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RESEARCH ARTICLE

The Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ) – assessing sexual function of urinary incontinent women in South Africa

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Objective. To develop and psychometrically validate a questionnaire that assesses sexual function of urinary incontinent women in South Africa and the influence of incontinence on their sexual function.

Design. A prospective descriptive study.

Setting. Urogynaecology and gynaecology outpatient clinics at Tygerberg Hospital, Stellenbosch University, South Africa.

Subjects. All patients attending the urogynaecology or gynaecology outpatient clinic at Tygerberg Hospital, who were older than 18 years, not pregnant and could communicate in either Afrikaans or English.

Outcome measures. The content validity, reliability (internal consistency) and construct validity (convergent and discriminant validity) of the Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ).

Results. Of the subjects 33% were not sexually active. Sexual quality of life was significantly influenced by urinary incontinence in 37.7% of individuals. Leakage during sexual activity occurred in 32%.

Conclusions. The SF-IUIQ is a reliable and valid measure of sexual function in urinary incontinent women, and of the influence of urinary incontinence on sexual function.

Urinary incontinence (UI) is a common condition, especially in middle-aged and older women.[1] However, owing to limited information regarding UI in black women and contradictory data, it remains unclear how many women in South Africa suffer from this condition. Early epidemiological studies in South Africa reported that the black population rarely develops stress UI.[1] Later studies showed no significant difference in the prevalence between white (46%), Indian (42%) and black South African nurses (40%).[1] In general more than a third of adult women experience UI at some stage in their lives. While UI is not associated with much morbidity and mortality, the impact on patients' quality of life (QoL) is severe.[2] The concept of QoL embodies a combination of patient-assessed measures of health, including physical role and social function, emotional state, burden of symptoms and sense of well being.[2] Sexual function (SF) is one aspect of QoL likely to be impaired in women with UI.[3,4] Limited data exist that address the impact of UI on SF, especially in South Africa.[1] Studies from the USA and Europe suggest that approximately 25% of women with UI report impaired SF and have significantly lower QoL scores.[5-7]

Defining the role that UI plays in SF remains challenging. Questionnaires that address SF have recently been developed, but no locally validated questionnaire is available.[8] Furthermore, at present there is no condition-specific validated measure that addresses the influence of UI on SF.[9] We sought to develop and psychometrically validate a local questionnaire that measures the SF of incontinent women and the influence of UI on SF.

Methods

Development

The Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ) was developed through consultation with clinicians and experts in the field of UI and SF. We reviewed the literature and validated instruments that evaluate SF.[9-11] Two existing questionnaires, the Sexual Self-Rating Scale[12] (SSRS) and a questionnaire that measures influence of UI on SF[13] (IUISF), were revised and combined, forming the SF-IUIQ. The SSRS has proven to be a reliable and valid measure in other populations. The IUISF has not previously been psychometrically assessed. Questions regarding severity and type of incontinence and demographics were added (Table I). The questionnaire was translated into Afrikaans and piloted on 30 patients. This resulted in exclusion of ambiguities and determination of the time involved in administration. The pilot study will not be addressed further.

Administration

The SF-IUIQ was administered by a female interviewer in a private setting to a total of 90 consecutive incontinent women attending the urogynaecology or gynaecology outpatient clinic at Tygerberg Hospital. Exclusion criteria were unwillingness to participate in the trial, pregnancy, age <18 years and poor fluency in either Afrikaans or English.

A 1-hour pad test was performed and used for correlation of UI severity;[14] 58 women consented to the pad test.

Psychometric testing

Questions on the SSRS and IUISF part of the SF-IUIQ included a 5- or 2-point response scale respectively. Responses to both parts were summed and translated into scores of 0 - 100, with a higher SSRS score representing a better SF and a higher IUISF score representing a greater influence of UI on SF. The total SSRS score and IUISF score were of different scales. They were therefore converted into z-scores to enable comparison. An SSRS z-score of 0 indicates that a person had an individual SSRS score that was similar to the mean of the total sample. A z-score of 1 indicates that the individual score is 1 standard deviation above the mean of the total sample.

Standard criteria recommended in psychometric testing of instruments were used.[15] Questions were considered for rejection if more than 80% gave the same response because they are not sensitive enough to discriminate between different levels of SF or influence of UI on SF. Items with greater than 5% missing data or an item to total correlation less than 0.40 were also considered for rejection. Our goal was to remove items that adversely affect the ability of the SF-IUIQ to discriminate between different levels of SF or influence of UI on SF.

Statistical methods

Internal consistency was tested with Crohnbach's alpha coefficient.[16] Alpha values range between 0 and 1. We used an alpha value of >0.70 as indicator of internal consistency.[16]

Convergent validity involved testing how accurately the SF-IUIQ was related to other measures of the same construct.[16] We evaluated convergent validity by correlating the SSRS and IUISF scores to domains that measured SF and influence of UI on SF from a different angle. A *p*-value of <0.05 was used to indicate statistical significance.

Discriminant validity was tested by evaluating the measure's ability to discriminate between persons with different levels of incontinence severity. We tested the correlation between incontinence severity and SF-IUIQ scores and anticipated that SSRS scores would significantly worsen as incontinence severity increased and IUISF scores would significantly increase as incontinence severity increased.

Table I. The Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ): Questions to assess type and severity of incontinence

1. How severe would you say your incontinence is?
- Minimal
- Moderate
- Severe

2. Do you wear protective underwear?
- Always
- Sometimes
- Never

3. If you wear protective underwear (for example pads), how many times in the last 24 hours did you change your protective underwear?

---------- number of times

4. Which of the following describes your urinary incontinence best?
- Urinary incontinence occurs during physical activity, for instance when I stand up, cough, sneeze or take part in sports.
- I sometimes feel I suddenly have the urge to go to the toilet, and when I get there I have sometimes already leaked urine.
- Both of the above describe what I have.
- I do leak urine, but none of the above applies to me.

In addition to the abovementioned psychometric tests, latent class analysis was used to distinguish classes for incontinence on the pad test. Incontinence was described as minimal, moderate, and severe.

Results

Of the 94 women approached, 90 consented to take part in the study (responsive rate 95.7%). Of these 90 women, 82.2% were not embarrassed to complete the questionnaire. The mean age of the women was 52.3 years (range 25 - 87 years).

As determined by latent class analysis, the 1-hour pad test showed 18 (31%) of 58 women to have minimal, 16 (27.6%) moderate and 24 (41.4%) severe incontinence. Self-perceived severity in the 90 women who completed the questionnaire was 26 (28.9%) minimal, 26 (29%) moderate and 38 (42.2%) severe (Spearman rank correlation 0.839, $p<0.001$).

Separating the sample by self-diagnosed type of incontinence yielded 15 (16.7%) with stress incontinence, 13 (14.4%) with urge incontinence, 52 (56.7%) with mixed incontinence and 10 (11.1%) with other types of incontinence (for example post-voiding dribbling). In our sample 42% of women used pads every day. The mean number of pad changes per 24 hours was 3 (SD=2.53).

Of the 90 women, 67.1% were either in a stable relationship or married. Only 24.4% of the patients were satisfied with their sex life; 42.3% were not satisfied and 33.3% were sexually inactive. Thirty-four women (37.8%) felt that UI had a large influence on SF. The most common complaint was 'having to empty the bladder before and/or after intercourse' (13 out of 34 women, 38.2%). Of the total sample 31.1% avoided sexual intercourse because of their incontinence. Urge incontinence had the lowest SF (mean SSRS score: 27) and the highest influence of UI on SF (mean IUISF score: 88) compared with women with other types of incontinence.

Leakage during sexual activity occurred in 29 women (32%). If leakage occurred it was most often during penetration. We compared the stage at which leakage occurred between pure stress- and pure urge-incontinent individuals. Leakage during penetration occurred more often in women with pure stress incontinence, 32% of whom experienced leakage during penetration versus 7.8% in the urge-incontinent group. Urge incontinence was more likely to lead to leakage during orgasm, which was experienced by 15.4% of the urge-incontinent women versus 6.6% of the stress-incontinent women.

Psychometric testing

The maximum response frequencies showed that no question had a category answered by more than 80% of respondents and that all therefore provide adequate discrimination (Table II). Maximum response frequencies on the IUISF part of the SF-IUIQ are rather high because each question contained only two response categories (yes or no). Item-total correlations were acceptable for all questions (Table II).

Table II. Response frequencies, missing data (%) and item-to-total correlation of the Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ). Questions to assess type and severity of incontinence

Question	Maximum response frequency (%)	Missing data (%)	Item-to-total correlation
IUISF part of the SF-IUIQ			
1. Empty bladder before	54.4	1.1	0.67
2. Empty bladder after	58.9	1.1	0.57
3. Less interest	75.6	2.2	0.66
4. Less involved	71.9	1.1	0.54
5. Postpone sex	71.1	1.1	0.61
6. Avoid sex	61.1	1.1	0.57
7. Avoid orgasm	78.2	1.1	0.23
8. Less appealing	70.0	1.1	0.42
SSRS part of the SF-IUIQ			
1. Interest now	39.1	3.3	0.60
2. Interest before	39.1	3.3	0.80
3. Activity now	54.9	3.3	0.72
4. Activity before	45.1	3.3	0.81
5. Satisfaction now	31.9	4.4	0.62
6. Satisfaction before	35.2	4.4	0.68
7. Pleasure now	47.3	4.4	0.61
8. Pleasure before	31.9	3.3	0.79
9. Orgasm now	30.8	6.6	0.70
10. Orgasm before	31.9	7.7	0.77
11. Importance now	35.2	3.3	0.61
12. Importance before	36.3	3.3	0.71

IUISF = Influence of Urinary Incontinence; SSRS = Sexual Self-Rating Scale; SF-IUIQ = Sexual function and Influence of Urinary Incontinence Questionnaire.

Table III. Convergent validity of the Influence of Urinary Incontinence Questionnaire (SF-IUIQ) with domains that address SF and influence of UI on SF from a different angle

Domain	**Correlation with SSRS part of the SF-IUIQ (*p*-value)**
1. Satisfied with sex life	0.49 (<0.001)
2. Pain	–0.31 (0.004)
3. Orgasm	0.31 (0.003)
Domain	**Correlation with IUISF part of the SF-IUIQ (*p*-value)**
1. Use of pads	0.18 (0.096)
2. Number of pad changes	0.22 (0.035)
3. Urinary leakage during sexual activity	0.72 (<0.001)

IUISF = Influence of Urinary Incontinence; SSRS = Sexual Self-Rating Scale; SF-IUIQ = Sexual function and Influence of Urinary Incontinence Questionnaire.

Internal consistency as measured by Cronbach's alpha coefficient was 0.82 for the IUISF part of the SF-IUIQ and 0.92 for the SSRS part. This indicates that the SF-IUIQ consist of items that perform well enough together to be a composite score.

Convergent validity for the SF-IUIQ is shown in Table III. As expected there were significant correlations between SF-IUIQ scores and domains that measured the same construct; thus convergent validity was achieved.

Considering discriminant validity, the ability of the SF-IUIQ to differentiate between patients with different levels of incontinence severity was very strong. More severe UI was associated with lower sexual function (SSRS z-scores below the mean) and more influence of UI on SF (IUISF z-scores above the mean; p=0.001) (Fig. 1).

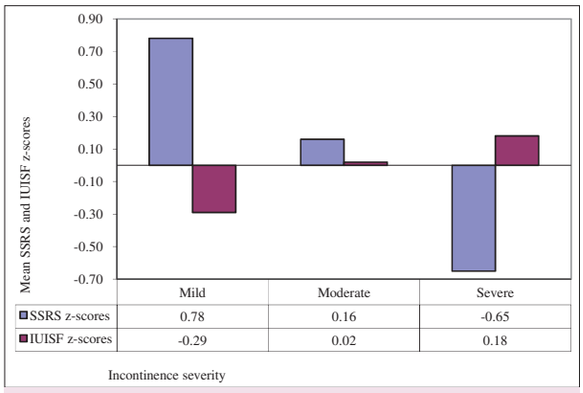

Fig. 1. Discriminant validity of the Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ): Mean z-scores on the Sexual Self-Rating Scale (SSRS) and Influence of Urinary Incontinence (IUISF) part according to self-perceived incontinence severity.

To confirm the negative association between SF and self-perceived severity, severity classification and number of pad changes, and the positive association with IUISF score, we developed a linear regression model. We assessed potential confounding by covariates, by examining changes in the standardised regression coefficients (β). Age, number of vaginal deliveries, previous hysterectomy, prolapse surgery, hormonal replacement therapy and menopause were not significant covariates. We removed these demographic variables from the model to assess the primary relationships of interest. Results confirmed the negative relationship between SSRS score and self-perceived incontinence severity (β=–0.61) severity classification (β=–0.69) and number of pad changes (β=–0.47), and also the positive relationship between IUISF score and incontinence severity: self-perceived severity (β=0.19), severity classification (β=0.86) and number of pad changes (β=0.22).

Incontinence severity was sufficient to explain 36% of variance in SSRS score and 73% of variance in IUISF score on the SF-IUIQ.

Discussion

This study presents the Sexual Function and Influence of Urinary Incontinence Questionnaire (SF-IUIQ), which proved to be highly reliable and valid. The measure comprises four parts: (*i*) demographics; (*ii*) type and severity of urinary incontinence; (*iii*) sexual function (SSRS); and (*iv*) the influence of UI on SF (IUISF). The type and severity of UI are self-diagnosed, so the data must be considered in this light. It is suitable for comparing groups of women as well as individuals. Multivariate regression verified that scores on the SF-IUIQ were not significantly affected by demographic variables. Reliability was achieved by a Cronbach's alpha above 0.7 for both the SSRI and IUISF part. Considering construct validity, the convergent and discriminant validity were obtained. For discriminant validity, the ability of the SF-IUIQ to discriminate between groups was very strong. For convergent validity testing, a limitation in our study was that we only used domains that address SF and influence of UI from a different angle for correlation. We recommend that in further research the questionnaire is used in conjunction with established measures of health, anxiety and depression. The SF-36, Hospital Anxiety and Depression Scale and PGWB could be used for correlation. In this study we did not achieve test-retest validity owing to logistic difficulty. Further research should test the ability of the SF-IUIQ to detect minimally significant changes in SF and influence of UI on SF over time and after treatment (test-retest validity).

In interpreting the results from the 1-hour pad test, it should be taken into account that not all the women (58 of 90) were tested, but the results of the pad test were highly correlated with self-perceived incontinence.

The SF-IUIQ was administered to women who self-reported sexual activity. We found that approximately 33% of our study population was sexually inactive. We advise that investigators who use this questionnaire to study SF in urinary incontinent women report whether patients are sexually active. When a woman is not sexually active, the reason for this should be recorded.

Previous research showed that urinary leakage during sexual activity occurs in 11 - 60% of women with UI.[17] Our finding of 32% is well within this range. Further, evidence suggests that leakage occurs most often during penetration in women with stress UI, while women with urge incontinence more often report leakage during orgasm.[17] Our results support these findings; leakage during penetration occurred in 32% of women with stress incontinence and leakage during orgasm in 15.4% of those with urge incontinence.

Our data demonstrate that UI impacts severely on QoL. In this study, 37.7% of women experienced impairment in SF because of UI. Having a uniform, validated instrument to measure the influence of UI on SF has several important functions. First it enables clinicians and researchers to evaluate comparability of individual patients as well as study populations. Second, it facilitates comparison of outcomes of studies performed in different places and with different therapies. This is particularly important when evaluating conditions such as incontinence, where emphasis is placed on patients' perceptions of their problem. Finally it can serve as an excellent initiation to a dialogue between the patient and her physician. Of our total sample, 82.2% were not embarrassed to answer the SF-IUIQ, which indicates that to a large extent we have managed to deal with the taboo nature of both SF and UI. During administration of the SF-IUIQ many patients commented that they were very pleased with the opportunity to talk about the influence of UI they experienced on their QoL.

Conclusion

The SF-IUIQ is a reliable and valid measure of SF of women with UI and of the influence of UI on SF in our local community. In upcoming controlled clinical trials the ability of the SF-IUIQ to detect minimally significant changes in SF and influence of UI on SF will be assessed.

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