

# Overactive Bladder and Mental Health Symptoms in Recently Deployed Female Veterans

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**Purpose:** We estimate the prevalence of current overactive bladder symptoms in recently deployed female veterans, and determine if overactive bladder symptoms are associated with problems commonly reported after deployment including mental health symptoms and prior sexual assault.

**Materials and Methods:** Baseline data were analyzed from a nationwide cohort study of urogenital symptoms in female veterans. Women returning from deployment to Iraq or Afghanistan in the prior 2 years and ending military service were eligible. Self-reported data were collected by computer assisted telephone interview. Overactive bladder and mental health conditions were identified using standardized definitions as well as validated urinary and mental health instruments. Associations between overactive bladder and depression, post-traumatic stress disorder, anxiety and sexual assault were assessed in separate logistic regression models using propensity scores to adjust for confounding.

**Results:** The 1,702 participants had a mean (SD) age of 31.1 (8.4) years and were racially/ethnically diverse. Overall 375 participants (22%; 95% CI 20.1, 24.1) reported overactive bladder. Mental health outcomes included post-traumatic stress disorder (19%), anxiety (21%), depression (10%) and prior sexual assault (27%). All outcomes were associated with overactive bladder (adjusted OR 2.7, 95% CI [2.0, 3.6], 2.7 [2.0, 3.5], 2.5 [1.5, 4.3] and 1.4 [1.1, 1.9], respectively).

**Conclusions:** Overactive bladder symptoms occurred in 22% of recently deployed female veterans, and were associated with self-reported mental health symptoms and traumatic events including prior sexual assault. Screening and evaluation for bothersome urinary symptoms and mental health problems appear warranted in female veterans presenting for primary and urological care after deployment.

**Key Words:** urinary bladder, overactive; lower urinary tract symptoms; mental disorders; women's health; veterans health

OVERACTIVE bladder, including urinary frequency and UII symptoms, commonly affects women of all ages and negatively impacts QOL.<sup>1</sup> Depression and anxiety have been associated

with OAB and UII in clinic based and epidemiological studies,<sup>2-4</sup> leading to hypotheses that mental health and urological conditions may share common neuropharmacological

## Abbreviations and Acronyms

OAB = overactive bladder  
PTSD = post-traumatic stress disorder  
QOL = quality of life  
UII = urgency urinary incontinence  
VA = Veterans Affairs

Accepted for publication November 26, 2013.  
Study received institutional review board approval.

Based on work funded by the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development, Health Services Research and Development Service (DHI 08-051 [CSB]).

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government.

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† Financial interest and/or other relationship with the National Institutes of Health.

pathways.<sup>2,5</sup> We previously found that PTSD was associated with UI in Midwestern female veterans.<sup>6</sup> An association between urinary and mental health symptoms may be particularly relevant in female veterans, who have high rates of mental health disorders.<sup>7</sup>

We designed the WVUHS (Women Veterans Urinary Health Study), a longitudinal study of OEF/OIF/OND (Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn) female veterans, to define the prevalence and natural history of urogenital symptoms, and their associations with mental health conditions, prior sexual assault and other deployment related factors in a large, diverse population of recently deployed veterans. Using WVUHS baseline data we 1) estimated the prevalence of OAB and 2) determined if OAB in female veterans was associated with mental health conditions or prior sexual assault.

## MATERIALS AND METHODS

A cross-sectional analysis was performed using baseline WVUHS data. This 1-year longitudinal study in OEF/OIF/OND veterans was approved by the local institutional review board and the VA Research and Development Committee.

### Participants

Potentially eligible participants were identified through the DOD (Department of Defense) DMDC (Defense Manpower Data Center) on a rolling basis between June 2010 and May 2012. Names, contact information, and basic demographic and military characteristics were obtained for all female veterans who returned from deployment to Iraq or Afghanistan during the previous 24 months and separated from the military. An introductory letter was mailed to veterans and those who did not contact the study team (by mail or toll-free number) within 10 days were telephoned. Mail and telephone protocols were followed until contact was made or the subject was deemed unreachable.

Telephone screening confirmed the participants were ambulatory, community dwelling female veterans who returned from deployment to Iraq or Afghanistan within the last 24 months and later separated from the military. Veterans reporting prior genital fistula, congenital urinary tract abnormality, pelvic radiation, lower urinary tract cancer, spinal cord injury, multiple sclerosis, Parkinson disease, stroke, or current or recent pregnancy (within 3 months) were excluded from enrollment. Women who refused participation were asked questions about general health, prior treatment for urinary symptoms and prior diagnosis of depression.

### Computer Assisted Telephone Interview

Baseline data were collected using a computer assisted telephone interview administered by trained female interviewers. Participants were queried about demographic and military service characteristics, health behaviors,

medical and reproductive histories, prior sexual assault, and urinary, mental and general health.

The UDI (Urogenital Distress Inventory) and Incontinence IIQ-7 (Impact Questionnaire-short form) are validated, condition specific QOL questionnaires.<sup>8,9</sup> The UDI is used to assess urogenital symptom frequency and bother (ranging from not at all to greatly bothersome), and includes 3 subscales (stress, irritative and obstructive). The IIQ-7 is used to assess functional impact related to urinary symptoms. Higher scores represent greater urinary symptom frequency and bother (UDI) or functional impact (IIQ-7).

Mental health symptoms were assessed using the PHQ-8 (8-item Patient Health Questionnaire), the GAD-7 (Generalized Anxiety Disorder short form) and the PCL-C (PTSD Checklist, Civilian version). The PHQ-8 and GAD-7 were used to assess how often someone has been bothered by depression and anxiety symptoms, respectively, during the last 2 weeks (responses included not at all, for several days, more than half the days and nearly every day).<sup>10,11</sup> The PCL-C asks subjects to rate bother (from not at all to extremely) associated with each of 17 PTSD symptoms in the last 30 days.<sup>12</sup>

Prior sexual assault was assessed using questions modified from past national surveys as well as studies on violence in women and female veterans.<sup>13,14</sup> Sexual assault was defined as completed sexual penetration of the vagina, mouth or rectum without a women's consent, involving the use of force or threat of harm.<sup>15</sup> Combat exposure was assessed using questions similar to the DOD Post-Deployment Health Assessment, and was considered present if the veteran witnessed someone wounded or killed, discharged her weapon, or felt in great danger of being killed.<sup>16</sup> Generic health related QOL was assessed using the SF-12 (Short Form 12-Item General Health Survey),<sup>17</sup> and drug and alcohol use was assessed with questions modified from the Substance Abuse Outcomes Module.<sup>18</sup>

### Outcome/Exposure Variables

The primary outcome was OAB symptoms (yes/no), identified if UII and/or urinary frequency were present and at least moderately bothersome. Secondary outcomes included disease specific QOL and functional impact related to OAB, assessed using UDI-I and IIQ-7 scores, respectively.

The 4 dichotomous exposures studied were defined. Depression was characterized using the PHQ-8, based on DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, 4th edition) criteria (5 depression symptoms must be present more than half of the days or nearly every day, including depressed mood or anhedonia).<sup>10</sup> PTSD was defined using the PCL-C and the DSM-IV based symptom cluster scoring method (symptoms with at least moderate bother required as 1—intrusion, 3—avoidance and 2—hyperarousal symptoms).<sup>19</sup> Anxiety was identified if the GAD-7 score categorized the participant as having moderate or severe anxiety (score 10 or greater).<sup>11</sup> Sexual assault was defined as a lifetime history of completed sexual assault.

### Analysis Methods

Demographic and military service characteristics were compared between potentially eligible participants who

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