Prevalence of overactive bladder and incontinence in Canada

Jacques Corcos, MD,[1] Erik Schick, MD[2]

[1]Jewish General Hospital, McGill University, Montreal, Quebec, Canada

[2]Maisonneuve-Rosemont Hospital, University of Montréal, Montreal, Quebec, Canada

CORCOS J. SCHICK J. Prevalence of overactive bladder and incontinence in Canada. The Canadian Journal of Urology. 2004;11(3):2278-2284.

Aims of study: *The main objectives of the study were to measure the prevalence of overactive bladder (OAB) with its sub-types (wet OAB, dry OAB, mixed OAB) in the Canadian population and to assess prevalence variations in according to gender and age.*

Methods: *The prevalence of OAB in Canada was investigated via a validated, computer-assisted telephone interview (CATI) system. The interviews were conducted in two steps: an initial questionnaire evaluating if respondents suffered from OAB, followed by a detailed questionnaire completing the assessment. The final data were weighted according to the census of metropolitan areas and by gender, on the basis of Canadian population statistics.*

Results: *A sample of 3249 adults, aged 35 years and older, was interviewed with the CATI system. Six hundred and three respondents were found to suffer from wet OAB, dry OAB or mixed OAB. The overall prevalence of OAB in this Canadian population was evaluated to be 18.1%. It was lower in men (14.8%) than in women (21.2%). Dry OAB was assessed to be the highest sub-type, with a rate of 13.6%, 11.7% in men and 15.6% in women. The prevalence of wet OAB was estimated to be 2.3%, 2% in men and 2.6% in women. Finally, the prevalence of mixed OAB was found to be 1.2% in this population, with a much lower prevalence in men (0.3%) than in women (2.1%). Dry OAB increased with age in both men and women; wet OAB was markedly higher in both men and women over the age of 75 years. No correlation was observed between age and prevalence of mixed OAB in women, whereas a linear relationship was noted between the two variables in men.*

Conclusions: *This is the first large study of OAB symptoms prevalence in the Canadian population aged 35 years and older. We established that OAB prevalence was higher in women than in men, with women experiencing more dry OAB and mixed OAB than men.*

Key Words: overactive bladder, incontinence, prevalence, epidemiology

Introduction

Since the International Continence Society (ICS) defined "overactive bladder" (OAB), the prevalence of its symptoms appears much higher than originally thought. Different surveys have been published recently on the prevalence and burden of OAB and urinary incontinence (UI) on national and multinational populations, or specific categories of patients. Such national surveys do not exist for the Canadian population which has its own particularities when compared to other North American or European populations (i.e. ethnic origins, cultural and dietary habits, and climate habitus). These differences may impact on a multi-symptomatic disease such as OAB.

In the ICS definition of OAB, urgency may or may not be associated with frequency, nocturia and/or urge incontinence, and may even occur in the absence of pathological or metabolic factors that could explain them.[1] To better evaluate the spectrum of these symptoms in Canada, we developed standardized questionnaires to ascertain the prevalence of OAB and stress urinary incontinence (SUI) as well as their impact on patient quality of life (QoL) and coping strategies. These questionnaires have served in phone interviews of more than 3000 individuals. Our article reports only on the prevalence of these conditions, globally, by gender, and age group.

Accepted for publication May 2004

Acknowledgement

This study has been made possible by an unrestricted grant from Pfizer Canada Inc. and Novartis Pharmaceuticals Canada Inc.

Address correspondence to Jacques Corcos, MD, Dept. Urology, Jewish General Hospital, 3755 Cote St. Catherine Rd, Rm E-211, Montreal, QC H3T 1E2

Methodology

We targeted the Canadian population aged 35 years and older. The probability sample was drawn from Canadian survey sampler programs. This national databank includes all valid telephone numbers in Canada and is updated monthly. The sample was stratified by the census of metropolitan areas (CMA) and by gender. The total number of conducted interviews was 3249 (Montreal: 1010; Toronto: 1378; Vancouver: 585; Edmonton: 276). Gender distribution was 48.2% men and 51.5% women.

Our questionnaires were developed by clinical and epidemiology experts, aided by patients suffering from OAB and/or SUI. (Complete questionnaires are available upon request.). The definitions used to build these questionnaires and to assess symptoms and their impact on QoL are listed in Table 1. The two questionnaires were completed through interviews – a short screening questionnaire of 23 questions for men and 27 questions for women, and a long questionnaire (59 questions) generated for selected populations by the screening questionnaire. A pre-test of 42 cases, conducted to validate these questionnaires, was held over four separate sessions, each involving 10 to12 respondents, which led to modifications in the wording of some questions to improve their understanding by respondents. Clinically-validated, computer-assisted telephone interviews (CATI) were conducted by an independent firm (Leger Marketing) from their national call centres, employing the "Interviewer" program with the possibility calling back up to 10 times if there was no answer. Supervisors monitored 10% of interviews. Interviews were conducted in English or French, depending on the individual preference of the respondent. The interviews took place in the spring of

TABLE 1. **Definitions**

Respondents without any symptoms
refers to respondents who do not suffer from any symptoms related to bladder problems

Respondents with stress incontinence only
refers to respondents who have stress incontinence, that is, they experience leak accidents only when they sneeze, cough, bend or lift something

Respondents with frequency symptoms
refers to respondents who go to the bathroom "9 times or more during 1 day" or "3 times or more during the night", but do not suffer from any other symptoms related to bladder conditions

Respondents who sometimes experience urinary leaks
refers to respondents who do not have the urge but who leak sometimes

Respondents who sometimes have the urge
refers to respondents who 3 times or less per month have such an urgent need to urinate that they run the risk of involuntary urine loss

Respondents who have OAB dry (urgency)
refers to respondents who either say they have felt an urgent need to urinate to such a point that they run the risk of an involuntary urine loss "every day", "3 to 4 times per week", "1 to 2 times per week", "4 times over the past 4 weeks" or they have found that "almost always", "more than half of the time", "about half of the time", "less than half of the time" or "less than 1 time in 5", it is difficult to postpone urination, and they engage in bathroom-seeking behaviour

Respondents who have wet OAB (urgency with incontinence)
refers to respondents who have urgency and who experience urinary leaks

Respondents who have urge urinary incontinence (UUI) and SUI (mixed incontinence)
refers to respondents who experience urinary leaks associated with urge and who have stress incontinence

IPSS: International Prostate Symptom Score

Mild cases
refers to respondents who have an IPSS from 1 to 8 on a scale of 35

Moderate cases
refers to respondents who have an IPSS from 9 to 19 on a scale of 35

Severe cases
refers to respondents who have an IPSS from 20 and above on a scale of 35

2002 and averaged 7.1 minutes for the short screening questionnaire, and an additional 8.8 minutes for the long questionnaire. The final data were corrected according to gender to be fully representative of the Canadian population 35 years of age or older within and between the CMA covered according to the latest Statistics Canada data. More than 12 weeks after the end of data collection, a total of 45 respondents were re-tested, meaning that they were taken through the long questionnaire again. These 45 respondents were selected from among the sufferer sub-group. Of the 45 that were re-tested, only one case arose where the initial responses were outside the generally-accepted norm of 1 in 20.

The statistical program STATXP, version 3.5 served to analyze the data, and estimate the prevalence of OAB in Canada both with and without SUI globally, by gender and by age. In addition, Spearman-rho tests (2-tailed) were run to measure the correlation between International Prostate Symptom Scores (IPSS) and OAB. To compare sub-groups, p values were derived from another statistical package, STATIS, version 1.2a.

Results

The sample base of the survey comprised 7487 individuals; 4238 did not take part in the interview process for different reasons (refusal, no answer). The 3249 subjects completed the interview, giving a response rate of 53.7% according to the Wideman and Billington method, which is way above the norm for a good response rate (30%-40% in surveys of the Canadian general population). The socio-demographic profile of the surveyed population showed that there were almost equal proportions of men and women; 82.4% of

TABLE 2. **Socio-demographic profile**

	Total (n = 3249)	**Male (n = 1566)**	**Female (n = 1683)**
Gender			
Men (average = 52.0 years of age)	48.2%	100%	-
Women (average = 50.9 years of age)	51.8%	-	100%
Age			
35 to 44 years	36.7%	37.7%	35.6%
45 to 54 years	28.8%	29.5%	28.1%
55 to 64 years	16.9%	16.9%	17.0%
65 to 74 years	10.8%	9.6%	11.9%
75 years and over	6.3%	5.7%	6.8%
Education			
Some high school	12.3%	11.3%	13.3%
High school degree	24.3%	21.5%	26.9%
Technical college or Cegep degree	21.4%	21.7%	21.2%
Some university credits or a certificate	9.4%	9.6%	9.1%
Undergraduate university degree	18.7%	20.3%	17.2%
Post-graduate studies, Master's or PhD	12.6%	14.6%	10.8%
Income			
Less than $10,000	2.9%	2.4%	3.4%
$10,000 to $19,999	6.8%	5.2%	8.2%
$20,000 to $29,999	7.8%	7.1%	8.4%
$30,000 to $39,999	11.3%	11.4%	11.2%
$40,000 to $49,999	8.8%	8.6%	8.9%
$50,000 to $74,999	17.3%	17.9%	16.8%
$75,000 to $99,999	11.4%	13.5%	9.5%
Over $100,000	14.4%	18.2%	10.9%
Health insurance			
Yes, private insurance	16.8%	15.2%	18.3%
Yes, insurance with employer	48.3%	51.0%	45.8%
Yes, insurance with government	15.7%	14.6%	16.8%
No insurance	18.0%	18.0%	18.0%

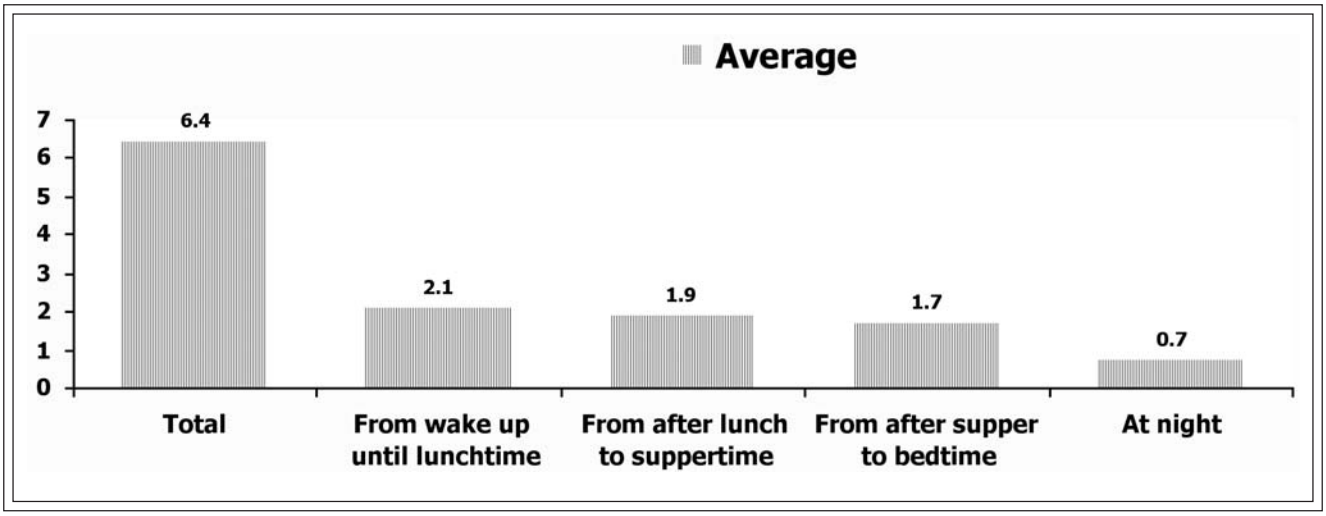

Figure 1. Frequency: average number of micturations per day.

responders were younger than age 65 years and 17.6%, older. Educational degree and income status were very variable, depending on age and gender. Almost one-half of the responders had private health insurance. Table 2.

The overall prevalence of OAB in Canada is 18.5% (14.7% male and 21.3% female), which is represented by 603 out of 3249 individuals. These 603 individuals will be called "sufferers" in the rest of this report. The margin of error for 3249 short questionnaires completed is ± 1.7% for a 95% confidence interval (CI). The margin of error for 603 questionnaires (short and long) completed is ± 4% for a 95% CI. If we analyse the results by OAB symptoms, we find that for the entire population surveyed, frequency during the day (>8 micturations/day) was higher in women than in men (15.5% versus 10.9%) ($p < .001$). However, nocturia was higher in men than in women (4.6% versus 3.2%) ($p < .05$). The distribution of this frequency over the day is detailed in Figure 1.

Urgency, as defined by an urgent need to urinate, was found in 19.4% of the entire population (15.3% men, 23.3% women). The severity of urgency is detailed in Table 3, which shows that only 1.5% of the surveyed population presented urgency every day.

Urge incontinence, allowing us to discriminate between dry OAB and wet OAB, depending on the presence or not of UI associated with other symptoms of OAB, was reported by an average of 4.5% of sufferers (2.3% men, 6.5% women). If we stratify the 603 OAB suffers by age, we find a noticeable increase of OAB and urge incontinence prevalence with age in men, while the values seem to be more stable in post-menopausal women Figure 2.

Pure stress urinary incontinence prevalence, deducted from our screening questionnaire, was 5.9 % (0.8% of men and 10.6% of women).

TABLE 3. **Urgency**

In the PAST FEW MONTHS, did you ever feel an urgent need to urinate, to such a point that if you did not immediately go to the bathroom, you risked having an involuntary urine loss or leak? IF SO, how often did this happen to you?

	Total (n = 3249)	**Men (n = 1566)**	**Women (n = 1683)**
Urgency			
Every day	1.5%	0.9%	2.1%
3 to 4 times per week	1.5%	0.5%	2.4%
1 to 2 times per week	3.6%	2.7%	4.5%
4 times over past 4 weeks	1.9%	1.3%	2.4%
3 times or less per month	12.7%	11.6%	13.8%
Never	78.5%	82.9%	74.5%
Refused to answer	0.3%	0.2%	0.4%

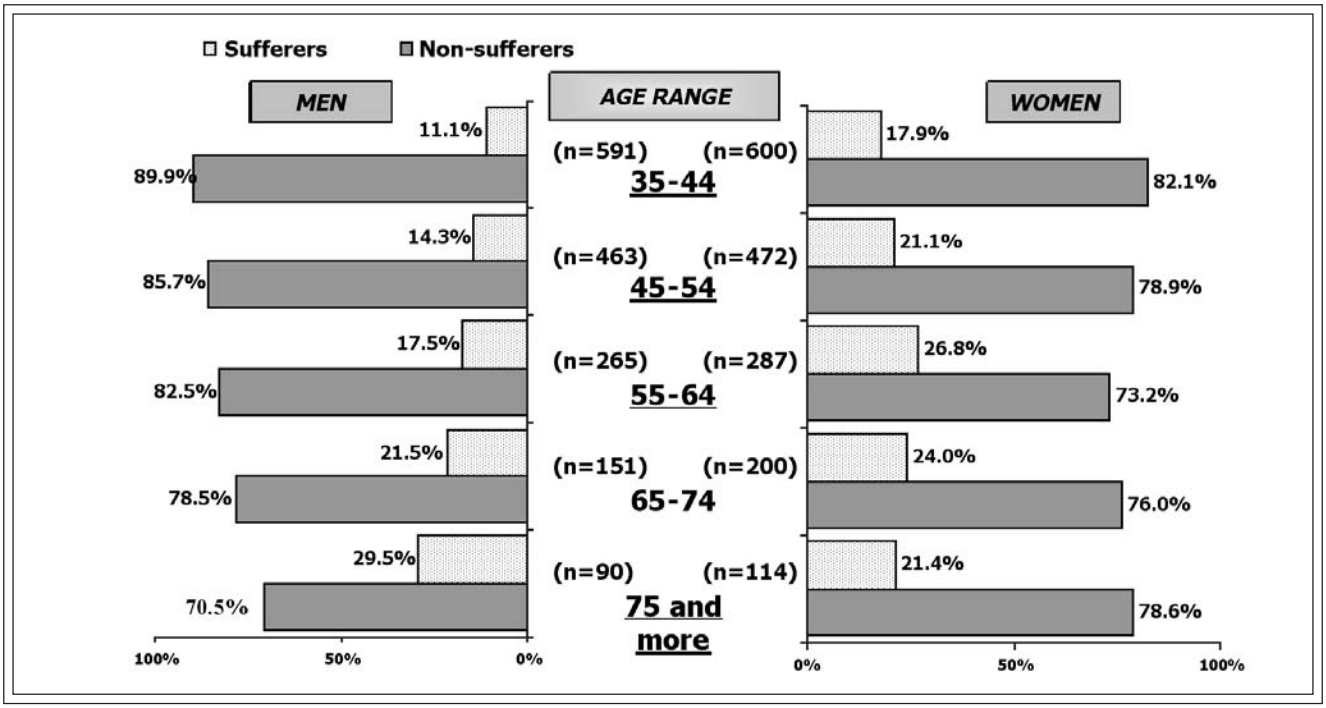

Figure 2. Prevalence of UUI and OAB by age groups.

A summary of the different types of OAB symptoms and incontinence is presented in Figure 3.

Looking at the relationship between OAB and "prostate" symptoms, 7% of men from the entire group believed they had a "prostate condition". Stratification of these conditions as reported by each individual is shown in Figure 4. Among the entire group, 69% had an IPSS below 8, 12.7% were between 8 and 18, and 2% were above 19. Correlation between the IPSS and OAB indicates parallel progression of the IPSS and OAB prevalence Table 4.

Discussion

The aims of country-wide prevalence studies of a specific medical condition are numerous. The most important one is probably to be able to convince educators at every level to play their role in improving disease awareness. Patients, governments, specialists, and primary care physicians then better understand the significance of the problem and behave accordingly. OAB has been shown to be a debilitating condition,[2-8] but is often neglected by patients and physicians despite the availability of efficient treatments. Several explanations can be found for this situation: the perception of OAB as an ageing phenomenon; the lack of information regarding

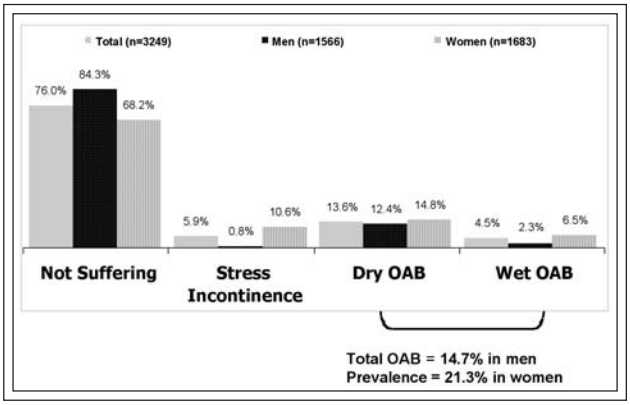

Figure 3. Prevalence of SUI and OAB in Canada.

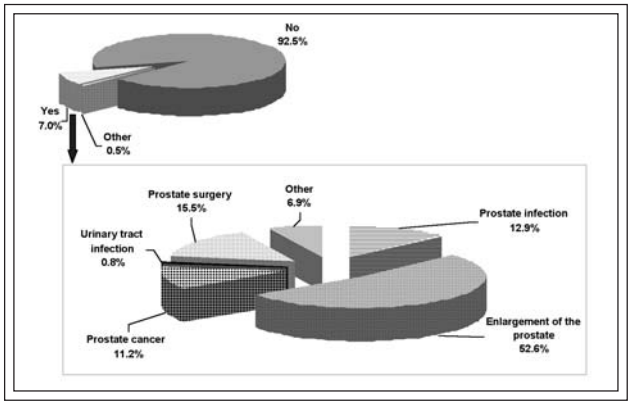

Figure 4. Prostate conditions.

TABLE 4. **IPSS results versus OAB**

(n = 1566)	No condition 0-3 (n = 255)	Mild condition 3-8 (n = 1119)	Moderate condition 9-18 (n = 166)	Severe condition 19 and over (n = 26)
Not suffering	99.5%	90.0%	41.0%	25.7%
Dry OAB	0.0%	9.0%	41.6%	47.1%
Wet OAB	0.5%	0.7%	10.2%	19.4%
Mixed OAB	0.0%	0.1%	1.1%	7.8%

simple available treatments; perception of the condition as a shame; and among all sufferers detected only a few consider that it has enough of a negative impact on their QoL to seek treatment. Many prevalence studies have already been published, but most of them differ from our survey either by the methodology used or by the fact that they targeted a specific population. Parazzini et al[9] investigated the rate of over mid-age populations consulting family physicians, and reported a very low OAB prevalence of 3% in men and 1.1% in women. This group may constitute the real sufferers, and only future studies will tell us if these numbers can be change significantly after a serious awareness program and screening by primary care physicians. Van Oyen et Van Oyen[3] conducted a large survey of the Belgian population 15 years of age and older, using a self-administered questionnaire. Their overall prevalence of UI was 1.4% in men and 4.5% in women. No specific values were reported. Peyrat et al[7] tested a questionnaire on incontinence in hospital workers at the time of their annual health visit. They found a prevalence of 13.5% (95% of CI) for wet OAB and 8.1% for mixed incontinence. In the elderly population, Liu and Andrews[10] reported a high prevalence rate of 36.6% to 41.6% among individuals having occasional problems, and only 7.5 to 9.0% having frequent leakage. Bo and Borgen[11] recorded a 16% prevalence of urge incontinence in a highly selected group of young, elite female athletes (similar to their control group). Other studies on specific populations show similar prevalence numbers, but most often different types of incontinence are mixed in the same study.[8-12]

The only other Canadian prevalence study that we found in the recent medical literature focussed on teenage girls with a 17% prevalence of urge incontinence.[13]

In their review article, Milsom et al[5] noted a 3% to 43% range of OAB prevalence, insisting on the fact that most of the published investigations had a different design with different definitions and questionnaires.

Two large studies deploying strategies similar to ours were reported recently. Milsom et al[14] conducted a large, multi-country European investigation. Their questionnaire, completed by phone in 6 different countries (France, Spain, Germany, United Kingdom, Sweden and Italy) involved 16776 respondents. The overall prevalence of OAB symptoms in individuals older than 40 years was 16.6%. Gender difference was small, 15.6% in men and 17.4% in women. Frequency, urgency and urge incontinence were found in respectively 85%, 54% and 36% of respondents. They noted a correlation between age and increased OAB prevalence. They also observed a large difference between countries. For example, OAB prevalence in men and women respectively was 11% and 13% in France and 20% and 24% in Spain.

Recently, Stewart et al[2] reported data from the National Overactive Bladder Evaluation (NOBLE) Study in the United States. A sample of 5204 adults, age 18 years and older, was interviewed by phone via a questionnaire aiming to define OAB prevalence with or without incontinence, risk factors for the syndrome, and burden of the condition. Prevalence was similar in men (16.0%) and women (16.9%), but gender-specific prevalence differed substantially by the severity of symptoms. The prevalence of urge incontinence increased with age in women (2% to 19%) and men (0.3% to 8.9%). Surprisingly, dry OAB was more frequent in men (13.6%) than in women (7.6%). Our sample size was much larger than in the two last-mentioned investigations, being proportional to our national population (.005% for Milsom, .002% for Stewart, and .01% for our study). This difference may impact on the accuracy of the results, and may explain the slightly higher overall prevalence of 18.5% that we found in our study. We also observed a bigger difference in overall prevalence between men and women (14.7% and 21.3%) than in similar investigations.[2,14] This higher prevalence in women concerned all OAB symptoms except nocturia which

was more frequent in men.

As in Milsom's and Stewart's studies, ours showed a rising prevalence with age. However, a plateau around menopause in women and after 65 years of age in men was noticeable in these increases. This interesting finding reflects, most probably, the importance of hormonal status in bladder function in women and the impact of prostatic growth in men.

Looking at the specific symptom of frequency Figure 1, it is noteworthy that in our study respondents on average go to the bathroom more frequently in the morning. The afternoon and evening are on average very similar in the number of times. Furthermore, it is also interesting to point out that on average women go to the bathroom more frequently in 1 day than men do. SUI has been found in our study to be the symptom with the biggest gender-related difference (0.8% for men versus 10.6% for women). The difference reported in all other large series[2,13] surely reflects the fact that, except after radical prostatectomy, SUI is uncommon in men and remains a woman's disease. This may explain also the multitude of available treatments for women as well as our very limited tools and methods for managing male incontinence.

The value of a telephone questionnaire (in our study, a CATI questionnaire was used) when conducting sensitive research helped in obtaining results that we hope are a more accurate reflection of the population than mailed surveys for instance. A lower prevalence of OAB (for every group) would be expected with research conducted on a more personal level (i.e. "face to face" interviews) because respondents would probably not have been as forthcoming when providing responses in sensitive areas. Furthermore, because the questionnaire was computerized, interviewer error was negated.

Conclusion

We reported the first Canada-wide survey of OAB and SUI symptoms. Proportionally to our population, the power of this telephone survey surpasses all other similar studies performed recently. Knowledge of the overall 18.5% prevalence and other percentages reported in this article is important for a better appreciation of the bulk of the disease in Canada and its possible economic, social and medical consequences. A more extensive analysis of the entire survey will allow us to provide, in the future, a picture of the impact of these symptoms on patient's QoL as well as their coping strategies to minimise the impact of the disease. □

References

1. Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, Van Kerrebroeck P, Victor A, Wein A. The standardisation of terminology of lower urinary tract function: Report from the Standardisation Sub-committee of the International Continence Society. *Neurourol Urodyn* 2002;21:167-178.
2. Stewart WF, Van Rooyen JB, Cundiff GW, Abrams P, Herzog AR, Corey R, Hunt TL, Wein AJ. Prevalence and burden of overactive bladder in the United States. *World J Urol* 2003;20(6):327-336.
3. Van Oyen H, Van Oyen P. Urinary incontinence in Belgium: prevalence, correlates and psychosocial consequences. *Acta Clin Belg* 2002 Jul-Aug;57(4):207-218.
4. Simiovona Z, Milsom I, Kullendorff AM, Molander U, Bengtsson C. The prevalence of urinary incontinence and its influence on the quality of life in women from an urban Swedish population. *Acta Obstet Gynecol Scand* 1999;78(6):546-551.
5. Milsom I, Stewart W, Thuroff J. The prevalence of overactive bladder. *Am J Manag Care* 2000;6(11 Suppl):S565-573.
6. Shaw C. A systematic review of the literature on the prevalence of sexual impairment in women with urinary incontinence and the prevalence of urinary leakage during sexual activity. *Eur Urol* 2002;42(5):432-440.
7. Peyrat L, Haillot O, Bruyere F, Boutin JM, Bertrand P, Lanson Y. Prevalence and risk factors of urinary incontinence in young and middle-aged women. *BJU Int* 2002;89(1):61-66.
8. Gavira Iglesias FJ, Caridad y Ocerin JM, Perez del Molino Martin J, Valderrama Gama E, Lopez Perez M, Romero Lopez M, Pavon Aranguren MV, Geurrero Munoz JB. Prevalence and psycholosocial impact of urinary incontinence in older people of a Spanish rural population. *J Gerontol A Biol Sci Med Sci* 2000;55(4):M207-214.
9. Parazzini F, Lavezzari M, Artibani W. Prevalence of overactive bladder and urinary incontinence. *J Fam Pract* 2002;51(12):1072-1075.
10. Liu C, Andrews GR. Prevalence and incidence of urinary incontinence in the elderly: a longitudinal study in South Australia. *Chin Med J* (English) 2002;115(1):119-122.
11. Bo K, Borgen JS. Prevalence of stress and urge urinary incontinence in elite athletes and controls. *Med Sci Sports Exerc* 2001;33(11):1797-1802.
12. Chen GD, Lin TL, Hu SW, Chen YC, Lin LY. Prevalence and correlation of urinary incontinence and overactive bladder in Taiwanese women. *Neurourol Urodyn* 2003;22(2):109-117.
13. Alnaif B, Drutz HP. The prevalence of urinary and fecal incontinence in Canadian secondary school teenage girls; questionnaire study and review of the literature. *Int Urogynecol J Pelvic Floor Dysfunct* 2001;12(2):134-137;discussion138.
14. Milsom I, Abrams P, Cardozo L, Roberts RG, Thuroff J, Wein AJ. How widespread are the symptoms of an overactive bladder and how are they managed? A population-based prevalence study. *BJU Int* 2001;87(9):760-766.