

The Prevalence of Overactive Bladder

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Presentation Summary

Overactive bladder (OAB) is a disorder that encompasses frequency, urgency, and urge incontinence, singly or in combination. It often has a significant individual impact on quality of life and on limitations to activities, yet most individuals with OAB do not seek medical care. Therefore, it is not possible to estimate the prevalence and, more generally, the societal impact of OAB based on medical encounter data. With few exceptions, most epidemiologic studies have focused on urge incontinence, the most severe form of OAB. The prevalence of OAB increases with age and is more common in women than men. However, prevalence estimates vary considerably among studies, ranging from 3% to 43%. The variation in estimates from epidemiologic studies is the result in part of differences in the criteria used to define a case of urge incontinence among studies. This problem is attributable in part to the lack of a standardized, validated, and operational definition.

Nonetheless, consensus exists regarding the significant individual and societal impact of urge incontinence and the recognition that it is underdiagnosed and undertreated. Frequency and urgency, the other 2 symptoms of OAB, have not received the same level of attention as urge incontinence, yet the societal impact of these symptoms of OAB may be considerably greater. Overall, frequency and urgency are considerably more common symptoms than urge incontinence, especially between 35 and 55 years of age, the period of peak productivity for most workers. Recent evidence indicates that a substantial proportion of individuals with frequency and urgency report a diminished quality of life and interference with activities in a number of roles, including work. Efforts are under way to more accurately describe the prevalence of frequency and urgency, using a validated and standardized epidemiologic case definition to determine the individual impact of each symptom of OAB and to estimate societal costs.

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Overactive bladder (OAB) is characterized by involuntary and unpredictable contractions of the detrusor muscle during filling of the bladder, which causes increased urgency (a strong desire to

void); frequency of urination; and in the worst case, involuntary loss of urine (urge incontinence). The frequent occurrence of these symptoms diminishes the quality of life in large segments of the population, among

which OAB goes mostly unrecognized, underdiagnosed, and undertreated. Epidemiologic evidence regarding the individual and societal impact of OAB varies considerably among studies, of which most have focused on urge incontinence and not considered the more common symptoms of frequency and urgency. Moreover, the specific data collected and the operational criteria used to define the presence of each symptom of OAB vary, and to date none has been clinically validated in population studies. Nonetheless, a consistent theme is beginning to emerge from epidemiologic studies as they reveal the range of the individual and overall societal impact of OAB.

Evidence from epidemiologic studies concerning the prevalence of and risk factors for OAB are reviewed, and recommendations for future epidemiologic research are made.

Urinary Incontinence

Most epidemiologic studies have focused on urinary incontinence, which encompasses urge incontinence, stress incontinence, and overflow incontinence. In 1995, an estimated 6.3 million community-dwelling older adults and 1.2 million nursing home residents in the United States were living with urinary incontinence.¹ Although the prevalence of incontinence is associated with age, the relationship differs for stress incontinence (leakage of urine as a result of increased intra-abdominal pressure) and urge incontinence (leakage of urine after a strong sensation of the need to void). Stress incontinence tends to be more common at younger ages and predominates in women, a likely consequence of damage to the pelvic floor during vaginal childbirth. In contrast, the prevalence of urge incontinence increases with age. In a longitudinal cohort study of more than 2000 women age 65 years and older living in rural Iowa, the prevalence of urge and stress incontinence was 36%

and 40%, respectively.² Among Icelandic octogenarian women living either at home or in nursing homes, the corresponding prevalence of urge and stress incontinence was 43% and 26%, respectively.³

The work of Simeonova and colleagues⁴ offers a more revealing picture of the contrasting age patterns of stress and urge incontinence. In a study of women in Göteborg, Sweden, the prevalence of urinary incontinence increased in a linear fashion from 3% in women age 20 to 29 years to 15% in women age 50 to 59 years. Stress incontinence was more common than urge incontinence in women younger than 50 years of age, whereas in women 50 years of age or older, symptoms of mixed (concurrent stress and urge incontinence) or urge incontinence predominated. Elving and colleagues⁵ have shown that the annual incidence (ie, the rate of occurrence of new cases) of stress incontinence decreases, whereas that of urge incontinence increases in women 45 to 50 years of age compared with those 55 to 60 years of age. These estimates of incidence are consistent with the contrasting age prevalence patterns that have been observed for stress and urge incontinence.

Samuelsson and associates⁶ also found that the prevalence of nocturia (voiding at least twice a night) increased sharply among women older than 50 years of age, ranging from 3.7% to 4.7% in women 20 to 49 years of age to more than 13.5% in women 50 years of age and older. Most important, nocturia correlated with significantly lower mean quality-of-life scores for sleep and health compared with scores from women who did not have nocturia.

Whereas most epidemiologic studies have focused on the prevalence and incidence of urinary incontinence in women, similar age prevalence patterns have been observed among men. In a survey questionnaire mailed to a random sample of residents from 2 general practice clinics in Somerset,

United Kingdom, 1 in a rural setting and the other in an urban setting, the prevalence of urge incontinence (defined as leaking urine 2 or more times per month) increased with advancing age, from a low of 2.4% among 35- to 44-year-old males to a high of 15.4% in men older than 75 years of age.⁷ In response to a questionnaire sent to 2800 community-dwelling men 52 years of age and older who were enrolled in a hospital-based senior citizen group in the southwest United States, 34% reported urge incontinence and 37% reported urgency.⁸ Thus, the increasing prevalence of symptoms with advancing age occurs in both men and women.

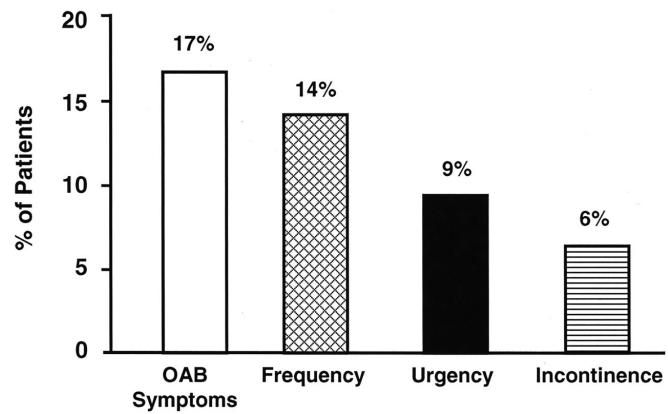
Prevalence of Symptoms of Overactive Bladder

Relatively few studies have evaluated all symptoms of OAB, including urge incontinence, frequency, and urgency. One exception is a recent survey conducted by SIFO Research and Consulting AB, which was designed to estimate the prevalence of all symptoms of OAB.⁹ This study consisted of 16,000 interviews with adults 40 years of age and older who were randomly selected from 6 European countries (France, Germany, United Kingdom, Italy, Sweden, and Spain). Telephone interviews were completed in all countries except Spain, where face-to-face interviews were completed. The symptom-based definitions of Wein and Rovner¹⁰ were used for frequency (ie, emptying the bladder more than 8 times per day), urgency (ie, sudden, strong desire to urinate), or urge incontinence (ie, involuntary loss of urine that occurs after the sensation of impending leakage), which occur either singly or in combination.

Seventeen percent of respondents reported having OAB symptoms with 14% reporting frequency, 9% urgency, and 6% urge incontinence (Figure 1), emphasizing the relative importance of OAB without incontinence based on prevalence alone.

Seventy-nine percent of those with OAB reported having symptoms for at least 1 year, with 49% having had symptoms for more than 3 years. As demonstrated with urge incontinence, the prevalence of all OAB symptoms increased with advancing age, as shown in Table 1. Some differences in

Figure 1. Estimates of the Prevalence of Frequency, Urgency, and Urge Incontinence in Recent Investigations



Source: Reference 9.

Table 1. Prevalence of OAB Symptoms in Men (N = 7048) and Women (N = 9728) Grouped According to Age

Age (years)	Frequency (%)		Urgency (%)		Urge Incontinence (%)	
	Men	Women	Men	Women	Men	Women
40-44	2.5	7.2	2.0	4.6	1.1	2.4
45-49	5.3	7.7	2.5	6.4	1.3	5.4
50-54	8.4	8.7	5.6	7.4	1.0	5.4
55-59	10.3	14.6	6.0	8.5	2.6	6.9
60-64	16.5	14.6	7.9	9.7	3.7	7.8
65-69	21.4	15.1	11.3	9.3	5.2	7.4
70-74	20.2	19.0	11.2	13.8	6.0	10.2
≥ 75	38.2	27.5	20.8	17.0	15.3	12.6
All	13.7	14.6	7.6	9.7	4.0	7.4

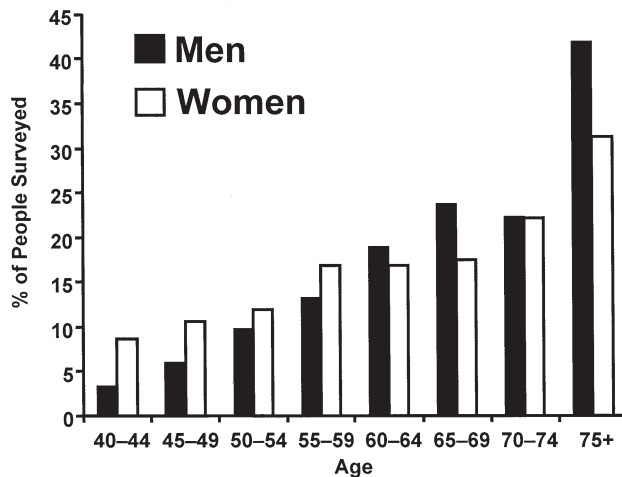
Source: Reference 9.

the prevalence of OAB with increasing age were noted between men and women (Figure 2). Overall, OAB symptoms were more common in women than men; however, with increasing

age, the prevalence of frequency was greater in men 60 years of age and older; urgency in men 65 years of age and older; and urge incontinence in men 75 years of age and older. Extrapolation of the figures from this population study indicates that OAB may be a significant public health problem. More than 22 million men and women residing in the 6 European countries studied may have symptoms suggestive of OAB.

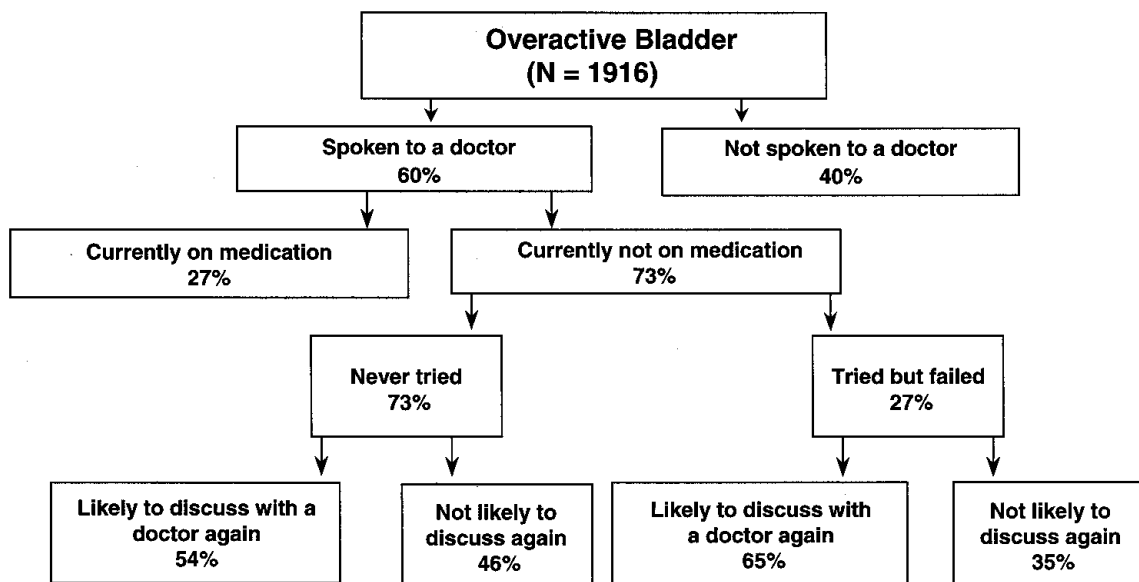
This survey also found that OAB adversely affected the lives of the majority (65%) of the respondents who reported symptoms of OAB. Sixty percent of those with symptoms found them bothersome enough to consult a medical practitioner. Frequency and urgency alone (59%) were almost as common as urge incontinence (66%) as reasons for seeking help. Of those who sought medical care, 27% were receiving medication for symptoms at the time of the interview. Of the respondents who were not taking medication, 27% had previously tried medication without favorable results (Figure 3).

Figure 2. Prevalence of OAB in Men and Women



Source: Reference 9.

Figure 3. Consultation-Seeking Behavior in People with OAB



Source: Reference 9.

Factors Influencing the Prevalence of OAB

Symptoms of OAB may unfold in a progressive fashion, in which the onset of urge and frequency precede the onset of urge incontinence, a progression through stages that has not been confirmed in prospective studies. Nonetheless, the risk factors for each stage may differ, and progression to the first stage does not necessarily imply that the end stage is deterministic. One important limitation in understanding the risk factors for OAB is that studies have been primarily limited to incontinence, and most have not distinguished between urge and stress incontinence. Not surprising, growing evidence suggests that the risk-factor profiles for stress incontinence and urge incontinence are likely to be different, a finding that would be consistent with differences in underlying pathophysiology and demographic profiles.

In a study of more than 7900 elderly women with urinary incontinence, Brown and colleagues¹¹ identified previous hysterectomy; greater body mass; and a history of stroke, diabetes, chronic obstructive pulmonary disease, and overall poor health as factors independently associated with daily urinary incontinence. In an independent population of 2700 postmenopausal women from the Heart and Estrogen/Progestin Replacement study,¹² Brown and associates¹³ collected data using a self-administered questionnaire to determine the prevalence of and risk factors for incontinence.

Study participants had a history of coronary artery disease. Fourteen percent of women reported having urge incontinence at least once per week, and 13% reported weekly stress incontinence. In multivariate analyses, urge incontinence was associated with advanced age, diabetes, and urinary tract infections, whereas stress incontinence was associated with factors not necessarily related to the urinary tract, including white race,

greater body mass index, and higher waist to hip ratio. In women, Simeonova and colleagues⁴ found that body weight and parity were associated with a prevalence of stress and mixed incontinence but not urge incontinence. In mixed incontinence, it is likely that the stress component, not the urge component, is associated with body weight and parity.

Given the lack of adequate data identifying predictors of OAB it is worthwhile to include factors that affect general urinary incontinence in this review because they ultimately may be shown to correlate more strongly with OAB. Risk factors for urinary incontinence are summarized in Table 2.

Both frequency and urge incontinence commonly occur during normal pregnancy; in a study of 181 pregnant women, the incidence of these symptoms was shown to increase steadily over the course of pregnancy.¹⁴ By the 40th week of pregnancy in nulliparous women, more than 90% reported daytime frequency and 70% reported nighttime frequen-

Table 2. Factors Affecting the Prevalence of Urinary Incontinence

Urge Incontinence	Stress Incontinence	Any Incontinence
Advanced age	White race	Advanced age
Diabetes	High body mass index	White race
Urinary tract infections	High waist-to-hip ratio	Education
Smoking	Parity	Functional or sensory impairment
		High body mass
		Previous hysterectomy
		Stroke
		Diabetes
		Chronic obstructive pulmonary disease

Source: References 4, 11, 13-15, 17, 20.

cy. Corresponding rates for multiparous women were more than 70% and 50%.

Ethnicity may be associated with urinary incontinence. In a study of more than 4000 women 70 years of age and older, the prevalence of involuntary urine loss was significantly higher in white women (23%) than in black women (16%).¹⁵ The severity of urine loss did not vary by race. Other factors associated with urinary incontinence included education, advanced age, functional or sensory impairment, stroke, and body mass. It is not clear whether the risk-factor profile identified in this study can be generalized to younger age groups. In a study¹⁶ of Chinese women 40 years of age or older in Hong Kong, the prevalence of frequency and of urgency was found to be several times greater in all age groups studied than those of white European women identified in the survey by SIFO Research and Consulting AB, described previously. However, it is possible that differences

in study design, the method of data collection, or the definition could explain all or part of the differences observed between these 2 studies.

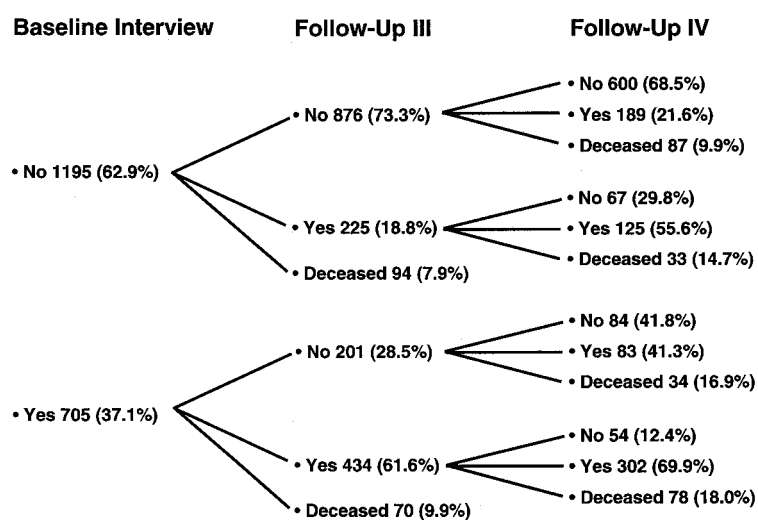
Studies consistently show that the highest prevalence of urinary incontinence is observed among the infirm population and among nursing home residents. The prevalence of urinary incontinence in stroke survivors has been reported to be between 44% and 69%, depending on the location and severity of the lesion.¹⁷ Urinary incontinence affects 50% of all nursing home residents.^{18,19} The higher prevalence could be driven by a number of factors, including the need for full-time care because of urinary incontinence, poor health and disability, and progressive deterioration after taking residence.

A history of smoking may be associated with a modest excess risk for lower urinary tract symptoms. In a population-based study,²⁰ more than 3000 Finnish men completed a self-administered questionnaire that included questions about the presence and severity of voiding symptoms (incomplete emptying and hesitancy) and storage symptoms (daily frequency, nocturia, urgency, and urge incontinence). After adjusting for age and confounding factors, the odds ratios for lower urinary tract symptoms for current and former smokers compared with symptoms in men who never smoked were 1.39 and 1.34, respectively. Although other factors (eg, selection bias, chance association) could account for the modest excess risk, these data suggest the need for additional research on the association between smoking and OAB.

The Progression of OAB

An important challenge in future research is to improve understanding of the natural history of OAB. Knowledge of how symptoms change and progress over time has direct implications for prevention, treatment, and patient and physician education. To date, our understanding of

Figure 4. Progression and Regression of Incontinence in Women 65 Years of Age and Older



Source: Adapted and reprinted with permission from Nygaard IE, Lemke JH. Urinary incontinence in rural older women: Prevalence, incidence and remission. *J Am Geriatr Soc* 1996;44:1049-1054.

the natural history of OAB is very limited because relatively few longitudinal studies have been conducted.

Nygaard and Lemke² showed that although symptoms can wax and wane over time, persistent changes do occur. Nearly 2000 American women older than 65 years of age were questioned about symptoms of incontinence. Initially, 37% of participants reported having symptoms of incontinence (Figure 4). Of these, 62% had persistence of incontinence 3 years later, whereas 29% had a spontaneous regression of symptoms (10% of patients had died by the 3-year follow-up). After 6 years, incontinence persisted in 70% of women who reported incontinence at the 3-year follow-up, whereas another 12% had a spontaneous regression of symptoms. Of those who had a spontaneous regression at 3 years, 41% had a relapse of symptoms. Nineteen percent of continent women had developed incontinence within 3 years; of these, 30% had a spontaneous regression of symptoms after an additional 3-year period.

Directions for Future Study

A nationwide population-based survey was conducted in the United States to better understand and define the prevalence and burden of OAB (W. Stewart, unpublished results). This study used a telephone interview technique, followed by a mailed questionnaire that included a generic quality-of-life assessment and questions pertaining to the use of medical care for OAB symptoms. Matched controls (those without symptoms of OAB) were also interviewed. Quality of life was most affected in patients with urge incontinence and to a lesser extent in those with frequency and urgency. Interestingly, the use of coping strategies commonly used by those with OAB, including scheduled urination, reduced fluid intake, and seeking out the bathroom as soon as one reached a new location, were

identified among some controls. These findings may suggest that use of coping strategies may emerge early in the natural history of OAB as an adaptive strategy to mitigate the impact of symptoms. This finding raises the question of whether coping strategies should be incorporated into the definition of OAB.

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The results of this survey have been used to develop an integrated set of studies known as the National Overactive Bladder Evaluation (NOBLE) Program, which were launched in late 1999.²¹ The primary objectives of this large research initiative are to describe the epidemiology of all symptoms of OAB, including the use of coping strategies, and to estimate individual and societal burden of disease associated with OAB by combining information on prevalence with information on limitations to activities and quality of life. A unique feature of this study is that the telephone survey instrument will be clinically validated in a population-based sample for the identification of OAB symptoms. This will be the first such study to conduct a population-based clinical validation investigation. In addition, results from the NOBLE Program will be used to develop a bladder health screening questionnaire, which is expected to be used by primary care physicians in screening individuals with bladder health problems. A secondary interest in launching the NOBLE Program is to

provide a foundation for longitudinal studies and to improve the understanding of the natural history of OAB.

Conclusion

Overactive bladder, a condition characterized by symptoms of frequency, urgency, and urge incontinence, singly or in combination, is a major clinical problem that affects a patient's quality of life and activities of daily living. Although OAB can affect anyone at any age, the prevalence tends to increase with advancing age. Unfortunately, the exact prevalence of OAB is unknown. Most epidemiologic studies estimate the prevalence of urge incontinence but not of frequency or urgency, so the prevalence of disease is likely to be underestimated.

Although certain factors tend to be associated with frequency, urgency, and urge incontinence (eg, pregnancy, increased body weight, and neurologic disorders), in most cases, the etiology of OAB remains unclear. Information regarding spontaneous and therapeutic remission of OAB symptoms is limited, and few risk factors for developing OAB have been adequately described. The paucity of knowledge of the disease combined with the recommendations for a new definition for OAB warrant additional epidemiologic studies to fully understand the disease.

A symptom-based definition is necessary to adequately conduct epidemiologic and clinical studies in large populations. Additional prospective, longitudinal studies to examine the incidence, remission rates, and factors influencing incontinence and OAB are critical to further understanding of the disease. Studies of smaller numbers of patients also would be beneficial in examining the course of disease in more detail. The economic burden of OAB cannot be accurately estimated until the prevalence is better known. Understanding the risk factors associated with OAB is necessary to comprehensively treat it.

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