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## THE IMPACT OF VARIATION IN SYMPTOMS OF OVERACTIVE BLADDER ON CHANGE IN ADAPTIVE BEHAVIOR IN A POPULATION BASED LONGITUDINAL STUDY

### Hypothesis / aims of study

Population-based studies in overactive bladder (OAB) report on prevalence estimates of urgency, frequency, nocturia, and incontinence, as well as adaptive changes in behavior in response to symptom and bother. However, symptoms of OAB vary over time and there is likely to be an association between these changes and changes in adaptive behavior. We used data from the General Longitudinal Overactive Bladder Evaluation (GLOBE), a population-based study, to determine if one or more of the self-reported symptoms related to OAB and incontinence are associated with change in adaptive behavior.

### Study design, materials and methods

The Bladder Health Survey was mailed to a sample of 15,656 individuals, 40+ years of age, randomly selected from primary care clinics of a large tertiary care health system. The response rate was 44% (n=6856). A sub-sample received the same survey six months later, and 74% (n = 2748) responded. The Bladder Health Survey used a four-week recall period and covered severity and occurrence of urgency (4 questions), nocturia (2 questions), frequency (3 questions), and incontinence (2 questions). An overall adaptive behavior score was the sum of responses to 6 questions. In addition, 3 symptom specific behavior scores were derived as follows: 1) Nocturia - Drink less fluid in the evening to keep from waking up to urinate 2) Urgency - Look for the bathroom immediately when in a new place even if you didn't have to urinate; Drink less fluid because of problems with bladder control; Avoid activities away from restrooms because of concerns about bladder control 3) Urinary Incontinence - choose to wear clothing that wouldn't show if you lost some urine; Wear a pad or other material to absorb urine you may have lost. Occurrence in the past four weeks was reported as never/rarely, a few times, about once a week, a few times a week, or every day. Composite scores were derived for urgency, nocturia, frequency, incontinence, and adaptive behaviors as indicators of severity and occurrence. Change from baseline to 6 months in reported behavior scores (dependent variable) between the two surveys were modeled as continuous measures using linear regression. The independent variables were change in urgency, frequency, nocturia, and urinary incontinence scores. Covariates in the model included age and time since onset of symptoms. The regression model was run separately for the change in composite adaptive behavior score (all 6 questions together) as well as the individual symptom specific behaviors. In this analysis, we use the partial  $r^2$  (i.e. correlation coefficient squared) for each symptom to compare the relative strength of the association with change in behavior score. The partial  $r^2$  is simply the correlation coefficient for each symptom adjusted for the presence of all other symptom scores. As a point of reference, the sum of all the correlations is between -1 and +1. A partial  $r^2$  of 0.1 explains twice the variance in behavior change as a partial correlation coefficient of 0.05.

### Results

The study population comprised 1537 women and 1182 men; 58% were 40-64. There were no differences between respondents and non-respondents in baseline and demographic characteristics at 6 months except for age where non-respondents were younger.

Tables 1 and 2 summarize results of the analysis for the relation between change in adaptive behavior and change in individual OAB symptom scores from baseline to 6 months. Results are summarized as partial correlation coefficients to indicate the relative amount of variance in the outcome that is explained by the independent symptom variable. A larger value indicates relatively more explained variance.

**Table 1.** Partial correlation coefficients for the association between the change in OAB symptom and incontinence scores and change in adaptive behavior scores from baseline to 6 months among females

Change in symptom status from baseline to 6 months	Change in Adaptive Behavior (Females)			
	Composite behavior (n=1384)	Urgency (n=1362)	Nocturia (n=1382)	Urinary incontinence (n=1349)
Urgency	0.116	0.103	0.029	0.038
Nocturia	0.041	0.030	0.019	0.005
Frequency	0.008	0.005	0.003	0.003
Incontinence	0.022	0.011	0.004	0.019

**Table 2.** Partial correlations for the association between the change in OAB symptom and incontinence scores and change in adaptive behavior scores from baseline to 6 months among males

Change in symptom score from baseline to 6 months	Change in Adaptive Behavior (Males)			
	Composite behavior (n=1101)	Urgency (n=1089)	Nocturia (n=1099)	Urinary incontinence (n=1085)
Urgency	0.090	0.090	0.022	0.015
Nocturia	0.015	0.008	0.010	0.003
Frequency	0.005	0.002	0.000	0.008
Incontinence	0.030	0.010	0.003	0.061

Change in symptoms status partially explains change in adaptive behavior in both genders with the partial correlations being mostly stronger in females compared to males. In both males and females, change in urgency score had the strongest correlation with the composite adaptive behavior change as well as the symptom specific behavior changes. One exception was that incontinence change in males had a higher partial correlation coefficient compared to other symptoms of OAB in relation to change in urinary incontinence behavior. Change in frequency symptoms had little to no partial correlation with all behavior change categories.

#### Interpretation of results

These results indicate that among OAB and incontinence symptoms, change in urgency severity is most strongly associated with adaptive behavior change for both males and females over the age of 40. Change in urinary frequency, nocturia, and incontinence offer little additional explanation to adaptive behavior change, except with incontinence in males for incontinence behavior.

#### Concluding message

Self-reported symptoms of OAB appear to be differentially associated with change in adaptive behavior, with urgency being the most powerful predictor.

**FUNDING:** Funded by GlaxoSmithKline

**HUMAN SUBJECTS:** This study was approved by the Geisinger Institutional Review Board (GIRB). and followed the Declaration of Helsinki Informed consent was obtained from the patients.