



Cultural adaptation and validation of the Turkish CONTILIFE: a quality of life questionnaire for urinary incontinence

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Abstract

Introduction and hypothesis The objective of the present study was to adapt the CONTILIFE, a quality-of-life questionnaire, into Turkish and to reveal its psychometric properties in women suffering from stress urinary incontinence (SUI).

Methods Ninety-eight patients with a symptom of SUI participated in the study and filled out the Turkish CONTILIFE. Cronbach's alpha (α) and intraclass correlation coefficients (ICCs) were evaluated for the internal consistency and test-retest reliability, respectively. Exploratory factor analysis was performed to determine the underlying structure. Criterion validity was analyzed using the correlation coefficients between the total and subscale scores of the CONTILIFE and King's Health Questionnaire (KHQ), the Incontinence Impact Questionnaire-7 (IIQ-7), and the Urinary Distress Inventory-6 (UDI-6).

Results Internal consistency was found to be strong to very strong (Cronbach's α : 0.90–0.96). Test-retest reliability was very strong (ICCs = 0.91–0.98, $p < 0.001$). Exploratory factor analysis revealed five significant factors, explained by 74% of the total variance. Total scores on the CONTILIFE were significantly correlated with the KHQ subscales ($r = -0.43$ – -0.81), IIQ-7 ($r = -0.89$), UDI-6 ($r = -0.66$), and ISI ($r = -0.66$); ($p < 0.01$).

Conclusion The Turkish CONTILIFE is a valid and reliable tool to determine the influence of SUI on health-related quality of life in Turkish women.

Keywords Stress urinary incontinence · Quality of life · Questionnaires · Validity · Reliability

Abbreviations

BMI	Body mass index
HRQoL	Health-related quality of life
ICC	Intraclass correlation coefficient
IIQ-7	Incontinence impact questionnaire
ISI	Incontinence severity index
KHQ	King's health questionnaire
QoL	Quality of life
SUI	Stress urinary incontinence
UDI-6	Urinary distress inventory
UI	Urinary incontinence

Introduction

Urinary incontinence (UI) is a common condition and defined as a complaint of any involuntary urinary leakage [1]. The global prevalence of UI is between 10% and 40% [2, 3]. In Turkey, studies have reported the rate of women suffering from UI in the range of 16.4% to 68.8% [4]. Stress urinary incontinence (SUI) is known as one of the most common types of UI, which occurs with effort, physical exertion, sneezing, or coughing [1]; it results in loss of self-esteem, feelings of helplessness, somatization, and deprivation. Consequently, it leads to reduced quality of life (QoL) [5, 6]. Additionally, outcomes of UI can be related to social embarrassment due to problems in social and personal relationships that influence psychosocial health [6].

Health-related QoL (HRQoL) is defined as a composite healthcare outcome and is categorized as follows: general, physical, social, and mental health [7]. There are a number of generic and urinary incontinence-specific measurements to determine the influences of UI on different aspects of life

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including general life, physical functioning, social functioning, emotional status, personal limitations, and quality of sleep [8]. Self-reported questionnaires are suggested to capture the subjective effect of UI on HRQoL in clinical settings or for research purposes [8]. However, it has been concluded that generic instruments such as Short Form 36 or the Nottingham Health Profile are also non-sensitive and not specific enough to determine the impairments in QoL specific to UI [9].

CONTILIFE, a quality-of-life questionnaire for urinary incontinence, is a condition-specific instrument to measure the influence of incontinence on QoL [10]. Cultural adaptation and validation of the CONTILIFE have been performed in six languages. Based on the International Consultation on Incontinence report, the CONTILIFE instrument was ranked as “grade A” in terms of the recommendation level [11]. The CONTILIFE is a more comprehensive questionnaire than Turkish validated questionnaires, namely King’s Health Questionnaire (KHQ) and the Incontinence Impact Questionnaire-7 (IIQ-7). Therefore, the CONTILIFE may provide a more elaborative evaluation of the impact of UI on QoL. It also includes a recall period of “over the last 4 weeks,” and the scoring of the total and subscale scores of the CONTILIFE is easy. In the literature, there is no study investigating the reliability and validity of the Turkish CONTILIFE. Additionally, possible correlations between the CONTILIFE and the objective severity of UI based on the results of the pad test or other QoL questionnaires (KHQ and IIQ-7) have not been reported yet. Culturally sensitive translation and psychometric analysis should be performed before the use of self-reported instruments [12]. Additionally, we believe that cultural adaptation of self-reported measurements is more feasible and cost-effective than the development of a new questionnaire. Therefore, the present study was aimed to perform cultural adaptation of the Turkish CONTILIFE, a quality of life questionnaire for urinary incontinence, and to determine the psychometric properties in Turkish patients suffering from SUI.

Materials and methods

Translation

In the present study, permission for the translation and validation process of the CONTILIFE was obtained from Gerard Amarenco [10]. Based on previous studies and guidelines [13–16], forward and backward translation methods were used to perform the cross-cultural adaptation. In stage 1, two independent professionals translated the CONTILIFE into Turkish. After the translated versions were harmonized as a first version (stage 2), a different professional translator performed a back-translation (stage 3). In stage 4, an expert committee including experienced researchers in the field of UI

produced the pre-final Turkish version of the CONTILIFE. Lastly, the pre-final version of the questionnaire was piloted in patients with SUI ($n = 20$) to determine the clarity of all items and their compatibility for Turkish patients (stage 5). The Turkish version of the CONTILIFE was finalized as the patients recruited for the pilot study indicated that clarity and understandability of the items were acceptable.

Participants

The present study recruited 123 patients with a diagnosis of SUI (pure SUI or stress-predominant UI) from the gynecology clinic of the university hospital between October 2017 and June 2018. Patients were referred to the department of physiotherapy and rehabilitation to be checked against the inclusion and exclusion criteria for their participation in the study and to fill out the questionnaires. Before completing the questionnaires, sociodemographic (age, level of education, marital status, occupation, and smoking) and physical characteristics [height, weight, and body mass index (BMI)] of the participants, parity, and menstrual status were recorded. The eligibility criteria were as follows: (1) > 18 years old; (2) diagnosis of pure SUI and stress-predominant UI based on the MESA questionnaire [17]; (3) sufficient literacy to complete the instruments; (4) a 24-h pad test value > 5 g. The MESA Urinary Incontinence Questionnaire consists of nine items on SUI and six items on urgency UI [17]. The response categories are as follows: (0) never, (1) rarely, (2) sometimes, and (3) often. Higher scores indicate more frequent symptoms of incontinence [17]. Exclusion criteria were: (1) \geq stage 3 pelvic organ prolapse, (2) medications for UI, (3) urinary tract infections, (4) pregnancy, (5) neurologic diseases, and (6) current cancer treatments.

The protocol of the present study was approved by the ethics committee of Hacettepe University (approval no. GO 17/719), and written informed consents were obtained from participants.

Questionnaires

The Turkish versions of the CONTILIFE, KHQ, IIQ-7, and UDI-6 were administered. For test-retest reliability, participants were asked to complete the CONTILIFE 1 week later. The Incontinence Severity Index (ISI) and 24-h pad test were used to assess the severity of SUI. Subjective severity of UI was evaluated by the ISI with two items regarding the frequency of incontinence and amount of leakage [18, 19]. The total score of the ISI is found by multiplying the scores of two items and ranges from 0 to 12 [18, 19]. Objective severity of UI was assessed by the 24-h pad test by calculating the weight gain of the used pads [7]. In the 24-h pad test, ≥ 4 g weight gain is accepted as significant [20]. Severity of UI is categorized as follows: a value between 5 and 20 g is mild, between 21 and

74 g is moderate, and > 75 g is severe [20]. The mean of the UI episodes was obtained from three 24-h frequency-volume charts, which were completed on separate days (for example, 2 weekdays and 1 weekend day).

CONTILIFE

The CONTILIFE is a self-reported QoL instrument for UI patients and contains 28 items and 6 subscales regarding daily activities, effort activities, self-image, emotional consequences, sexuality, and well-being [10]. Each item is scored on a five- (1–5) or six-point (0–5) Likert-type scale. All scores are converted to a scale score ranging from 0 (worse QoL) to 10 (better QoL) [14]. The reliability of the CONTILIFE was found to be strong to very strong [Cronbach's alpha (α) > 0.76; intraclass correlation coefficients (ICCs) = 0.87–0.94] [21].

King's Health Questionnaire (KHQ)

The KHQ is a 21-item self-reported instrument with four or five response categories for the evaluation of the incontinence impact on QoL in UI patients [22]. The KHQ consists of eight subscales. General health perceptions and incontinence impact are single-item subscales. Role limitations, physical limitations, social limitations, limitations in personal relationships, emotional problems, and sleep and energy disturbances are multiple-item subscales [22]. The score for each domain varies between 0 (best health) and 100 (worst health). Kaya et al. [13] reported that the Turkish KHQ had acceptable internal consistency (Cronbach's $\alpha \geq 0.68$) and test-retest reliability (0.68–0.83).

Incontinence Impact Questionnaire (IIQ-7) and Urinary Distress Inventory (UDI-6)

The IIQ-7 and UDI-6 are used for evaluating the impact of incontinence on QoL and symptom distress in patients with UI, respectively [23]. Total scores of these questionnaires range from 0 (low impact) to 100 (high impact). The Turkish IIQ-7 and UDI-6 were found to have strong internal consistency (Cronbach's $\alpha = 0.87$ and 0.74 , respectively) and very strong test-retest reliability (Spearman's rho 0.99) [23].

Statistical analysis

Statistical analyses were performed using the IBM SPSS software, version 21. The normality distribution of data was checked by the Kolmogorov-Smirnov test. Descriptive statistics were shown as mean and standard deviation, median (25%–75%), or number (percentage). Floor and ceiling effects were computed to analyze the proportion of the lowest and highest possible scores for all dimensions of the CONTILIFE.

Cronbach's α was calculated for the internal consistency of each domain and the total scale. It was reported that a Cronbach's α coefficient ≥ 0.7 was acceptable. Test-retest reliability was measured by intraclass correlation coefficients (ICCs) with the 95% confidence interval. Exploratory factor analysis was performed to evaluate construct validity. The Kaiser-Meyer-Olkin test of sampling adequacy and Bartlett's test were conducted to examine the suitability of data for factor analysis. The value of the Kaiser-Meyer-Olkin test was 0.931, and the Bartlett's test statistic was statistically significant at 2544.5 ($p < 0.001$). Based on these results, exploratory factor analysis was performed. In addition, no item was subtracted from the scale since the coefficients on the diagonal were > 0.80 in the anti-image matrix. The maximum likelihood method was used for the factor extraction, and factor loadings were rotated by Varimax with Kaiser normalization. Criterion validity was measured by Pearson correlation analysis, which revealed the correlations between the domains and/or total scores of the CONTILIFE, KHQ, ISI, IIQ-7, and UDI-6. Kruskal-Wallis test was performed to analyze the differences in total and subscale scores of the CONTILIFE among SUI mild, moderate, and severe groups. Cronbach's α coefficients, ICCs, and correlation coefficients were categorized as follows: weak ($0 < 0.40$), moderate (0.41–0.74), strong (0.75–0.90), and very strong (> 0.90). $p < 0.05$ was accepted as significant.

Results

The eligibility of 123 patients with SUI (pure SUI and stress-predominant UI) was screened for the present study. Thirteen patients did not meet the inclusion criteria [insufficient literacy ($n = 5$), POP \geq stage 3 ($n = 5$), neurologic diseases ($n = 3$)]. Twelve patients did not complete all questionnaires. Consequently, 98 patients completed the study, and all patients answered all items. Mean age was 49.56 ± 9.05 years, and mean BMI was 27.95 ± 3.77 kg/m². Of the 98 women, 47 were postmenopausal (48%). The majority of the sample was married (86%), and approximately 41% of the patients were employed. Based on the 24-h pad test, objective severity of SUI was categorized as follows: mild ($n = 32$), moderate ($n = 45$), and severe ($n = 21$). Demographic and clinical features are shown in Table 1.

Psychometric analysis

Reliability testing

Descriptive statistics, internal consistency, and test-retest reliability of the translated questionnaire are shown in Table 2. Subscales and all items of the Turkish CONTILIFE showed

Table 1 Demographic and clinical characteristics

	Patients with SUI (<i>n</i> = 98)
Age (years)	49.56 ± 9.05
BMI (kg/m ²)	27.95 ± 3.77
Education level (years)	11.0 (8.0–15.0)
Duration of SUI (years)	4.0 (2.0–6.0)
Pregnancies (<i>n</i>)	3.0 (2.0–5.0)
Parity (<i>n</i>)	2.0 (2.0–3.0)
Mode of delivery	
No delivery	7.0 (7.1)
Vaginal	71.0 (72.4)
Cesarean	15.0 (15.3)
Vaginal and cesarean	5.0 (5.1)
Postmenopausal status, yes	47.0 (48.0)
Married, yes	86.0 (87.8)
Employed, yes	40.0 (40.8)
Smoking status, yes	14.0 (14.3)
Chronic constipation, yes	20.0 (20.4)
Chronic cough, yes	15.0 (15.3)
Use of diuretics, yes	12.0 (12.2)
Use of antidepressants, yes	13.0 (13.3)
24-h pad test	
Mild	32.0 (32.7)
Moderate	45.0 (45.9)
Severe	21.0 (21.4)
SUI episodes	2.0 (1.0–2.66)

Data presented as mean ± SD, median (25%–75%) or frequency (%)

BMI body mass index, SUI stress urinary incontinence

strong to very strong internal consistency. Cronbach's α coefficients were found ranging from 0.90 to 0.96. Additionally, test-retest reliability for the total score of the CONTILIFE and the score of each subscale was found to be very strong (ICCs = 0.91–0.98, $p < 0.001$).

Floor and ceiling effects

Floor and ceiling effects of each subscale of the Turkish CONTILIFE are shown in Table 3. Floor and ceiling effects were calculated after converting the scores of items 17 and 28. A floor effect was found in the sexuality subscale of the CONTILIFE; 58.1% of the patients rated the items between 25 and 27 as score 1 revealing that SUI has less impact on the sexuality subscale compared with the other subscales. On the other hand, a score of 5 was given by 13.2% of the patients for the well-being subscale, indicating poor HRQoL related to incontinence.

Construct validity testing

Based on the results of the Kaiser-Meyer-Olkin test (0.931) and Bartlett's test of sphericity (chi-square value = 2544.5; $p < 0.001$), there was suitability to perform exploratory factor analysis. Five factors with eigenvalues > 0.90 were obtained using a Varimax rotation. The identified factors explained 74% of the total variance (Table 4). Exploratory factor analysis demonstrated that the items in the "daily activities," "effort activities," "self-image," and "sexuality" subscales on the original scale were included in factors 1, 2, 3, and 5, respectively. However, unlike the original scale, three items, shown as underlined in Table 4, included different factors. Item 28 in the well-being subscale was also included in factor 1. Additionally, items 23 and 24 in the emotional consequences subscale were included in factor 3.

Criterion validity testing

The correlation coefficients between different subscales and the total score of the CONTILIFE and the KHQ, IIQ-7, UDI-6, ISI, and SUI episodes are presented in Table 5. There were moderately to strongly significant correlations between the

Table 2 Descriptive statistics (data were presented as mean ± standard deviation), internal consistency, and test-retest reliability of the CONTILIFE

CONTILIFE dimensions	CONTILIFE scores		Consistency Cronbach's alpha	Test-retest		
	First test (<i>n</i> = 98)	Test-retest (<i>n</i> = 51)		ICC	95% CI	<i>p</i> *
Daily activities	6.06 ± 2.14	6.17 ± 2.24	0.92	0.97	0.96–0.98	< 0.001*
Effort activities	5.11 ± 2.57	5.07 ± 2.32	0.91	0.96	0.94–0.98	< 0.001*
Self-image	5.95 ± 2.40	6.17 ± 2.17	0.90	0.97	0.95–0.98	< 0.001*
Emotional consequences	5.74 ± 2.38	5.74 ± 2.16	0.90	0.98	0.96–0.98	< 0.001*
Sexuality	7.55 ± 3.18	8.28 ± 2.47	0.94	0.91	0.84–0.95	< 0.001*
Well-being	5.00 ± 2.63	5.35 ± 2.22	–	0.91	0.86–0.95	< 0.001*
Total score	6.05 ± 2.15	6.19 ± 1.92	0.96	0.98	0.96–0.98	< 0.001*

ICC intra-class correlation coefficient, CI confidence interval

* $p < 0.05$

Table 3 Floor and ceiling effects of the CONTILIFE

CONTILIFE subscales	Floor		Ceiling	
	n	%	n	%
Daily activities (7 items)	122	17.78	38	5.53
Effort activities (4 items)	36	9.18	36	9.18
Self-image (7 items)	152	22.15	57	8.30
Emotional consequences (6 items)	120	20.40	57	9.69
Sexuality (3 items)	171	58.16	15	5.10
Well-being (1 item)	4	4.08	13	13.26

Data are presented as frequency (percentage). Floor and ceiling effects are in bold

total score of the CONTILIFE and all subscales of the KHQ ($r = -0.43 - -0.89$) ($p < 0.01$). Other than the sexuality subscale of the CONTILIFE, there were strong correlations between the common subscales of the CONTILIFE and KHQ ($r = -0.77 - -0.85$) ($p < 0.01$). The sexuality subscale of the CONTILIFE had moderate correlation with the personal relationships subscale of the KHQ ($r = -0.46$) ($p < 0.01$). The total scores of the IIQ-7, UDI-6, and ISI and the number of SUI episodes had moderate to strong correlations with the total score of the CONTILIFE, ranging from -0.66 to -0.89 ($p < 0.01$).

CONTILIFE scores based on the severity of SUI

In Table 6, the total score on the CONTILIFE and the scores of all domains are compared among mild, moderate, and severe SUI groups. Significant differences were observed in the total and subscale scores of the CONTILIFE among patients with mild, moderate, and severe SUI ($p < 0.001$). Based on the post-hoc comparisons, patients with severe SUI had lower scores on the CONTILIFE than patients with mild and moderate SUI ($p < 0.001$), representing a higher impact on the HRQoL.

Discussion

Based on the findings of the present study, the Turkish version of the CONTILIFE, which is a condition-specific questionnaire, is a valid and reliable instrument to evaluate different aspects of HRQoL among Turkish women suffering from SUI. The present study is the first study that has performed psychometric validation of the Turkish CONTILIFE using the pad test for objective severity of SUI and disease-specific questionnaires, which measure the impairment of SUI on HRQoL.

UI is a highly prevalent worldwide problem, considered a cross-cultural and costly condition, affecting women of all ages [24]. It has been reported that SUI itself has a significant impact on patient's HRQoL, may result in frequent avoidance

behavior regarding physical and social activities, and emotional problems that include anxiety and embarrassment, and it may interfere with personal relationships [8]. Based on a review that investigated the impact of UI symptoms on HRQoL, a moderate-to-severe impact of incontinence on the HRQoL was found in 10%–22% of the patients, and personal life and sexuality were influenced by UI in 7.5% and 33% of the patients [24]. In the present study, the “well-being” and “effort activities” subscales of the CONTILIFE were mostly affected in women with SUI. Similar to a previous study [25], the “sexuality” subscale had higher scores, indicating better HRQoL.

To date, the assessment of HRQoL has become an essential part of the patient-reported outcomes [26]. It appears that HRQoL provides adjuvant and useful information regarding the specific issues of urinary problems, clinically important differences after treatment, and alterations over time [8]. Therefore, it is essential to determine well-being and HRQoL related to UI in both the clinical environment and research settings [27]. The use of specific instruments for certain diseases is suggested to evaluate the influence of the symptoms on HRQoL of UI patients [26]. The International Consultation on Incontinence ranked the CONTILIFE instrument as “grade A,” a recommendation level based on the evaluation criteria of psychometric properties including validity, reliability, and responsiveness [11]. Although the CONTILIFE was originally developed and validated for both stress and urgency UI, previous studies revealed promising results regarding the psychometric properties of the CONTILIFE in patients with SUI [10, 14]. In addition, previous studies have revealed a significant correlation between self-reported severity of SUI and the total and subscale scores of the CONTILIFE [25, 28].

A previous study concluded that further validation studies of the CONTILIFE would be useful to confirm previous results in a broader range of countries and cultures [10]. Based on the ethical and cultural differences, it has been reported that multistep adaptation and validation processes are necessary to use the original questionnaire in target languages [29]. Additionally, Gjersing et al. indicated that a cultural adaptation and validation process allows the comparison of the results of the studies both internationally and nationally [29]. In the present study, multistep adaptation and validation processes were applied in accordance with a previous guideline reported by Beaton et al. [16]. In stage 4, based on the decisions of an expert panel comprised of health professionals experienced in the evaluation and treatment of UI, some revisions were suggested to improve the simplicity and understandability of the Turkish CONTILIFE. Due to the grammatical rules of the Turkish language, only the “how much have your urinary problems bothered you” part of the sentence was repeated for each item. The choice of “not applicable” was changed to “this question is not applicable to me.” Lastly, some

Table 4 Factor analysis of the CONTILIFE

CONTILIFE subscales in original scale	CONTILIFE questions	According to explanatory factor analysis				
		Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Daily activities	Q1	0.628				
	Q2	0.482				
	Q3	0.522				
	Q4	0.702				
	Q5	0.755				
	Q6	0.616				
	Q7	0.211				
Effort activities	Q8		0.533			
	Q9		0.514			
	Q10		0.725			
	Q11		0.647			
Self-image	Q12			0.475		
	Q13			0.735		
	Q14			0.597		
	Q15			0.764		
	Q16			0.615		
	Q17			0.370		
	Q18			0.512		
Emotional consequences	Q19				0.534	
	Q20				0.743	
	Q21				0.445	
	Q22				0.609	
	Q23			0.628		
	Q24			0.658		
Sexuality	Q25					0.866
	Q26					0.858
	Q27					0.852
Well-being	Q28	0.362				
Eigenvalues		1.862	0.912	15.833	1.279	1.048
Explained variance (%)		6.651	3.256	56.545	4.566	3.743
Cumulative %		63.196	74.762	56.545	67.763	71.505

Kaiser-Meyer-Olkin measure of sampling adequacy = 0.931; Bartlett's test statistics = 2544.5 and $p < 0.001$, Extraction method: maximum likelihood and Varimax with Kaiser normalization

additional explanations regarding exercise and urine stains were provided for items 9 and 15, respectively.

In the present study, internal consistency and test-retest reliability ranged from strong to very strong. Similar to a previous European multicenter study, in which the Cronbach's α coefficient for all items of the CONTILIFE was observed as 0.94, Cronbach's α coefficient in the present study was found to be 0.96. Rogowski et al. also reported that the Polish version of the CONTILIFE had excellent internal consistency [14]. Additionally, the ICCs for the total score of the Turkish CONTILIFE and for the scores of six subscales showed very strong test-retest reliability, ranging from 0.84 to 0.98.

Based on the results of exploratory factor analysis, five significant factors were determined, namely "daily activities," "effort activities," "self-image," "emotional consequences," and "sexuality." Unlike the original scale, only three items (items 23, 24, and 28) were included in different subscales. In the present study, the "well-being subscale" was not distinguished by the factor analysis. A previous study reported that the construct validity of the CONTILIFE was good, and items were grouped based on their subscales in French, Danish, and the pooled sample. In addition, construct validity is acceptable in English, Dutch, and German [10]. In the total population of a European multicenter study, six factors were represented by

Table 5 Criterion validity of the CONTILIFE

CONTILIFE subscales	KHQ subscales										IIQ-7	UDI-6	ISI	SUI episodes
	GHP	II	RL	PL	SL	PR	EP	SE	SM					
Total score	-0.43*	-0.71*	-0.81*	-0.77*	-0.66*	-0.74*	-0.80*	-0.49*	-0.79*	-0.89*	-0.66*	-0.66*	-0.74*	
Daily activities	-0.42*	-0.69*	-0.79*	-0.77*	-0.62*	-0.71*	-0.65*	-0.43	-0.71*	-0.85*	-0.64*	-0.62*	-0.71*	
Effort activities	-0.38*	-0.72*	-0.73*	-0.79*	-0.56*	-0.65*	-0.65*	-0.35*	-0.64*	-0.82*	-0.53*	-0.56*	-0.65*	
Self-image	-0.41*	-0.61*	-0.74*	-0.68*	-0.66*	-0.71*	-0.79*	-0.49*	-0.81*	-0.84*	-0.63*	-0.66*	-0.71*	
Emotional consequences	-0.44*	-0.65*	-0.74*	-0.70*	-0.67*	-0.71*	-0.85*	-0.43*	-0.73*	-0.86*	-0.61*	-0.67*	-0.71*	
Sexuality	-0.35*	-0.39*	-0.37*	-0.37*	-0.34*	-0.46*	-0.39*	-0.26*	-0.34*	-0.48*	-0.34*	-0.34*	-0.46*	
Well-being	-0.41*	-0.77*	-0.65*	-0.77*	-0.66*	-0.67*	-0.71*	-0.34*	-0.64*	-0.82*	-0.54*	-0.66*	-0.67*	

Main correlations are in bold and highlighted

KHQ King’s Health Questionnaire, *GHP* general health perception, *II* incontinence impact; *RL* role limitations, *PL* physical limitations, *SL* social limitations, *PR* limitations in personal relationships, *EP* emotional problems, *SE* sleep and energy disturbances, *SM* severity measures, *SUI* stress urinary incontinence, *ISI* Incontinence Severity Index, *IIQ-7* Incontinence Impact Questionnaire-7, *UDI-6* Urinary Distress Inventory

*Correlation is significant at 0.01 level

64.3% of the total variance, and most of the items were categorized in accordance with their subscales [10].

Criterion validity of the Turkish CONTILIFE was revealed using the incontinence-specific questionnaires, validated in Turkish, namely the KHQ, IIQ-7, UDI-6, and ISI. As expected, the correlations between the total score on the CONTILIFE and all subscales of the KHQ were found to be moderate to strong. Except for the “sexuality” subscale, the common subscales of the CONTILIFE and KHQ were strongly correlated. Significant negative correlations were found between the total score of the Turkish CONTILIFE and the total scores of IIQ-7, UDI-6, and ISI. The highest correlation coefficient was found between the total score of the IIQ-7 and the total score of the CONTILIFE ($r = -0.89$). Additionally, the correlation between SUI episodes and the total score of the Turkish CONTILIFE was also determined as the criterion validity. Similar to a previous study [14], the patients with the

greater number of SUI episodes had lower QoL scores on both the total and subscale scores of the Turkish CONTILIFE.

In the present study, it was observed that the influence of SUI symptoms on the perception of HRQoL is associated with UI severity. When comparing the CONTILIFE total and subscale scores, patients with severe SUI had lower scores compared with those with mild and moderate SUI. These findings are in line with those of a previous study [25], which compares the impacts on HRQoL using the CONTILIFE among different intensities of SUI symptoms.

The present study has several strengths. First, the translation and adaptation processes of the questionnaire were performed based on international consensus [16]. Second, in the present study, different aspects of validity were analyzed. Valid and reliable Turkish disease-specific instruments were used to determine the criterion validity. Lastly, the severity of UI was evaluated by the 24-h pad test, which is identified as an objective instrument.

Table 6 Total and subscale scores of the CONTILIFE based on the severity of stress urinary incontinence

CONTILIFE	Severity of SUI			p^a
	Mild ($n = 32$)	Moderate ($n = 45$)	Severe ($n = 21$)	
Daily activities	7.85 (6.87–8.57)	6.45 (5.17–7.14)	3.21 (2.14–4.47)	< 0.001*
Effort activities	7.50 (6.87–8.59)	5.00 (3.16–6.25)	2.50 (0–3.80)	< 0.001*
Self-image	8.21 (7.14–8.92)	6.78 (5.37–7.14)	2.14 (1.44–3.57)	< 0.001*
Emotional consequences	7.91 (6.76–8.33)	5.83 (5.00–7.08)	2.50 (1.66–3.33)	< 0.001*
Sexuality	10.00 (9.16–10.00)	8.35 (7.50–10.00)	3.33 (1.66–9.60)	< 0.001*
Well-being	7.50 (7.50–7.50)	5.00 (5.00–7.50)	0 (0–3.75)	< 0.001*
Total score	8.00 (7.42–8.77)	6.48 (5.43–6.94)	3.33 (1.80–4.16)	< 0.001*

Data were presented as median (25%–75%)

SUI stress urinary incontinence

* $p < 0.05$

^a Kruskal-Wallis test for continuous variables

Some limitations are also present in the present study. Similar to previous studies [10, 14], in the present study, the psychometric properties of the CONTILIFE were only investigated in patients with SUI (pure SUI and stress-predominant UI). Further studies should also reveal the validity and reliability of the CONTILIFE in patients with mixed and urgency UI. Additionally, the recruitment of SUI patients from only one university hospital may reduce the generalizability. However, patients from all regions of Turkey are referred to the obstetrics and gynecology clinic of the university hospital since it is one of the biggest clinics in Turkey. Furthermore, the SUI population in the present study was younger (mean age = 49.5) compared with the previous studies investigating the psychometric properties of the CONTILIFE [10, 14], which could affect the external validity since higher prevalence is present at older ages [2, 3]. However, this age difference can be attributed to variations in etiological factors for SUI, such as differences in menopausal age and/or in obstetric factors/interventions in populations. In addition, a previous study, which investigated the psychometric properties of the Turkish KHQ, reported that the mean age of the patients with stress, mixed, or urgency UI was 50.5 years [13]. In the present study, the responsiveness of the Turkish CONTILIFE, defined in this context as the ability of the questionnaire to change when some parameters related to UI are improved, was not tested. Future studies should investigate the responsiveness of the Turkish CONTILIFE.

The present study has obtained evidence regarding the psychometric properties of the Turkish CONTILIFE. In conclusion, the Turkish CONTILIFE can be used to assess the impact of UI on the life of patients suffering from SUI. In clinical settings and for research purposes, healthcare providers can benefit from the Turkish CONTILIFE to provide more elaborate evaluation of the impact of UI on QoL in Turkish patients. The Turkish CONTILIFE is a more comprehensive questionnaire compared with the present validated instruments and also includes the sexuality and self-image subscales for the evaluation of different aspects of HRQoL.

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Compliance with ethical standards

Conflicts of interest None.

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