The effect of hyperactive bladder severity on healthcare utilization and labor productivity

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Received 21 October 2013; accepted 4 November 2013
Available online 21 March 2014

Objective: To explore the relationship between the severity of urinary urge incontinence (UUI) on healthcare resources utilization (HRU) and loss of labor productivity in subjects with overactive bladder (OAB) in the general population in Spain.

Methods: Secondary analysis of a cross-sectional web-based study conducted in the general population >18 years of age, through a battery of HRU questions asked using an online method. Probable OAB subjects were identified using a previously validated algorithm and a score >8 in the OAB-V8 questionnaire. HRU questions included an assessment of concomitant medication used as a consequence of OAB/UUI pad utilization, and medical office visits. Patients were grouped according to the number of UUI episodes into 0, 1, 2–3 or 4+ episodes.

Results: Of a total of 2035 subjects participating from the general population, 396 patients [52.5% women, mean age: 55.3 (11.1) years, OAB-V8 mean score: 14.5 (7.9)] were analyzed: 203 (51.3%) with 0 episodes, 119 (30.1%) with 1, 52 (13.1%) with 2 or 3, and 22 (5.6%) with 4 or more episodes. A linear and significant adjusted association was observed between the number of UUI episodes and HRU; the higher the number of daily episodes, the higher the HRU. Subjects with more episodes had medical visits more frequently at the primary care (p = .001) and specialist (p = .009) level as well. Consumption of day (p < .001) and night (p < .001) urinary absorbents, anxiolytic medicines (p = .021) and antibiotics (p = .05) was higher in patients with more UUI episodes.

** Study partially presented at the 43rd Annual Meeting of the International Continence Society (ICS 2013 Barcelona).
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**Conclusion:** The severity of OAB in terms of frequency of daily urge incontinence episodes was significantly and linearly associated with higher healthcare resources utilization and a decrease in labor productivity in subjects with probable OAB in Spain.

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### Background

In 2002, the International Continence Society (ICS) defined overactive bladder syndrome (OABS) as a syndrome characterized by the presence of isolated urinary urgency or in combination with other symptoms such as urge incontinence. OAB is generally associated with an increase in urinary frequency and nocturia, in the absence of other demonstrable diseases. The overactive bladder (OAB) is a very common, chronic and debilitating medical condition, which affects individuals of all ages and both genders. The EPIC study revealed a 5.9% prevalence for women between 25 and 64 years of age, 4.6% for men between 50 and 65 years and 38.5% for institutionalized patients older than 65 years (both genders). OAB represents a significant socioeconomic burden as a result of both the direct use of medical and nonmedical resources and the reduced occupational productivity due to disability or absenteeism associated with the disease. A study conducted in 6 Western countries on the economic impact of OAB estimated that in Spain the mean annual direct cost associated with diagnosis, treatment (drugs and incontinence pads), medical consultations and treatment for depression associated with the disease was €255 per patient/year. The annual cost due to absenteeism/reduced productivity associated with OAB was estimated at 142 million euros.

The urge urinary incontinence (UUI) represents on average half of all costs associated with OAB. It is assumed therefore that conditions of increased OAB severity, according to the number of UUI episodes daily, represent an increased care and occupational burden. The aim of this study was to explore the impact of OAB severity, in terms of the daily number of UUI episodes, on the use of healthcare resources and the occupational productivity in a population setting in Spain.

### Material and methods

A cross-sectional, observational epidemiological study was conducted using a battery of questions and questionnaires completed online (Internet). The study comprised a total of 2035 participants who were >18 years of age, of both genders, residents of Spain, selected randomly from the general population and grouped by gender and age according to the OAB prevalence data in Spain. The exclusion criterion was a failure to complete the entire questionnaire. The sample size was established by considering the available data on the prevalence of OAB to ensure a representative population distribution.

We used a computer-assisted web interviewing (CAWI) procedure to obtain completed questionnaires. The participants were part of a representative population panel...
Healthcare utilization and impact of hyperactive bladder

Figure 1  Flow diagram describing the patients included in the study. 1 Along the ICS (urgency or urgency with incontinence). 2 Bothersome urinary symptoms or score >8 on the OAB-V8 scale. 3 Participants who do not meet the inclusion criteria.

The battery of questions and questionnaires administered included the following: a set of independent questions concerning the participant’s bladder health developed ad hoc for this study; the OAB detection questionnaire (OAB-V8) 14; and a modified version of the WPAI productivity questionnaire 15 for patients with OAB, which considers general occupational performance in the 4 weeks prior to the interview, including complete days away from work due to OAB and days at work with lower performance due to symptoms. The bladder health questions evaluated the following 3 aspects: core symptoms descriptive of OAB (urinary urgency, urgency with incontinence, nocturia and urinary frequency); the presence of discomfort associated with these urinary symptoms; and the presence of one or more coping strategies and/or behaviors for bladder symptoms, such as modifying lifestyle habits according to the presence of a toilet, changing the dietary intake of liquids and avoiding places that lack toilets. We also collected sociodemographic data, health habits, medical history, treatments followed in the previous 12 months and the number of medical visits (primary care, specialist and emergency) in the last month due to OAB symptoms.

The patients were classified as “probable OAB”, “possible OAB” and “no OAB” depending on the presence of a number of core symptoms descriptive of OAB, applying a previously validated automated algorithm, which used the OAB classification algorithm described by Coyne et al. as reference. 14 The algorithm consists of a structured questionnaire that asks about the previously mentioned cardinal symptoms that define OAB syndrome. The algorithm also explores the level of discomfort due to the symptoms and analyzes coping strategies. Participants who experienced at least 1 cardinal symptom, which they perceived as somewhat annoying and for which they developed at least 1 coping strategy, were classified as “probable OAB”. The participants also had to have a score >8 on the OAB-V8 questionnaire. 15 Patients with probable OAB were then classified into 4 subgroups according to severity, considering the number of daily UUI episodes (0, 1, 2 or 3 and 4+), a grouping that has been previously performed in other studies published in the medical literature. 15

Healthcare resources related to OAB included medical visits, concomitant medication associated with OAB and the use of urinary pads, both diurnal and nocturnal. Workplace productivity was assessed using the responses in the modified WPAI questionnaire, from which we determined the number of lost work day equivalents (LWDEs). 16,19 To determine the LWDEs, the patients were asked about the impact of OAB symptoms on work productivity over the last 4 weeks. Data were collected on the number of days that the patients did not work due to urinary symptoms, the days on which they went to work with symptoms and the mean self-perceived workplace productivity on those days (expressed as 0–100% productivity). Based on these data, the number of LWDEs was calculated using the following formula: LWDE = W1 + W2 (1 − P), where W1 is the number of days absent or during which they could not perform their daily activities due to urinary symptoms in the last 4 weeks; W2 is the number of work days with reduced productivity due to the previously mentioned symptoms in the same period; (1 − P) is the percentage of work disability at work; and P is the percentage of occupational productivity. 16,19

A descriptive analysis of all recorded data was performed. The bilateral statistical test for qualitative variables was conducted using the Fisher test and the Mantel–Haenszel test for a significance level < .05. For the quantitative variables, we conducted an analysis of covariance (ANCOVA). The comparison of groups and variables was performed with Student’s t-test (for 2 groups) or with a unidirectional ANOVA test (for 3 or more groups). No data was lost; the calculations were therefore performed using all available data. The analysis was performed with the SPSS® statistical package, version 18 (Chicago, IL, USA).

Results

A total of 2035 patients participated in the study (mean age, 52.65 years; 18 = 12.14; 95% CI: 52.12–53.18), 50.81% of whom were men. Some 19.46% (396) of the patients were classified as having probable OAB, and these
Table 1  Demographic and clinical characteristics and health habits of participants with probable OAB. Classification according to the number of UUI episodes/day.

<table>
<thead>
<tr>
<th>OAB severity (according to the number of UUI episodes)</th>
<th>Total</th>
<th>0</th>
<th>1</th>
<th>2-3</th>
<th>4+</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>396 (100.00)</td>
<td>203 (51.26)</td>
<td>119 (30.05)</td>
<td>52 (13.13)</td>
<td>22 (5.56)</td>
<td></td>
</tr>
<tr>
<td>Men n (%)</td>
<td>188 (47.47)</td>
<td>120 (59.11)</td>
<td>50 (42.02)</td>
<td>14 (26.92)</td>
<td>4 (18.18)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Women n (%)</td>
<td>208 (52.53)</td>
<td>83 (40.89)</td>
<td>69 (57.98)</td>
<td>38 (73.08)</td>
<td>18 (81.82)</td>
<td></td>
</tr>
<tr>
<td>Age, mean (SD)</td>
<td>55.27 (11.14)</td>
<td>53.78 (12.28)</td>
<td>57.76 (9.43)</td>
<td>54.96 (9.65)</td>
<td>56.32 (10.01)</td>
<td>0.002</td>
</tr>
<tr>
<td>&lt;40 years, n (%)</td>
<td>40 (10.10)</td>
<td>30 (14.78)</td>
<td>6 (5.04)</td>
<td>1 (1.92)</td>
<td>3 (13.64)</td>
<td></td>
</tr>
<tr>
<td>40-49 years, n (%)</td>
<td>49 (12.37)</td>
<td>22 (10.84)</td>
<td>12 (10.08)</td>
<td>15 (28.85)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>50-59 years, n (%)</td>
<td>110 (27.88)</td>
<td>53 (26.11)</td>
<td>34 (28.57)</td>
<td>17 (32.69)</td>
<td>6 (27.27)</td>
<td></td>
</tr>
<tr>
<td>≥60 years, n (%)</td>
<td>197 (49.75)</td>
<td>98 (48.28)</td>
<td>67 (56.30)</td>
<td>19 (36.54)</td>
<td>13 (59.09)</td>
<td></td>
</tr>
<tr>
<td>BMI; kg/m², mean (SD)</td>
<td>27.59 (5.42)</td>
<td>27.04 (5.23)</td>
<td>28.53 (6.11)</td>
<td>27.75 (4.34)</td>
<td>27.21 (5.16)</td>
<td>0.258</td>
</tr>
<tr>
<td>Occupational status, n (%)</td>
<td>198 (50)</td>
<td>115 (56.65)</td>
<td>47 (39.50)</td>
<td>26 (59)</td>
<td>10 (45.45)</td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>112 (28)</td>
<td>45 (22.17)</td>
<td>44 (36.97)</td>
<td>15 (28.85)</td>
<td>8 (36.36)</td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>71 (17.93)</td>
<td>39 (19.21)</td>
<td>19 (15.57)</td>
<td>9 (17.31)</td>
<td>4 (18.18)</td>
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<tr>
<td>Unemployed</td>
<td>2 (0.51)</td>
<td>0</td>
<td>2 (1.68)</td>
<td>0</td>
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<td>Disability</td>
<td>13 (3.28)</td>
<td>4 (1.97)</td>
<td>7 (5.88)</td>
<td>2 (3.85)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Education level, n (%)</td>
<td>215 (54.29)</td>
<td>120 (59.11)</td>
<td>64 (53.78)</td>
<td>22 (42.31)</td>
<td>9 (40.91)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>179 (45.20)</td>
<td>82 (40.39)</td>
<td>55 (46.22)</td>
<td>30 (57.69)</td>
<td>12 (54.55)</td>
<td></td>
</tr>
<tr>
<td>Compulsory education</td>
<td>2 (0.51)</td>
<td>1 (0.49)</td>
<td>0</td>
<td>0</td>
<td>1 (4.55)</td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>13 (3.28)</td>
<td>4 (1.97)</td>
<td>7 (5.88)</td>
<td>2 (3.85)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Personal and medical history, n (%)</td>
<td>45 (11.36)</td>
<td>23 (11.33)</td>
<td>13 (10.92)</td>
<td>4 (7.69)</td>
<td>5 (22.73)</td>
<td>0.344</td>
</tr>
<tr>
<td>Skin infections</td>
<td>68 (17.17)</td>
<td>32 (15.76)</td>
<td>20 (16.81)</td>
<td>10 (19.23)</td>
<td>6 (27.27)</td>
<td>0.522</td>
</tr>
<tr>
<td>Urinary infections</td>
<td>132 (33.33)</td>
<td>62 (30.54)</td>
<td>47 (39.50)</td>
<td>17 (32.69)</td>
<td>6 (27.27)</td>
<td>0.386</td>
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<tr>
<td>High blood pressure</td>
<td>30 (7.58)</td>
<td>12 (5.91)</td>
<td>7 (5.88)</td>
<td>5 (9.62)</td>
<td>6 (27.27)</td>
<td>0.012</td>
</tr>
<tr>
<td>Diabetes</td>
<td>7 (1.77)</td>
<td>0</td>
<td>5 (4.20)</td>
<td>2 (3.85)</td>
<td>0</td>
<td>0.012</td>
</tr>
<tr>
<td>Neurological diseases</td>
<td>28 (7.07)</td>
<td>13 (6.40)</td>
<td>4 (3.36)</td>
<td>6 (11.54)</td>
<td>5 (22.73)</td>
<td>0.010</td>
</tr>
<tr>
<td>Urogenital infections</td>
<td>50 (12.63)</td>
<td>29 (14.29)</td>
<td>15 (12.61)</td>
<td>4 (7.69)</td>
<td>2 (4)</td>
<td>0.658</td>
</tr>
<tr>
<td>Benign prostate hyperplasia</td>
<td>132 (33.33)</td>
<td>59 (29.06)</td>
<td>43 (36.13)</td>
<td>18 (34.62)</td>
<td>12 (54.55)</td>
<td>0.093</td>
</tr>
<tr>
<td>Sleep disorders</td>
<td>63 (15.91)</td>
<td>30 (14.78)</td>
<td>24 (20.17)</td>
<td>4 (7.69)</td>
<td>5 (22.73)</td>
<td>0.146</td>
</tr>
<tr>
<td>Others</td>
<td>179 (45.20)</td>
<td>100 (49.26)</td>
<td>55 (46.22)</td>
<td>20 (38.46)</td>
<td>4 (18.18)</td>
<td>0.033</td>
</tr>
<tr>
<td>Alcohol consumption, n (%)</td>
<td>105 (26.52)</td>
<td>50 (24.63)</td>
<td>28 (23.53)</td>
<td>19 (36.54)</td>
<td>8 (36.36)</td>
<td>0.202</td>
</tr>
<tr>
<td>Tobacco consumption, n (%)</td>
<td>14.8 (10.08)</td>
<td>15.30 (10.02)</td>
<td>15.50 (10.79)</td>
<td>15.32 (10.49)</td>
<td>8 (4.00)</td>
<td>0.253</td>
</tr>
<tr>
<td>Cigarettes/day, n (SD)</td>
<td>333 (84.09)</td>
<td>170 (83.74)</td>
<td>103 (86.55)</td>
<td>42 (84.77)</td>
<td>18 (81.82)</td>
<td>0.256</td>
</tr>
<tr>
<td>Coffee or tea consumption, n (%)</td>
<td>294 (74.74)</td>
<td>154 (75.86)</td>
<td>89 (74.79)</td>
<td>35 (67.31)</td>
<td>16 (72.73)</td>
<td>0.630</td>
</tr>
<tr>
<td>Engages in exercise, n (%)</td>
<td>154 (38.89)</td>
<td>70 (34.48)</td>
<td>48 (40.34)</td>
<td>25 (48.08)</td>
<td>11 (50.00)</td>
<td>0.193</td>
</tr>
</tbody>
</table>

Abbreviations: BMI, body mass index; SD, deviation standard. *p < .05.

constituted the study population. The study population was classified based on OAB severity according to the daily number of UUI episodes: 51.2% had no episodes, 30.05% had a daily episode, 13.13% had 2 to 3 episodes and 5.56% had 4 or more episodes per day (Fig. 1). Table 1 shows the demographic characteristics of the analyzed sample. The mean age was 55.27 years (9 = 11.14, 95% CI: 54.27-56.37), and 52.53% were women. Women were found to be more affected by UUI, representing a greater percentage in all groups corresponding to different degrees of UUI severity (p < .001). A significant relationship was found between age and number of UUI episodes/day (p < .001), with patients older than 60 years having a greater number of events. A significant relationship was also found between the number of incontinence episodes and diabetes (p = .012) or urogenital infection (p = .01). There was no relationship with the other evaluated life habits.

Relationship between overactive bladder severity and the use of healthcare resources

The patients who experienced more UUI episodes/day used more anxiolytic agents (45.5%, p = .020) and antibiotics for
urinary diseases (31.8%, p = .053) than those who did not experience any episode (17.2% and 12.8% for anxiolytic agents and antibiotics, respectively). Likewise, those who experienced more UUI episodes used more pads for urine loss (68.2% vs. 9.4%, p < .001), both diurnal [2.8 [95% CI: 1.6–4.0] vs. 0.1 [0.1–0.2], p < .001] and nocturnal (0.9 [0.3–1.5] vs. 0.1 [0.0–0.1], p < .001). This observation was confirmed when considering only the users of pads, both for diurnal (4.1 [2.9–5.4] vs. 1.4 [1.1–1.7], p < .001) and nocturnal use (1.3 [0.5–2.2] vs. 0.7 [0.4–1.1], p = .037) (Table 2).

Patients who experienced at least 4 UUI episodes/day attended medical visits more frequently than normal when compared with other patients with probable OAB and fewer UUI episodes (p = .015) (Fig. 2). A significant relationship was found between UUI episodes and the number of visits to the family doctor and specialist (Fig. 2). Patients with 4+ UUI episodes/day visited the family doctor (1 [0.1–1.9] and the specialist (0.5 [0.1–0.8]) (p < .005) more frequently. There was no significant relationship in terms of the number of visits to the emergency department (Fig. 2).

**Relationship between overactive bladder severity and work productivity**

We studied the effect of OAB severity on work productivity in the subgroup of active workers, which represented 50% of the sample with “probable OAB”. A significant relationship was also found between the number of urge incontinence episodes and the number of work days lost (p = .005) or the lost work day equivalents (LWDE) (p = .007) (Fig. 3). Patients with at least 4 UUI episodes/day stated having lost more work days during the last 4 weeks (3.0 [1.3–7.3]). This fact was also confirmed with the lost work day equivalents (5.8 [1.2–12.7]) (p < .01) (Fig. 3).

**Discussion**

OAB has a high prevalence in Spain. It is important for the medical community and health authorities to understand this disease’s burden of care in order to establish and/or improve the management strategies and the handling of the disease and its associated symptoms. The results of our study suggest that OAB severity, in terms of UUI episodes per day, has an important relationship with the proportional use of healthcare resources and work performance, with its resulting economic impact, both in terms of healthcare costs and the repercussion of costs in terms of work productivity.
and absenteeism and temporary disability. The patients with more UIU episodes/day showed an increased use of medication to control anxiety and distress (2.6 times), antibiotics to treat urinary symptoms (2.5 times) and pads for urine loss (7.3 times) than those who experienced no such event. Patients with more UIU episodes/day also went to medical visits more often than usual (3.2 times) and had a slightly higher mean number of visits to family doctors and specialists. Users of pads whose OAB was more serious required 3 times more pads per day (3.01) and 2 times more at night (2.02). Our results also indicate a significant loss of work productivity directly related to the increase in OAB severity, such that as the number of UIU episodes increased, so did the lost work day equivalents (Fig. 3).

In this study, we observed a relationship between OAB severity and other intercurrent diseases. This also entails an increase in the consumption of resources for patients with more serious OAB, not only in resources directly attributable to OAB but also those related to the comorbidity. Appropriate treatment of these intercurrent diseases could reduce the use of resources, as has been suggested in other studies.\(^{20,21}\) In addition to the previously mentioned medical and productivity costs, these costs do not reflect other intangibles and indirectly related items, such as the time invested by family members to accompany their elderly kin who have difficulties, helping them obtain pads and handling them, as well as helping them with hygiene.

OAB prevalence and severity increase with age. For a country such as Spain, with a demographic trend toward aging, the economic burden associated with OAB could therefore substantially increase in the future. It is therefore essential to ensure appropriate diagnosis and treatment. OAB is underdiagnosed and undertreated due to the fact that an OAB diagnosis is not routinely performed, even at the primary care level.\(^{22}\) We must also add that not all patients seek professional help for this problem due to the social stigma associated with bladder control problems, the tendency to assimilate and tolerate OAB symptoms, the lack of understanding of available treatments and the belief that these symptoms are part of the normal aging process.\(^{23,24}\) All of these result in a situation where in Spain only 28.4% of patients who have this syndrome have been diagnosed and only 16.7% receive treatment for OAB.\(^{11}\) Greater information on its economic impact could attract more attention to this syndrome and thereby contribute to improving its diagnosis and treatment, which in turn could reduce the percentage of patients affected by serious OAB. It could also reduce the use of associated resources and their costs, given that it will help start specific OAB treatments early, thereby saving patients from the discomfort and bother of OAB and saving society the costs of OAB. At least, that is what a number of studies on healthcare cost models of OAB treatment performed in Europe and in Spain have shown.\(^{25-27}\) These studies have shown that the treatment of symptomatic OAB with antimuscarinic drugs in Nordic countries and in Spain is associated with a lower cost for healthcare systems than when patients with OAB do not receive any treatment, compensating the pharmaceutical cost of these therapies.
with the reduced use of healthcare resources that OAB entails.

It should be noted that the main limitation of this study is focused on the fact that the methodology used is based on a system of online surveys and not direct surveys of the population or surveys conducted in medical consultations. Therefore, only those patients who had access to the Internet could participate. However, it is increasingly common to conduct surveys and population studies using methodology currently provided by modern communication and data collection systems, especially if we consider that the majority of Spanish homes have access to computers with Internet access. Additionally, our results do not differ in terms of reliability from those of other studies that used a similar methodology.16,16

In conclusion, the intensification of OAB severity in terms of UUI entails an increased use of healthcare resources related to drug products, healthcare products and medical visits, as well as lower associated work productivity, which will have repercussions in the form of higher costs, both direct and indirect. This could suggest that early diagnosis and treatment of OAB could substantially reduce the costs associated with OAB resulting from the greater use of healthcare resources, thereby limiting the substantial healthcare and occupational burden that this health problem represents.

Funding

This study was funded by Pfizer SLU.

Conflicts of interest

Dr. Isabel Lizarraga, Susana Trillo and Javier Rejas are employees of Pfizer SLU. Dr. Daniel Arumi is an employee of Pfizer Europe. Dr. David Ochayta is self-employed and was contracted by Pfizer SLU to perform the statistical analysis for this study. The other authors declare that they have no conflicts of interest.

References

