Overactive bladder: prevalence, risk factors and relation to stress incontinence in middle-aged women.

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Overactive bladder: prevalence, risk factors and relation to stress incontinence in middle-aged women

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Objective To investigate the prevalence of and factors associated with overactive bladder in middle-aged women.

Design Cross sectional population-based study.

Setting Southern Sweden and the Women’s Health in the Lund Area study (WHILA 1995–2000) where 6917 (64% of the invited) women, 50–59 years old in 1995, participated.

Population From the WHILA study, 1500 women reporting troublesome urinary incontinence (INCONT-1) and 1500 without incontinence (CONT-1) were selected by computerised randomisation and received the Bristol Female Lower Urinary Tract Symptoms (BFLUTS) questionnaire in January 2001.

Methods Overactive bladder was defined in two versions using the ICS definition of 2002 as either urgency alone (OAB-1) or urgency combined with frequency more than eight times per day and/or nocturia twice or more per night (OAB-2). Risk factors were analysed by multiple logistic regression analyses.

Main outcome measures Prevalence figures and odds ratios with corresponding 95% confidence intervals.

Results The prevalence of OAB-1 was 46.9% in the INCONT-1 and 16.7% in the CONT-1 group, and that of OAB-2 was 21.6% and 8.1%, respectively. Most urgency occurred in combination with stress incontinence (i.e. as mixed incontinence). The overlap between stress and urge symptoms increased with the frequency of stress incontinence episodes ($P < 0.001$). Metabolic risk factors were body mass index (BMI) ≥ 30 for OAB-1, OAB-2 and stress incontinence, positive metabolic screening for OAB-1, family history of diabetes for OAB-2 and elevation of BMI ≥ 25% since the age of 25 for stress incontinence. Stress incontinence was associated with the current use of hormonal replacement therapy.

Conclusions Overactive bladder and stress incontinence are intimately associated with each other. Both OAB and stress incontinence are associated with abnormal metabolic factors, mainly increased BMI.

INTRODUCTION

The concept of ‘overactive bladder (OAB)’ has recently been established.1,2 OAB has been described as a ‘syndrome of symptoms’ defined by the International Continence Society as urgency, with or without urge incontinence, usually with frequency and nocturia.3,4 The prevalence of OAB depends mainly on how it is defined.5,6

Traditionally, female urinary incontinence has been described and divided in relation to physical exertion and/or the presence of the urge to void. Stress incontinence is usually regarded as a consequence of insufficiency in the pelvic floor and urethral striated sphincter. Urge incontinence and OAB are believed to originate in the bladder or neurological disorders.7–9 This means that these two conditions are usually seen as separate dysfunctions. They do however have a lot in common. We know, for instance, that mixed incontinence is common, and also that treatment of the stress component by surgery as well as pelvic floor training most often has a beneficial effect on urge symptoms.10,11 However, there is still no reliable method to predict neither a reduction/cure of the urge component of mixed incontinence by surgery nor when it could be worsened.12 Our group has previously shown that incontinent middle-aged women, regardless of symptoms, have a more efficient bladder-emptying mechanism than symptom-free women expressed as higher urinary flow acceleration as well as maximum urinary flow without increase of the detrusor pressure. In addition, the incontinent women had a decreased ability to increase urethral pressure during squeeze compared with continent women of the same age.13,14 An impaired pelvic floor muscle function measured by vaginal surface EMG has been demonstrated not
3. Do you have to rush to the toilet to urinate?

- never □
- occasionally (less than one third of the time) □
- sometimes (between one and two thirds of the time) □
- most of the time (more than two thirds of the time) □
- all of the time □

How much of a problem is this for you?

- not a problem □
- a bit of a problem □
- quite a problem □
- a serious problem □

**Table 1.** Prevalence of mixed incontinence (i.e. OAB-1 and OAB-2 in combination with stress incontinence) and pure urge incontinence ‘sometimes’ or more often in the women reporting incontinence (INCONT-1) and continence (CONT-1) in the WHILA study. The vast majority of women with urgency also have stress incontinence.

<table>
<thead>
<tr>
<th></th>
<th>INCONT-1 (%)</th>
<th>CONT-1 (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed incontinence (OAB-1 + stress)</td>
<td>40.5</td>
<td>9.4</td>
<td>0.0003</td>
</tr>
<tr>
<td>Mixed incontinence (OAB-2 + stress)</td>
<td>18.4</td>
<td>5.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Urge incontinence</td>
<td>2.2</td>
<td>0.8</td>
<td>0.004</td>
</tr>
</tbody>
</table>

software SPSS 10.0 system (SPSS, Chicago, Illinois, USA). Odds Ratio (OR) with a confidence interval (CI) of 95% was used to express risk estimation.

RESULTS

A total of 2682 (89%) women responded and were included. Missing answers in the questions analysed in this study accounted for 1.2–2.0% of the total. Premenopausal women accounted for 2.25% (n = 27) and 1.45% (n = 18) of the INCONT-1 and CONT-1 groups, respectively (ns). In the INCONT-1 group, 711 (59.3%) of the women had used some kind of hormonal replacement therapy continuously during the last four months, in the CONT-1 group 657 (52.9%), P < 0.01.

In contrast to the WHILA study, urinary leakage was reported regardless of perceived bother in the BFLUTS; thus, both stress and urge incontinence were reported to a certain degree by women in the CONT-1 group. The multiple logistic regression analyses were made based on symptoms reported in the BFLUTS questionnaire.

The prevalence of OAB-1 was 46.9% in the INCONT-1 group and 16.7% in the CONT-1 group (P = 0.0003), of OAB-2 21.6% in the INCONT-1 group and 8.1% in the CONT-1 group (P < 0.0001). The prevalence of overactive bladder in combination with stress incontinence is presented in Table 1. In the women who reported stress incontinence in the BFLUTS, the prevalence of coexisting OAB (i.e. mixed incontinence) increased significantly with increasing frequency of stress incontinence episodes (Fig. 2).

OAB was independently associated with abnormal metabolic factors but not with lifestyle factors such as smoking or alcohol consumption (Table 2). Because mixed incontinence was much more common than urge incontinence, stress incontinence was entered into the logistic regression analysis to avoid confounding; it turned out to be the factor with the strongest association to OAB-1 (OR 4.5,

![Fig. 2. Women reporting more pronounced stress incontinence expressed as a higher frequency of leakage episodes in the BFLUTS also had a higher prevalence of urgency (i.e. mixed incontinence); P < 0.001, \( \chi^2 \) test for trend.](image)

Table 2. Risk factors associated with stress incontinence ‘sometimes’ or more often analysed by multiple logistic regression analysis. Stress incontinence defined as stress incontinence sometimes or more often according to the BFLUTS questionnaire.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Odds ratio</th>
<th>Confidence interval</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAB-1 Stress incontinence</td>
<td>4.5</td>
<td>3.7–5.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
<td>1.5</td>
<td>1.1–2.1</td>
<td>0.013</td>
</tr>
<tr>
<td>Positive screening</td>
<td>1.3</td>
<td>1.04–1.7</td>
<td>0.022</td>
</tr>
<tr>
<td>OAB-2 Stress incontinence</td>
<td>3.0</td>
<td>2.3–3.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
<td>1.6</td>
<td>1.2–2.3</td>
<td>0.004</td>
</tr>
<tr>
<td>Family history of diabetes</td>
<td>1.5</td>
<td>1.04–2.3</td>
<td>0.029</td>
</tr>
</tbody>
</table>

Table 3. Risk factors associated with stress incontinence ‘sometimes’ or more often analysed by multiple logistic regression analysis. BMI ≥ 30 and the elevation of BMI by 25% or more since the age of 25 are both independent risk factors. In this material, low to moderate alcohol consumption seems to lower the risk of stress incontinence.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Odds ratio</th>
<th>Confidence interval</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated BMI</td>
<td>1.69</td>
<td>1.38–2.06</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>BMI ≥ 30</td>
<td>1.55</td>
<td>1.17–2.05</td>
<td>0.002</td>
</tr>
<tr>
<td>Use of hormone replacement therapy</td>
<td>1.47</td>
<td>1.22–1.78</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Low alcohol consumption</td>
<td>0.72</td>
<td>0.57–0.89</td>
<td>0.03</td>
</tr>
<tr>
<td>Moderate alcohol consumption</td>
<td>0.64</td>
<td>0.46–0.88</td>
<td>0.006</td>
</tr>
</tbody>
</table>

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95% CI 3.7–5.6, \( P < 0.001 \)) and OAB-2 (OR 3.0 95% CI 2.3–3.9, \( P < 0.001 \)), respectively. Stress incontinence was associated with abnormal metabolic factors and current hormonal replacement therapy. Mild to moderate alcohol consumption was negatively associated with stress incontinence (Table 3).

**DISCUSSION**

Stress incontinence was strongly associated with symptoms of OAB. The vast majority of women with OAB in this study, in the INCONT-1 group 40% of 46% with OAB-1, also reported stress incontinence symptoms (i.e. mixed incontinence). Traditionally, this association has been explained by a behavioural adaptation in the stress incontinent woman, emptying her bladder more frequently to reduce the leakage, thus inducing frequency and later on urgency. Conceivably, our findings could be in favour of a close association between the origin itself of stress and urge symptoms. This is also supported by our previous studies that show more efficient emptying of the bladder without detrusor pressure increase as well as an impaired ability to raise urethral pressure incontinent women regardless of stress or urge/mixed symptomatology compared with continent women of the same age and parity. Together with the lack of consistency between urge symptoms and urodynamically demonstrated detrusor overactivity, this leads us to assume that urgency in the majority of cases originates from a deteriorated neuromuscular ability to close the proximal urethra. Similar findings were reported by Bump et al. in a study concerning medical treatment of mixed incontinence, where the major determinant of concurrent urge symptoms in women with stress incontinence was the severity of the stress incontinence. Scotti et al. suggested that the outcome of surgery in patients with mixed incontinence was better in those in whom the stress component preceded the urge in the history. When the urge component preceded the stress, the outcome was poor. The wider definition OAB-1 (i.e. urgency sometimes or more often) showed the strongest association with coexisting stress incontinence. The reason why urgency is so closely correlated to stress incontinence could be that it is related to physical activity (i.e. the triggering mechanism is the same as in stress incontinence). This is consistent with our findings showing an increasing prevalence of coexisting OAB in stress incontinent women with an increasing frequency of stress leakage episodes.

The results of this part of the WHILA population-based study show an association between metabolic factors (mainly elevated BMI) and the presence of an OAB. These findings coincide with those of a recently published study by the Leicestershire MRC Incontinence Study Group where OAB as well as stress incontinence were associated with obesity. This study found, in contrast to ours, an association between smoking and OAB, and also that OAB as well as stress incontinence were related to diet. A similar association between the components of the metabolic syndrome and an OAB has previously been found in men with benign prostatic hyperplasia.

The current definition of OAB is vague but helps to improve communication with the patient. The BFLUTS questionnaire tends to give high prevalence figures for most lower urinary tract symptoms, possibly because it also catches infrequent symptoms.

In the original WHILA study, the incontinent group reported a higher hormonal replacement therapy use. In the BFLUTS study, current use of hormonal replacement therapy was associated with an elevated risk of stress incontinence but not with OAB.

**CONCLUSIONS**

Symptoms of an OAB are common in middle-aged women, the exact prevalence depending on how widely the ICS definition is interpreted. OAB was associated with factors of the metabolic syndrome, firstly BMI ≥ 30, but also to a high degree with concurrent stress incontinence. The data in this study support the previously suggested model of a common origin for stress and urge symptoms.

**References**


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