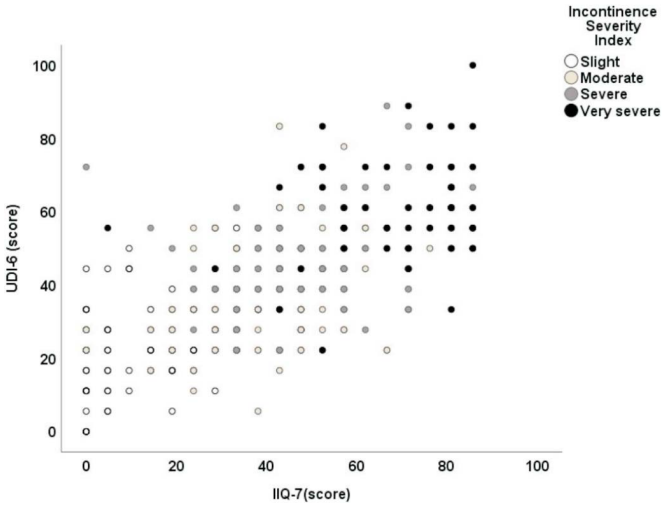

Figure 1. Spearman's correlation between the instruments of quality of life (IIQ-7) and Urogenital Distress Inventory (UDI-6) by level of severity of the UI.

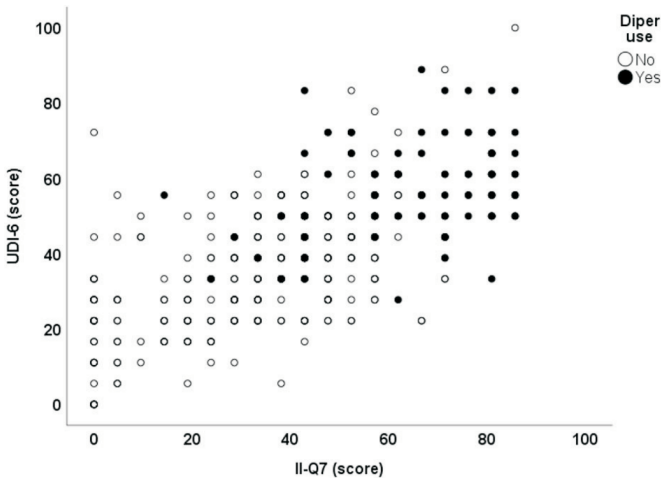

Figure 2. Spearman's correlation between the instruments of quality of life (IIQ-7) and Urogenital Distress Inventory (UDI-6) by use of diapers.

Table 2
Relationship of severity and quality of life.

IIQ-7	Incontinence Severity Index (ISI)			
	Slight	Moderate	Severe	Very severe
Role (Q1)	0	0	0	0
Physic (Q2–Q4*)	(17, 0–33)	(50, 33–67)	(67, 50–83)	(83, 67–100)
Social (Q3–Q5)*	(17, 0–33)	(50, 33–67)	(67, 50–83)	(83, 67–100)
Limitation-Emotional (Q6–Q7)*	(33, 0–33)	(33, 33–67)	(67, 33–67)	(100, 67–100)

n = 317 women; * Slight *versus* very severe p < 0.0001, (median, confidence interval).

Table 3
Urogenital distress inventory and severity.

UDI-6 Question	Incontinence Severity Index (ISI)				p*,**
	Slight*	Moderate	Severe	Very severe*	
Q1 Do you experience frequent urination?	67, 33–67	67, 50–83	67, 67–100	67, 67–100	0.002
Q2 Do you experience urine leakege related to the feeling of urgency?	0, 0–33	33, 33–67	67, 33–67	67, 33–100	0.0001
Q3 Do you experience urine leakage related to physical activity, coughing or sneezing?	33, 0–33	33, 33–67	33, 33–67	67, 33–100	0.0001
Q4 Do you experience small amount of urine leakage; that is drops?	33, 0–33	33, 33–33	67, 67–67	100, 100–100	0.0001
Q5 Do you experience difficulty emptying your bladder?	0, 0–33	0, 0–33	33, 0–67	0, 0–67	0.01
Q6 Do you experience pain in the lower abdominal or genital area?	22, 17–33	0, 0–33	0, 0–42	0, 0–33	0.03

n = 317 women; * Slight *versus* very severe. Median, confidence interval. ** Kruskal-walls.

Table 4
Incontinence Severity Index and diper use.

Incontinence Severity Index	Diper use	
Age (yrs)	No	Yes
60–69	4, 3–5	NA
70–79	4, 3–5	5, 5–6
80–89	5, 4–6	6, 6–7
> 90	5, 4–6	6, 5–7
P < 0.01	n = 268	n = 49

Median, confidence intervals.

without diaper usage. It was found that in physical domain, social and emotional limitation improved to 50 (33–67), 50 (33–67) and 33 (33–67) concerning those who used a diaper of 83 (67–100), 83 (67–100) and 67 (48–81) (p < 0.0001) (Table 5).

Likewise, the quality of life with the type of UI showed higher scores with the use of diaper, having values by questions compared without diaper usage (Table 5).

4. Discussion

The UI is defined as any loss of urine,[15] and its presence correlates to a person's quality of life. Currently, various tests are used to quantify it. However, they are not validated in Mexico. This is the first study conducted in Mexico using the UDI-6, IIQ-7 and *ISI* questionnaires showing good reliability.

The internal consistency of those questionnaires in the studies conducted in China, Hebrew and Polish show (Cronbach's α) ranges for UDI-6 were 0.600 to 0.910 and for IIQ-7 they were from 0.620 to 0.890;[11,16,17] The Dutch adaptation of the UDI-6 questionnaire and IIQ-7 showed ranges from 0.870 and 0.860 respectively.[18] Also, in China, Turkey, Spain is the highest score to IIQ-7 and UDI-6 obtained a Cronbach α UDI-6 of 0.973 and for IIQ-7 of 0.980.[18,19] Moreover, the validation of the Spanish Cronbach's α was 0.667 for the UDI-6 and 0.910 for the IIQ-7.[12] Our internal consistency is in accordance with the results seen by Spain. Although, our study only included elderly women who lived in nursing homes.

The questionnaires UDI-6 and IIQ-7 assessments have good internal concordance, which are accessible and inexpensive to perform in isolated patients.[13,18,19] That is because the small adaptation made of the UDI-6 and IIQ-7 to the Mexican version made them reproducible instruments, easy to use, and understandable for elderly women who live in nursing homes in Mexico.

The test and *ISI* showed low reliability and strengthen the as-

Table 5
Quality of life with the diaper use in older adults with urinary incontinence.

UDI-6 (score)	Diper use		*p*
	No	Yes	
Q1 Do you experience frequent urination?	67, 33–100	67, 67–100	0.01
Q2 Do you experience urine leakege related to the feeling of urgency?	33, 0–67	100, 67–100	0.0001
Q3 Do you experience urine leakage related to physical activity, coughing or sneezing?	33, 33–67	67, 33–100	0.0001
Q4 Do you experience small amount of urine leakage; that is drops?	33, 33–67	67, 67–100	0.0001
Q5 Do you experience difficulty emptying your bladder?	0, 0–33	33, 0–67	0.0001
Q6 Do you experience pain in the lower abdominal or genital area?	0, 0–33	33, 0–33	0.01
Total UDI-6	33, 22–50	56, 50–66	0.0001
IIQ-7 (score)	No	Yes	*P*
Role (Q1)	0	0	NS
Physic (Q2–Q4)	50, 33–67	83, 67–100	0.0001
Social (Q3–Q5)	50, 33–67	83, 67–100	0.0001
Limitation Emotional (Q6–Q7)	33, 33–67	67, 67–100	0.0001
Total IIQ-7	38, 22–50	67, 48–81	0.0001

Question (Q), n = 317; medians, confidence interval

sessment of UI and its conditions. The low reliability could be because this test comprises only two questions to assess the severity of this condition.

Furthermore, the results obtained show a population with various chronic diseases and nursing homes, which are public or charitable institutions without enough strategies to care for patients.[20]

A directly proportional correlation was found between UDI-6 and QII-7, and the *ISI* level is higher as the scores increase. They seem to be closely related factors that go hand in hand. However, we do not know what the relationship between them is.[7,8,19] Henceforth studies are needed to analyze whether severity regulates both quality of life and Urogenital Distress.

On the other hand, among the frequent providers for UI in the older population at home is diaper handling. The frequency of diaper usage is not related to the age group. However, this study found a relationship in the population of nursing homes studied that presented a high frequency of UI with the use of diapers. Additionally, the physical, social and limitation-emotional quality of life of Urogenital Distress almost doubled the score with the use of diapers.

A meta-analysis about hospital care factors that favors UI in the elderly included 13 articles and showed that there is an unjustified and indiscriminate use of diapers.[20] In Brazil, 38% of hospitalized elderly people had no reason to use diapers, because they had no UI.[21]

Furthermore, 48.4% of Nursing Home's residence in Texas, USA showed a prevalence of UI.[4] Whereas, the current study showed almost the double, and a quarter of them used diaper. Conditions must be improved within this population to allow them to be more independent, with a higher quality of life. Strategies to recover pelvic floor functions, as far as possible, should be evaluated as indicators of severity and quality of life in patients with UI in nursing homes.

Finally, the UDI-6 and IIQ-7 (short form) were valid and reliable questionnaires for the Mexican population of elderly women in nursing homes with UI. These tests will be useful to improve their quality of life in nursing homes in the metropolitan area of Guadalajara, Mexico. The Mexican Spanish adaptation of the UDI-6 and IIQ-7 (short form) had good reliability in elderly women from nursing homes in Mexico.

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Conflicts of interest

The authors declare no conflict of interest.

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