

## THE EPIDEMIOLOGY OF LOWER URINARY TRACT SYMPTOMS AND SEXUAL DYSFUNCTION IN MEN: A SYSTEMATIC REVIEW

**Hypothesis / aims of study:** Lower urinary tract symptoms (LUTS) and sexual dysfunction are commonly present in men and both conditions show higher prevalence rates with increasing age. The literature base assessing the epidemiology of LUTS and sexual dysfunction in men has increased since the 1990s. These conditions are no longer solely attributed to older age and research assessing the inter-relationship between LUTS and sexual dysfunction has been conducted. The traditional theoretical classification divides LUTS into three categories: voiding, storage and post-micturition symptoms. Voiding symptoms are commonly referred to as 'obstructive' symptoms and are reported to result from the mechanical blockage caused by an enlarged prostatic adenoma or from an increase in prostate muscle tone. Voiding symptoms have traditionally been associated with the presence of Benign Prostatic Hyperplasia in men and are commonly referred to using the terms 'prostatism' or 'symptoms of BPH'. Storage symptoms, also called 'irritative' symptoms, are commonly linked to bladder over activity, independent of or secondary to obstruction and conventionally, the prevalence of storage symptoms has been considered higher in women than in men. Post-micturition symptoms are experienced immediately after micturition (feeling of incomplete emptying and post micturition dribble). However, this categorization of symptoms has not been validated and recent studies have demonstrated that men with LUTS often suffer from coexisting storage, voiding and post micturition symptoms. The more inclusive term LUTS to describe all symptoms occurring at any age and in either sex with no reference to disease or aetiology may therefore be more appropriate than the use of the term 'prostatism' (1). Despite the growing clinical interest in LUTS and sexual dysfunction, a systematic review assessing the relationships between LUTS and sexual dysfunction and between individual LUTS symptoms in men is not currently available. The objective of the systematic review was therefore to identify and review all relevant literature related to the epidemiology of the comorbidity of storage, voiding and post-micturition symptoms and LUTS and sexual dysfunction.

**Study design, materials and methods:** Medline, Embase and Cinahl databases were searched from 1990- February 2006. Relevant conference proceedings were hand searched from 2002-2005. A team of reviewers independently determined the eligibility of each publication by applying a set of criteria. Reviewers extracted data from eligible publications in parallel. A third reviewer checked the resulting extractions and the team resolved any discrepancies. A concise critical appraisal was written for each study and each publication was graded using a custom-made grading tool. Due to the inherent difficulties with respect to the meta-analysis of observational data, a qualitative approach to the analysis and presentation of data was employed (2). Data was tabulated, where possible, according to the respective study objective. Trends in the data were identified and interpreted with reference to individual outlying studies. During the interpretation of data, studies were categorised using baseline characteristics, study methods for the retrieval and analysis of data, appropriate sub-grouping of outcomes and study grade resulting from the quality assessment. Throughout the review, the ICS categorisation system for LUTS was employed (3).

**Results:** Of 8801 citations retrieved, 271 full text publications were ordered for more detailed evaluation. Seventy-seven reports of 46 studies were included in the review. Twenty-one studies assessing the prevalence and association of voiding and storage symptoms were included. The remaining 25 studies reported the prevalence and association of LUTS and sexual dysfunction.

**Prevalence of voiding or post-micturition symptoms and storage symptoms co-morbidity in the general population:** A range of 6.6% to 18.7% was reported by two studies.

**Prevalence of storage, voiding and post-micturition symptoms in men with LUTS:** A single study reported the prevalence of storage symptoms (urgency 61.5%, nocturia 47.0% and increased daytime frequency 50.7%) in 410 men with a clinical diagnosis of BPH. In another study, 68% of 413 men with mixed urinary incontinence reported feeling of incomplete emptying and 24% of 408 men with mixed urinary incontinence reported hesitancy.

**Association between storage and voiding or post-micturition symptoms:** Thirty-four correlation coefficients ranging from 0.1-0.45 for the association between storage and voiding or post-micturition symptoms in the general population were reported by two studies. Of these, 12 correlation coefficients were > 0.3; p values for three of these correlation coefficients were reported by one study and were statistically significant at the 5% level: urgency and feeling of incomplete emptying (0.31, p ≤0.001), nocturia and intermittent stream (0.32, p≤0.001), nocturia and slow stream (0.37, p ≤0.001). Twenty-three correlation coefficients ranging from -0.17-0.32 for the association between storage and voiding or post-micturition symptoms in men with LUTS were reported by two studies. Of these, one correlation coefficient was >0.3 and statistically significant at the 5% level as reported by one included study in the review: increased daytime frequency and feeling of incomplete emptying (0.32, p<0.01). Eleven negative correlation coefficients were reported by a single study that did not publish data on statistical significance.

**Prevalence of LUTS and sexual dysfunction:** Included studies reported a range of 41%-88% for the prevalence of reduced/no ejaculation in men with LUTS. Three studies reported prevalence rates of erectile dysfunction in men with voiding symptoms ranging from 63%-65%. Data from seven studies indicate that there is a higher prevalence of erectile dysfunction in men with moderate or severe LUTS compared to those with mild LUTS.

**Association between LUTS and sexual dysfunction:** The range of odds ratios of sexual dysfunction in a population with LUTS compared to those with no LUTS by LUTS severity and sexual dysfunction category is shown in Table 1. The majority of studies used multivariate regression models to control for confounding factors including age.

Table 1: Range of odd ratios of sexual dysfunction in a population with LUTS compared to those without LUTS

LUTS Severity	Erectile Dysfunction (No.	Abnormal/Reduced/No Ejaculation (No. of	Pain/Discomfort on Ejaculation (No. of
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	of Studies)	Studies)	Studies)
Mild	1.20-1.98 (4)	1.00-1.64 (3)	2.11-2.68 (2)
Moderate-Moderate/severe	1.90-3.76 (5)	1.90-3.19 (3)	5.46-8.65 (2)
Severe	3.17-7.67 (5)	1.80-6.25 (4)	5.6-16.18 (3)

Interpretation of results: This systematic review suggests that there are certain assumptions implicit in separating out storage, voiding and post-micturition symptoms. The results reported here demonstrate the co-morbidity of storage, voiding and post-micturition symptoms in men and include statistically significant correlation coefficients for associations between storage and voiding/post-micturition symptoms from a limited number of studies. Clearly it is likely that there will be a whole spectrum present from pure voiding through to storage symptoms, passing through intermediate situations with varying degrees of each category of symptom. Whilst the results of this review support the hypothesis of an association between LUTS and sexual dysfunction that is independent of age; the storage and voiding symptom groups may either be in a causal relationship or co-exist independently. Data from included studies indicate a higher prevalence and increasing age-adjusted odds of all types of sexual dysfunction with greater severity of LUTS.

Concluding message: The data reported by this review concerning the association between storage, voiding and post micturition symptoms indicates that there are limitations to the division of LUTS symptoms into these categories. This finding may have implications for the assessment and diagnosis of LUTS. For example, the commonly used IPSS instrument currently only includes a few LUTS symptoms and may therefore underestimate the severity of LUTS experienced by men due its lack of sensitivity relating to storage symptoms. Investigation of the efficacy of tools more carefully evaluating all LUTS symptoms along with extrapolation from ongoing studies of novel therapeutic approaches are likely to have important consequences for informing our approach as to the most effective treatment of men with LUTS.

References: 1. BMJ (1994) 308; 929-930, 2. BMJ (1998); 316: 140–144, 3. Neurourology and Urodynamics (2002) 21; 167-178

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