

Evidence of the Impact of Diet, Fluid Intake, Caffeine, Alcohol and Tobacco on Lower Urinary Tract Symptoms: A Systematic Review



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Abbreviations and Acronyms

AUA-SI = American Urological Association Symptom Index
BPH = benign prostatic hyperplasia
LUTS = lower urinary tract symptoms
NS = nonsignificant association
NUF = nonurological factor
OAB = overactive bladder
RCT = randomized controlled trial
SS = statistically significant association
SUI = stress urinary incontinence
UI = urinary incontinence
UUI = urgency urinary incontinence

Purpose: Diet, fluid intake and caffeine, alcohol and tobacco use may have effects on lower urinary tract symptoms. Constructive changes in these modifiable nonurological factors are suggested to improve lower urinary tract symptoms. To better understand the relationship between nonurological factors and lower urinary tract symptoms, we performed a systematic literature review to examine, grade and summarize reported associations between lower urinary tract symptoms and diet, fluid intake and caffeine, tobacco and alcohol use.

Materials and Methods: We performed PubMed® searches for eligible articles providing evidence on associations between 1 or more nonurological factors and lower urinary tract symptoms. A modified Oxford scale was used to grade the evidence.

Results: We reviewed 111 articles addressing diet (28 studies), fluid intake (21) and caffeine (21), alcohol (26) and tobacco use (44). The evidence grade was generally low (6% level 1, 24% level 2, 11% level 3 and 59% level 4). Fluid intake and caffeine use were associated with urinary frequency and urgency in men and women. Modest alcohol use was associated with decreased likelihood of benign prostatic hyperplasia diagnosis and reduced lower urinary tract symptoms in men. Associations between lower urinary tract symptoms and ingestion of certain foods and tobacco were inconsistent.

Conclusions: Evidence of associations between lower urinary tract symptoms and diet, fluid intake and caffeine, alcohol and tobacco use is sparse and mostly observational. However, there is evidence of associations between increased fluid

Accepted for publication April 30, 2017.

No direct or indirect commercial incentive associated with publishing this article.

The corresponding author certifies that, when applicable, a statement(s) has been included in the manuscript documenting institutional review board, ethics committee or ethical review board study approval; principles of Helsinki Declaration were followed in lieu of formal ethics committee approval; institutional animal care and use committee approval; all human subjects provided written informed consent with guarantees of confidentiality; IRB approved protocol number; animal approved project number.

This is publication number 3 of the Symptoms of Lower Urinary Tract Dysfunction Research Network (LURN) and is supported by Grants DK097780, DK097772, DK097779, DK099932, DK100011, DK100017, DK097776 and DK099879 from the National Institute of Diabetes and Digestive and Kidney Diseases through cooperative agreements.

Supplementary references 51 to 126 for this article can be obtained at <http://jurology.com/>.

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† Financial interest and/or other relationship with Medtronic.

and caffeine intake and urinary frequency/urgency, and between modest alcohol intake and decreased benign prostatic hyperplasia diagnosis and lower urinary tract symptoms. Given the importance of these non-urological factors in daily life, and their perceived impact on lower urinary tract symptoms, higher quality evidence is needed.

Key Words: lower urinary tract symptoms, risk factors, urination disorders, health surveys, self report

LOWER urinary tract symptoms are common and bothersome, affecting 20% to 50% of men and women and negatively impacting health related quality of life.^{1–3} Patients seeking care for lower urinary tract symptoms are frequently instructed to modify daily behaviors to reduce symptoms. For example providers may recommend that patients change fluid intake, or use less caffeine or alcohol.⁴ The quantity and quality of evidence to support such recommendations are unclear. Lifestyle changes, while typically low risk, may be obtrusive to the lives of patients and may increase anxiety or stress. What patients eat, drink and ingest depends on culture, region, employment, socioeconomic status and other factors. These behaviors are part of the daily human experience, and as such, a better understanding of their impact on lower urinary tract symptoms is critical.

LURN (Symptoms of Lower Urinary Tract Dysfunction Research Network) is a cooperative network supported by the NIDDK (National Institute of Diabetes and Digestive and Kidney Diseases) with objectives to improve the measurement of LUTS and identify important LUTS subtypes.⁵ In conceptualizing the scope of lower urinary tract dysfunction and its resultant symptoms we considered multiple factors that potentially contribute to LUTS. The objectives of this study were to identify, grade and summarize peer-reviewed literature examining associations between LUTS and diet, fluid intake and caffeine, alcohol and tobacco use. In addition to identifying evidence-based associations between these factors and LUTS, the results will help identify gaps where future efforts may be focused.

METHODS

This systematic review was designed to answer the question, “Are diet, fluid intake and caffeine, alcohol and tobacco use associated with the prevalence and/or severity of LUTS in men and women?” The review used findings from RCTs, cohort, case-control and case series, and cross-sectional studies that could provide evidence related to these associations. Research focused on bladder pain and conditions such as interstitial cystitis/bladder pain syndrome was excluded. This systematic review was based on guidelines put forth by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).⁶

PubMed searches were developed with assistance from a health science librarian. Five separate searches were

performed to identify publications studying associations between LUTS and each of the 5 NUFs. A search string was developed for LUTS and each factor, including MeSH® terms and key words for text searches, limited to English language publications (supplementary table 1, <http://jurology.com/>).

All citations and abstracts were screened using previously developed eligibility criteria (table 1). If the initial screener was unsure whether to include a citation, a second investigator reviewed it. When uncertainty persisted, the citation was included for additional review at the full text stage. Each article considered eligible after screening was reviewed (full text) by 2 investigators. All articles confirmed eligible were assigned a level of evidence by both reviewers using a system based on the Oxford Centre for Evidence-Based Medicine Level of Evidence scale (2009 version),⁷ and International Consultation on Urological Diseases steps for developing and grading guideline recommendations modified to include cross-sectional studies as level 4b evidence (see Appendix).⁸ If initial grades differed, investigators arrived at a grade by consensus.

Data from each article were reviewed and abstracted using a standard form. Information collated included study design, population, LUTS outcome (eg OAB), NUF exposure (eg caffeine), summary measure of association and analysis performed. Meta-analyses were not performed given the heterogeneous study designs, outcomes and exposures identified.

RESULTS

Electronic searches were performed through January 4, 2016. Results of the searches, screening and selection process, and reasons for exclusion are presented in tables 1 and 2. We reviewed 111 unique articles in the areas of diet (28 studies), fluid

Table 1. Criteria for excluding articles from systematic review

Reasons for Exclusion	No. Articles
No relevant nonurological factor studied	158
No relevant LUTS or lower urinary tract condition (including prostate Ca)	83
LUTS studied as treatment result or adverse effect (eg postprostatectomy incontinence)	24
Sample size smaller than 25 pts (unless RCT design)	3
Editorial/commentary/nonsystematic review	76
Nonrelevant research type (eg qualitative studies, instrument development)	6
Not human subject research	9
Pediatric population	5
Pregnant population	1

More than 1 reason for exclusion may be listed for an individual article.

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