

DEVELOPMENT OF A NEW INSTRUMENT TO ASSESS MULTIPLE DIMENSIONS OF URGENCY SENSATION: THE UNIVERSITY OF SOUTH AUSTRALIA URINARY SENSATION ASSESSMENT (USA²).

Hypothesis / aims of study

Urinary urgency is a symptom of many disorders of the urinary tract and when idiopathic is the defining symptom of overactive bladder syndrome. Differences between the normal desire to void and urgency are poorly understood. The purpose of this program of research was to characterise the sensation of desire to void between people with and without overactive bladder in order to develop a self-report instrument to assess multiple dimensions of urgency sensation.

Study design, materials and methods

The program of research comprised three studies. The first was a systematic literature review to identify instruments which had been used to assess urgency across the decade 2000 – 2010 (1). Instruments were classified according to the dimensions of sensation measured.

The second study was a prospective, observational repeated-measures design which aimed to determine the feasibility, test-retest reliability and validity of assessing multiple dimensions of the sensation of desire to void via structured interview (2). Dimensions of sensation to be assessed were decided based on a model of sensory processing designed for pain and dyspnoea (3) and adapted for urgency based on the systematic literature review results. Sensory quality was assessed via an open question and the descriptors of sensation volunteered by participants were categorised by the research team, participants with and without overactive bladder and finally by mathematical cluster analysis. Other dimensions assessed were intensity, unpleasantness, suddenness, difficulty holding on, perceived bladder fullness (assessed via visual analogue scales) and location (assessed via body chart). Sixty-four men and women aged ≥ 50 years attended two interviews approximately a week apart; at the second interview the order of interview items was reversed for a randomly selected half of participants. Random effects mixed modelling assessed whether time (interview 1 versus interview 2) or the order of interview items affected reliability. Validity assessment used partial least squares regression to determine whether dimensions predicted the overactive bladder status of participants as determined by symptom screening questionnaires (overactive bladder symptom score and awareness tools).

Based on the findings from Study 2, a new self-report instrument, the University of South Australia Urinary Sensation Assessment (USA²), was developed to assess multiple dimensions of urgency sensation. The USA² was assessed for user-friendliness by eight participants who had been involved in Study 2. In the second phase, USA² data were collected from 230 men and women aged ≥ 50 years, with and without overactive bladder. Exploratory factor analysis was used to assess questionnaire structure. In the final phase USA² data were collected from an independent sample ($n = 211$) of people with and without overactive bladder, 16% of whom repeated the questionnaire on a second occasion after a week. Data were analysed for questionnaire structure (confirmatory factor analysis), test-retest reliability (intra-class correlation coefficients and Wilcoxon-signed-rank tests) and discriminative validity (Mann-Whitney-U tests between groups with and without overactive bladder). Effect sizes (Cohen's d) were calculated to express the magnitude of between-group differences.

Results

The systematic review (1) identified 216 instruments, the majority of which assessed urgency as a unidimensional construct with the most common dimensions being behavioural responses or bother triggered by sensation. No instruments assessed urgency as a multidimensional perceptual experience.

In Study 2 (2), participants generated 689 descriptors of the quality of desire to void sensation from which 13 language categories were developed; 'Urgency', 'Fullness', 'Pressure', 'Normal', 'Anxiety', 'Uncomfortable', 'Annoying', 'Intense', 'Sudden', 'Tickle/tingle', 'Pain/ache', 'Heavy' and 'Unique-somatic'. People who volunteered words from the 'Urgency' category were twice as likely to have overactive bladder, whilst people who volunteered words from the 'Fullness' category were almost three times as likely not to have overactive bladder. Overactive bladder was also predicted by higher visual analogue scale ratings of intensity, unpleasantness, suddenness and difficulty holding on. Perceived bladder fullness and sensory location did not differ between groups. With the exception of intensity, perceived fullness and location of sensation in the genital region, all other dimensions were reliable between occasions of assessment.

In the final study, instructions for the USA² were modified based on feedback in the initial phase. Exploratory factor analysis revealed a three factor solution with simple structure which formed subscales titled 'Urgency', 'Affective' and 'Fullness'. The three factor structure was upheld by confirmatory factor analysis in an independent sample. All three subscales and the total USA² score demonstrated test-retest reliability with intra-class correlation coefficients > 0.75 and no significant between-occasion differences on Wilcoxon signed rank testing. USA² subscales and total scores were all significantly higher in people with overactive bladder. The total score and 'Urgency' and 'Affective' subscales differed between groups with Cohen's d effect sizes approaching 2, whilst the effect size for the 'Fullness' sub-scale was < 1 .

Interpretation of results

Urgency has traditionally been assessed as a unidimensional construct with a focus on behavioural and affective responses to sensation. The current research program has demonstrated that the sensation of desire to void differs in multiple dimensions between individuals with and without overactive bladder. The USA² is a new self-report questionnaire for the assessment of urgency in multiple dimensions. The 'Urgency' and 'Affective' sub-scales differentiated between people with and without overactive bladder. The 'Fullness' sub-scale, however, demonstrated a smaller between-group difference. This finding, along with the finding from Study 2 that participants without overactive bladder were almost three times as likely to describe their sensation in terms of bladder fullness, indicates that 'Fullness' might be a descriptor that represents normal bladder sensation.

Concluding message

The USA² is an innovative, rigorously designed, self-report questionnaire which provides the unique opportunity to assess multiple dimensions of urgency sensation. Further research is required to continue validation of this questionnaire, particularly in regards to its responsiveness and its appropriateness to urgency as experienced in conditions other than overactive bladder syndrome.

References

1. Das, R., Buckley, J.D., Williams, M.T., (2013), Dimensions of sensation assessed in urinary urgency: a systematic review, *The Journal of Urology*, 190(4):1165-1172.
2. Das, R., Buckley, J.D., Williams, M.T., (2014), The multidimensional sensation of desire to void differs between people with and without overactive bladder, *Neurourology and Urodynamics*, published online 19th November 2013, DOI: 10.1002/nau.22520.
3. Lansing, R.W., Gracely, R.H., Banzett, R.B., (2008), The multiple dimensions of dyspnea; review and hypotheses, *Respiratory Physiology and Neurobiology*, 167(1): 53-60

Disclosures

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