Overactive Bladder and Nocturia In Middle-Age American Women: Symptoms and Impact Are Significant

Rachel Levkowicz, Kristene E. Whitmore, Nancy Muller

Overactive bladder (OAB) is defined by the International Continence Society (ICS) (2005) as “urgency, with or without urgency incontinence, usually with frequency and nocturia.” Typical symptoms include urinating more than eight times per day (urinary frequency) and a strong, sudden desire to urinate (urinary urgency) (van Kerrebroek et al., 2002). Nocturia is described by the ICS (2005) as “sleep-disturbing voiding.” About 17% of women and 16% of men over 18 years of age in the U.S. have overactive bladder. This translates into an estimated 33 million adult Americans with symptoms of OAB, of which an estimated 12.2 million adults have urgency incontinence (Stewart et al., 2003).

The overall prevalence of nocturia in a study of almost 3000 men and women 60 to 80 years of age was 77%, and there was no difference between men and women (Bing et al., 2006). In men, however, the prevalence of nocturia was higher (85%).

Brief Study

This research study assessed the severity of overactive bladder and nocturia in middle-age American women, as well as their attitudes about seeking treatment and the impact of the symptoms, including nocturia, on quality of life.

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Key Words: Overactive bladder, urinary incontinence, nocturia, quality of life.

Introduction

Nocturia is a widespread symptom of overactive bladder (OAB) increasing with age. Aims of this study were to assess 1) the severity of OAB and nocturia in middle-age American women, 2) their attitudes about seeking treatment, and 3) the impact of symptoms of OAB, including nocturia on quality of life.

Methods

Online interviews were administered to a total of 1111 women, of whom 500 constituted a nationally representative sample between 40 and 65 years of age. In addition, a sample of 611 women in the same age bracket with symptoms of OAB was surveyed regarding their experiences and attitude about treatment.

Results

Most (n = 586 of 611 [96%]) women with OAB get up at least once during the night to urinate. Nearly half of all (n = 280 of 611 [46%]) women with OAB typically get up nightly to urinate three or more times. There is no significant difference in the average frequency of nighttime urination experienced by women who are currently getting treatment, who stopped treatment, and who never sought treatment. Women with OAB, including nocturia, were more likely than women with OAB, excluding nocturia, to alter their behavior in social situations, refrain from physical activity and intimacy, and cancel social plans because of their condition.

Discussion

The number of trips taken to the bathroom at night by women with nocturia may be more significant than acknowledged by health care providers and deserves more attention. Sixty-five percent of women with nocturia in this study admitted they waited longer than they should have to seek treatment, and many of those who did consult a health care professional were dissatisfied and/or ultimately discontinued treatment. Individuals living with nocturia alter their daily life because of their symptoms, and their relationships with others are impacted.

Conclusions

General and specialty physicians alike are called to make a greater effort to address OAB including nocturia and keep patients engaged in treatment. Further research is warranted to refine intervention by practitioners aimed at ameliorating symptoms of nocturia. More public health education is needed to improve consumer knowledge about OAB including nocturia and the understanding of all treatment options for its symptoms.

Level of Evidence: VI
(Melnyk & Fineout-Overholt, 2011)
nocturia increases more rapidly with age than in women, although it is more common among women at a younger age (Tikkinen, Tammela, Huhtala, & Auvinen, 2006). Research indicating the overall prevalence of nocturia varies depending on the population, but most studies demonstrate that the incidence of nocturia increases with age. For example, the prevalence has been shown to increase from 60% to 90% in a population 60 to 80 years of age (Barker & Mitteness, 1998) and from 56% to 74% in men 50 to 70 years of age in a 20-year span (Hakkinen et al., 2007). The age-attributable increase in nocturia has been hypothesized to be caused by a nocturnal decrease in vaso-pressin over time (Donahue & Lowenthal, 1997).

While the ICS (2005) defines nocturia specifically as “the complaint that the individual has to wake at night one or more times to void,” the American Urological Association (AUA) and researchers in general reference nocturia as the need to urinate at least twice during the night (AUA, 2007; Rudd Bosch & Weiss, 2010). Furthermore, nocturia is considered a clinical problem if frequency is greater than twice a night (AUA, 2007; Rudd Bosch & Weiss, 2010). Using the strict ICS definition of getting up at least once, 96% (n = 586 of 611) of women with OAB in the study reported experiencing nocturia. While this statistic is noteworthy, for the purposes of analyzing the impact of nocturia, the term is defined in this study in accordance with the more conservative AUA (2007) definition as “a need to urinate at least twice during the night.” Going to the bathroom four or more times per night is termed severe nocturia.

Daytime urinary frequency is the hallmark symptom of OAB, but how many times are women with OAB going to the bathroom during their waking hours, and how often are they getting up in the night? With a large number of Americans now in their 60s, the need to understand the severity and implications of OAB and nocturia is growing increasingly important. Aims of the study were to assess the severity of OAB and nocturia in middle age American women, their attitudes about seeking treatment, and the impact of symptoms of OAB and nocturia on their quality of life.

Materials and Methods

The design of this study was a descriptive, cross-sectional survey in which all measurements were made on a single occasion. This design is considered well-suited to the research goal of describing variables and their distribution patterns. Kelton Research, a leading national public opinion company, administered online interviews between March 18 and March 31, 2009, with a total of 1111 female American Internet users, of whom 500 constituted a nationally representative sample between 40 to 65 years of age. This constituted the norm, or control group, strictly for a baseline view of American women’s beliefs about the role of health for achieving a sense of balance in life. The demographic quotas for the 500 non-OAB audience approximated U.S. Census figures. Separately, a sample of 611 women in the same age bracket and with self-reported symptoms of OAB was surveyed online during the same time interval in 2009. Based on responses, women with OAB were further categorized into three subgroups: those who had never been treated, those who were currently in treatment, and those who had discontinued treatment. The study was intentionally structured in this manner to mirror similar, but not identical, consumer research among women with OAB. It was commissioned by The National Association for Continence (NAFC), which also employed online methodology and was completed in early 2003. This latest, independent study represents the fifth such nationwide survey of American consumers about their bladder and bowel control problems commissioned by NAFC since 2000.

An e-mail invitation was used, and quotas were set to ensure reliable and accurate representation of the U.S. female population 40 to 65 years of age. Descriptive demographic data were collected about all subjects in both sample groups. Characteristics regarding age, geographic region of the country, ethnicity, marital status, employment status, household income, education, area of living, and parental status were captured for each respondent. The identity and answers of respondents were maintained confidentially and anonymously, and all survey responses were reported in the aggregate only. No commercial products or services were involved in the questions. Respondents were not incentivized to participate in this or the earlier survey. While ethical issues may be present in studies of help-seeking behaviors, particularly those involving sensitive or personal health topics such as bladder control, the anonymity allowed by private, online participation minimizes risk of violating ethical research standards, and thus, optimizes freedom of participation and liberty in responses to questions. No third-party Institutional Review Board (IRB) review was submitted; as such, a study would have qualified for an IRB exemption.

The 500 women representing the norm were asked seven questions, primarily related to feelings of normalcy and disruptions in their lives. Questions were also asked of respondents about their attitudes toward personal health. The 611 respondents self-reporting symptoms of OAB were asked the same seven questions, as well as 16 additional questions specifically regarding their search for treatment, satisfaction with current treatment, and reasons for stopping treatment for OAB if treated in the past but having elected to discontinue treatment. Some questions used dichotomous, binary measures (for example, “Which better
describes the amount of time it took for you to consult a medical professional about your OAB after you first experienced symptoms?”). Other questions used a Likert scale of 1 to 5 for responses, commonly used to measure abstract variables and quantify attitudes, behaviors, and domains of health-related quality of life. For this question, an ordinal, categorical variable served as a response choices, although ordered categories lack quantifiable intervals. Still other questions were framed with only a single response selection allowed, represented by a nominal, categorical variable, from a multiple list of options (for example, “Which of the following best describes how having OAB makes you feel?”). The scope of this article is not intended to cover the full extent of all findings and conclusions from this survey, rather only the portion pertaining to nocturia.

Results of any sample are subject to sampling variation. For the sample of 500 nationally representative women 40 to 65 years of age, the chances are 95 in 100 that a survey result does not vary, plus or minus, by more than 4.4 percentage points from the result that would be obtained if interviews had been conducted with all persons in the universe represented by the sample. In other words, the confidence interval for interpreting results is ± 4.4%. For the sample of 611 nationally representative women 40 to 65 years of age with self-reported OAB, the chances are 95 in 100 that a survey result does not vary, plus or minus, by more than 4.4 percentage points from the result that would be obtained if interviews had been conducted with all persons in the universe represented by the sample. For interpretation of univariate statistics, standard deviations around means of the sample were assessed. Quantum version 5.8 by SPSS, Inc. was the software used to analyze the data. To interpret the statistical significance of the difference between any two subgroups, a t-test was applied to the data to determine the probability that the difference between the two means is caused by chance ($p < 0.05$) used to establish the significance of the difference. On this basis, only those findings determined to have statistical significance are reported and discussed. A Chi-squared test was not utilized because it is typically used to compare the proportion of subjects in each of the two groups displaying a dichotomous outcome, more typical of randomized clinical trials comparing a treatment group to a placebo group.

The greatest limitation to this study is its external validity. Generalizability may be questioned because the sample drawn only from female users of the Internet may not be representative of the general U.S. population in the target age group and across all desired demographic characteristics.

### Results

#### Severity of Overactive Bladder and Nocturia

Table 1 provides results as a distribution table of self-reported daytime frequency of urination. As shown in Table 1, nearly half of women ($n = 278$ of $611$ [46%]) with OAB included in the OAB sample survey reported that they urinate between 10 and 14 times per day or more, and 1 in 10 ($n = 62$ of $611$ [10%]) urinate more than 14 times per day.

Table 2 provides results as a distribution table of self-reported nighttime toileting frequency by women in this same OAB sample. Using the AUA definition of nocturia, Table 2 illustrates that more than three-fourths of respondents in the OAB sample of middle-age women report they experience nocturia ($n = 478$ of $611$ [78%]). This is also reflected in the mean of 2.6 times and a median of 2.0 derived from the sample data.

Not only do results also suggest that women with OAB almost always get up to urinate at night, but 1 in 5 ($n = 121$ of $611$ [20%]) respondents typically experience severe nocturia, necessitating four or more trips to the bathroom during the night. Most women with OAB surveyed ($n = 586$ of $611$ [96%]) get up at least one time during the night to urinate. Three (3) in 4 ($n = 478$ of $611$ [78%]) women with OAB surveyed experience nocturia. One (1) in 4 ($n = 159$ of $611$ [26%]) women with OAB surveyed typically get up to urinate three times per night.

When asked if urinary leakage is experienced by not making it to the toilet in time, data show

<table>
<thead>
<tr>
<th>Number of Times Urinating</th>
<th>Number of Respondents</th>
<th>Percent of Total</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20+</td>
<td>25</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>15 to 19</td>
<td>37</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>10 to 14</td>
<td>216</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>7 to 9</td>
<td>146</td>
<td>24</td>
<td>70</td>
</tr>
<tr>
<td>5 to 6</td>
<td>147</td>
<td>24</td>
<td>94</td>
</tr>
<tr>
<td>3 to 4</td>
<td>32</td>
<td>5</td>
<td>99</td>
</tr>
<tr>
<td>1 to 2</td>
<td>7</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>611</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Daytime frequency of urination sample: Mean = 9.0; sample median = 8.0.
that women with nocturia in the OAB sample (those urinating twice or more during the night) are more likely to experience urgency urinary incontinence, or episodes of urine loss, than women without nocturia surveyed \( n = 345 \) of \( 478 \) [72\%] versus \( n = 71 \) of \( 133 \) [53\%], and thus, are more likely to have more severe OAB symptoms in general.

**Attitudes about Treatment**

Despite their more severe symptoms, respondents with OAB including nocturia surprisingly are no more likely to consider themselves proactive about seeking treatment for their symptoms than women without nocturia. When those who have ever sought treatment for their OAB are asked directly about the degree to which they think they are proactive, 59\% \( (n = 182 \) or 306) with nocturia compared to 60\% \( (n = 56 \) of 94) without nocturia somewhat or strongly agree. In fact, nearly 2 in 5 \( (n = 172 \) or 478 [36\%]) of women with nocturia surveyed had never sought treatment for symptoms of OAB, whereas 29\% \( (n = 39 \) of 133) of those with OAB but without nocturia reported they had not sought treatment. Interestingly, of those who have nocturia, 76\% \( (n = 365 \) of 478) reported that they waited longer than they should to consult a medical professional versus 65\% \( (n = 86 \) of 133) of women without nocturia.

According to this research, many women have not had positive experiences with treatment for their OAB symptoms. There is no significant difference in symptoms of nighttime frequency experienced by women who are currently getting treatment \( (n = 133 \) of 200 [67\%]), who stopped treatment \( (n = 128 \) of 200 [64\%]), and who never sought treatment \( (n = 144 \) of 211 [68\%]). Roughly one-third of women with OAB in the sample survey experienced nocturia regardless of whether or not they were in treatment; 149 of 478 (31\%) were in treatment, 157 of 478 (33\%) had stopped treatment, and 172 of 478 (36\%) had never treated their OAB.

Nearly 1 in 4 \( (n = 34 \) of 149, or 23\%) of OAB respondents with nocturia felt somewhat or extremely dissatisfied with the current treatment of their symptoms. Of the two-thirds \( (n = 306 \) of 478, or 64\%) of OAB respondents with nocturia who had sought treatment, half \( (n = 157 \) of 306, or 51\%) had discontinued treatment.

According to those women with nocturia who lapsed in their treatment, 59 of 157 (38\%) reported the treatment options tried were “not effective.” 47 of 157 (30\%) reported treatments were “too expensive,” and 31 of 157 (20\%) reported they “didn’t want to live with the side effects of treatment.” (To this question, asking the reason why treatment for OAB was stopped, multiple responses were allowed, and thus, were not mutually exclusive.) While complaints about side effects were lower than seen in earlier research, criticisms on the basis of effectiveness and cost remained similar to responses in the 2003 NAFC survey.

Women with OAB reported the most commonly experienced side effects of medication are dry mouth \( (n = 220 \) of 351 [63\%]), constipation \( (n = 130 \) of 351 [37\%]), and dry skin \( (n = 94 \) of 351 [27\%]), much as seen in past consumer survey research by NAFC.

**Impact of Nocturia**

Sixty-three percent \( (n = 316 \) of 500) of nationally representative American women reported that not getting enough sleep throws off their sense of “normalcy.” In addition, 60\% \( (n = 300 \) of 500) of women reported that when one aspect of life is thrown off, it disrupts other areas of life. The results of this study suggest how nocturia, in particular, impacts quality-of-life considerations, and thus, could represent a factor disrupting a person’s sense of normalcy.

When asked about insecurities (comparing feelings about OAB versus retirement savings), more women with nocturia \( (n = 134 \) of 478 [28\%]) expressed feeling insecure about their OAB symptoms than women without nocturia \( (n = 26 \) of 133 [20\%]). Respondents with nocturia were also more likely than respondents without nocturia to experience life differently due to altered behavior, as reflected in Table 3.

| Table 2. Distribution of Nighttime Toileting Frequency Self-Reported by *Women Age 40 to 65 with OAB* |

<table>
<thead>
<tr>
<th>Number of Times Urinating</th>
<th>Number of Respondents</th>
<th>Percent of Total</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>25</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>108</td>
<td>18</td>
<td>96</td>
</tr>
<tr>
<td>2</td>
<td>198</td>
<td>32</td>
<td>78</td>
</tr>
<tr>
<td>3</td>
<td>159</td>
<td>26</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>69</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>5 to 6</td>
<td>37</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>7 to 9</td>
<td>9</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10 to 14</td>
<td>6</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:** Nighttime frequency of urination sample: Mean = 2.6, sample mean = 2.0.
Negatively severe nocturia (urinating four or more times per night) robs a middle-age woman with OAB of a sense of “normalcy,” as shown in Table 4. Variances between comparative percentages in Table 4 suggest that severe nocturia ravages more than a woman’s physical health and even disrupts a sense of normalcy surrounding one’s emotional and social circumstances.

Insecurity, behavioral alterations, and a sub-par sense of “normalcy” are not without emotional repercussions. Respondents with nocturia were more likely to report suffering from depression than those without nocturia (215 of 478 [45%] versus 46 of 133 [35%], respectively). While not causal, this finding is supported by the fact that 293 of 500 (59%) of all American women 40 to 65 years of age report that being able to do and experience as much as possible of the variety that life has to offer is a requirement of having a sense of balance in life. Thus, when women are robbed of this freedom, it is reasonable they could suffer from depression.

### Table 3.
**Impact of Nocturia on Personal Life Activities**

<table>
<thead>
<tr>
<th>Change of Behavior</th>
<th>With OAB Excluding Nocturia (n = 133)</th>
<th>With OAB Including Nocturia (n = 478)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alter behavior in social situations</td>
<td>32 (24)</td>
<td>176 (37)</td>
</tr>
<tr>
<td>Refrain from physical activity</td>
<td>28 (21)</td>
<td>142 (30)</td>
</tr>
<tr>
<td>Refrain from physical intimacy</td>
<td>23 (17)</td>
<td>125 (26)</td>
</tr>
<tr>
<td>Cancel social plans</td>
<td>11 (8)</td>
<td>80 (17)</td>
</tr>
</tbody>
</table>

### Table 4.
**Impact of Severe Nocturia in Women with OAB**

<table>
<thead>
<tr>
<th>Feeling of Well Being</th>
<th>Excluding Severe Nocturia (n = 490)</th>
<th>Including Severe Nocturia (n = 121)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normalcy of emotional state</td>
<td>209 (43)</td>
<td>42 (35)</td>
</tr>
<tr>
<td>Normalcy of health and well being</td>
<td>163 (33)</td>
<td>24 (20)</td>
</tr>
<tr>
<td>Normalcy of social life</td>
<td>191 (39)</td>
<td>32 (26)</td>
</tr>
</tbody>
</table>

**Discussion**

Whether the AUA or stricter ICS definition is used, nocturia is a common symptom among women with OAB. Not only do almost all women with OAB wake up at night to urinate, almost half (n = 280 of 611 [46%]) have severe enough nighttime voiding patterns to be considered a “clinical problem” according to the AUA. Perhaps the number of trips taken to the bathroom at night by women with OAB deserves more attention by providers because of its impact on quality of life as determined by personal life activities and because of the numbers of women with OAB who are affected.

Women with nocturia in this study tended to prolong seeking treatment. Perhaps apathy toward treatment is connected to the finding that half of women (n = 301 of 611 [49%]) with OAB and nocturia do not think they will ever be able to completely control their OAB, and many of those who did consult a health care provider were dissatisfied and/or ultimately discontinued treatment. One might therefore question whether apathy is not a reflection of a somewhat fatalistic acceptance of symptoms in middle-age women with OAB including nocturia who lack a full knowledge of their options for intervention.

Despite the large percentage of women surveyed who either never sought medical help or dropped out of treatment, living with OAB and severe nocturia appears to impact a woman’s emotional well-being and relationships. Published research has revealed that individuals with incontinence change their daily life because of their symptoms (Lenderking, Nackley, Anderson, & Testa, 1998). Once more, NAFC research supports this notion and specifically identifies nocturia as being related to behavioral alterations and unfulfilled social relationships. The fact that nocturia affects socialization, physical intimacy, and significant other relationships is reinforced several times by these data. Significantly fewer women surveyed with severe nocturia than those without severe nocturia reported feeling their life is “normal” (31% versus 45%), suggesting that severe nocturia steals away more than a woman’s physical health. Nocturia clearly affects a woman’s life experiences and may therefore throw off a woman’s sense of daily balance.

**Conclusions**

Recommendations based on these research findings include a call to primary care providers to address OAB and nocturia during office visits, and for general and specialty physicians alike to make a greater effort to keep patients engaged in their treatment. Upon consultation with a medical provider, almost 9 in 10 (n = 351 of 400 [88%]) of all women surveyed with OAB including nocturia and undergoing treatment were prescribed medication. Fewer women tried bladder retraining (n = 75 of 400 [19%]), and only 3% (n = 13 of 400) had an implantable device delivering electrical stimulation to the sacral nerves.
Physicians must help patients explore combination therapy and devices when warranted because medication in combination with behavioral therapies has been demonstrated as more effective than any single intervention alone (Burgio, Locher, & Goode, 2000; Markinkovic, Gillen, & Stanton, 2004; Newman & Giovannini, 2002). Otherwise, frequent trips to the bathroom during the night will continue to disrupt patient quality of life, rob women of their sense of normalcy, and increase risks of falls and concomitant injuries such as fractures (Nakagawa et al., 2009; Stewart, Moore, May, Marks, & Hale, 1992; Tromp et al., 2009).

Epidemiological studies such as surveys enhance the understanding by clinicians, policy-makers, and public health educators of how sufferers of conditions such as OAB are impacted (van Kerrebroeck et al., 2009). Further research is needed to refine intervention by practitioners to ameliorate symptoms of OAB and understanding of all treatment options for its symptoms. Lastly, studies such as these need to be repeated in broader scope to improve the generalizability to the population as a whole.

References