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ORIGINAL ARTICLE

Dutch translation and validation of the pelvic organ prolapse/incontinence sexual questionnaire-IUGA revised (PISQ-IR)

Heleen van Dongen[1] · Huub van der Vaart[2] · Kirsten B. Kluivers[3] · Henk Elzevier[4] · Jan Paul Roovers[5] · Alfredo L. Milani[6]

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Abstract

Introduction and hypothesis Condition-specific sexual questionnaires are important patient-reported outcome measures. The aim of this study was to translate and validate the Pelvic Organ Prolapse/Incontinence Sexual Questionnaire-International Urogynecology Association Revised (PISQ-IR) into Dutch.

Methods The translated PISQ-IR was linguistically validated, followed by psychometrical validation among women presenting with symptoms of pelvic floor dysfunction in urogynecology clinics. For analysis of the criterion validity, the Pelvic Floor Dysfunction Inventory-20 (PFDI-20) and Female Sexual Function Index (FSFI) were used. Descriptive statistics, floor and ceiling effects, internal consistency using Cronbach's alpha coefficient and Pearson's and Spearman's correlations were calculated for all PISQ-IR subscales.

Results The PISQ-IR was completed by 220 women, of whom 61 (27.7%) considered themselves not sexually active (NSA) and 159 (72.3%) sexually active (SA). The mean age of participating women was 57 years; 49.5% reported symptoms of pelvic organ prolapse (POP), 66.8% urinary incontinence and 2.3% anal incontinence. The PISQ-IR subscales were analyzed separately for SA and NSA women with Cronbach's alpha coefficient ranging from 0.61 to 0.87. Moderate to high correlations were observed between PISQ-IR subscales and corresponding FSFI subscales and a moderate correlation between urinary distress and the condition impact (CI) subscale among NSA subjects.

Conclusions The Dutch PISQ-IR demonstrated a good internal consistency and criterion validity compared with the FSFI, but criterion validity compared with the PFDI-20 was poor except for urinary distress in NSA women and needs further attention.

Keywords Pelvic floor dysfunction · Pelvic organ prolapse · Urinary and/or anal incontinence · Sexual function questionnaire · Validation

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✉ Heleen van Dongen
h_vandongen@hotmail.com

[1] Department of Obstetrics and Gynecology, Groene Hart Hospital, Bleulandweg 10, 2803 HH Gouda, The Netherlands

[2] Department of Gynecology, University Medical Center Utrecht, Utrecht, The Netherlands

[3] Department of Gynecology, Radboud University Medical Center, Nijmegen, The Netherlands

[4] Department of Urology and Department of Medical Decision Making, Leiden University Medical Center, Leiden, The Netherlands

[5] Department of Gynecology, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

[6] Department of Obstetrics and Gynecology, Reinier de Graaf Hospital, Delft, The Netherlands

Introduction

Symptoms of pelvic floor dysfunction, such as urinary incontinence, increased urinary frequency, nocturia, urgency and vaginal bulging, are common in adult women.

The estimated prevalence of pelvic organ prolapse stage ≥ 2, according to the Pelvic Organ Prolapse Quantification (POPQ) system, is 38.5%, and the prevalence of urinary incontinence ranges between 25 and 45% [1]. Apart from symptoms directly related to organ dysfunction, women with pelvic floor dysfunction are at higher risk for sexual dysfunction [2, 3].

This association between pelvic floor dysfunction and sexual function can be assessed with validated questionnaires, of which the Female Sexual Function Index (FSFI) and Pelvic organ prolapse/ urinary Incontinence Sexual Questionnaire 12 (PISQ-12) are the most commonly used [4, 5]. Both were validated for the Dutch language [6, 7]. However, the FSFI is not specifically designed for women with pelvic floor symptoms, and in the PISQ-12 women who are not sexually active or do not have a partner are excluded. The latter might underestimate the impact of pelvic floor symptoms on sexual function, since women with severe bother may choose not to be sexually active [7].

The PISQ-IR is designed as a condition-specific measure of sexual function in women with pelvic floor dysfunction, including urinary and anal incontinence and pelvic organ prolapse [8]. In contrast to the PISQ-31 (and PISQ-12), the PISQ-IR was designed to include women who do not have a partner or consider themselves not to be sexually active as well.

The objective of this study was to translate the PISQ-IR into the Dutch language and to study its validity among Dutch women with symptoms of pelvic floor dysfunction. Main outcome measures were internal consistency and criterion validity compared with related and validated questionnaires.

Materials and methods

The original English language version of the PISQ-IR consists of two sections: one for not sexually active (NSA) women and one for sexually active (SA) women. The first item is designed to lead women to the correct part of the questionnaire, depending on how they consider themselves: SA (with or without a partner) or NSA. The two sections are analyzed separately. The NSA section consists of four subscales: condition-specific reasons for sexual inactivity (NSA-CS; Q2c-Q2d-Q2e), partner-related reasons (NSA-PR; Q2a-Q2b), global rating for sexual quality (NSA-GQ; Q4a-Q4b-Q5a-Q6) and condition impact (NSA-CI; Q3-Q5b-Q5c). The SA section consists of six subscales: sexual arousal and orgasm (SA-AO; Q7-Q8a-Q10-Q11), partner-related reasons (SA-PR; Q13-Q14a-Q14b), condition-specific matters (SA-CS; Q8b-Q8c-Q9), condition impact (SA-CI; Q18-Q20b-Q20c-Q20d), global quality (SA-GQ; Q19a-Q19b-Q19c-Q20a) and sexual desire (SA-D; Q15-Q16-Q17). For NSA women, a higher score indicates greater negative impact on sexual function. For SA women, a higher score indicates less impact and better sexual function.

Translation and linguistic validation

According to the IUGA-recommended international protocol for the translation and validation (http://www.iuga.org/?page=pisqir), the PISQ-IR was first translated into Dutch by a translation agency qualified in medical issues. This was followed by a community review. This review process consisted of conducting cognitive interviews with 30 respondents. These interviews were performed according to the verbal probing technique. After filling in all relevant items of the questionnaire, the verbal probing method was used, addressing one question at a time. Women were probed about their initial reactions, their understanding of the content and whether there was any alternative wording they would find easier to understand. Revision of the translation was performed three times after a block of ten interviews based on the identified new issues and concerns. The revisions consisted of minor modifications. The interviewer was a member of the research team (HvD). Revision of the translation was done by two of the authors (HvD and ALM). After completing the interviews and revision of the questionnaire, a back-translation was performed by a qualified translation agency with expertise on medical issues. Two independent agencies performed the translation and back-translation to maintain independency of both translations. The back-translation was discussed with and approved by the IUGA PISQ-IR committee.

Psychometric validation

The Dutch language version of the PISQ-IR was distributed between April 2015 and April 2016 among women presenting to urogynecology outpatient clinics of five participating hospitals. According to the international protocol, inclusion of 220 women (120 sexually active and 100 not sexually active) was intended. This number was based on the common rule of thumb in psychometric work that for every variable included in an analysis at least ten subjects are needed [9].

Inclusion criteria were diagnosis of urinary incontinence, pelvic organ prolapse symptoms and/or anal incontinence, sufficient knowledge of the Dutch language and aged over 18 years. Women with a diagnosis of vulvodynia, painful bladder syndrome or chronic pelvic pain were excluded, according to committee protocol. Since distribution of sexual function questionnaires among urogynecology patients is accepted as regular practice, no ethical approval needed to be obtained according to the medical ethics committee (Radboud

University Medical Center, 24/04/2014, registration no. 2014/131). Informed consent was collected from all participants.

The FSFI [6] and Pelvic Floor Distress Inventory-20 (PFDI-20) [10], two related and previously validated questionnaires, were chosen to analyze criterion validity for sexual function in general and the correlation with pelvic floor dysfunction respectively.

For each participant demographic and clinical data [including physical investigation, e.g., the Pelvic Organ Prolapse Quantification (POP-Q) [1] and pelvic floor function] were collected for analysis of criterion validity as well. Together with the PISQ-IR, the FSFI and PFDI-20 were distributed among the participants. Participating women gave written informed consent and were handed a survey package containing these questionnaires. They were requested to return the completed questionnaires in a prepaid envelope by mail. To evaluate the responsiveness of scales, a follow-up survey was sent to all participating women 6 months after enrollment in the study.

Statistical analysis

Differences in clinical characteristics and questionnaire data between NSA and SA women were assessed with Student's *t* test. Descriptive statistics, floor and ceiling effects were calculated for all PISQ-IR subscales. Subscales were calculated in case at least half of the items were answered [8]. Internal consistency was assessed using Cronbach's alpha coefficient. To assess criterion validity, the PISQ-IR subscales were compared with the 'reference' questionnaires FSFI and PFDI-20 and with clinical measures (POP-Q and pelvic floor muscle function). For analysis, Pearson correlations or Spearman's rank-sum correlations were used. Scale responsiveness was based on comparison of change of scores in our Dutch PISQ-IR questionnaire to the change of scores in the PFDI-20 and FSFI. According to the recommendation of the PISQ-IR study group, imputation of missing values was not performed [11]. Statistical analyses were performed using IBM® SPSS software 22.0.

Results

PISQ-IR translation

Thirty women visiting a urogynecology unit with pelvic floor dysfunction participated in the translation process. After the initial translation into Dutch, ten women were interviewed, during which all items were extensively discussed. Based on these results, the wording of the question was revised and subjected to a second and third round of ten interviews. After the third round a final wording for each item was established. The back-translation was submitted and approved by the PISQ-IR committee.

In the final Dutch version, the answering format of question 4 and 19 was adjusted. In the Dutch rating system, the highest number is perceived as the best outcome and used as such in other validated questionnaires; therefore, the Likert scale ranking was transformed into the anticipated direction.

PISQ-IR validation

To obtain 220 evaluable data sets, we approached 377 women, of whom 230 (61.0%) agreed to participate. Ten women were excluded from the final analyses because of incomplete data sets.

Of the remaining 220 women, 61 (27.7%) women considered themselves NSA and 159 (72.3%) SA. Six months after inclusion, a follow-up questionnaire was sent and returned by 102 women (46.4%). Of all included NSA women, 54.1% returned the follow-up questionnaire. Among the SA women, 43.4% returned the follow-up questionnaire.

The clinical characteristics of our study population are shown in Table 1. The women who considered themselves SA were significantly statistically younger (13 years younger), and half of them were postmenopausal. Most women who were NSA were postmenopausal (90.2%). Of all women included, 49.5% had complaints of pelvic organ prolapse (POP), 66.8% reported urinary incontinence and 2.3% anal incontinence (AI). The results of the PFDI-20 demonstrated no difference in bother of pelvic floor symptoms comparing SA and NSA women. The FSFI (subscales and total score) showed better sexual function among SA women compared with NSA women.

As recommended by the authors of the original publication [8], the PISQ-IR results were analyzed separately for SA and NSA women (Table 2). No relevant floor or ceiling effects were found. The different Cronbach's alpha coefficients ranged from 0.61 to 0.87, with three subscales [NSA-condition specific (NSA-CS), SA-arousal/orgasm (NSA-AO) and SA-desire (SA-D)] below the level of 0.7. Other subscales showed a good level of internal consistency. In Table 3, the non-response levels of all questionnaire items and subscales are depicted. The non-response levels of SA women are below 10%, except for the condition-specific subscale. The non-response levels for NSA women range from 16 to 42%.

Table 4 shows the criterion validity analysis for NSA women. There were only moderate correlations between the urinary distress subscale of the PFDI-20 and the global quality (NSA-GQ) subscale and condition impact (NSA-CI) subscale of the PISQ-IR.

Table 1 Clinical characteristics and quality of life questionnaire results

	Not sexually active *n = 61* (27.7%)	Sexually active *n =* 159 (72.3%)	Total *n = 220*
Age, years (mean ± SD) *	66.2 (10.1)	53.5 (12.3)	57.0 (13.0)
Parity (median)	2 (0–5)	2 (0–4)	2 (0–5)
BMI (mean ± SD)	27.4 (4,4)	25.9 (3.7)	26.3 (4.0)
Postmenopausal*	90.2%	55.3%	65.6%
Past surgical history			
Hysterectomy*	39.3%	18.9%	24.5%
Prior prolapse surgery*	29.5%	10.1%	15.5%
Prior incontinence surgery*	14.8%	5.7%	8.2%
Clinical diagnosis			
Symptomatic POP	52.5%	48.4%	49.5%
Stress UI*	11.5%	35.2%	28.6%
Urge UI	14.8%	11.3%	12.3%
Mixed UI*	41.0%	21.1%	25.9%
Anal incontinence	–	3.1%	2.3%
POP-Q stage	*n = 57*	*n = 154*	*n = 211*
Stage 0 and I	28.1%	27.3%	27.7%
Stage II	57.9%	55.8%	56.4%
Stage III and IV	14%	16.9%	16.1%
Pelvic floor muscle function	*n = 45*	*n = 114*	*n = 159*
Normal	44.4%	42.1%	42.7%
Overactive	40.0%	31.6%	34.0%
Underactive	8.9%	16.7%	14.5%
Non-functioning	6.7%	9.6%	8.8%
PFDI-20 scales[a]	*n = 58*	*n = 157*	*n = 215*
POPDI	21.2 (15.9)	20.8 (10.2)	20.9 (17.5)
CRADI	18.3 (14.3)	17.4 (17.6)	17.6 (16.7)
UDI	36.4 (21.0)	32.0 (22.0)	33.1 (21.8)
Total score	75.8 (36.9)	70.2 (43.9)	71.7 (42.2)
FSFI scales[b]	*n = 53*	*n = 156*	*n = 209*
Desire*	1.8 (1.0)	3.3 (1.2)	2.9 (1.3)
Arousal*	0.8 (1.4)	4.2 (1.5)	3.4 (2.1)
Lubrication*	0.7 (1.6)	4.6 (1.6)	3.6 (2.4)
Orgasm*	0.9 (1.8)	4.3 (1.6)	3.5 (2.9)
Satisfaction*	2.2 (1.2)	4.4 (1.4)	4.1 (1.6)
Pain*	0.3 (1.1)	3.8 (2.3)	3.0 (2.6)
Total score*	6.7 (4.9)	25.1 (6.9)	23.0 (9.0)

POP Pelvic organ prolapse, *PFDI-20* Pelvic Floor Dysfunction Inventory-20, *POPDI* pelvic organ prolapse distress, *CRADI* colorectal and anal distress, *UDI* urinary distress, *FSFI* Female Sexual Function Index

*$p < 0.05$ (Student's *t*-test or chi-square test)

[a] Higher scores indicate more bother of pelvic floor symptoms

[b] Higher scores indicate better sexual functioning

Table 5 shows the criterion validity analysis for SA women. There was a weak correlation between PFDI-20 overall and the condition-specific (SA-CS) and condition-impact (SA-CI) subscales of the PISQ-IR. There were moderate correlations between the corresponding subscales of the FSFI and the PISQ-IR, but no correlations with BMI, POP-Q stage or pelvic floor muscle function.

Table 6 shows the responsiveness of NSA women. The condition impact subscale (NSA-CI) demonstrated a significant correlation with the urinary distress subscale of the PFDI-20.

Table 2 Scale parameters of the Pelvic Organ Prolapse/Incontinance Sexual Questionnaire-International Urogynaecology Association Revised (PISQ-IR)

Scale	No. of items	Mean (SD)	Cronbach's alpha	Floor	Ceiling
Not sexually active (NSA)					
Condition-specific (NSA-CS)	3	1.7 (1.0)	0.61	0.9%	0%
Partner-related (NSA-PR)	2	3.0 (1.1)	n.a.	10.0%	4.1%
Global quality (NSA-GQ)	4	2.2 (1.1)	0.83	0.5%	0%
Condition impact (NSA-CI)	3	1.9 (1.0)	0.86	0.9%	1.4%
Sexually active (SA)					
Arousal/orgasm (SA-AO)	3	3.6 (0.7)	0.65	0.5%	0%
Partner-related (SA-PR)	3	3.4 (0.6)	0.76	0%	0%
Condition-specific (SA-CS)	3	4.1 (0.9)	0.73	16.8%	0.5%
Global quality (SA-GQ)	4	3.5 (1.0)	0.87	0%	0%
Condition impact (SA-CI)	4	3.3 (0.8)	0.86	0%	0.5%
Desire (SA-D)	3	3.0 (0.7)	0.68	0%	0%

Table 7 shows the responsiveness of SA women. There was a weak correlation in anticipated direction between the condition-impact subscale (SA-CI) and the PFDI-20. Most comparisons with the FSFI demonstrated a significant positive correlation.

Among both NSA as SA women, no significant changes of PFDI-20 and FSFI scores were found after 6 months of follow-up. No correlation was found between the PFDI-20 and FSFI among SA and NSA women (data not shown).

Table 3 Item and subscale non-reponse levels

Not sexually active (NSA)	Missing N (%)	Sexually active (SA)	Missing N (%)
NSA-partner related	10 (16.4)	SA-arousal orgasm	5 (3.1)
Q2a	19 (31.1)	Q7	2 (1.3)
Q2b	19 (31.1)	Q8a	6 (3.8)
NSA-condition specific	25 (40.1)	Q10	5 (3.1)
Q2c	23 (37.7)	Q11	9 (5.7)
Q2d	25 (41.0)	SA-partner related	11 (6.9)
Q2e	25 (41.0)	Q13	8 (5.0)
NSA-global quality	13 (21.3)	Q14a	11 (6.9)
Q4a	20 (32.8)	Q14b	19 (11.9)
Q4b	26 (42.6)	SA-condition specific	24 (15.1)
Q5a	14 (23.0)	Q8b	25 (15.7)
Q6	8 (13.1)	Q8c	27 (17.0)
NSA-condition impact	16 (26.2)	Q9	4 (2.5)
Q3	10 (16.4)	SA-global quality	7 (4.4)
Q5b	17 (27.9)	Q19a	12 (7.5)
Q5c	17 (27.9)	Q19b	11 (6.9)
		Q19c	19 (11.9)
		Q20a	7 (4.4)
		SA-condition impact	5 (3.1)
		Q18	4 (2.5)
		Q20b	6 (3.8)
		Q20c	7 (4.4)
		Q20d	6 (3.8)
		SA-desire	4 (2.5)
		Q15	3 (1.9)
		Q16	4 (2.5)
		Q17	4 (2.5)

Discussion

The present study describes the validation of the Dutch translation of the PISQ-IR. The questionnaire showed good internal consistency and criterion validity compared with the FSFI, but the criterion validity compared with the PFDI-20 was poor, except for urinary distress in NSA women.

As proposed by the PISQ-IR Committee, the PFDI-20 was used for testing the correlation between bother of pelvic floor dysfunction and sexual function. Unfortunately, we did not find a clinically significant correlation between pelvic floor dysfunction in general and sexual function. Therefore, in this study population, we have to conclude that the PISQ-IR as a condition-specific instrument measuring sexual function was limited to NSA women with symptoms of urinary distress. The PISQ-IR as a condition-specific instrument for pelvic floor disorders in general is weak. In the original validation study [8], as well as the Spanish [12], Hungarian [13], Polish [14] and Arabic translation [15] of the PISQ-IR, the correlation between the PFDI-20 and PISQ-IR was also rather weak.

This could be explained by the following. Sexual function is far too complex to capture the relation to pelvic floor dysfunction with this solitary questionnaire. Sexual functioning is also dependent on many other

Table 4 Not sexually active (NSA) Pelvic Organ Prolapse/Incontinance Sexual Questionnaire-International Urogynaecology Association Revised (PISQ-IR) scale correlations with Pelvic Floor Distress Inventory-20 (PFDI-20) and clinical measures

Scale	Condition specific	Partner related	Global quality	Condition impact
PFDI-20	0.24	−0.28	0.45**	0.46**
Pelvic organ prolapse distress	0.05	−0.26	0.21	0.14
Colorectal and anal distress	0.10	0.05	0.15	0.12
Urinary distress	0.33	−0.33*	0.51**	0.61**
Clinical measures				
BMI	0.28	−0.32	−0.30	−0.21
POPQ-stage	−0.08	0.07	0.09	−0.06
Pelvic floor function	−0.25	0.05	−0.06	−0.11

For POP-Q and pelvic floor function Spearman's rank-sum correlations were computed; all other correlations were assessed with Pearson's correlations

POPQ Pelvic organ quantification system, *BMI* body mass index

*$p < 0.05$, **$p < 0.005$

PFDI-20: higher scores indicate more bothersome pelvic floor symptoms

PISQ-IR for NSA women: higher scores indicate greater negative impact and worse sexual function

factors besides the anatomical and functional integrity of the pelvic floor. Depression, anxiety, the relationship with the partner, body image, general health status, diabetes mellitus, cardiovascular disease and sociodemographic factors all have been reported to affect sexual functioning [16, 17].

Likewise, we found no correlation between the PISQ-IR and POP-Q stages, pelvic floor muscle function or BMI. This

Table 5 Sexually active (SA) Pelvic Organ Prolapse/Incontinance Sexual Questionnaire-International Urogynaecology Association Revised (PISQ-IR) scale correlations with Pelvic Floor Distress Inventory-20 (PFDI-20) and Female Sexual Function Index (FSFI) subscales and clinical measures

Scale	Arousal orgasm	Partner related	Condition specific	Global quality	Condition impact	Desire
PFDI-20 scales	−0.06	0.02	−0.37**	−0.08	−0.30**	0.19*
Pelvic organ prolapse distress	−0.15	−0.03	−0.18	−0.04	−0.25*	0.14
Colorectal and anal distress	−0.04	0.07	−0.31**	−0.01	−0.20*	0.15
Urinary distress	0.04	0.02	−0.30**	−0.13	−0.24**	0.14
FSFI scales						
Desire	0.49**	0.32**	−0.09	0.33**	0.05	0.73**
Arousal	0.66**	0.42**	0.09	0.46**	0.26**	0.58**
Lubrication	0.49**	0.34**	0.13	0.30**	0.22**	0.36**
Orgasm	0.54**	0.42**	0.22*	0.39**	0.25**	0.39**
Satisfaction	0.51**	0.60**	0.22*	0.76**	0.37**	0.37**
Pain	0.26**	0.23*	0.12	0.25**	0.28**	0.16
Clinical measures						
BMI	−0.00	−0.09	−0.20*	−0.15	−0.13	0.05
POPQ stage	−0.09	−0.19*	0.07	0.01	−0.07	−0.14
Pelvic floor function	−.11	−0.03	0.01	0.02	0.03	−0.14

For POP-Q and pelvic floor function, Spearman's rank-sum correlations were computed; all other correlations were assessed with Pearson's correlations

POPQ Pelvic organ quantification system, *BMI* body mass index

*$p < 0.05$, **$p < 0.005$

PFDI-20: higher scores indicate more bothersome pelvic floor symptoms

PISQ-IR for SA women: higher scores indicate less impact and better sexual function

FSFI: higher scores indicate better sexual function

Table 6 Not sexually active (NSA) Pelvic Organ Prolapse/Incontinance Sexual Questionnaire-International Urogynaecology Association Revised (PISQ-IR) scale changes correlations with Pelvic Floor Distress Inventory-20 (PFDI-20)

Scale	Condition specific	Partner related	Global quality	Condition impact
PFDI-20	0.20			0.36
Pelvic organ prolapse distress	0.02			0.12
Colorectal and anal distress	−0.27			−0.22
Urinary distress	0.52			**0.80****

Correlations were assessed with Pearson's correlations (values > 0.50 in bold)

*$p < 0.05$, **$p < 0.005$

PFDI-20: higher scores indicate more bothersome pelvic floor symptoms (mean change score 8.4, standard deviation ± 33.7)

PISQ-IR for NSA: higher scores indicate greater negative impact and worse sexual function

can be explained by the fact that the physical examination findings correlate poorly with functional problems [8].

NSA women were significantly older, and age (or postmenopausal status) plays a role in decreased sexual activity, as reported in other studies [18, 19]. In our study, there was a more pronounced association between pelvic floor dysfunction and sexual dysfunction of the NSA women. In this group, the majority of women were postmenopausal, so the question arose whether higher age and postmenopausal status caused this effect.

We might overestimate the effect of pelvic floor dysfunction on sexual function, even when measured with a condition-specific instrument.

Strengths of this study were the adequate sample size of SA women and the clear international protocol that was followed as well as the evaluation of responsiveness of items in our study population.

A limitation of our study was inclusion of a lower proportion of NSA women than expected, which was lower compared with the other validation studies [12–15, 20, 21]. This was possibly because it is more difficult to recruit NSA women, because their reason for sexual inactivity was often not associated with their pelvic floor dysfunction. Women were then less likely to recognize the importance of this sexual function questionnaire. Despite the fact that the number of included NSA women was rather small, we did find a strong association of urinary distress and sexual dysfunction in this subgroup.

Another limitation is that only a few women reported bother of anal incontinence in our study group, and thus the validity of the Dutch PISQ-IR could not be adequately evaluated among these women. Furthermore, about half of the original cohort returned their second questionnaire. No change in pelvic floor dysfunction (measured by the PFDI-20) or change in sexual function (measured by the FSFI) was measured after 6 months of follow-up. The loss to follow-up may have accounted for the lack of measuring responsiveness. Finally, the

Table 7 Sexually active (SA) Pelvic Organ Prolapse/Incontinance Sexual Questionnaire-International Urogynaecology Association Revised (PISQ-IR) scale changes correlations with Pelvic Floor Distress Inventory-20 (PFDI-20) and Female Sexual Function Index (FSFI) subscales

Scale	Arousal orgasm	Partner related	Condition specific	Global quality	Condition impact	Desire
PFDI-20 scales			−0.26		−0.32**	
Pelvic organ prolapse distress	–		−0.18		−0.20	
Colorectal and anal distress			−0.34*		−0.36**	
Urinary distress			−0.14		−0.26*	
FSFI scales						
Desire	0.23	0.12	−0.26	0.38**	0.30*	0.15
Arousal	0.48**	−0.12	0.10	**0.054****	**0.51****	0.04
Lubrication	0.44**	−0.03	−0.01	0.33*	0.16	0.05
Orgasm	0.43**	−0.02	0.03	0.32*	0.30*	0.38**
Satisfaction	0.41**	0.27*	0.02	0.43**	0.29*	0.10
Pain	0.20	−0.10	0.02	0.15	−0.02	−0.10

Correlations were assessed with Pearson's correlations (values > 0.50 in bold)

*$p < 0.05$, **$p < 0.005$

PFDI-20: higher scores indicate more bothersome pelvic floor symptoms (mean change score 18.6, standard deviation ± 43.2)

PISQ-IR for sexually active women: higher scores indicate less impact and better sexual function

FSFI: higher scores indicate better sexual function (mean change score − 0.7, standard deviation ± 5.1)

level of item nonresponse was rather high among NSA women. This pattern was also found in the original English validation study. In this data set, not using imputation resulted in subscale scores similar to subscale scores calculated where item nonresponse was not present. That is why multiple imputation of missing data has not been performed on our data set [11].

In conclusion, the Dutch PISQ-IR was translated and found to have good construct validity. However, in this study population its clinical use seems to be best for NSA women with urinary distress. The poor correlation of the PISQ-IR scales with other aspects of pelvic floor dysfunction was disappointing. The multifactorial character of sexual functioning probably makes it too complex to capture in a single questionnaire. Therefore, changes in sexual functioning after interventions, as measured with the PISQ-IR, need more study to determine their responsiveness following treatment for pelvic floor disorders.

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Compliance with ethical standards

Conflicts of interest None.

References

1. Haylen BT, Maher CF, Barber MD, Camargo S, Dandolu V, Digesu A, et al. An International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic organ prolapse (POP). Neurourol Urodyn. 2016;35(2):137–68.
2. Rogers RG, Villarreal A, Kammerer-Doak D, Qualls C. Sexual function in women with and without urinary incontinence and/or pelvic organ prolapse. Int Urogynecol J Pelvic Floor Dysfunct. 2001;12(6):362–5.
3. Barber MD, Visco AG, Wyman JF, Fantl JA, Bump RC. Continence program for women research. Sexual function in women with urinary incontinence and plevic organ prolapse. Obstet Gynecol. 2002;99(2):281–9.
4. Rogers RG, Kammerer-Doak D, Villarreal A, Coates K, Qualls C. A new instrument to measure sexual function in women with urinary incontinence or pelvic organ prolaps. Am J Obstet Gynecol. 2001;184(4):552–8.
5. Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, et al. The female sexual function index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. J Sex Marital Ther. 2000;26(2):191–208.
6. Ter Kuile MM, Brauer M, Laan E. The female sexual function index (FSFI) and the female sexual distress scale (FSDS): psychometric proporties within a Dutch population. J Sex Marital Ther. 2006;32(4):289–304.
7. 't Hoen LA, Utomo E, Steensma AB, Blok BF, Korfage IJ. The pelvic organ prolapse/urinary incontinence sexual questionnaire (PISQ-12): validation of the Dutch version. Int Urogynecol J. 2015;26(9):1293–303.
8. Rogers RG, Rockwood TH, Constantine ML, Thakar R, Kammerer-Doak DN, Pauls RN, et al. A new measure of sexual function in women with pelvic floor disorders (PFD); the pelvic organ prolapse/incontinence sexual questionnaire, IUGA-revised (PISQ-IR). Int Urogynecol J. 2013;24(7):1091–103.
9. Pett MA, Lackey NR. Making sense of factor analysis: the use of factor analysis for instrument development in health care research. Chapter 2 Designing and testing the instrument; determining the number of subjects, page 47. Thousand Oaks, Calif., Sage Pub.; 2003.
10. Utomo E, Blok BF, Steensma AB, Korfage IJ. Validation of the pelvic floor distress inventory (PFDI-20) and pelvic floor impact questionnaire (PFIQ-7) in a Dutch population. Int Urogynecol J. 2014;25:531–44.
11. Rockwood TH, Constantine ML, Adegoke O, Rogers RG, McDermott E, Davila GW, et al. The PISQ-IR: considerations in scale scoring and development. Int Urogynecol J. 2013;24(7):1105–22.
12. Mestre M, Lleberia J, Pubill J, Espuna-Pons M. Spanish version of the pelvic organ prolapse/urinary incontinence sexual questionnaire IUGA-revised (PISQ-IR): transcultural validation. Int Urogynecol J. 2017. https://doi.org/10.1007/s00192-017-3312-9.
13. Farkas B, Tiringer I, Farkas N, Kenryeres B, Nemeth Z. Hungarian language validation of the pelvic organ prolapse/incontinence sexual questionnaire, IUGA-revised (PISQ-IR). Int Urogynecol J. 2016;27:1831–6.
14. Grzybowska ME, Piaskowska-Cala J, Wydra DG. Polish translation and validation of the pelvic organ prolapse/urinary incontinence sexual questionnaire, IUGA-revised (PISQ-IR). Int Urogynecol J. 2017.
15. Al-Badr A, Al-Juraifani R, Al-Sheikh G, Al-Mandeel H, Al-Dakhyel L, Al-Shahrani N. Validation of the international urgynecology association's pelvic organ prolapse/urinary incontinence sexual questionnaire in Arabic. Int Urogynecol J. 2017;28:437–45.
16. Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States: prevalence and predictors. JAMA. 1999;281(6):537–44.
17. Lowenstein L, Gamble T, Sanses TV, van Raalte H, Carberry C, Jakus S, et al. Changes in sexual function after treatment for prolapse are related to the improvement in body image perception. J Sex Med. 2010;7(2pte2):1023–8.
18. Lindau S, Schumm LP, Laumann E, Levinson W, O'Muircheartaigh C, Waite L. A study of sexuality and health among older adults in the United States. N Engl J Med. 2007;357(8):762–74.
19. Addis IB, van den Eeden SK, Wassel-Fyr CL, Vittinghoff E, Brown JS, Thom DH. Sexual activity and function middle-aged and older women. Obstet Gynecol. 2006;107(4):755–64.
20. Wang H, Lau H-H, Hung M-J, Huang W-C, Zheng Y-W, Su T-H. Validation of a mandarin Chinese version of the pelvic organ prolaps/urinary incontinence sexual questionnaire IUGA-revised (PISQ-IR). Int Urogynecol J. 2015;26(11):1695–700.
21. Trotnovsky G, Nagele E, Ulrich D, Aigmüller T, Dörfler D, Geiss I, et al. German translation and validation of the pelvic organ Prolaps/incontinence sexual questionnaire-IUGA revised (PISQ-IR). Int Urogynecol J. 2016;27(8):1235–44.