Should the Preference-based Index Set of Values Be Country- or Disease-specific? An Analysis Using Data From Women With Symptoms of Overactive Bladder

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Abstract

Background: Overactive bladder (OAB) and urinary incontinence (UI) are common conditions among women. However, no studies have evaluated the utility value of this population using different country-specific value sets. We aimed to 1) verify the difference between the preference-based index extracted from the Short Form six dimensions (SF-6Dv1) questionnaire in women with OAB using different country-specific value sets; 2) translate and cross-culturally adapt the King's Health Questionnaire Five Dimension (KHQ-5D) into Brazilian Portuguese; and 3) examine the association between utility index obtained by the SF-6Dv1 and KHQ-5D.

Methods: This cross-sectional study included 387 women over 18 years of age with OAB symptoms, divided into groups with and without UI. All participants answered the sociodemographic questionnaire, KHQ, KHQ-5D, and SF-6Dv1. To the statistical analysis a two-way mixed ANOVA was applied to verify the interaction between the presence of UI and utility index obtained from different country-specific value sets. *Post-hoc* multiple comparisons were applied following the main analysis. Spearman's test was applied to verify the correlation between the utility values of SF-6Dv1 and KHQ-5D. The significance level was set at 5%.

Results: We evaluated 298 women classified according to the presence of UI (119 without UI vs. 179 with UI). The main analysis showed a statistically significant interaction between the presence of UI and the utility index obtained from the different countries ($p = 0.005$, Cohen's $d= 0.02$). The *post-hoc* analyses showed that there was a statistically significant main effect of the utility index obtained from different countries ($p <0.001$, $d = 0.63$) and in the presence of UI ($p = 0.012$, $d = 0.02$). The correlations between the utility indices obtained from different countries using the SF-6Dv1 and KHQ-5D were significant, positive, and small.

Conclusions: The differences between the indices obtained in different countries and groups with and without UI, assessed using the SF-6Dv1, are shown. The correlation between general and specifics preference-based measures was small; therefore, the SF-6Dv1 should be used with caution in cost-utility studies for this population. We recommend that in women with OAB, the value set for GPBM be obtained in countries where cost utility is applied.

Background

Overactive bladder (OAB) is defined by the International Continence Society as a urological condition associated with symptoms of urinary urgency, increased frequency of bathroom visits, and nocturia with or without urinary incontinence (UI) [1]. Urge urinary incontinence (UUI) is defined as the complaint of involuntary loss of urine associated with urgency [1]. An important factor related to OAB and UUI in women is its varied prevalence rate, estimated by epidemiological studies, between 9% and 43% [2]. Apart from the high prevalence, some studies [3,4] showed that women with mixed urinary incontinence (MUI) or UUI report the worst impact on quality of life (QoL) compared to women with stress urinary incontinence (SUI).

Due to its symptomatological characteristics, the assessment of symptoms and perceptions reported by women are important and allow the evaluation of the impact of OAB on QoL [5]. OAB directly interferes with the psychosocial domain, generating changes in daily life, such as decreased socialization [6], increases the prevalence of anxiety, depression, and mental disorders [6]. Despite the existence of instruments that aim to assess the QoL of patients with OAB, the choice and applicability of these instruments must consider the cultural differences and preferences of the health states that impact the QoL questionnaire results [7].

Many questionnaires have been developed to assess patient reported outcomes in the area of women's health in research and clinical practice. All patient-reported outcome measures are valuable in the field of urogynecology for understanding patients' perspectives on their conditions without the interruption and medical influence on symptoms

and impact of their health status on QoL [8]. Usually, the assessment of QoL is based on several domains such as physical functioning, role limitations, mental well-being, social functioning, and pain [9]. Furthermore, it is also important to evaluate health-related quality of life (HRQoL) using generic preference-based measures (GPBM) or specific preference-based measures (SPBM).

Normally, GPBMs are widely used because they are general and can be applied in different populations/conditions, an example of a GPBM is the Short Form Six Dimensions version 1 (SF-6Dv1). On the other hand, SPBM can more reliably capture the health states of a given condition, for example, the King's Health Questionnaire Five Dimensions (KHQ-5D) is used to extract HRQoL from women with UI or OAB [10]. In economic evaluations, an ideal GPBM [11] or SPBM [10] should be able to assess the change in a patient's HRQoL over time according to the benefit gained in their health. For this, the HRQoL is evaluated to obtain preferences according to health status [12].

Among the measures of economic evaluation of health technologies, the quality-adjusted life-year (QALY) is commonly used, which combines HRQoL and length of life into a single index summary measure [11]. For decision-makers dealing with the limitations of health spending, this measure has the advantage of capturing the gains in reducing morbidity (quality gains) and mortality (quantity gains) by putting them into a single measure. HRQoL is represented by a utility value (index) normally anchored on a scale of 1 (full health) to 0 (dead), with negative values equivalent to states worse than death [9]. Generic or specific preference-based multi-attribute utility instruments (MAUIs) such as the SF-6Dv1 and KHQ-5D are mechanisms for indirectly estimating these utilities [9]. The utility value is extracted from weights (value sets) that are usually generated from general population preferences using different valuation methods such as the visual analog scale (VAS), standard gamble (SG), Time Trade-off (TTO), and Discrete-Choice Experiments (DCE) [12]. Considering population cultural differences, it is common for the extraction of weights for the utility value to be carried out in the country to be evaluated; however, direct extraction measures are complex, time-consuming, and costly [13].

As stated earlier, OAB and UI are common conditions among women, and HRQoL assessment using SPBM is not commonly considered [8]. Therefore, few studies [10,14,15] have evaluated HRQoL to obtain the QALY of women with OAB or UUI. Furthermore, to the best of our knowledge, no studies have correlated the utility values of GPBM with SPBM in this population. Thus, this study aimed to: 1) verify the difference between the preference-based index extracted from the SF-6Dv1 questionnaire using value sets (i.e., weights) from different countries (indices obtained in 19 different studies and 11 different countries) and in a population of women with OAB with and without UI; 2) translate and cross-culturally adapt the KHQ-5D to Brazilian Portuguese; and 3) examine the association between the utility index of a GPBM (i.e., SF-6Dv1) with SPBM (i.e., KHQ-5D).

We hypothesize that the preference-based index will differ between countries because of cultural differences in social expectations and values [11,16–29] and between women with and without UI because of different perceptions of health states [10]. We also hypothesized that the KHQ-5D, translated into Brazilian Portuguese, would be valid and reliable. Furthermore, we hypothesized that the KHQ-5D would have a small-to-moderate correlation with the SF-6Dv1 because of the lack of specificity of the SF-6Dv1.

Methods

Study Population

This cross-sectional study, with a convenience sample, was conducted at the Women's Health Research Laboratory at the Federal University of São Carlos, São Carlos, SP, Brazil. Participants were 387 women with or without UI. The inclusion criteria were being over 18 years of age and literate and having at least one of the following symptoms of OAB— increased frequency, nocturia, or urgency of pollakiuria—assessed by the KHQ (cf. Instruments) [30] with the

following questions: “Do you usually go to the bathroom?” “Do you get up at night to urinate?” “Do you have a strong urge to urinate and have difficulty controlling it?”

Participants included in the study were classified according to the presence of UI (group with UI *vs.* group without UI). To classify the groups, the KHQ questions about “losing urine when you have a powerful desire to urinate” and “if you lose urine with physical activity, coughing or sneezing,” were used. The UI group comprised participants who reported urine loss according to the KHQ, and the group without UI was composed of participants who did not report urine loss, as shown in figure 1. This study was approved by the Ethics and Research Committee [OMITTED FOR BLINDED PURPOSES]. All participants signed an informed consent form, and the studies were conducted following the Declaration of Helsinki.

Instruments and Data Collection

Data were collected through semi-structured interviews containing sociodemographic and anthropometric data such as years of education, marital status, and age, and providing answers to the KHQ [30], KHQ-5D [10], and SF-6Dv1 [16].

King’s Health Questionnaire

The KHQ consists of 21 questions divided into eight domains (general health perception, incontinence impact, role limitations, physical limitations, social limitations, personal relationships, emotions, and sleep and energy disturbances associated with UI) and two independent Likert-type scales of urinary symptoms. The score ranges from 0 (best QoL) to 100 (worst QoL) and is measured by each domain. In this study, only the Symptom Severity Scale, which assesses the presence and severity of urinary symptoms, was used to verify the eligibility to participate in the study and questions about UI to form each group [31]. The KHQ was translated and validated in Brazil by Fonseca et al. [30].

Short Form Six Dimensions version 1

The MAUI SF-6Dv1, developed by Brazier et al. [16], describes health states on six dimensions using four to six severity levels: physical functioning (six levels), role limitations (four levels), social functioning (five levels), pain (six levels), mental health (five levels), and vitality (five levels); therefore, the SF-6Dv1 can describe 18,000 health states. The SF-6Dv1 has been translated and validated in Brazil by Cruz et al. [27].

King’s Health Questionnaire Five Dimensions

The MAUI KHQ-5D, developed by Brazier et al. [10], consists of five questions about urinary problems that are assessed in five dimensions: functional limitation, physical limitation, social limitation, emotion, and sleep. Each dimension has four levels of responses (does not affect, affects slightly, affects moderately, and affects a lot), and therefore can assess 1024 health states.

Protocol translation and cross-cultural adaptation

The translation protocol was performed after authorization was obtained through electronic contact with the authors of the KHQ-5D [10]: John E. Brazier and Con Kelleher.

As illustrated in figure 2, the translation and cross-cultural adaptation protocol of the items, instruction, and response options were carried out in five steps: i) Translation: two independent translators fluent in English but residing in Brazil, were responsible for translating the KHQ-5D from English to Brazilian Portuguese; ii) Synthesis of translations: two reviewers held a meeting to synthesize the translations into a single document; iii) Translation-back: a new translation of the new document from Brazilian Portuguese to English was performed; iv) Review Committee: a committee of six

judges and two reviewers evaluated the new version translated into English and considered the grammatical and conceptual semantics; v) Pre-test: 10 women, without mental restrictions that could impair the understanding of the instrument and with symptoms of OAB (evaluated by the KHQ), participated in the pre-test. Pretest participants were asked about the layout of the form, whether they had other comments about the questionnaire, whether they considered the questions confusing, and whether the answer options were inadequate.

Acceptability was considered low when an item was judged and > 10% of the participants responded positively to these questions [22]. Understandability was considered insufficient when at least 20% of the participants found some questions difficult to answer.

Data Processing

To contemplate the objectives of this study, the utility value of the SF-6Dv1 was generated with a custom-made routine developed in R by a member of the research team, and the KHQ-5D was calculated using the KHQ package [32]. The utility values of the SF-6Dv1 and KHQ-5D were calculated according to the weights obtained in 11 countries [11,16,22–25,28,33]. Several evaluation methods have been used to elicit these weights, including the VAS, SG, ordinal preference, probability lottery equivalent, full profile, and discrete choice experiment. The most common evaluation method was the SG, as shown in table 1, which describes the validation process in several countries.

Statistical analysis

Descriptive statistics were performed to express the characteristics of the sample through means, standard deviations, frequencies, and percentages, according to the presence of UI. The Kolmogorov-Smirnov test was used to verify the normality of the data. Although the data did not meet the normality assumption, a two-way mixed-design analysis of variance (ANOVA) was used, considering that it is a sufficiently robust test to support non-parametric data [34]. A two-way mixed ANOVA was applied to verify the interaction between the presence of UI and preference indices obtained from different countries. If Mauchly's test of sphericity was statistically significant ($p<0.05$), the epsilon correction (Huynh-Feldt) was used to adjust the degrees of freedom. Thus, if an interaction between groups *vs*. the utility index of different countries, differences between groups, and differences between the utility indices of different countries were found in the main analysis, two different *post hoc* comparisons would be applied. The first *post hoc* test measured the difference in each country's utility index between groups using an independent Student’s t-test. The second *post hoc* (multiple comparisons) measured the difference between the utility indices of different countries within each group using a one-way ANOVA, and to counteract the problem resulting from multiple comparisons, a Bonferroni correction was applied. Spearman's correlation was used to verify the correlation between utility indices obtained through the SF-6Dv1 and KHQ-5D. A significance level of 5% was considered in the analyses, and all analyses were performed using the SPSS software (IBM SPSS Statistics, v. 22).

Table 1: Description of validation in several countries.

Author	Country	Year	Valuation methods	MAUI	Original questionnaire	Sample	Population
Brazier et al. [16]	UK	1998	VAS	SF-6Dv1	SF-36v1		General Public
Brazier et al.[16]	UK	1998	SG	SF-6Dv1	SF-36v1		General Public
Brazier et al.[11]	UK	2002	SG	SF-6Dv1	SF-36v1	611	General Public
Brazier et al.[22]	UK	2004	SG	SF-6Dv1	SF-36v1	611	General Public
Brazier et al.[22]	UK	2004	SG	SF-6Dv1	SF-12	611	General Public
McCabe et al.[23]	UK	2007	SG	SF-6Dv1	SF-36v1		
Atroshi et al.[24]	UK	2007	OV	SF-6Dv1	SF-36v1		
Lam et al.[25]	China	2008	SG	SF-6Dv1	SF-36v1	126	General Public
Ferreira et al.[26]	Portugal	2010	SG	SF-6Dv1	SF-36v1	140	General Public
Cruz et al.[27]	Brazil	2011	SG	SF-6Dv1	SF-36v1	469	General Public
Ferreira et al.[28]	Portugal	2011	SG	SF-6Dv1	SF-36v1	140	General Public
McGhee et al.[29]	Hong Kong	2011	SG	SF-6Dv1	SF-36v1	582	General Public
Méndez et al. [17]	Spain	2011	PLE	SF-6Dv1	SF-36v1	4980	General Public
Abellan Perpinan et al.[19]	Spain	2012	PLE	SF-6Dv1	SF-36v1		
Craig et al.[20]	USA	2013	PF	SF-6Dv1	SF-36v1	666	General Public
Norman et al.[33]	Australia	2014	DCE	SF-6Dv1	SF-36v1		
Craig et al.[20]	United Kingdom	2016	SG	SF-6Dv1	SF-36v1		
Kharroubi et al.[39]	Lebanon	2020	SG	SF-6Dv1	SF-36v1	126	General Public
Kharroubi et al. [39]	Lebanon	2020	SG	SF-6Dv1	SF-36v1	126	General Public
Brazier J et al.[10]	United Kingdom	2008	SG	KHQ-5D	KHQ	110	Women and men with UI

Abbreviations: VAS, Visual Analogic Scale; SG, Standard gamble; OV, Ordinal Valuation; PLE, Probability Lottery

Equivalent utilities; PD, Pivoted design; DCE, Discrete-Choice experiments; MAUI, Multi-attribute utility instrument; SF-6Dv1, Short-Form Six Dimensions version 1; KHQ-5D, King's Health Questionnaire Five Dimensions; SF-36, 36-item Short-Form Health Survey version 1; KHQ, King's Health Questionnaire.

Results

A total of 298 women with OAB were evaluated and classified into two groups according to the presence of UI. The mean age of the group without UI was 30.40 (DP=10.77) years old and group with UI was 41.92 (DP=16.95) years old. In addition, in the group with UI, 42 (23%) had UUI, 43 (23%) complained of SUI, and 98 (54%) complained of MUI. Table 2 shows the sociodemographic characteristics of the participants according to the presence of UI.

Table 2. Sociodemographic characteristics of the sample with overactive bladder according to the presence of urinary incontinence.

	Without UI	With UI
	Frequency (%)	
Stable union	**n=119**	**n=179**
Yes	39 (33)	95 (55)
No	80 (67)	81 (45)
Education	**n=119**	**n=160**
Incomplete elementary school	1 (1)	11 (6)
Elementary school	-	55 (31)
High school	23 (19)	52 (29)
University education	95 (80)	60 (34)
Family income	**n=119**	**n=178**
< $4.486.60	8 (7)	5 (3)
$1076.29 - $2059.48	54 (45)	72 (45)
$356.67 - $600.89	51 (43)	77 (48)
< $160.68	6 (5)	6 (3)

It can be observed (figure 3) that there is a wide dispersion of the utility indices obtained in different countries and according to the presence of UI.

Abbreviations: UK, United Kingdom; US, United States of America; VAS, visual analog scale; SG, standard gamble; OV, ordinal valuation; PLE, probability lottery equivalent utilities; PD, pivoted design; DCE, discrete-choice experiments; UI, urinary incontinence.

The two-way mixed-design ANOVA showed a statistically significant interaction between the presence of UI and utility index obtained from different countries (F [2.40,710.52] =4.83, p=0.005, Cohen's d=0.02). Additionally, we observed a significant main effect of the utility index obtained from different countries (F [2.40,710.52] =494.45, p<0.001, Cohen's d=0.63) and a significant main effect of the presence of UI (F [1.0; 296,0] =6.38, p=0.01, Cohen's d=0.02). Table 3 shows

the results of the *post hoc* comparison of the differences in the utility index between the groups. It is possible to observe that there was a significant difference in the value of the utility index obtained from different countries between the group without UI and the group with UI. In general, women with UI tended to have a lower mean utility index value than those without UI (Table 3).

Table 3. Comparison between presence of urinary incontinence (UI) in the utility index.

Utility index of country	Without UI n=119 Mean (DP)	With UI n=179 Mean (DP)	MD (95% CI)	*t*	*p*-value	Cohen's d
UK-1998-VAS	0.68 (0,13)	0.63 (0,17)	0.05 (0,02; 0,09)	8.64	**0.01**	0.03
UK-1998-SG	0.90 (0,06)	0.88 (0,08)	0.02 (0,00; 0,04)	5.35	**0.02**	0.02
UK-2002-SG	0.78 (0,10)	0.75 (0,12)	0.03 (0,01; 0,06)	5.58	**0.02**	0.02
UK-2004-SG	0.78 (0,10)	0.75 (0,12)	0.03 (0,00; 0,06)	5.06	**0.03**	0.02
UK-2004-SG	0.77 (0,12)	0.76 (0,12)	0.01 (-0,01; 0,04)	0.88	0.35	0.00
UK-2006-SG	0.74 (0,11)	0.72 (0,13)	0.03 (0,00; 0,06)	3.66	0.06	0.01
UK-2006-OV	0.79 (0,11)	0.75 (0,14)	0.05 (0,01; 0,08)	7.96	**0.01**	0.03
China-2008-SG	0.77 (0,12)	0.73 (0,16)	0.04 (0,01; 0,08)	6.66	**0.01**	0.02
Portugal-2010-SG	0.88 (0,06)	0.86 (0,08)	0.02 (0,00; 0,04)	6.26	**0.01**	0.02
Brazil-2011-SG	0.74 (0,11)	0.70 (0,12)	0.04 (0,01; 0,06)	6.42	**0.01**	0.02
Portugal-2011-SG	0.78 (0,14)	0.73 (0,17)	0.05 (0,01; 0,08)	6.38	**0.01**	0.02
Hong Kong-2011-SG	0.81 (0,09)	0.77 (0,13)	0.04 (0,02; 0,07)	10.01	**0.01**	0.03
Spain-2011-PLE	0.62 (0,18)	0.56 (0,23)	0.06 (0,01; 0,11)	5.01	**0.03**	0.02
Spain-2012-PLE	0.73 (0,15)	0.69 (0,20)	0.04 (0,00; 0,09)	4.16	**0.04**	0.01
US-2013-PD	0.89 (0,06)	0.88 (0,07)	0.02 (0,00; 0,03)	3.65	0.06	0.01
Australia-2014-DCE	0.66 (0,21)	0.59 (0,26)	0.07 (0,01; 0,12)	5.70	**0.02**	0.02
UK-2016-SG	0.85 (0,08)	0.85 (0,07)	0.00 (-0,02; 0,02)	0.10	0.75	0.00
Lebanon-2020-SG	0.89 (0,09)	0.85 (0,12)	0.05 (0,02; 0,07)	12.34	**0.01**	0.04
Lebanon-2020-SG	0.87 (0,10)	0.83 (0,12)	0.04 (0,02; 0,07)	10.05	**0.01**	0.03

Abbreviation: UK, United Kingdom; the US, United States of America; UI, urinary incontinence; MD; mean difference between the group without UI and the group with UI; 95% CI, the lower and upper limit of a 95% confidence interval on the mean difference; *t*, *t*-test statistic; p-value < 0,05; Effect size, Cohen's d effect size. Results with $p<0.05$ are shown in bold.

Table 4 shows the *post hoc* results for the utility indices of the different countries in each group. In the group of women without UI, significant differences were observed between the utility indices obtained in different countries (i.e., the indices obtained from the value sets of 19 countries are different). For example, in the group without UI, the utility index obtained by the value set of UK-1998-SG (indicated by the letter B in table 4) was significantly different from that obtained by the value set of Brazil-2011-SG (indicated by the letter J in table 4). The same was observed for the group

with UI, and significant differences were observed between the utility indices obtained in different countries; therefore, the utility indices obtained from the weights of the 19 countries are different between them. The utility index obtained by the set value of UK-1998-SG (indicated by the letter B in table 4) was significantly different from that obtained by the value set of Brazil-2011-SG (indicated by the letter J in table 4).

Table 4. Comparison between utility index obtained in different countries according to the presence of urinary incontinence.

Without UI (n=179); F (2.54, 299,24) =225,98, p<0.001, η^2=0.66*

Utility index of country		Mean (DP)	*Post hoc* **																		
A	UK-1998-VAS	0.68 (0.13)	-	B	C	D	E	F	G	H	I	J	K	L	M	N	O	-	Q	R	S
B	UK-1998-SG	0.90 (0.06)	A	-	C	D	E	F	G	H	-	J	K	L	M	N	-	P	Q	-	S
C	UK-2002-SG	0.78 (0.10)	A	B	-	-	-	F	-	-	I	J	-	L	M	N	O	P	Q	R	S
D	UK-2004-SG	0.78 (0.10)	A	B	-	-	-	F	-	-	I	J	-	L	M	N	O	P	Q	R	S
E	UK-2004-SG	0.77 (0.12)	A	B	-	-	-	F	-	-	I	J	-	L	M	N	O	P	Q	R	S
F	UK-2006-SG	0.74 (0.11)	A	B	C	D	E	-	G	H	I	-	K	L	M	-	O	P	Q	R	S
G	UK-2006-OV	0.79 (0.11)	A	B	-	-	-	F	-	H	I	J	-	L	M	N	O	P	Q	R	S
H	China-2008-SG	0.77 (0.12)	A	B	-	-	-	F	G	-	I	J	-	L	M	N	O	P	Q	R	S
I	Portugal-2010-SG	0.88 (0.06)	A	-	C	D	E	F	G	H	-	J	K	L	M	N	-	P	Q	-	-
J	Brazil-2011-SG	0.74 (0.11)	A	B	C	D	E	-	G	H	I	-	K	L	M	-	O	P	Q	R	S
K	Portugal-2011-SG	0.78 (0.14)	A	B	-	-	-	F	-	-	I	J	-	L	M	N	O	P	Q	R	S
L	Hong Kong-2011-SG	0.81 (0.09)	A	B	C	D	E	F	G	H	I	J	K	-	M	N	O	P	-	R	S
M	Spain-2011-PLE	0.62 (0.18)	A	B	C	D	E	F	G	H	I	J	K	L	-	N	O	P	Q	R	S
N	Spain -2012-PLE	0.73 (0.15)	A	B	C	D	E	-	G	H	I	-	K	L	M	-	O	P	Q	R	S
O	US-2013-PD	0.89 (0.06)	A	-	C	D	E	F	G	H	-	J	K	L	M	N	-	P	Q	-	S
P	Australia-2014-DCE	0.66 (0.21)	B	-	C	D	E	F	G	H	I	J	K	L	M	N	O	-	Q	R	S
Q	UK-2016-SG	0.85 (0.08)	A	B	C	D	E	F	G	H	I	J	K	-	M	N	O	P		R	-
R	Lebanon-2020-SG	0.89 (0.09)	A	-	C	D	E	F	G	H	-	J	K	L	M	N	-	P	Q	-	S

S	Lebanon-2020-SG	0.87 (0.10)	A	B	C	D	E	F	G	H	-	J	K	L	M	N	O	P	-	R	-
With UI (n=179); F (2.32, 412.80) = 311.62, p<0.001, η^2=0.64*																					
A	UK-1998-VAS	0.63 (0.17)	-	B	C	D	E	F	G	H	I	J	K	L	M	N	O	-	Q	R	S
B	UK-1998-SG	0.88 (0.08)	A	-	C	D	E	F	G	H	I	J	K	L	M	N	-	P	Q	R	S
C	UK-2002-SG	0.75 (0.12)	A	B	-	-	E	F	-	H	I	J	-	L	M	N	O	P	Q	R	S
D	UK-2004-SG	0.75 (0.12)	A	B	-	-	-	F	-	H	I	J	K	L	M	N	O	P	Q	R	S
E	UK-2004-SG	0.76 (0.12)	A	B	-	-	-	F	-	H	I	J	K	-	M	N	O	P	Q	R	S
F	UK-2006-SG	0.72 (0.13)	A	B	C	D	E	-	G	-	I	J	-	L	M	N	O	P	Q	R	S
G	UK-2006-OV	0.75 (0.14)	A	B	-	-	-	F	-	H	I	J	K	L	M	N	O	P	Q	R	S
H	China-2008-SG	0.73 (0.16)	A	B	C	D	-	-	G	-	I	J	-	L	M	N	-	P	Q	R	S
I	Portugal-2010-SG	0.86 (0.08)	A	B	C	D	E	F	G	H	-	J	K	L	M	N	O	P	-	R	S
J	Brazil-2011-SG	0.70 (0.12)	A	B	C	D	E	F	G	H	I	-	K	L	M	-	O	P	Q	R	S
K	Portugal-2011-SG	0.73 (0.17)	A	B	-	D	E	-	G	-	I	J	-	L	M	N	O	P	Q	R	S
L	Hong Kong-2011-SG	0.77 (0.13)	A	B	C	D	F	-	G	H	I	J	K	-	M	N	O	P	Q	R	S
M	Spain-2011-PLE	0.56 (0.23)	A	B	C	D	E	F	G	H	I	J	K	L	-	N	O	P	Q	R	S
N	Spain -2012-PLE	0.69 (0.20)	A	B	C	D	E	F	G	H	I	-	K	L	M	-	O	P	Q	R	S
O	US-2013-PD	0.88 (0.07)	A	-	C	D	E	F	G	H	I	J	K	L	M	N	-	P	Q	R	S
P	Australia-2014-DCE	0.59 (0.26)	-	B	C	D	E	F	G	H	I	J	K	L	M	N	O	-	Q	R	S
Q	UK-2016-SG	0.85 (0.07)	A	B	C	D	E	F	G	H	-	J	K	L	M	N	O	P	-	-	-
R	Lebanon-2020-SG	0.85 (0.12)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	-	-	S
S	Lebanon-2020-SG	0.83 (0.12)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	-	R	-

*Results of one-way ANOVA for differences among utility index of different countries, *p*-value, and effect size. **Post hoc comparisons of pairs of countries; letters show pairs differing at *p*<0.005. Abbreviation: UK, United Kingdom; the US, United States of America.

Regarding the translation and cross-cultural adaptation process, the participants had no difficulty answering the questionnaire, hence the questionnaire was considered to have good acceptability and understandability.

The correlation between the KHQ-5D and SF-6Dv1 (utility index obtained in different countries) is shown in table 5. In the group without UI, the associations between SF-6Dv1 and KHQ-5D were significant, positive, and small in most countries, except for UK-2004-SG and UK-2016-SG, whose correlations were not significant. In the group with UI, the correlations between SF-6Dv1 and KHQ-5D were significant, positive, and small in most countries, except for UK-2016-SG, whose correlation was not significant.

Table 5. Correlation between the utility index extracted from the SF-6D (each country) and KHQ-5D, for each group.

SF-6D	KHQ-5D	
Country	Without UI n=119	With UI n=179
UK-1998-VAS	**0.30**	**0.24**
UK-1998-SG	**0.23**	**0.18**
UK-2002-SG	**0.18**	**0.23**
UK-2004-SG	**0.20**	**0.23**
UK-2004-SG	0.15	**0.20**
UK-2006-SG	**0.21**	**0.21**
UK-2006-OV	**0.24**	**0.23**
China-2008-SG	**0.23**	**0.24**
Portugal-2010-SG	**0.29**	**0.23**
Brazil-2011-SG	**0.23**	**0.23**
Portugal-2011-SG	**0.28**	**0.27**
Hong Kong-2011-SG	**0.26**	**0.22**
Spain-2011-PLE	**0.26**	**0.18**
Spain -2012-PLE	**0.27**	**0.19**
US-2013-PD	**0.22**	**0.19**
Australia-2014-DCE	**0.29**	**0.20**
UK-2016-SG	0.07	0.11
Lebanon-2020-SG	**0.29**	**0.28**
Lebanon-2020-SG	**0.26**	**0.25**

Abbreviation: UK, United Kingdom; the US, United States of America; Urinary incontinence, UI. Spearman correlation results with p<0.05 are shown in bold.

Discussion

This study aimed to compare the utility index obtained from a set of values from different countries for a population of women with OAB with and without UI. The results of this study point to the intercultural importance of obtaining value sets for each country [27]. According to Karimi's review, published in 2016, HRQoL measures broadly describe health, which is better related to functioning and well-being than clinical measures; therefore, it is classified as a self-perceived measure of health status [9]. In this sense, cultural and regional aspects can diversify according to the perception of population health, especially on issues related to healthcare [27,35].

Thus, for cost-utility studies, the use of a GPBM, such as SF-6Dv1, seems to be the most appropriate alternative, considering the value set in each country. [27]. As proposed by Brazier et al. [16], over the last few years, techniques have to estimate MAUIs through the SF-6Dv1, and it has been possible to observe an increase in research to obtain MAUIs in different parts of the world, contributing to intercultural comparisons [27]. However, Ferreira et al. [36] proposed a comparison of the SF-6Dv1 utility index from SF-36 with the SF-6Dv1 administered as an independent instrument in the general population. According to the results presented by the authors, the SF-6Dv1 administered as an independent instrument generated higher rates than the utility index administered by the SF-36 [36].

Surveys of MAUIs tend to be performed by the general population [18,20], although the set of values obtained is used most often in populations with specific conditions, such as OAB [10]. The present study used the value sets obtained from different countries for a specific population of women with OAB. An effect on the value sets and the presence of UI was observed. Although women's health is an area recognized by scientific evidence, few studies have assessed the cost-effectiveness of treatment.

Despite the few cost-utility studies, a survey published in 2008 by Brazier et al. [10] demonstrated interest in obtaining measures of health status in the population with UI, and the value sets for the preference-based indices were obtained from the KHQ. No studies obtained weights from the KHQ of countries other than the United Kingdom. Obtaining an algorithm for a specific condition in a country like Brazil is not an easy task, and because of the lack of investment, it becomes complex and expensive [13,27]. The area of research in health economics is still new in Brazil, especially as a subarea of physiotherapy.

The translation and validation of the KHQ-5D, and the correlation of the utility index of the SF-6D (with the sets of values obtained in different countries) with the KHQ-5D (with the sets of values obtained in the United Kingdom) was performed due to the need to obtain health status in a specific population of women with OB, with and without UI. According to the obtained results, it was possible to observe a significant, positive, but small correlation between the utility indices of the SF-6Dv1 and KHQ-5D in both groups with and without UI. Even when we observe the correlation between the utility indices of the SF-6D with value sets obtained in the UK and KHQ-5D, in which the value set was also obtained in the UK, it is possible to observe the same pattern in the correlations (small correlation, although positive and significant).

Based on the results of this study, it is possible to reflect on the importance of obtaining weights in each country as well as the need to consider the specific health conditions for each population [37]. OAB symptoms and UI are chronic conditions that affect women's daily lives. However, for GPBM, such as SF-6Dv1, for the assessment of MAUI, the risk of death may not be representative of this population, and therefore, health conditions could be considered mild in this population [10,38]. Although OAB with or without UI affects QoL in several aspects, it is not a limiting condition and, therefore, in patients with UI, it is placed at the upper end of the scale [10]. In a study that compared the QALY of women with UI using the KHQ-5D according to the time of use of pads (daytime use *vs.* daytime and nighttime use), it was possible to observe a significant difference in health status between the groups. Thus, the MAUI, derived from a

specific questionnaire for urinary problems, allowed for reflection on everyday changes and adaptations in women with UI.

Although the KHQ-5D has been translated and cross-culturally adapted to avoid semantic errors, the present study was limited in terms of the scoring system used to obtain value sets for the KHQ-5D in Brazil.

Conclusion

From the results of this study, it can be concluded that there is an effect on the value sets obtained in different countries for MAUI assessment in a sample of Brazilian women with OAB with and without UI. There is an effect of the presence of UI in women with OAB and the value sets obtained in different countries, and an interaction between the effects. However, the evaluation of GPBM in women with OAB and UI may present an overestimated result. The SF-6Dv1 questionnaire was able to assess the MAUI of women with OAB in both groups, with and without urinary incontinence, but should be performed with caution in cost-utility studies because the correlation between the assessment of MAUI by GPBM and SPBM (specific for women with OAB) was small. However, considering the difficulties and complexities of direct QALY assessment by the MAUI, the SF-6Dv1 can be applied as a cost-utility tool in the treatment of women with OAB in countries whose value sets have been obtained only for GPBM. We recommend that, in women with OAB, the weights for GPBM be obtained in countries where cost utility will be applied.

Abbreviations

Overactive bladder (OAB),

Urinary Incontinence (UI),

Urge Urinary Incontinence (UUI),

Mixed Urinary Incontinence (MUI),

Stress Urinary Incontinence (SUI),

Quality of life (QoL),

Health-related Quality of Life (HR-QoL),

Generic preference-based measure (GPBM),

Specific preference-based measure (SPBM),

Short Form Six Dimensions version 1 (SF-6Dv1),

King's Health Questionnaire Five Dimensions (KHQ-5D),

Quality-adjusted life-year (QALY),

Multi-attribute utility instruments (MAUIs),

Weights (value sets),

Visual analog scale (VAS),

Standard gamble (SG),

Time trades off (TTO),

Discrete-choice experiments (DTE).

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics and Research Committee of the Federal University of São Carlos by the registration process #99691118.8.0000.5504, all participants signed an informed consent form, by the Helsinki declaration.

Consent for publication

"Not applicable"

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

APRR: Conceptualization, Investigation, Methodology, Formal analysis, Writing - Review & Editing. **LAB**: Conceptualization, Investigation, Methodology, Formal analysis, Writing - Review & Editing. **AJSS**: Conceptualization, Investigation, Methodology, Writing - Review & Editing. **ABO**: Writing - Review & Editing. **PD**: Conceptualization, Methodology, Writing - Review & Editing, Supervision.

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Figures

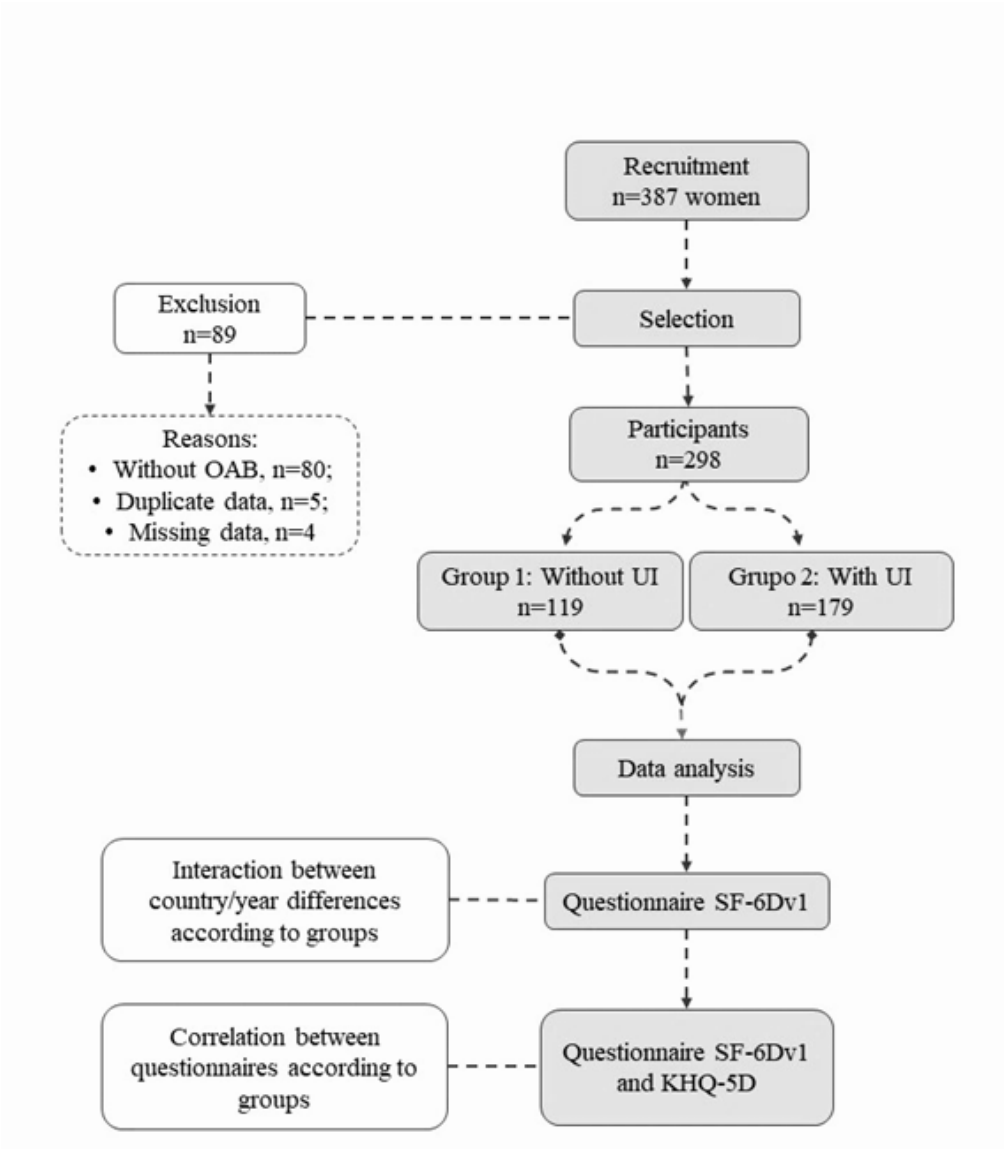

Figure 1

Flowchart of participant recruitment and data collection.

Abbreviations: OAB, overactive bladder; UI, urinary incontinence; SF-6Dv1, short-form six-dimension version one; KHQ-5D, King's Health Questionnaire Five Dimension.

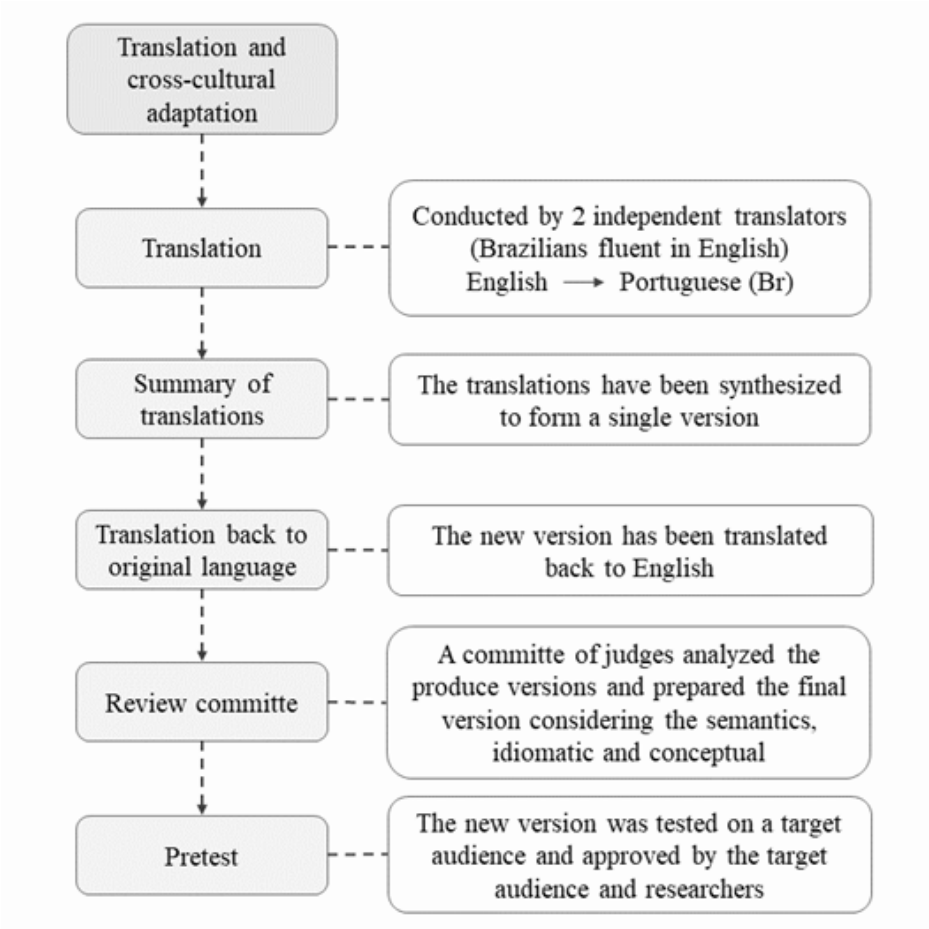

Figure 2

Flowchart of translation process.

Abbreviations: OAB, overactive bladder; UI, urinary incontinence; SF-6Dv1, short-form six-dimension version one; KHQ-5D, King's Health Questionnaire Five Dimension.

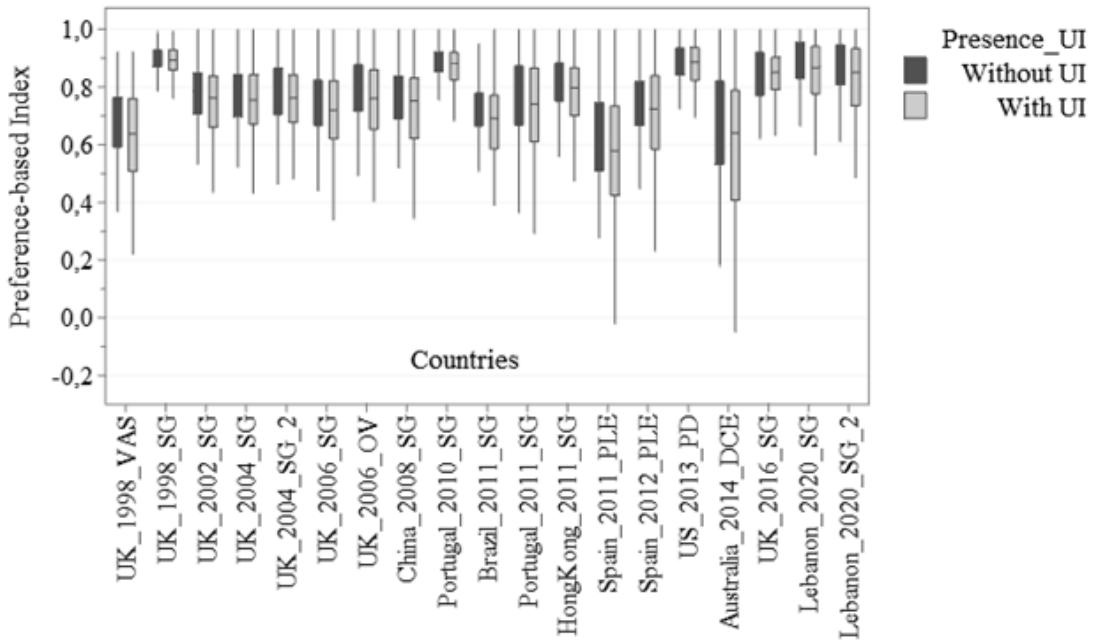

Figure 3

Preference-based index according to the weights in different countries.

Abbreviations: UK, United Kingdom; US, United States of America; VAS, visual analog scale; SG, standard gamble; OV, ordinal valuation; PLE, probability lottery equivalent utilities; PD, pivoted design; DCE, discrete-choice experiments; UI, urinary incontinence.