

Translation and Validation of the Korean Version of MUDI and MUSIQ with Urinary Incontinent Older Men

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Purpose: The purpose of this study was to evaluate the psychometric properties of the Korean version of the Male Urinary Distress Inventory (MUDI) and Male Urinary Symptom Impact Questionnaire (MUSIQ). **Patients and Methods:** A convenient sample of community-dwelling older men with urinary incontinence participated. A cross-sectional survey design was used for this study. A panel of experts completed the initial translation into Korean and back-translated the MUDI and MUSIQ. Upon establishment of the content and translation equivalence between English and Korean versions of the MUDI and MUSIQ, psychometric properties were evaluated for reliability, concurrent, and construct validity with a sample of 143 older men. **Results:** The internal consistencies of both instruments were found to be acceptable, and Cronbach's coefficients were 0.88 for the MUDI-K and 0.92 for the MUSIQ-K. A significant moderate correlation between MUDI-K and MUSIQ-K was found in this study, indicating modest concurrent validity between these 2 instruments ($r = 0.56, p < 0.001$). For construct validity, the mean scores of the MUDI-K were significantly different for age, marital status, prostate surgery, erectile dysfunction, and depression ($p < 0.05$). The means scores of MUSIQ-K were significantly different for depression ($p < 0.05$) only. For both the MUDI-K and MUSIQ-K, 7 factors were extracted, accounting for 68.1% and 72.1% of the variance. **Conclusion:** Results of this study suggest that the MUDI-K and MUSIQ-K can be used as a reliable and valid measure of health-related quality of life in community-dwelling Korean older men with urinary incontinence.

Key Words: Urinary incontinence, aged, health measurement scale

INTRODUCTION

Urinary incontinence (UI) in older men and

women is an important and complex clinical issue because of its significant impact on the quality of life of the elderly. This problem has been documented in many studies across cultures.¹⁻⁴ Depending on the population studies, prevalence estimates of urinary incontinence vary widely. Based on US report in 2000, urinary incontinence affects an estimated 17% of men 60 years of age and older.⁵ In Japan, it was found that the incidence rate of urinary incontinence, occurring almost daily, in hospitalized men aged 60 and over was 23.3%.⁶ In Korea, 11.3% of men over the age of 60 and 25.8% of men over 70 years of age suffer from urinary incontinence.⁷

The potential impact of urinary incontinence results in negative health-related quality of life among men.^{2,8,9} To promote the quality of life of this population, it would be necessary to assess how they get affected and from what specific problem they get distressed.

The Male Urinary Distress Inventory (MUDI) and Male Urinary Symptom Impact Questionnaire (MUSIQ)¹⁰ are the instruments with which many health professionals assess the health-related quality of life of men with lower urinary tract symptoms (LUTS). These measures were developed, based on the Incontinence Impact Questionnaire (IIQ) and the Urogenital Distress Inventory (UDI) designed for women.

The MUDI with 27 items has a 5-point scale (1 = symptom not present, 2 = symptom present but not bothersome, 3 = symptom present and slightly bothersome, 4 = symptom present and moderately bothersome, and 5 = symptom present and greatly bothersome). The MUDI ranges from 27 (no symptom) to 135 (27 symptoms, each with the

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maximum degree of associated distress). It includes 7 interpretable factors; stress symptoms, irritative symptoms, obstructive symptoms, pain, situational urgency, contact urgency, and emotional urgency. The MUSIQ has 32 items and a 4-point scale (0 = not at all, 1 = slightly, 2 = moderately, and 3 = greatly). The MUSIQ ranges from 0 (no impact) to 96 (maximum impact). Six factors including activity, social contact, emotional health, self-confidence, stability of support, and sleep were conceptually derived through factor analysis.

Although there have been several studies on the quality of life among men with urinary incontinence, little attention has been paid to health-related quality of life specific to Korean older men with such health problem. Therefore, systematic studies are needed to examine and quantify distress and impact on urinary symptom to measure health-related quality of life of Korean elders in modern, aging society.

Despite critical clinical implications, no cross-culturally validated Korean language measures are currently available to quantify health-related quality of life of older men with urinary incontinence. Hence, the establishment of a quality, cross-culturally validated instrument is in need. In this study, the existing MUDI and MUSIQ were translated into Korean, and the psychometric properties of the Korean version of MUDI-K and MUSIQ-K were tested.

PATIENTS AND METHODS

The psychometric properties of the MUDI-K and MUSIQ-K were established in 3 phases. In phase I, the content validity and equivalence between the Korean and English version of the instruments were examined. In phase II, internal consistency and concurrent validity were established. In phase III, hypotheses were tested to establish construct validity.

Phase I. Establishing content validity and equivalence

Cross-cultural equivalence

For cross-cultural research, functional and linguistic equivalence were evaluated as suggested in previous studies.^{11,12} Functional equivalence was as-

sessed by reviewing literature to identify applicability to another culture.^{11,13,14} Prior to translating the original MUDI and MUSIQ, the content and context of each item were clarified by the researchers. All items in the original English version of MUDI and MUSIQ were relevant to Korean culture. Next, linguistic equivalence was evaluated by verifying content and semantic equivalence.^{11,12,15}

Translating/Back translating

After justification of the context of distress and impact of urinary incontinence, the original MUDI and MUSIQ were translated into Korean by a bilingual nursing professor who is an expert in urinary incontinence research. After the MUDI and MUSIQ were translated, a bilingual researcher with Ph.D translated the Korean version back into English. The both translators had more than 7 years of formal English education, completed their graduate program and earned either Master's or PhD nursing degree in the US.

With the exception of "do you wet the bed?", all items of the MUDI were simple to understand and were appropriate to Korean culture. In contrast to western people who use bed on carpeted bedroom floor, most of Korean use sleeping mat(called 'Yo' in Korean) on the top of 'Ondol' bedroom floor which is traditional Korean style. Therefore, 'bed' in the original version was translated into sleeping mat in the Korean version.

Of 32 items in MUSIQ, with the exception of "your ability to go on vacation", 31 items were appropriate to understand and be translated in Korean cultural context. In Korea, most retired older men are not currently employed, therefore the word 'vacation' in the original version was judged to be insignificant for the Korean older men. Hence, the 'vacation' was translated into 'taking a trip for rest'.

Establishing content equivalence

To confirm the linguistic equivalence between the original and back translated version of the MUDI and MUSIQ, the content equivalence of each item of instruments was evaluated by Dr. Robinson who developed the original instruments. All items in the back translated version were found to have the same meaning as the original version.

Clarifying semantic equivalence

To generate the final Korean version of MUDI and MUSIQ, the semantic meaning was clarified by refining the wording of each item of the Korean version of MUDI and MUSIQ by researchers. The final Korean version of MUDI (MUDI-K) and MUSIQ (MUSIQ-K) was confirmed to have the same meaning, as in the original English version of MUDI and MUSIQ.

Field testing

Prior to the psychometric evaluation with a target population, a field test was conducted with 5 bilingual graduate and post-graduate students and professors who could fluently read and understand Korean and English. Five bilingual persons rated all items using 4-point rating scale; 1 = equivalent, 2 = almost equivalent, 3 = almost not equivalent, 4 = not equivalent in the instruments for the Content Validity Index (CVI) analysis. The CVI was computed as the proportion of items given ratings of '1' and '2'.¹⁶ All items in MUDI-K and MUSIQ-K were rated as either equivalent, or almost equivalent and yielded a CVI of 1.00.

Phase II. Determining internal consistency and concurrent validity

Internal consistency of both MUDI-K and MUSIQ-K was estimated using Cronbach's coefficient. The corrected item-total correlation coefficients were calculated for each item of the both scales. Items whose correlation coefficients were under 0.15 were considered to be poorly correlated with total scale scores.

For concurrent validity, the correlation between MUDI-K scores and MUSIQ-K scores was calculated. Positive correlations between the MUDI-K scores and the MUSIQ-K scores were expected, meaning that the more the distress of urinary symptoms, the more impact on quality of life.

Phase III. Verifying construct validity

In order to establish construct validity of MUDI-K and MUSIQ-K, both known group comparison and principle component analysis were investigated. Known group comparison was conducted by tes-

ting theoretical hypotheses based on the existing literature.¹⁷ In this study, it was hypothesized that those who are older, have no spouse, and have history of hypertension, diabetes mellitus, prostate surgery, erectile dysfunction, or depression would have higher score on MUDI-K and MUSIQ-K.¹⁸⁻²¹ A factor analysis of the MUDI-K with 27 items and MUSIQ-K with 32 items was performed using the principle component analysis with extraction method and varimax rotation method.

Design and sample

A descriptive, cross-sectional survey method was used. Data were collected with a non-probability sampling strategy using structured format face-to-face interviews. A convenience sample of community-dwelling older men with lower urinary tract symptoms (LUTS) was recruited over a 5-month period in the waiting room of the urology outpatient clinic at a suburban general hospital in Korea. The sampling criteria were (1) had episodes of urine leakage in the past, (2) able to communicate, and (3) agree to participate. A total of 143 male subjects participated.

Data collection

After obtaining approval from human subjects committee of the medical center and university, the urology outpatient clinic was contacted and permission was obtained. Research assistants asked potential participants for permission to describe the study to them. Potential participants were given explanation of the study, and informed written consents were obtained. The participants were given the option of completing instruments independently or with assistance by research assistants.

Data analysis

Data were managed and analyzed using the Statistical Package for the Social Science (SPSS) software version 11.0. Descriptive statistics were obtained; the frequency, mean, standard deviation, distribution of each item, and subscales of the MUDI-K and MUSIQ-K were analyzed. For internal consistency, Cronbach's alpha was utilized for subscales and overall score of two instru-

ments. For concurrent validity, Pearson's correlation coefficient between the degree of urinary incontinence and MUDI-K and MUSIQ-K was used. The statistical significant level was set at a p value of less than 0.05. Construct validity was evaluated by two different methods; 1) t-test and Analysis of Variance test to examine differences in mean scores on both instruments with regard to demographic variables and health problems and 2) principle component analysis.

RESULTS

Description of sample

The age of the subjects ranged from 46 to 93 years with a mean of 66.9 years ($SD = 8.5$), and 53.8% were 70 years or older. The majority of the men were married (90.9%), and over half of the participants (55.2%) were not working. Ninety participants (62.9%) had middle school education or higher. The 3 most prevalent self-reported health problems were erectile dysfunction (53.8%), hypertension (37.8%), and diabetes mellitus (21.7%). Other self-reported problems were cardiovascular disease (10.5%), prostate surgery (9.1%), depression (7.0%), and stroke (4.9%).

Descriptive statistics for the MUDI-K and MUSIQ-K

Descriptive statistics for the MUDI-K and MUSIQ-K are shown in Table 1. The MUDI-K scores ranged from 27 to 99, with a mean of 44.15 ($SD = 13.14$). The MUSIQ-K scores ranged from 0 to 67, with a mean of 10.50 ($SD = 11.56$). All mean scores for the MUDI-K and MUSIQ-K were lower than those of the English version of MUDI and MUSIQ.

Reliability

In this study, both instruments demonstrated internal consistency, with Cronbach's coefficients of 0.88 and 0.92 for the MUDI-K and the MUSIQ-K respectively. No items of the MUSIQ-K and MUSIQ-K showed corrected item-total correlation coefficients smaller than 0.15 (Table 2).

Concurrent validity

As expected, the relationship was statistically significant between distress and impact associated with urinary symptom which represents health related quality of life. In Table 2, significant moderate correlation between MUDI-K and MUSIQ-K was found at 0.563 ($p < 0.001$), indicating modest concurrent validity between distress and impact instruments. This finding showed results similar to the English version of MUDI and MUSIQ ($r = 0.59$, $p < 0.001$).¹⁰

Construct validity

Table 3 shows results of t-test and analysis of variance that were used to examine the differences in mean scores on MUDI-K and MUSIQ-K with regard to subjects' socio-demographic characteristics and self-reported health problems.

As expected, the mean scores of the MUDI-K were significantly different depending on age, marital status, prostate surgery, erectile dysfunction, and depression, ($p < 0.05$): indicating that MUDI-K scores were higher in older age and the subjects with no spouse, with a history of prostate surgery, erectile dysfunction, and depression. The mean scores of MUDI-K were higher in subjects with hypertension, and diabetes mellitus, but the

Table 1. Descriptive Statistics and Reliability Coefficient of MUDI-K and MUSIQ-K

| Subscales | Items | Mean \pm SD | Alphas |
|---------------------|-------|-----------------|--------|
| MUDI-K | 27 | 44.2 \pm 13.1 | 0.88 |
| MUDI ¹⁰ | 27 | 59.3 \pm 16.9 | 0.89 |
| MUSIQ-K | 32 | 10.5 \pm 11.6 | 0.92 |
| MUSIQ ¹⁰ | 32 | 15.5 \pm 17.6 | 0.95 |

MUDI-K, Male Urinary Distress Inventory-Korean; MUSIQ-K, Male Urinary Symptom Impact Questionnaire-Korean.

Table 2. Corrected Item-Total Correlations for Items of the MUDI-K and MUSIQ-K

| | | Corrected item-total correlation |
|---------|--|----------------------------------|
| MUDI-K | 1. Urinating often | 0.553 |
| | 2. Urinating more than once or twice per night | 0.502 |
| | 3. Urinating more during the night than during the day | 0.245 |
| | 4. Trouble starting a stream | 0.565 |
| | 5. Weak stream | 0.488 |
| | 6. Trouble with bladder emptying | 0.515 |
| | 7. Feeling urine left in bladder after urinating | 0.527 |
| | 8. Pain when urinating | 0.533 |
| | 9. Lower abdominal or perineal pain | 0.401 |
| | 10. Suprapubic heaviness or pressure | 0.527 |
| | 11. Sharp suprapubic pain lasting more than a few minutes | 0.329 |
| | 12. Sudden or strong urges to urinate | 0.490 |
| | 13. Urgency when getting close to home | 0.325 |
| | 14. Urgency when going from a warm to a cold place | 0.442 |
| | 15. Urgency while standing or walking in water | 0.473 |
| | 16. Urgency when hearing bad news or under sudden stress | 0.505 |
| | 17. Urgency when first waking up in the morning | 0.631 |
| | 18. Urgency when turning on a water faucet | 0.274 |
| | 19. Leaking drops of urine | 0.496 |
| | 20. Constant dripping | 0.150 |
| | 21. Wetting the bed | 0.151 |
| | 22. Leaking when changing from a sitting to a standing position | 0.389 |
| | 23. Leaking with coughing, laughing, or physical activity | 0.495 |
| | 24. Leaking after activities associated with shortness of breath | 0.445 |
| | 25. Leaking with lifting | 0.390 |
| | 26. Leaking because of dripping | 0.340 |
| | 27. Leaking with neither activity nor urge | 0.453 |
| MUSIQ-K | 1. What do you do when you go out | 0.553 |
| | 2. Church or temple attendance | 0.608 |
| | 3. Doing usual tasks or repair work | 0.539 |
| | 4. Shopping trips | 0.670 |
| | 5. Traveling less than 20 minutes from home | 0.561 |
| | 6. Traveling more than 20 minutes from home | 0.669 |
| | 7. Inviting friends to visit | 0.463 |
| | 8. Hobbies | 0.495 |
| | 9. Going places when you don't know where the bathroom is | 0.626 |
| | 10. Participating in social activities away from home | 0.369 |
| | 11. Physical exercise | 0.620 |
| | 12. Feeling about yourself | 0.492 |
| | 13. Going on vacation | 0.675 |
| | 14. Friendships | 0.547 |
| | 15. Working outside the home | 0.642 |
| | 16. Closeness to family members other than wife or partner | 0.365 |
| | 17. Sex life | 0.512 |
| | 18. Mood or outlook on life | 0.651 |
| | 19. Manner or dress | 0.450 |
| | 20. Seeing a doctor or dentist | 0.509 |
| | 21. Quality of sleep | 0.362 |
| | 22. Quantity of sleep | 0.324 |
| | 23. Closeness to wife or partner | 0.491 |
| | 24. Ability to pay bills | 0.226 |
| | 25. Fear of embarrassment | 0.588 |
| | 26. Leaking because of dripping | 0.407 |
| | 27. Feeling nervous or anxious | 0.606 |
| | 28. Feeling afraid | 0.673 |
| | 29. Feeling frustrated | 0.613 |
| | 30. Feeling angry | 0.561 |
| | 31. Feeling depressed | 0.653 |
| | 32. Feeling embarrassed | 0.595 |

MUDI-K, Male Urinary Distress Inventory-Korean; MUSIQ-K, Male Urinary Symptom Impact Questionnaire-Korean.

Table 3. Analysis of Variance in MUDI-K and MUSIQ-K Scores for Sociodemographic Variables and Health Problem Variables

| Variable | MUDI-K | | | | | MUSIQ-K | | | | |
|----------------------|--------|------|------|------|---------|---------|------|------|------|---------|
| | n | Mean | SD | t/F | p value | n | Mean | SD | t/F | p value |
| Age (yrs) | | | | | | | | | | |
| < 70 | 93 | 42.0 | 12.1 | 2.7 | 0.007 | 93 | 9.9 | 10.6 | -0.9 | 0.366 |
| ≥ 70 | 50 | 48.1 | 14.1 | | | 50 | 11.7 | 13.2 | | |
| Spouse | | | | | | | | | | |
| Yes | 130 | 43.3 | 12.4 | 2.5 | 0.013 | 130 | 10.2 | 11.1 | 1.1 | 0.265 |
| No | 13 | 52.8 | 17.5 | | | 13 | 13.9 | 15.3 | | |
| Hypertension | | | | | | | | | | |
| Yes | 54 | 44.7 | 14.6 | -0.3 | 0.685 | 54 | 12.1 | 13.5 | 1.3 | 0.191 |
| No | 89 | 43.8 | 12.3 | | | 89 | 9.5 | 10.1 | | |
| Diabetes mellitus | | | | | | | | | | |
| Yes | 31 | 46.3 | 15.8 | -1.0 | 0.308 | 31 | 14.2 | 15.8 | -1.6 | 0.127 |
| No | 112 | 43.6 | 12.3 | | | 112 | 9.5 | 9.9 | | |
| Prostate surgery | | | | | | | | | | |
| Yes | 13 | 52.8 | 16.1 | -2.5 | 0.013 | 13 | 14.8 | 11.8 | -1.4 | 0.156 |
| No | 130 | 43.3 | 12.6 | | | 130 | 10.1 | 11.5 | | |
| Erectile dysfunction | | | | | | | | | | |
| Yes | 66 | 47.4 | 15.7 | 2.7 | 0.005 | 66 | 12.3 | 12.9 | 1.7 | 0.090 |
| No | 77 | 41.3 | 9.8 | | | 77 | 8.9 | 8.9 | | |
| Depression | | | | | | | | | | |
| Yes | 10 | 53.6 | 19.5 | -2.4 | 0.018 | 10 | 23.3 | 17.7 | 2.4 | 0.037 |
| No | 133 | 43.4 | 12.3 | | | 133 | 9.5 | 10.4 | | |

MUDI-K, Male Urinary Distress Inventory-Korean; MUSIQ-K, Male Urinary Symptom Impact Questionnaire-Korean.

difference did not reach the statistical significance.

The mean scores of MUSIQ-K were significantly different for depression ($p = 0.037$) only. The MUSIQ-K scores were high in older men and in elders with no spouse, a history of prostate surgery, erectile dysfunction, hypertension, and diabetes mellitus, but did not reach the statistical significance.

Construct validity was also confirmed by factor analysis (Table 4). For MUDI-K, 7 factors consisted of 27 items were extracted with eigen values greater than 1.00, accounting for 68.1% of the total item variance. MUDI-K with all of the original 27 items was shown to have 7 latent factors. For MUSIQ-K, seven factors with eigen values greater than 1.00

explained 72.1% of the variance. MUSIQ-K with 32 items was shown to have seven latent factors.

DISCUSSION

Urinary incontinence is a common problem in older men and women and can affect their daily lives. Especially, incontinence can have a deleterious impact on their everyday lives. To our best knowledge this is the first study to investigate the distress and quality of life among elderly Korean men with UI, and was conducted to validate the MUDI and MUSIQ among community dwelling

Table 4. Factor Loadings Explained from the Principle Component Analysis of the MUDI-K and MUSIQ-K

| | Factor | Items | Loading | |
|--------------------------------|---|--|---|-------|
| MUDI-K | Feelings of heaviness | 4. Trouble starting a stream | 0.630 | |
| | | 5. Weak stream | 0.729 | |
| | | 6. Trouble with bladder emptying | 0.831 | |
| | | 7. Feeling urine left in bladder after urinating | 0.754 | |
| | | 19. Leaking drops of urine | 0.494 | |
| | | 10. Suprapubic heaviness or pressure | 0.532 | |
| | | 1. Urinating often | 0.551 | |
| | | Pain | 9. Lower abdominal or perineal pain | 0.767 |
| | | | 11. Sharp suprapubic pain lasting more than a few minutes | 0.889 |
| | | | 8. Pain when urinating | 0.663 |
| | Physical distress | 12. Sudden or strong urges to urinate | 0.561 | |
| | | 24. Leaking after activities associated with shortness of breath | 0.817 | |
| | | 25. Leaking with lifting | 0.732 | |
| | | 20. Constant dripping | 0.317 | |
| | Emotional distress | 26. Leaking because of dripping | 0.597 | |
| | | 16. Urgency when hearing bad news or under sudden stress | 0.457 | |
| | | 21. Wetting the bed | 0.704 | |
| | Contact urgent distress | 22. Leaking when changing from a sitting to a standing position | 0.784 | |
| | | 27. Leaking with neither activity nor urge | 0.678 | |
| | | 15. Urgency while standing or walking in water | 0.641 | |
| | Situational urgent distress | 18. Urgency when turning on a water faucet | 0.721 | |
| | | 23. Leaking with coughing, laughing, or physical activity | 0.735 | |
| | | 13. Urgency when getting close to home | 0.717 | |
| | Nocturnal distress | 14. Urgency when going from a warm to a cold place | 0.486 | |
| | | 17. Urgency when first waking up in the morning | 0.390 | |
| | | 2. Urinating more than once or twice per night | 0.519 | |
| | MUSIQ-K | Emotion | 3. Urinating more during the night than during the day | 0.311 |
| 27. Feeling nervous or anxious | | | 0.778 | |
| 28. Feeling afraid | | | 0.806 | |
| 29. Feeling frustrated | | | 0.753 | |
| 30. Feeling angry | | | 0.752 | |
| 31. Feeling depressed | | | 0.806 | |
| 32. Feeling embarrassed | | | 0.662 | |
| 12. Feeling about yourself | | | 0.596 | |
| 18. Mood or outlook on life | | | 0.649 | |
| 17. Sex life | | | 0.449 | |
| Activity | | 2. Church or temple attendance | 0.774 | |
| | | 3. Doing usual tasks or repair work | 0.885 | |
| | | 4. Shopping trips | 0.518 | |
| | | 8. Hobbies | 0.694 | |
| | | 11. Physical exercise | 0.650 | |
| | | 10. Participating in social activities away from home | 0.562 | |
| Social contact | | 13. Going on vacation | 0.735 | |
| | | 14. Friendships | 0.546 | |
| | | 15. Working outside the home | 0.664 | |
| Sleep and social support | | 20. Seeing a doctor or dentist | 0.617 | |
| | | 1. What you do when you go out | 0.598 | |
| | | 21. Quality of sleep | 0.800 | |
| | | 22. Quantity of sleep | 0.875 | |
| Fear of body image | | 16. Closeness to family members other than wife or partner | 0.661 | |
| | | 23. Closeness to wife or partner | 0.790 | |
| | | 24. Ability to pay bills | 0.814 | |
| Transportation | | 19. Manner or dress | 0.778 | |
| | 26. Fear of odor | 0.706 | | |
| Fear of embarrassment | 5. Traveling less than 20 minutes from home | 0.695 | | |
| | 6. Traveling more than 20 minutes from home | 0.709 | | |
| | 7. Inviting friends to visit | 0.667 | | |
| | | 9. Going places when you don't know where the bathroom is | 0.762 | |
| | | 25. Fear of embarrassment | 0.583 | |

MUDI-K, Male Urinary Distress Inventory-Korean; MUSIQ-K, Male Urinary Symptom Impact Questionnaire-Korean.

male elders with urinary incontinence in Korea.

In this study, the internal consistencies of both instruments, MUDI-K and MUSIQ-K, were found to be acceptable. Consistent with results of the English version of MUDI and MUSIQ in the Robinson and Shea¹⁰ study, a significant moderate correlation between MUDI-K and MUSIQ-K was found in this study, indicating modest concurrent validity between these 2 instruments.

The theoretical structures of the MUDI-K and MUSIQ-K were also confirmed by principle component analysis. For MUDI-K, the seven factors reflected physical dimensions of urogenital distress experienced by Korean older men with urinary incontinence. Results of this study support similar findings that about 74.3% of men with genitourinary cancer had moderate to severe discomfort from lower urinary tract symptoms such as nocturia, weak stream, urgency, and intermittency,²² and men with urinary incontinence had more bothersome limitations in daily activities.²³ For MUSIQ-K, the fifth (fear of body image) and the seventh (fear of embarrassment) among the seven factors reflected more unique dimensions of urinary symptom impact, experienced by Korean older men. One possible explanation of this finding would be cultural differences in viewing the impact on quality life of older men in Korea. It is assumed in Korean culture that elders should especially be respected. Feelings of degradation related to elders' experience with UI, however, impinged on their self-esteem, ultimately resulting in a negative impact on quality of life. The latent dimension captures the fear of not being respected as an older man, hence, and is regarded as one of the most stressful situations which they feel.

The relationships between scores on the distress of urogenital symptoms and urinary symptom impact, and sociodemographic and health problems data support the construct validity of MUDI-K and MUSIQ-K. For age, there was a significant difference on MUDI-K, but no significant difference on MUSIQ-K, indicating that older men felt less impact from urinary symptoms, but more distress from urogenital symptoms compared to younger men, which was similar to the findings of a study by Girman et al.¹⁵ This is, however, inconsistent with findings from the study by Robinson and Shea,¹⁰ in which only MUSIQ scores

were significantly higher in younger men than in older men. In other study by Ku et al.,²⁴ pain severity had the most predictive factor for distress and quality of life impact in younger Korean men with urinary incontinence. Further studies with a variety of samples to examine the relationship between demographic factors (i.e., age) and troublesome and impact of urinary symptoms would be valuable.

As expected, absence of spouse was a significant factor on distress and impact on urogenital symptoms in Korean men with UI. This finding is not consistent with findings from Robinson and Shea¹⁰ study, and may imply that elders even with spouse in the traditional Korean family system might naturally expect to be cared for by their adult children when they get sick. The spousal support could be a significant factor to influence the quality of life among older men, because urogenital problem could be a threat not only to their expectation for respect of age but also to self-esteem. These results may support cultural differences in distress and quality of life among men with UI between Korea and the USA. Future research is needed to examine the impact on the quality of life in regard with the relationship of spousal support cross-culturally, particularly among older men with urinary incontinence.

Results of this study consistently support findings that higher MUDI-K and MUSIQ-K scores represent effects of depression.¹⁰ Consistent with studies in the US, the present results showed that in Korea there was a statistically significant difference in both MUDI-K and MUSIQ-K between men with UI who were depressed and those who were not. These findings were similar to those of other studies.^{25,26} Thus, it is concluded that psychological problem (i.e. depression) could be identified, using the MUDI-K and MUSIQ-K, as a measurement of the construct Health Related Quality of Life (HRQL).

Participants in this study and the study by Robinson and Shea¹⁰ did not reflect representative samples, nevertheless, the results of these studies support the feasibility of both MUDI and MUSIQ to measure the construct of HRQL in men with continence problems. In future studies, these validated instruments can be used in practice and research to evaluate the effect of intervention for

health related quality of life of men with urinary incontinence.

In conclusion, results of this study demonstrated that the MUDI-K and MUSIQ-K can be used as a reliable and valid measure of health-related quality of life in community dwelling Korean men with urinary incontinence. The method, including translation, back-translation, and field-testing, was appropriate to examine the psychometric properties of a translated version of the instrument. This is the first research study conducted on distress and impact of urinary symptoms in community dwelling older men with urinary incontinence in Korea. Therefore, the results described herein can be an important basis for future research and clinical application. Further studies to evaluate factor structure and test-retest reliability of the MUDI-K and MUSIQ-K would be worthwhile.

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