

Urinary incontinence

Common problem among women over 45

J. Graham Swanson, MD, MSC, CCFP Janusz Kaczorowski, MA, PHD
Jennifer Skelly, RN, PHD Murray Finkelstein, MD, PHD, CCFP

ABSTRACT

OBJECTIVE To examine age-specific prevalence and correlates of urinary incontinence (UI) among community-dwelling women.

DESIGN A questionnaire survey used a modified Dillman method.

SETTING Two family practice clinics in Hamilton, Ont.

PARTICIPANTS Questionnaires were mailed to 1082 women 45 years old and older. Ninety women were disqualified; 606 recipients responded.

MAIN OUTCOME MEASURES Self-reported prevalence of UI and potential risk factors.

RESULTS Overall response rate was 61% (606/992); 51% (311/606; 95% confidence interval 47.3% to 55.3%) reported an episode of UI during the last month. Of the 311 women reporting UI, 35.7% perceived it as a problem, 27% had had it for less than a year, 41.9% had had it for 1 to 4 years, and 31.1% had had it for 5 years or longer. Three kinds of UI were reported: 34% (106/311) reported stress UI, 14.5% (45/311) reported urge UI, and 51.4% (160/311) reported a mixed pattern. In multivariate analysis, the overall prevalence of incontinence increased significantly with "usually having a cough," "being troubled by swollen ankles," "giving birth," "ever smoking cigarettes," and "being troubled by headaches." Stress UI was associated with "usually having a cough" and "ever smoking cigarettes." Urge UI was associated with "having troubles with constipation" and "swollen ankles." Mixed incontinence was associated with "get sick more than other people," "usually having a cough," "taken hormones for menopause," and body mass index in the 50th to 75th percentile or greater. Age was not significantly associated with prevalence of UI or any of its subtypes. Only 40% of incontinent women indicated they had discussed urine loss with their physicians; 70% of these women felt satisfied with physicians' responses.

CONCLUSION Incontinence occurs in more than half of community-dwelling women 45 years old and older. Almost one of five women in the community reported UI that affected normal activities. Treating the effect of incontinence will require further understanding of women's coping skills and self-perceptions. Prevalence does not appear to increase with age.

EDITOR'S KEY POINTS

- Half of the women 45 and older who attended two family medicine clinics presented with urinary incontinence (UI). Contrary to findings in other studies, the prevalence of UI among these women did not increase with age.
- More than one third of women suffering from UI thought that it was a problem.
- Multivariate analyses showed that the factors mainly associated with UI were cough, swollen ankles, headaches, constipation, ever giving birth, smoking, and being overweight.

This article has been peer reviewed.

Full text available in English at www.cfpc.ca/cfp

Can Fam Physician 2005;51:84-85.

Urinary incontinence (UI) is a serious medical, social, and economic burden¹⁻⁴; an estimated \$11 billion is spent annually in the United States on managing women with UI.^{5,6} Despite its high prevalence, health care professionals and the public are uncomfortable with, and know little about, UI. A study based on a random sample of family physicians in Canada found that only one third were comfortable dealing with UI, and less than half had an organized plan for managing women with UI.⁷ Women are embarrassed or do not see UI as a medical problem, so they are reluctant to communicate their concerns to their family physicians.⁸

There have been several surveys of incontinent women in nursing homes or receiving home care services⁹ but, as far as we know, there are no Canadian studies of UI among women living in the community and attending family practices. This cross-sectional study of women from two family practices was designed to examine the age-specific prevalence and correlates of UI and its subtypes among women older than 45 years.

METHOD

Between November 1999 and March 2000, questionnaires were mailed to all women 45 years and older in one family practice ($n = 362$) and to a random sample of women (720/1553) from a second, larger practice in Hamilton, Ont. The list of eligible women was generated from roster or billing databases at each clinic. Women from the larger practice were selected using a computer-generated list of random numbers.

Sample size was calculated to provide an overall prevalence estimate of UI within 3% to

4% of the true rate 95% of the time, assuming a 65% response rate to the survey. The questionnaire was constructed by the authors from previously validated questionnaires assessing general health, severity and duration of incontinence, sociodemographic variables, potential correlates of UI as assessed by patients, the SF-12 quality-of-life instrument,¹⁰ and the I-QOL, a UI quality-of-life scale.¹¹

Urinary incontinence was defined by an affirmative response to one of two questions: "During the past month have you ever experienced urine loss (wet yourself) when coughing, laughing, or doing some other activity" and "During the past month have you ever had to pee and then wet yourself before getting to the toilet?" Mixed incontinence was defined as an affirmative answer to both questions; stress incontinence as "yes" to only the first question and urge incontinence as "yes" to only the second question. These questions have been tested against urodynamic measures and found to have high specificity and sensitivity for stress and urge incontinence.¹² A third question inquired about the effect of UI on the women's lives, "Is wetting yourself a problem that interferes with your day-to-day activities or bothers you in other ways?" Women who answered "no" to all three questions were considered to be continent.

A modified Dillman¹³ approach was used to increase the response rate. The first mailing was followed by a reminder card, and then a second mailing was sent to nonresponders. An ethics review board at St Joseph's Healthcare in Hamilton approved the study protocol.

Data were analyzed using SPSS (version 10.0). We used univariate logistic regression for risk factor analysis using responses to the two screening questions to define UI and its subtypes to determine associations between potential risk factors and different types of UI, with and without adjustment for age. Age and variables significantly associated with UI in univariate analyses ($P < .10$) were retained in multivariate models using forward and backward stepwise multivariable logistic regression and the likelihood ratio method. Probability of

Dr Swanson teaches in the Department of Family Medicine, Dr Kaczorowski teaches in the Department of Family Medicine and the Department of Clinical Epidemiology and Biostatistics, and Ms Skelly teaches in the School of Nursing, all at McMaster University in Hamilton, Ont. Dr Finkelstein teaches in the Department of Family and Community Medicine at the University of Toronto in Ontario.

a type 1 error (α) in the final models was set at .05 (two-tailed).

RESULTS

Questionnaires were sent to 1082 women; 90 were returned undelivered. Of the 992 remaining, 606 were completed, 115 were returned with an indication that women did not wish to participate, and 271 were not returned. The overall response rate was 61.1% (606/992).

Figure 1 shows the overall prevalence of UI by age. Of the 606 respondents, 311 (51.3%) reported wetting during the previous month. Prevalence did not increase with age. Urge, stress, and mixed incontinence rates are shown in **Figure 2**, broken down by whether women perceived UI as a problem. Of the 311 women reporting UI, 35.7% perceived it as a problem; 27.0% of the 311 women had been incontinent for less than a year, 41.9% for 1 to 4 years, and 31.1% for 5 years or longer. **Table 1** shows univariate associations of sociodemographic

characteristics, selected health conditions, and lifestyle factors with self-reported UI.

Multivariate analyses are shown in **Table 2**. For overall incontinence, there were six statistically significant factors: usually having a cough, troubled by swollen ankles, having ever given birth, having ever smoked cigarettes, troubled by headaches, and body mass index (BMI) >75th percentile. Two independent factors remained in the equation for stress incontinence: usually having a cough and ever having smoked cigarettes. Urge incontinence was significantly associated with two factors: troubled by constipation and having swollen ankles. Mixed incontinence was related to five factors: getting sick more than other people, usually having a cough, having taken hormones for menopause, BMI in the 50th to 75th percentile, and BMI >75th percentile.

About one third (39.7%) of incontinent women indicated that they had discussed urine loss with their physicians. Among these women, 70% felt satisfied with their physicians' responses.

Figure 1. Overall prevalence rates of urinary incontinence and 95% confidence intervals grouped according to age category: $N = 606$.

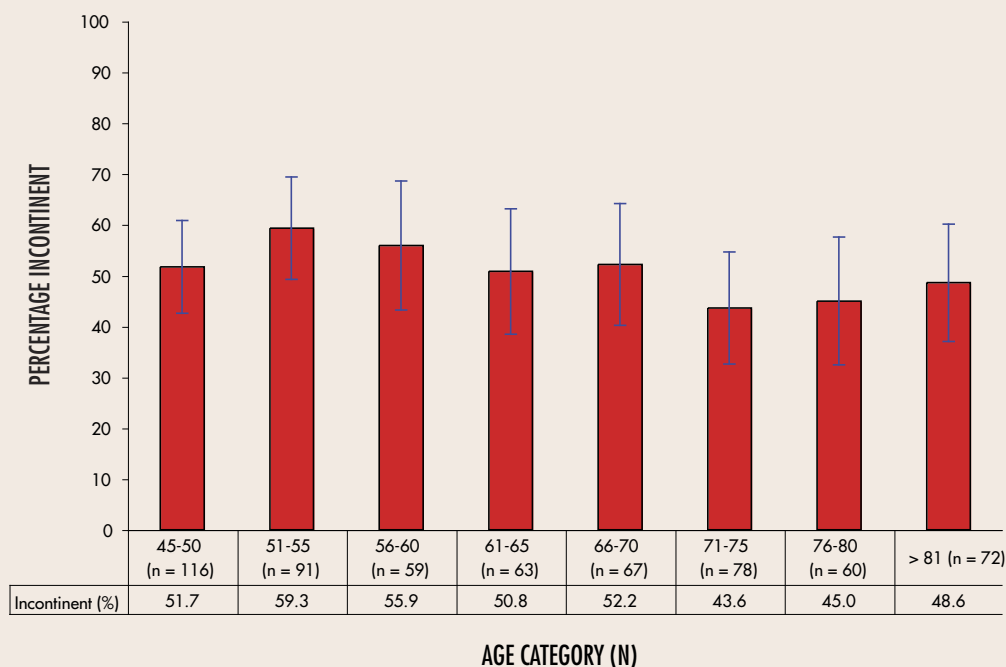
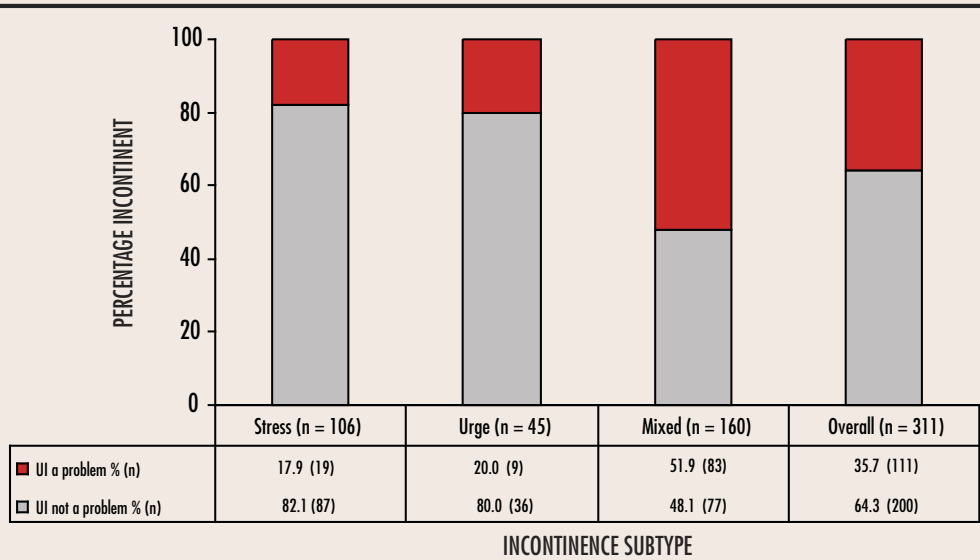


Figure 2. Type of urinary incontinence by subtype and whether it was perceived as a problem: *N*=311.



DISCUSSION

Prevalence

The prevalence of UI in our study (51%) is within the range (17% to 55%) reported in other studies.^{14,15} The time frame for assessing incontinence is not standardized; we used “in the past month.” Other studies have used “ever,” “ever in the past year,” “daily,” or “twice a week” to define incontinence.^{2,16,17}

The overall prevalence of UI was not associated with age. This was unexpected, as most other studies have found the prevalence of UI increased with age.^{9,18} One possible explanation is that younger women, not afflicted with wetting, were less likely to respond to the survey, which might have falsely elevated the prevalence of UI in younger age groups. We tested this hypothesis by recalculating prevalence rates under the assumption that all nonrespondents were continent (results not shown). While the overall prevalence of UI was lower, there was no indication that there was a differential response rate by women in different age groups or a corresponding increase in the prevalence of UI with age. Another explanation is that UI and increasing age are factors that lead to admission to residential homes.⁹ This could systematically remove

older women from the sampling frame, thus reducing the prevalence in older age groups.

The prevalence of the subtypes stress, urge, and mixed UI (17.5%, 7.4%, and 26.4%, respectively) were comparable to those reported in some studies (15%, 13%, 11%),^{3,14} but different from results reported in others.^{2,19} This might be due to the variety of definitions of UI used by authors and the differences in populations studied. As with overall UI, prevalence did not increase with age for any subtype of UI in our study.

Causes

Identifying causes of UI is important because intervention could lessen or eliminate leakage. Women who reported “usually having a cough” were significantly more likely to be incontinent. Analysis of incontinence reported by respondents to the National Population Health Survey (NPHS) showed that asthma and chronic obstructive pulmonary disease, respiratory conditions having cough as a symptom, were associated with incontinence in both men and women.²⁰ Physicians should be aware that medical conditions associated with cough increase their patients’ risk of UI and should make appropriate inquiries. Treating

Table 1. Univariate analyses to detect associations between selected conditions and self-reported urinary incontinence: Only statistically significant results ($P < .05$) are shown. Additional variables tested but not significant included age cohort; high blood pressure; diabetes; heart problems; number of children born by vaginal birth; still having periods; currently receiving hormone replacement therapy; marital status; country of birth; high school graduation; and consumption of coffee, tea, colas, and alcohol, and number of drinks or cups per day. Sum of rows might not equal total sample size due to missing data ($N = 606$).

VARIABLE (N)	NO. (%) INCONTINENT	CRUDE ODDS RATIO (95% CONFIDENCE INTERVAL)
Have asthma		
• No (511)	252 (49.3)	1.0*
• Yes (66)	44 (66.7)	2.1 (1.2-3.5)
Troubled by headaches		
• No (418)	201 (48.1)	1
• Yes (165)	103 (62.4)	1.8 (1.2-2.6)
Troubled by constipation		
• No (463)	225 (48.6)	1.0
• Yes (119)	75 (63.0)	1.8 (1.2-2.7)
Troubled by swollen ankles		
• No (474)	227 (47.9)	1.0
• Yes (105)	67 (63.8)	1.9 (1.2-3.0)
Get sick more often or more easily than others		
• No (539)	268 (49.7)	1.0
• Yes (45)	33 (73.3)	2.8 (1.4-5.5)
Usually have a cough		
• No (488)	229 (46.9)	1.0
• Yes (94)	69 (73.4)	3.1 (1.9-5.1)
Ever taught to do Kegel exercises		
• No (362)	172 (47.5)	1.0
• Yes (209)	122 (58.4)	1.6 (1.1-2.2)
Ever had a baby		
• No (113)	47 (41.6)	1.0
• Yes (482)	256 (53.1)	1.6 (1.1-2.4)
Ever taken hormones for menopause		
• No (287)	127 (44.3)	1.0
• Yes (207)	121 (58.5)	1.8 (1.2-2.5)
Ever smoked cigarettes		
• No (301)	136 (45.2)	1.0
• Yes (299)	171 (57.2)	1.6 (1.2-2.2)
Current smoking status		
• Not at all (293)	156 (53.2)	1.0
• Occasionally (13)	11 (84.6)	4.8 (1.1-22.2)
• Daily (69)	41 (59.4)	1.3 (0.8-2.2)
Body mass index (BMI)		
• ≤ 25 th percentile (≤ 22.7 BMI) (135)	54 (40.0)	1.0
• 25th- <50 th percentile (22.7- <25.5 BMI) (137)	68 (49.6)	1.5 (0.9-2.4)
• 50th-75th percentile (25.5-28.9 BMI) (132)	68 (51.5)	1.6 (1.0-2.6)
• ≥ 75 th percentile (≥ 28.9 BMI) (132)	83 (62.9)	2.5 (1.6-4.2)
Missing data (70)	37 (52.9)	1.7 (0.9-3.0)

*First category is reference category for all variables.

the causes of cough might benefit incontinent women.

“Having ever smoked cigarettes” was significantly associated with all and stress UI independent of cough. It is unclear whether this is the result of lung damage, air trapping, or a more direct effect on the bladder. Women with higher BMI scores were more likely to be incontinent in all and mixed subtypes of UI. Heavier women are often less mobile and have less muscle tone than lighter women. Excess weight could aggregate in the abdomen and increase pressure on pelvic floor muscles. Advice about weight reduction might be helpful.

Self-reported swollen ankles were significantly associated with all and urge UI. Swollen ankles can be the result or cause of decreased mobility. Women who are less mobile might have greater difficulty getting to a washroom. A significant association between mobility and UI has been reported.^{18,20,21} Incontinence can be a side effect of other therapies, such as diuretic agents. Although questions about medications were not asked in our study, Kok et al²¹ and the NPHS²⁰ have reported a significant association between UI and diuretics.

Constipation was associated with urge incontinence. This is unsurprising, as control of bladder and bowel should be considered together. The pelvic floor supports and helps to control both rectum and bladder. Fecal incontinence can accompany UI. Intra-abdominal pressure of stool increases pressure on the bladder and can contribute to a sense of urgency. Poor pelvic muscle tone can affect control of both functions. Women who reported headaches were more likely to be incontinent. Although we did not inquire about drug use, an association between narcotics, laxatives, and UI has been noted.²⁰

Table 2. Multivariate analyses to detect associations between selected characteristics and self-reported urinary incontinence (UI) and its subtypes, all UI, stress UI, urge UI, and mixed UI: Only statistically significant ($P < .05$) results are shown. Age cohort variable was forced into all models.

VARIABLE (N)	NO. (%) INCONTINENT	ADJUSTED ODDS RATIO (95% CONFIDENCE INTERVAL)
ALL INCONTINENCE (566)		
Usually have a cough		
• No (466)	219 (47.0)	1.0*
• Yes (90)	66 (73.3)	2.9 (1.7-5.0)
Troubled by swollen ankles		
• No (457)	220 (48.1)	1.0
• Yes (99)	65 (65.7)	1.9 (1.2-3.2)
Ever had a baby		
• No (102)	42 (41.2)	1.0
• Yes (454)	243 (53.5)	1.8 (1.1-2.9)
Ever smoked cigarettes		
• No (276)	125 (45.3)	1.0
• Yes (280)	160 (57.1)	1.5 (1.0-2.1)
Troubled by headaches		
• No (403)	191 (47.4)	1.0
• Yes (153)	94 (64.1)	1.5 (1.0-2.3)
Body mass index		
• ≤25th percentile (125)	49 (39.2)	1.0
• 25th- <50th percentile (131)	66 (50.4)	1.5 (0.9-2.5)
• 50th-75th percentile (128)	65 (50.8)	1.3 (0.8-2.2)
• ≥75th percentile (123)	77 (62.6)	2.0 (1.2-3.5)
• Missing data (49)	28 (57.1)	1.9 (0.9-3.8)
STRESS URINARY INCONTINENCE (382)		
Usually have a cough		
• No (334)	78 (23.3)	1.0
• Yes (48)	24 (50.0)	3.5 (1.8-6.8)
Ever smoked cigarettes		
• No (200)	43 (21.5)	1.0
• Yes (182)	59 (32.4)	1.7 (1.0-2.7)
URGE URINARY INCONTINENCE (39)		
Troubled by constipation		
• No (276)	40 (14.5)	1.0
• Yes (43)	14 (32.6)	2.3 (1.0-5.1)
Troubled by swollen ankles		
• No (276)	35 (12.7)	1.0
• Yes (43)	12 (27.9)	2.5 (1.1-6.0)
MIXED URINARY INCONTINENCE (345)		
Get sick more often or more easily than others		
• No (317)	99 (31.2)	1.0
• Yes (36)	24 (66.7)	4.0 (1.7-9.1)
Usually have a cough		
• No (209)	62 (29.7)	1.0
• Yes (144)	61 (42.4)	3.7 (1.9-7.4)
Ever taken hormones for menopause		
• No (299)	89 (29.7)	1.0
• Yes (54)	34 (63.0)	2.1 (1.3-3.6)
Body mass index		
• ≤ 25th percentile (83)	18 (21.7)	1.0
• 25th- <50th percentile (86)	25 (29.1)	1.6 (0.8-3.4)
• 50th-75th percentile (78)	29 (37.2)	2.4 (1.1-5.0)
• 75th percentile (73)	36 (49.3)	4.1 (1.9-8.9)
• Missing data (33)	15 (45.5)	2.8 (1.1-7.0)

*First category is reference category for all variables.

The association of all UI with childbirth is well supported.^{2,22,23} This association did not appear in any subtype of incontinence and was not present when the number of cesarean deliveries was removed from the calculation. The trauma of delivery has been thought to contribute to UI. Some surveys have shown a positive correlation between stress UI and childbirth,^{22,23} but a survey of nulliparous nuns found the prevalence of stress incontinence similar to that in other populations.²⁴ Statistical power to detect such an association might have been compromised as subtype sample size became smaller.

Mixed UI was associated with “getting sick more often or more easily than other people your age.” Having mixed UI might be an emotional stressor that makes women feel they are sicker than their peers. Conversely, women who think they are sicker than their peers might be more likely to report UI on a survey. Caffeine, shown to be associated with UI and detrusor instability,²⁵ was not correlated with UI in this survey.

Is UI a problem?

Almost two thirds of women who were somewhat incontinent did not find wetting a problem, and 60% of women who experienced urine loss had not discussed it with their doctors. Of those who did discuss the problem with their doctors, 70% were satisfied with treatment received.

Limitations


This study has several limitations. The population sampled came from two university-affiliated family practice units in Hamilton; women who attend such practices might not be representative

of the general population. While 56% of respondents to the NPHS were graduates of high school or beyond,²⁰ 72% of the women in our sample had this level of education. There was no association between education and UI.

This survey was self-administered. Self-reported behaviour can be biased to reflect what is perceived as a more acceptable response. Factors, such as age, can influence both response rate and continence.

Sample-size reduction as a result of subtype analysis can reduce power to detect statistically significant associations. The statistical power of this study was further reduced because actual response rate was slightly lower than originally anticipated and because some questions were not answered by all respondents. The possible relationship between drugs, such as narcotics and diuretics, with UI requires further study.

Conclusion

More than half of these community-dwelling women older than 45 experienced UI. Almost one in five of these women reported that UI affects their normal activities. Managing the effect of UI on women will require further understanding of their coping skills and their perceptions of themselves. Although less than half the women sought medical opinion, most of those who did were satisfied with the advice given. The effect of factors, such as smoking, cough, and swollen ankles, on treatment needs to be further studied. 

Contributors

Drs Swanson, Kaczorowski, and Finkelstein and Ms Skelly designed the study, gathered and analyzed the data, and prepared the article for publication.

Competing interests

This work was supported by a grant from the Father Sean O'Sullivan Research Foundation of St Joseph's Healthcare in Hamilton, Ont.

Correspondence to: Dr J. Graham Swanson, 2238

Caroline St, Burlington, ON L7R 1M6; telephone (905) 681-1059; fax (905) 681-3419; e-mail swansongr@yahoo.com

References

- Nygaard IE, Lemke JH. Urinary incontinence in rural older women: prevalence, incidence and remission. *J Am Geriatr Soc* 1996;44:1049-54.
- Sommer P, Bauer T, Nielsen KK, Kristensen ES, Hermann GG, Steven K, et al. Voiding patterns and prevalence of incontinence in women. A questionnaire survey. *Br J Urol* 1990;66:12-5.
- Simeonova Z, Bengtsson C. Prevalence of urinary incontinence among women at a Swedish primary health care centre. *Scand J Prim Health Care* 1990;8:203-6.
- Brown JS, Grady D, Ouslander JG, Herzog AR, Varner RE, Posner SF. Prevalence of urinary incontinence and associated risk factors in postmenopausal women. Heart and Estrogen/Progestin Replacement Study (HERS) Research Group. *Obstet Gynecol* 1999;94(1):66-70.
- Wagner TH, Hu TW. Economic costs of urinary incontinence in 1995. *Urology* 1998;51:355-61.
- Wilson L, Brown JS, Shin GP, Luc K, Subak LL. Annual direct cost of urinary incontinence. *Obstet Gynecol* 2001;98(3):398-406.
- Swanson JG, Skelly J, Hutchison BG, Kaczorowski J. Urinary incontinence in Canada: national survey of family physicians' knowledge, attitudes and practices. *Can Fam Physician* 2002;48:86-92.
- Shaw C, Tansey R, Jackson C, Hyde C, Alan R. Barriers to help seeking in people with urinary symptoms. *Fam Pract* 2001;18(1):48-52.
- Mohide EA. The prevalence of urinary incontinence. In: Roe B, editor. *Clinical nursing practice: the promotion and management of continence*. Upper Saddle River, NJ: Prentice Hall; 1994. p. 1-11.
- Ware J, Kosinski M, Keller SD. A 12-item Short Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996;34(3):220-33.
- Patrick DL, Martin ML, Bushnell DM, Yalcin I, Wagner TH, Buesching DP. Quality of life of women with urinary incontinence: further development of the incontinence quality of life instrument (I-QOL) [published erratum: *Urology* 1999;53(5):1072]. *Urology* 1999;53(1):71-6.
- Lagro-Janssen AL, Debruyne FMJ, van Weel C. Value of the patient's case history in diagnosing urinary incontinence in general practice. *Br J Urol* 1991;67(6):569-72.
- Dillman DA. *Mail and Internet surveys: the tailored design method*. New York, NY: John Wiley; 2000.
- Thom D. Variation in estimates of urinary incontinence prevalence in the community: effects of differences in definition, population characteristics, and study type. *J Am Geriatr Soc* 1998;46:473-80.
- Kok AL, Voorhorst FJ, Burger CW, Van Houten P, Kenemans P, Janssens J. Urinary and faecal incontinence in community-residing elderly women. *Age Ageing* 1992;21:211-5.
- Temml C, Haidinger G, Schmidbauer J, Schatzl G, Madersbacher S. Urinary incontinence in both sexes: prevalence rates and impact on quality of life and sexual life. *Neurourol Urodyn* 2000;19(3):259-71.
- Branch L, Walker LA, Wetle TT, Dubeau CE, Resnick NM. Urinary incontinence knowledge among community dwelling people 65 years of age and older. *J Am Geriatr Soc* 1994;42(12):1257-62.
- Ostbye T, Hunskaar S, Sykes E. Predictors and incidence of urinary incontinence in elderly Canadians with and without dementia—a five-year follow up: the Canadian Study of Health and Aging. *Can J Aging* 2000;21:95-102.
- Samuelsson E, Victor A, Tibblin G. A population study of urinary incontinence and nocturia among women aged 20-59. *Acta Obstet Gynecol Scand* 1997;76:74-80.
- Finkelstein MM. Medical conditions, medications, and urinary incontinence. Analysis of a population-based survey. *Can Fam Physician* 2002;48:96-101.
- Kok AL, Voorhorst FJ, Half-Butter CM, Janssens J, Kenemans P. The prevalence of urinary incontinence in elderly women. *Ned Tijdschr Geneesk* 1991;135(3):98-101.
- Rortveit G, Hannestad YS, Daltveit AK, Hunskaar S. Age- and type-dependent effects of parity on urinary incontinence: the Norwegian EPINCONT study. *Obstet Gynecol* 2001;98(6):1004-10.
- Foldsang A, Mommsen S, Lam GW, Elving L. Parity as a correlate of adult female urinary incontinence prevalence. *J Epidemiol Community Health* 1992;46(6):595-600.
- Buchsbaum GM, Chin M, Glantz C, Guzick D. Prevalence of urinary incontinence and associated risk factors in a cohort of nuns. *Obstet Gynecol* 2002;100(2):226-9.
- Tomlinson BU, Dougherty MC, Pendergast JF, Boyington AR, Coffman MA, Pickens SM. Dietary caffeine, fluid intake and urinary incontinence in older rural women. *Int Urogynecol J Pelvic Floor Dysfunct* 1999;10(1):22-8.

