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**Psychometric Properties of the Arabic Version of the International Consultation on Incontinence
Questionnaire on Long-Term Catheter Quality Of Life**

Quality of life questionnaire

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Acknowledgements: We would like to thank all patients who participated in this study. We would
also like to thank the Researcher Development Fund, University of Stirling for funding the translation
of the questionnaire.

Conflicts of Interest: There are no conflicts of interest noted.

Authorship agreement: All authors meet the authorship criteria and are in agreement with the content of this manuscript.

Authorship Criteria: NY, AS, SH designed the study; NY collected the data; NY and CB analysed the data; NY, CB, WM, SH and AS developed and prepared the final manuscript.

Psychometric Properties of the Arabic Version of the International Consultation on Incontinence Questionnaire on Long-Term Catheter Quality of Life

Abstract

Aim

To translate the International Consultation on Incontinence Questionnaire (ICIQ) Long-Term Catheter Quality of Life (LTCqol) questionnaire (ICIQ-LTCqol) questionnaire from English to Arabic and evaluate its psychometric properties.

Background

Currently, no tool for Arabic speaking patients is available to measure the quality of life in patients using long-term urinary catheters.

Design

Translation and psychometric assessment of questionnaire.

Methods

The internal consistency and construct validity of the translated Arabic version of the ICIQ-LTCqol were evaluated in a convenience sample of 141 participants recruited from a hospital in Egypt from April to September 2017. Test-retest reliability was assessed for a sample of 15 participants who completed this version at two-time points. Construct validity was assessed by factor analysis.

Results

The translated Arabic version of the ICIQ-LTCqol showed satisfactory test-retest reliability and internal consistency, with Cronbach's $\alpha = 0.75$. Confirmatory factor analysis confirmed the same two factors ('catheter function' and 'lifestyle') structure as found in the English version of the tool supporting the construct validity of the translated questionnaire.

Conclusion

This original and significant study allows, for the first time, researchers and clinicians working with Arabic speaking patients, the opportunity to evaluate the quality of life in long-term urinary catheter users.

Summary statement:

What is known about this topic:

- The potential negative impact of using a long-term indwelling urinary catheter on patients' everyday lives has been well documented.
- There is no available psychometrically robust self-report questionnaire that can be used to assess the impact of living with a long-term catheter among Arabic speakers.
- To date, the Incontinence Questionnaire (ICIQ) Long-Term Catheter Quality of Life (LTCqol) questionnaire (ICIQ-LTCqol) has not been translated into Arabic and therefore it has not been used with Arabic speaking catheter patients.
- In Arabic countries, no research has been conducted focusing on the experience of patients with urinary catheters.

What this paper adds:

- The International Consultation on Incontinence Questionnaire (ICIQ) Long-Term Catheter Quality of Life questionnaire (ICIQ-LTCqol) Arabic version is a clear, understandable and short questionnaire.
- The Arabic version of the ICIQ-LTCqol has the same factor structure as the English version using Confirmatory Factor Analysis.
- The Arabic version of the ICIQ-LTCqol has good internal consistency.

Implications of this paper:

- Clinicians and researchers working with Arabic speaking patients who use long-term urinary catheters can utilise the this version of the ICIQ-LTCqol to evaluate their QOL.
- The Arabic version of the ICIQ-LTCqol is a robust tool for assessing the impact of living with a long-term catheter in Arabic countries.
- Further research is needed on the retest reliability of the ICIQ-LTCqol in the Arabic speaking population.
- The impact of living with a long-term catheter has not been investigated in Arabic countries.

Key words

Arabic; Egypt, Incontinence, Psychometrics; Quality of life; Questionnaire; Translate, Urinary catheter

This research project was funded by the University of Stirling and the Deanship of Scientific Research, Princess Nourah bint Abdulrahman University, through the program of research project funding after publication. The funders of the study had no role in the research design, data collection, data analysis, data interpretation, or writing of the manuscript.

1 INTRODUCTION

For many people living with urinary incontinence or urinary retention, the only adequate means of control is the use of a long-term indwelling catheter. Nurses are the key health professional to provide education and support for these people and are also usually responsible for catheter assessments and changes. Nurses also play a key role in detecting and treating catheter related complications.

The potential negative impact of using a long-term indwelling urinary catheter on patients' everyday lives has been well documented (O'Donohue et al., 2010; Fowler et al., 2014). The impact is due in part to the number of complications associated with catheter use including catheter-associated urinary tract infections (CAUTIs), leakage of urine, and catheter blockage (Prinjha, et al., 2016; Shepherd, et al., 2017). Previous studies have shown that those who use urinary catheters long-term come to accept that their catheter is necessary despite the associated stigma and problems (Wilde, 2003; Kralik et al., 2007; De Jaeger, 2011).

Generic quality of life tools are of limited use for people who have long-term urinary catheters (Wilde et al., 2010) as many in this population also suffer from disability or neurological disease. In Arabic countries however, no research has been conducted focusing on the experience of patients with urinary catheters. In particular, no validated instrument to measure the quality of life for people who have long-term urinary catheters is available in Arabic.

The International Consultation on Incontinence Questionnaire (ICIQ)-Long Term Catheter Quality of Life (LTCqol) tool developed in the UK provides a self-report evaluation in the specific areas of catheter function and concern and lifestyle factors (Cotterill et al., 2016). The instrument has two scored domains: catheter function and concern (9 items) and lifestyle impact (3 items) and four standalone items, relating to pain, pads, bladder spasm and sexual activity. The items are rated on a five-point Likert scale and other items are rated on 10 points scale where 0 = not at all to 10 = a

great deal. A summary score is calculated by summing each of the domain items. This psychometrically robust tool, which is easy to administer taking less than 10 minutes to complete, provides a reliable and valid summary of the quality of life of those living with a long-term urinary catheter (Cotterill et al., 2016).

To date, this questionnaire has not been translated into Arabic and therefore it cannot be used with Arabic speaking patients.

The overall aim of this study was to make the first translation of the English version of the ICIQ-LTCqol into Arabic and to determine its psychometric properties among a sample of patients with long-term urinary catheters living in Egypt. Specific objectives were to assess the feasibility of using the translated ICIQ-LTCqol (Arabic version), to assess its construct convergent validity and to examine its retest reliability.

2 METHODS

2.1 DESIGN AND SETTING OF THE STUDY

A cross-sectional study was conducted over a period of six months (April – September 2017) at the Urology wards and Urology outpatient clinics in one of the largest teaching hospitals in Egypt.

2.2 PROCESS OF TRANSLATION AND CULTURAL ADAPTATION OF THE ICIQ-LTCQOL

The ICIQ translation protocol recommended by the ICIQ group was followed to translate the ICIQ-LTCqol (Figure 1: Translation Process).

The ICIQ-LTCQOL was forward translated by a bilingual translator who was a native Arabic speaker and proficient in English (T1-translation). To minimise bias, the translator was not aware of the underpinning concepts and objectives of the questionnaire. A qualified translator who was a native English speaker (T2-translation) and proficient in Arabic carried out the back translation. The back translator was not aware of the underpinning concepts and objectives of the questionnaire.

2.2.1 Committee review

The back translated English version was reviewed by the ICIQ group to make any necessary adjustment before proofing the content validity of the Arabic version.

To assess the face and content validity of the translated ICIQ-LTCqol, a review committee of two physicians and two registered nurses (all native Arabic speaking) was convened to develop the penultimate version for field testing. They were given two versions of the ICIQ-LTCqol (Arabic and original) and asked to rate the appropriateness, adequacy and validity of the items of the ICIQ-LTCqol (Arabic version) using a guidance sheet designed by the researcher. This feedback was returned to the researcher. There was only one minor change made to alter the structure of one sentence according to the Arabic language rules.

2.3 FEASIBILITY TESTING

Ten participants (seven males, three females; mean age 51.9 years) were interviewed to assess the feasibility of ICIQ-LTCqol. A probe technique was used to determine whether a patient had understood the questions correctly (Bayliss et al., 1998). The time taken to complete the questionnaire and the questions deemed difficult to answer were noted during the participant interview. An item was defined as difficult if the participant (1) did not provide a specific answer; (2) gave an open-ended answer; or (3) gave an answer that indicated they had misunderstood the question. Additionally, after each question answered on the Arabic ICIQ-LTCqol questionnaire, the participants were asked to clarify what they meant by each answer. This 'probe technique' encourages the participants to explain their understanding of the questions in order to determine whether they have understood the items correctly (Guillemin et al., 1993). This process resulted in the final version of the Arabic ICIQ LTCqol questionnaire that was then used in the psychometric validation study.

2.4 PARTICIPANTS AND RECRUITMENT PROCEDURE

A convenience sample of 153 eligible patients who met the following inclusion criteria were invited to participate in the study – those with long-term urinary catheters (suprapubic or urethral catheters, in situ for more than 28 days), aged 18 years or older, and gave written consent to participate (Figure 2).

At time 1, participants were asked to complete the translated ICIQ-LTCqol and a background data sheet. To test reliability, at time 2, they were asked to complete the ICIQ-LTCqol only, which was administered with a maximum of three days between time points. The background data sheet collected sociodemographic data and information on disease severity and other medical history.

2.5 SAMPLE SIZE

The required sample size was estimated based on a two factor solution with the first factor having nine items and approximate factor loadings of 0.50 and the second factor having three items and approximate factor loadings of 0.65 (Cotterill et al. 2016). For such models a sample size of 200 will be sufficient for power of 80% or greater (with $\alpha = .05$) for all parameters of interest (in this case, factor loadings, correlations, regressive paths) (Wolf et al. 2013).

2.6 PLAN OF DATA ANALYSIS

2.6.1 Psychometric validation

Exploratory factor analysis translated ICIQ-LTCqol was conducted with maximum likelihood extraction and Varimax rotation in order to compare factor loadings to those of the English version of the ICIQ-LTCqol. Confirmatory factor analysis through structural equation modelling was used to test whether the translated questionnaire had the same factor structure as the original questionnaire (Cotterill et al 2016). The structural equation model included 12 covariance terms to model observed dependence between items.

Cronbach's alpha was calculated to examine the internal consistency of the translated ICIQ-LTCqol questionnaire; where $\alpha \geq 0.70$ was considered an acceptable level of internal consistency (Nunnally & Bernstein 1994). Retest reliability is given by the intra-class correlation coefficient (ICC) (Shrout & Fleiss, 1979, McGraw & Wong, 1996). ICC estimates were calculated based on individual measures, consistency of agreement, and in a 2-way mixed-effects model.

Analysis was undertaken using SPSS version 23 and structural equations modelling in Stata version 15.

2.7 ETHICAL APPROVAL AND CONSENT

Ethical approval was granted by the Research Ethics Committee Board of Faculty of Nursing, Cairo University (code 2017-26). Verbal and written information was given to all participants explaining the study's aims. Before any data was collected, participants provided written consent. Permission to translate the ICIQ-LTCqol questionnaire into Arabic was granted from the original authors.

3 RESULTS

3.1 CHARACTERISTICS OF THE PARTICIPANTS

There were 141 patients enrolled in the study: 67 (47.5%) inpatients and 74 (52.5%) outpatients. Most (78%) of the participants were males with mean age 53.8 years (SD 16.4) (Table 1).

Although the target sample size was not reached, the obtained effect sizes were still sufficient for analysis within the achieved sample size.

3.2 PSYCHOMETRIC PROPERTIES OF THE ARABIC ICIQ-LTCQOL

3.2.1 Feasibility of the translated ICIQ-LTCqol

All participants agreed that the questionnaire was clear and understandable. Consequently, it was considered that no items required modification due to misunderstanding or misinterpretation. The questionnaire was completed with the researcher present in a mean time of 5.2 minutes (SD 1.9).

3.2.2 Construct validity

The psychometric properties of the ICIQ-LTCqol Arabic version are presented below with reference to the findings from the development and validation of the original ICIQ-LTCqol English version of the questionnaire (Cotterill et al., 2016).

Exploratory factor analysis of the original English version of the questionnaire found a two-factor solution. Nine items loaded onto a 'catheter function and concern' factor and three items onto a 'lifestyle impact' factor. Four items did not load onto any factor but were retained due to their importance from clinicians and or participants' perspectives. Factor loadings from a comparable exploratory factor analysis on the Arabic scale are shown for comparison in Table 2. We also confirmed the same two factor structure for the Arabic version using Confirmatory Factor Analysis. A good model fit for a two-factor solution was found for the Arabic version (Chi square=46.67 $p=0.25$, CFI=0.99 RMSEA=0.03). Further information on the CFA results is available in supplementary materials see supplementary information file Tables 1 and 2.

3.2.3 Internal consistency

The Cronbach's alpha for the English version of the full 16 item scale was 0.72 and for the Arabic version Cronbach's alpha was 0.75 indicating good internal consistency. The internal consistency of the Arabic version factors comparable to the English version is shown in the table below (Table 3).

3.2.4 Retest reliability

The values shown for the total score indicate high reliability as defined by Koo and Li (2016) (Table 4).

4 DISCUSSION

Arabic is the fifth most spoken language around the world with approximately 420 million native speakers mostly located in North and West Africa (Istizada, 2018). Very little literature exists on the numbers of people in Arabic speaking nations using urinary catheters; although Labib and Spasojevic (2013) highlight that the use of urethral catheters in Zambia is very common for relieving bladder outlet obstruction. Once catheterised, patients are often left with long-term catheters due to a shortage of educated health care staff, inaccessible healthcare facilities, and lack of urologist intervention. It has been estimated that between 42 – 50% of catheterised patients in Arabic countries develop a CAUTIs (Ndomba et al., 2008; Greco & Magombe, 2011). This is due not only to the length of time the catheter is in situ but also the unsterile environment when the catheter is inserted, the poor quality of catheters used and also the lack of catheter leg bags available. The consequences of life with a long-term catheter and the impact on quality of life for these patients is unknown.

Our study successfully translated the ICIQ-LTCqol and has shown that the Arabic version is feasible and acceptable for measuring catheter related Quality of Life in Arabic speaking people who are long-term catheter users. Participants were able to complete the questionnaire quickly and easily. The feasibility testing indicated that participant's interpretation of the questions corresponded to their intended meaning.

The psychometric properties of the Arabic version of the ICIQ-LTCqol are good. Cronbach's alpha for the full scale was 0.75, which is acceptable. The test-retest reliability (ICCs) for the total score

was 0.97 which indicates good reliability of the questionnaire. However, a larger sample is required to confirm the results of the retest reliability.

The confirmatory factor analysis supported the construct validity of the Arabic version confirming that it assesses the same two domains 'Catheter function and concern' and 'Lifestyle impact' as the original English version of the scale.

4.1 LIMITATIONS

The sample size achieved for factor analysis was lower than the *a priori* sample size estimate. However, the sample size estimate was based on parameters from the Exploratory Factor Analysis conducted on the original scale by Cotterill and colleagues (2016) and model assumptions such as orthogonality of the factors differed between that analysis and the CFA employed here. The observed data was sufficient to demonstrate a good fit for a two-factor solution using conventional model fit indices. A further limitation of this study was the small sample for the test-retest reliability. Confidence intervals for the ICC estimates are presented to indicate the precision of the estimates. A test-retest is needed on a sample bigger than 15. Therefore, a further study is required to study the retest reliability in a larger sample.

5 CONCLUSION

In summary, this study has demonstrated that the Arabic version of the ICIQ-LTCqol is valid and reliable for use in the Arabic speaking population. It is a brief, understandable and useful questionnaire that allows researchers and clinicians the opportunity to investigate quality of life issues for these often-vulnerable patients. It can help identify those with the lowest quality of life to ensure that the very limited resources are directed where they may have most effect. However, this study results only preliminary psychometric properties of the Arabic ICIQ-LTCqol. Thus, a study with a larger sample from multi-hospitals in Egypt is recommended specially to investigate the re-test reliability.

REFERENCES

- Bayliss, M. S., Gandek, B., Bungay, K. M., Sugano, D., Hsu, M. A., & Ware, J. E. (1998). A questionnaire to assess the generic and disease-specific health outcomes of patients with chronic hepatitis C. *Quality of Life Research*, 7(1), 39-55. <https://doi-org.ezproxy.stir.ac.uk/10.1023/A:1008884805251>
- Complete List of Arabic Speaking Countries, accessed 2018, <http://istizada.com/complete-list-of-arabic-speaking-countries-2014/>
- Cotterill, N., Fowler, S., Avery, M., Cottenden, A. M., Wilde, M., Long, A., & Fader, M. J. (2016). Development and psychometric evaluation of the ICIQ-LTCqol: A self-report quality of life questionnaire for long-term indwelling catheter users. *Neurourology and urodynamics*, 35(3), 423-428. <https://doi.org/10.1002/nau.22729>
- De Jaeger, M. (2011). Exploring urinary catheters: the perspectives of patients and nurses. *British Journal of Nursing*, 20(7), 400-408. <https://doi.org/10.12968/bjon.2011.20.7.400>
- Fowler, S., Godfrey, H., Fader, M., Timoney, A. G., & Long, A. (2014). Living with a long-term, indwelling urinary catheter: catheter users' experience. *Journal of Wound Ostomy & Continence Nursing*, 41(6), 597-603. doi: 10.1097/WON.0000000000000069
- Greco, D., & Magombe, I. (2011). Hospital acquired infections in a large north Ugandan hospital. *Journal of preventive medicine and hygiene*, 52(2). <https://doi.org/10.15167/2421-4248/jpmh2011.52.2.250>
- Guillemin, F., Bombardier, C., & Beaton, D. (1993). Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *Journal of clinical epidemiology*, 46(12), 1417-1432. [https://doi.org/10.1016/0895-4356\(93\)90142-N](https://doi.org/10.1016/0895-4356(93)90142-N)
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of chiropractic medicine*, 15(2), 155-163. <https://doi.org/10.1016/j.jcm.2016.02.012>
- Kralik, D., Seymour, L., Eastwood, S., & Koch, T. (2007). Managing the self: living with an indwelling urinary catheter. *Journal of clinical nursing*, 16(7b), 177-185. <https://doi.org/10.1111/j.1365-2702.2005.01440.x>
- Labib M and Spasojevic N (2013). Problem of Catheter Associated Urinary Tract Infections in Sub-Saharan Africa. In: Recent advances in the treatment of urinary tract infections. *Intech Open Publishers*. DOI: 10.5772/55371
- McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological methods*, 1(1), 30. <https://psycnet.apa.org/doi/10.1037/1082-989X.1.4.390>
- Ndomba, A. L., Smide, B., & Aarts, C. (2008). Preventing IUC infections in Tanzanian patients; nurses' knowledge, clinical practice and patients' views. *International Journal of Urological Nursing*, 2(1), 33-41. <https://doi.org/10.1111/j.1749-771X.2008.00044.x>
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (McGraw-Hill Series in Psychology).
- O'Donohue, D., Winsor, G., Gallagher, R., Maughan, J., Dooley, K., & Walsh, J. (2010). Issues for people living with long-term urinary catheters in the community. *British journal of community nursing*, 15(2), 65-70. <https://doi.org/10.12968/bjcn.2010.15.2.46392>

- Prinjha, S., Chapple, A., Feneley, R., & Mangnall, J. (2016). Exploring the information needs of people living with a long-term indwelling urinary catheter: a qualitative study. *Journal of advanced nursing*, 72(6), 1335-1346. <https://doi.org/10.1111/jan.12923>
- Shepherd, A. J., Mackay, W. G., & Hagen, S. (2017). Washout policies in long-term indwelling urinary catheterisation in adults. *Cochrane Database of Systematic Reviews*, (3). <https://doi.org/10.1002/14651858.CD004012.pub5>
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: uses in assessing rater reliability. *Psychological bulletin*, 86(2), 420. <https://psycnet.apa.org/doi/10.1037/0033-2909.86.2.420>
- Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). Mahwah, NJ: Lawrence, Erlbaum
- Wilde, M. H. (2003). Life with an indwelling urinary catheter: the dialectic of stigma and acceptance. *Qualitative Health Research*, 13(9), 1189-1204. <https://doi.org/10.1177%2F1049732303257115>
- Wilde, M. H., Getliffe, K., Brasch, J., McMahon, J., Anson, E., & Tu, X. (2010). A new urinary catheter-related quality of life instrument for adults. *Neurourology and urodynamics*, 29(7), 1282-1285. <https://doi.org/10.1002/nau.20865>

Table 1. Characteristics of the participants included in psychometric validation, n = 141

Variable	N	%
Age:		
Mean (SD)	53.8 (16.4)	
Median	57 years	
Range	18 – 86 years	
Gender:		
Female	31	22.0
Male	110	78.0
Marital status:		
Unmarried	31	22.0
Married	110	78.0
Education:		
Uneducated	81	57.4
Primary/preparatory	26	18.4
Secondary	24	17.0
Higher education	10	7.1
Employment status:		
Employed	86	61.0
Unemployed	55	39.0
Clinic		
Inpatient	67	47.5
Outpatient	74	52.5

Table 2. Factor Loadings for the Arabic and English ICIQ-LTCqol from an Exploratory Factor

Analysis

Factor	Question items	Factor	Factor
		loading (English)	loading ^a (Arabic)
Catheter function and concern	4a Confidence in catheter equipment	0.55	0.40
	5a Catheter leakage on mind	0.68	0.37
	6a Catheter blockage on mind	0.62	0.64
	7a How problematic catheter considered to be	0.62	0.45
	8a Frequency of urine infections	0.46	0.46
	9a Worry about smell	0.66	0.45
	10a Embarrassed about catheter	0.61	0.50
	11a Adapted to life with catheter	0.56	0.31
	12a Overall effect on everyday life	0.48	0.31
	Lifestyle impact	13 Effect on ability to travel	0.65
14 Effect on social activities		0.64	0.97
15 Effect on ability to go out of the house		0.67	1.00

^a EFA with maximum likelihood extraction, 2 factor solution eigenvalues>1, Varimax rotation

Table 3. Internal consistency of the English and Arabic ICIQ-LTCqol

Domains	English version (Cronbach's alpha)	Arabic version (Cronbach's alpha)
Catheter function and concern	0.76	0.68
Lifestyle impact	0.74	0.99
Full scale	0.72	0.75

Table 4. Retest reliability of the Arabic ICIQ-LTCqol

Domain	Question items	Reliability (retest) ICC (C,1) (95% CI) n=15
Catheter function and concern	4a Confidence in catheter equipment	0.90 (0.73-0.97)
	5a Catheter leakage on mind	0.86 (0.63-0.95)
	6a Catheter blockage on mind	0.89 (0.70-0.96)
	7a How problematic catheter is considered to be?	0.59 (0.12-0.83)
	8a Frequency of urine infections	0.85 (0.61-0.95)
	9a Worry about smell	0.77 (0.44-0.92)
	10a Embarrassed about catheter	0.95 (0.85-0.98)
	11a Adapted to life with catheter	1.00 (1.00-1.00)
	12a Overall effect on everyday life	0.91 (0.75-0.97)
	Lifestyle impact	13 Effect on ability to travel
14 Effect on social activities		0.97 (0.90-0.99)
15 Effect on ability to go out of the house		1.00 (1.00-1.00)
Unscored items	16a Pad use in addition to catheter	0.54 (0.05-0.82)
	17a Pain	0.57 (0.10-0.83)
	18a Bladder spasm	0.69 (0.29-0.88)
	19a Prevention of sexual activity	0.91 (0.76-0.97)
Total score	Total score (excluding unscored items)	0.97 (0.90-0.99)

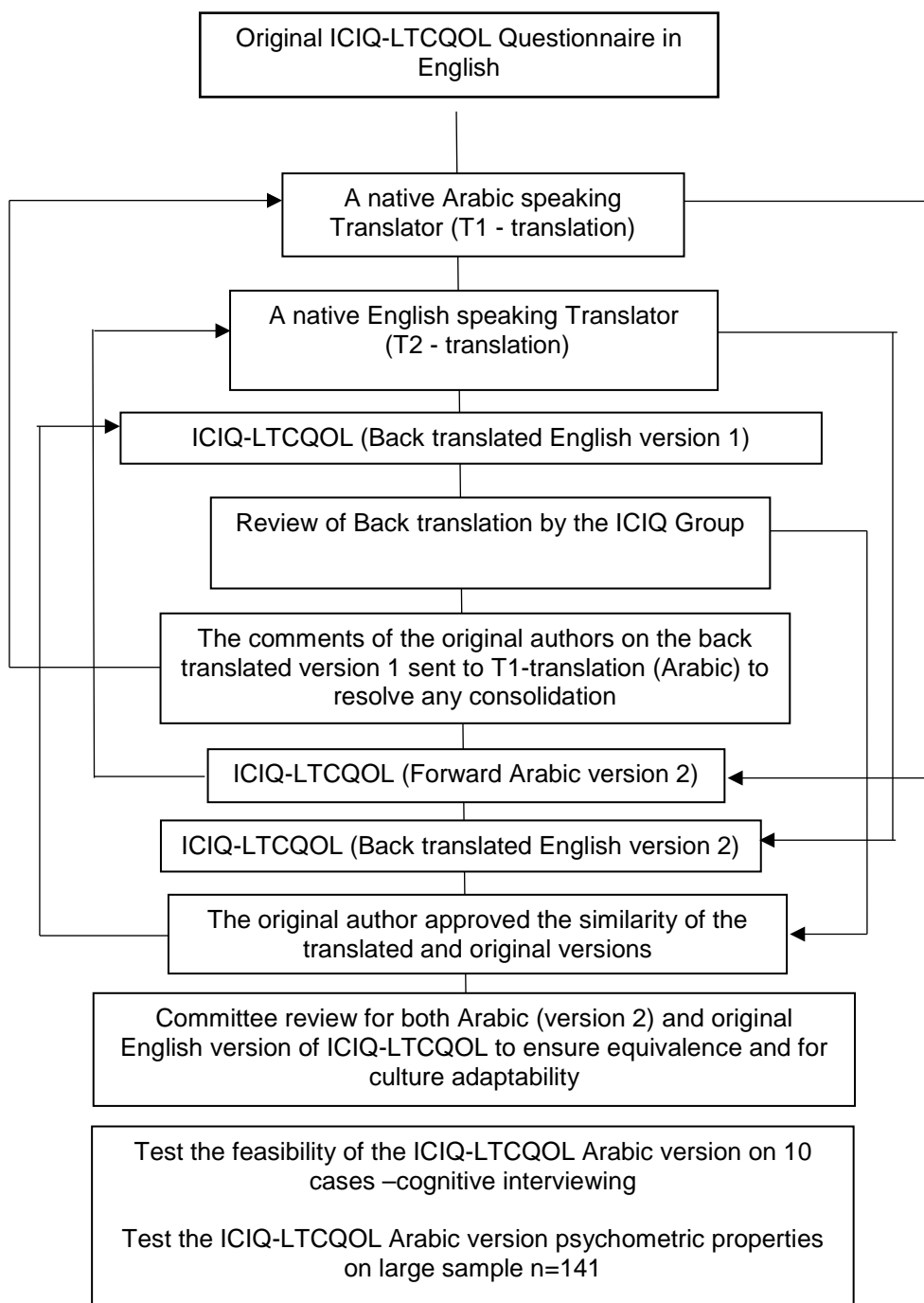


Figure 1. Translation Process

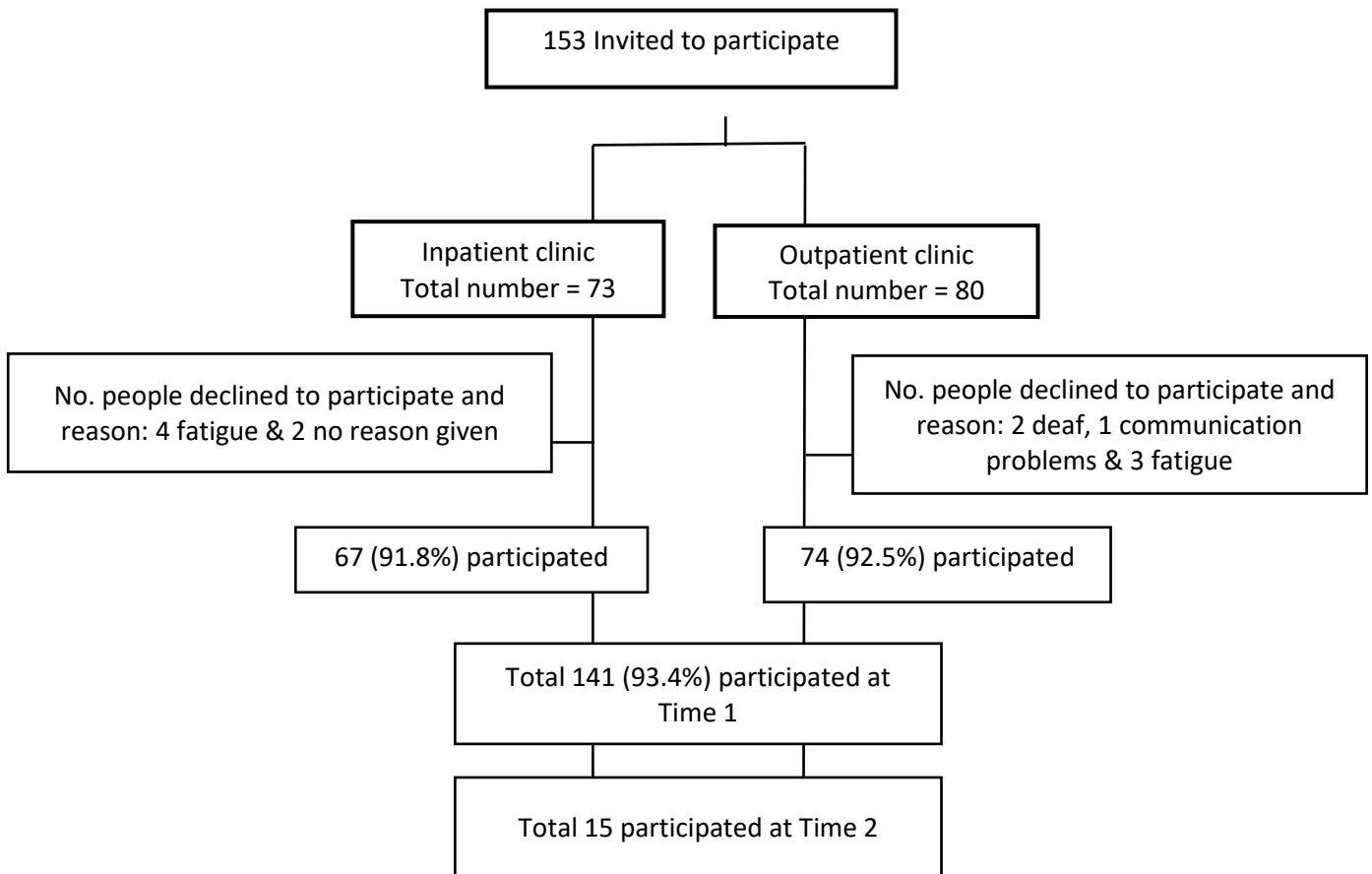


Figure 2: Sample flowchart

Supplementary Information File

Confirmatory factor analysis of the Arabic version of the ICIQ-LTCqol

The following supplementary materials provide further detail on the Confirmatory factor analysis conducted on the Arabic version of the ICIQ-LTCqol.

Endogenous variables were q4a q5a q6a q7a q8a q9a q10a q11a q12a q13 q14 q15

Exogenous latent variables were 'function' and 'lifestyle' domains.

The CFA was fitted via a structural equation model using a maximum likelihood estimation method on the standardized endogenous variables. N=141

eTable 1 Structural Equation Model coefficients

Domain	Variable	Coefficient	95% CI of coefficient
Function	4a Confidence in catheter equipment	0.39	0.22 to 0.56
	5a Catheter leakage on mind	0.42	0.24 to 0.60
	6a Catheter blockage on mind	0.52	0.35 to 0.68
	7a How problematic catheter considered to be	0.48	0.33 to 0.64
	8a Frequency of urine infections	0.27	0.08 to 0.45
	9a Worry about smell	0.31	0.12 to 0.49
	10a Embarrassed about catheter	0.64	0.50 to 0.77
	11a Adapted to life with catheter	0.67	0.52 to 0.81
	12a Overall effect on everyday life	0.33	0.16 to 0.50
Lifestyle	13 Effect on ability to travel	0.97	0.95 to 0.98
	14 Effect on social activities	0.98	0.97 to 0.98
	15 Effect on ability to go out of the house	0.99	0.99 to 1.00

12 error covariances were included in the model. These were as follows:

eTable 2 Error Covariances from the Structural Equation Model

Error Covariance	Value	95% CI
Q4a Q6a	0.24	0.07 to 0.41
Q4a Q14	-0.20	-0.38 to 0.03
Q5a Q9a	0.19	0.03 to 0.36
Q5a Q10a	-0.11	-0.32 to 0.11
Q6a Q8a	0.19	0.04 to 0.35
Q6a Q11a	-0.19	-0.40 to 0.03
Q6a Q15	-0.37	-0.69 to -0.05
Q7a Q8a	0.21	0.05 to 0.37
Q8a Q9a	0.25	0.11 to 0.40
Q9a Q10a	0.26	0.08 to 0.43
Q12a Q13	-0.14	-0.32 to 0.03
Q12a Q14	0.19	0.02 to 0.37
Function Lifestyle	0.54	0.39 to 0.69

Fit statistics

Fit statistic	Value	Description
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Likelihood ratio

chi2_ms(41)	46.671	model vs. saturated
p > chi2	0.251	
chi2_bs(66)	1054.651	baseline vs. saturated
p > chi2	0.000	

Population error

RMSEA	0.031	Root mean squared error of approximation
90% CI, lower bound	0.000	
upper bound	0.068	
pclose	0.762	Probability RMSEA <= 0.05

Information criteria

AIC	5293.989	Akaike's information criterion
BIC	5438.478	Bayesian information criterion

Baseline comparison

CFI	0.994	Comparative fit index
TLI	0.991	Tucker-Lewis index

Size of residuals

SRMR	0.058	Standardized root mean squared residual
CD	0.997	Coefficient of determination

Stata syntax

#delimit;

sem(FUNCTION-> q4a q5a q6a q7a q8a q9a q10a q11a q12a)(LIFESTYLE-> q13 q14 q15),

cov(e.q4a*e.q6a) cov(e.q4a*e.q14) cov(e.q8a*e.q9a)

cov(e.q5a*e.q9a)cov(e.q5a*e.q10a)cov(e.q6a*e.q8a)cov(e.q6a*e.q11a)

cov(e.q6a*e.q15)

cov(e.q7a*e.q8a)

cov(e.q9a*e.q10a)

cov(e.q12a*e.q13)

cov(e.q12a*e.q14)stand;

estat gof, stats(all)