

## LOWER URINARY TRACT SYMPTOM CLUSTERS AMONG CARE-SEEKING WOMEN

### Hypothesis / aims of study

Although individual lower urinary tract symptoms (LUTS) including urinary urgency, nocturia, and bladder pain are direct targets for pharmacological intervention, they can also be considered as the subjective indicators of underlying pathological processes. The different pathological entities that result in LUTS, may have either distinct or overlapping patterns of symptoms. With limited available empirical evidence, current standardized terminology reports suggest different classifications for lower urinary tract symptoms (LUTS) among men and women. Current IUGA/ICS standardised terminology for women [1] categorises symptoms as “storage”, “incontinence”, or “voiding & post micturition”. A recent population-based study using Principal Components Analysis (PCA) confirmed these three categories in men [2], but a large web survey with similar methods, did not support these groupings among women [3]. Understanding combinations between individual LUTS is important for the diagnosis and treatment of easily confused symptom complexes. With limited available data, we aimed to use PCA to understand the clustering of LUTS among a sample of care-seeking women.

### Study design, materials and method

Between October 2012 and July 2013 adult women presenting to gynaecology hospital outpatient clinics were recruited. Women with neurological dysfunction, urinary calculi, urinary tract malignancy, recurrent urinary tract infections, current pregnancy or breast-feeding were excluded. Women completed the validated 12 item International Consultation on Incontinence Questionnaire for Female Lower Urinary Tract Symptoms (ICIQ-FLUTS), including questions on incontinence, storage and voiding symptoms. The preceding 4-week period was used as the time frame for the questionnaire. All items from this questionnaire are scored on a five point scale, with most following the response categorisation of the stress incontinence item “Does urine leak when you are physically active, exert yourself, cough or sneeze?”, (responses: “never”, “occasionally”, “sometimes”, “most of the time”, “all of the time”). We used PCA to identify clusters among the 12 measured LUTS. The PCA was performed for all symptoms in all women and then for each age group separately. Sensitivity analyses were performed to check robustness to choice of items. Both Varimax and Oblimin rotation were used to simplify the interpretation of the extracted factors, with all analyses conducted using SPSS version 21.0.

### Results

557 women, mean age 49 (range 20-90), median parity 1, BMI 25.8 kg/m<sup>2</sup> were recruited. The Kaiser–Meyer–Olkin index was high (0.848), with Bartlett sphericity <0.0001. In PCA there were three factors that explained 66.1% of the variability in the ICIQ-FLUTS items. After Varimax rotation these three factors were defined as storage (urgency, daytime frequency, nocturia and bladder pain), voiding (hesitancy, intermittency and straining), and incontinence (stress UI, urgency UI, incontinence episodes, insensible incontinence and nocturnal enuresis) (see Table). Bladder pain consistently associated with the storage symptoms, albeit with weaker correlations. Identical groupings were obtained with Oblimin rotation, and in analyses stratified by 10 year age bands. In sensitivity analyses dropping each symptom once from analysis, results were also largely robust to item choice. However, omission of either urinary frequency or hesitancy items caused collapse to just two clusters among the remaining 11 items.

### Interpretation of results

These data provide empirical support for the current IUGA/ICS taxonomy of LUTS among care-seeking, women, with separate categories of storage, incontinence, and voiding symptoms. Major strengths include a population with high ethnic diversity, representative of women seen in secondary care gynaecology services, and the use of ICIQ-FLUTS, that provides a very wide assessment of individual LUTS with extensive validation. Importantly the observed groupings were robust to the choice of items measured. The categorisation observed might however, have been implicit or explicit in the design, item selection and item ordering for the ICIQ-FUTS, which for example includes no items on post-micturition symptoms. The five point scores for each item may not be clinically equivalent for each symptom, and thus the observed clusters might be sensitive to the choice of scale.

Symptom item	Incontinence Cluster	Voiding Cluster	Storage Cluster
Nocturia	.222	.248	<b>.612</b>
Urgency	.353	.143	<b>.696</b>
Bladder pain	.116	.374	<b>.487</b>
Daytime frequency	-.005	.065	<b>.733</b>
Hesitancy	.018	<b>.830</b>	.112
Straining	.058	<b>.802</b>	.201
Intermittency	.263	<b>.706</b>	.199
Urge Incontinence	<b>.757</b>	.040	.403
Incontinence frequency	<b>.834</b>	.018	.258
Stress incontinence	<b>.800</b>	-.023	.136
Insensible incontinence	<b>.813</b>	.216	.013
Nocturnal enuresis	<b>.628</b>	.307	.038

Table: Three principal components among women aged 20-90.  
Bold font highlights associations between individual items and each component >0.45.

#### Concluding message

In this study PCA was used to derive an empirical classification of urinary symptoms. We observed separate categories of storage, voiding and incontinence symptoms. These groupings were robust to various assumptions, and consistent across age ranges. Our results provide direct evidence in support of the current IUGA/ICS taxonomy of LUTS. The present findings are also consistent with recent population based data for men [2], and suggests the need for harmonisation of ICS/IUGA standardised female and ICS standardised male LUTS terminology.

#### References

1. Neurourol Urodyn 29(1):4–20;2010
2. BJU Int 111(3):467-73;2013
3. Neurourol Urodyn 31(4):448-54;2012

#### Disclosures

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