

Epidemiology of Urinary Incontinence in Women – Clinical Implications

a report by

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Introduction

Progress has been made in the understanding of the epidemiology of urinary incontinence (UI), especially in women. Specifically, prevalence rates, correlates and risk factors are emerging and are beginning to be understood and defined. Woefully lacking are longitudinal studies that look into incidence and remission rates and risk factors as it correlates with the onset of UI. These are major challenges in epidemiologic studies as they are time consuming and expensive. Nevertheless, this must be the goal if understanding of this very prevalent, expensive and socially devastating condition is to be furthered.

Definitions

Epidemiology is the study of the distribution and determinants of a disease or condition in a population group. Prevalence is the probability of having the condition within a defined population group at a defined point in time. Incidence is the probability of developing or acquiring the condition during a defined period of observation, i.e., within a year. Readers of epidemiologic reports must be aware of issues such as definitions used to define the condition or disease, the time period of the study or survey, the methodology used in obtaining the information (mail, face to face interview, telephone, etc.), the population group being surveyed (women, men, children, young, old, etc.), and the site and location of the survey (community or healthcare facility, rural or urban, etc.). These are just some of the mundane issues that must be clearly defined before attempts to compare one study against another are made.

Prevalence of UI

UI is highly prevalent worldwide. A cross-sectional mail survey in the US was conducted nationally among 45,000 households, representing a close match to the US census demographic distributions. In this survey, UI was defined as any leakage or involuntary loss of urine during the preceding 30 days. There was a 66% response rate of which 82% were females. The results revealed that the prevalence of UI in the last 30 days was 37%.¹

A similar survey using a similar questionnaire was conducted in four European countries to determine the prevalence of UI among community-dwelling women. This was a mail survey of 29,000 households comprising of 10,000 in Spain, 6,500 each in France, Germany, and the UK representing the adult general population of 18 years and older. The report revealed that the prevalence rate of UI in adult women in Spain was 15%, UK 32%, France 32%, and Germany 34%.²

The Asian Society for Female Urology (ASFU) conducted a cross-sectional survey of Asian women to determine the prevalence of UI in several Asian countries. A total of 5,506 women in 11 countries participated in the survey. Unfortunately, the questions used to establish the prevalence of UI were different from the US and European surveys. As a matter of fact, the questions seemed to be leading toward an answer favoring urge UI (UUI). The prevalence rates were reported from as high as 17% for Thailand and 13% for the Philippines to as low as 4% for Singapore and China (see *Figure 1*).³

The discrepancy between the rates in Asia from that of the European and American rates can be attributed to the method and questions used, although cultural differences and ethnicity could be factors. Likewise, there is a significant difference in the prevalence of stress UI (SUI) between African-American and Caucasian women. One study reported the prevalence of SUI as 22% and 46% for African-American and Caucasian women, respectively.⁴

Prevalence of Types of UI

The US national survey reported a prevalence of 41% for SUI, 45% for mixed UI, and 12% for UUI. The prevalence of types of UI among women in the European survey in four countries is depicted in *Figure 2*.

Prevalence of Pelvic Organ Prolapse (POP)

Few epidemiological studies have been conducted specifically in this condition. The Women's Health

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Initiative (WHI) hormone replacement therapy (HRT) multicenter clinical trial conducted from 1994 to 1998 reported the prevalence of POP among 27,342 women enrolled in the study.⁵ The prevalence rates for those whose uterus presents with uterine prolapse was 14.2%, rate of cystocele 34.3%, and rectocele 18.6%, whereas for those who had hysterectomy, the prevalence of cystocele was 32.9% and rectocele 18.3%. After controlling for age, body mass index (BMI) and other health variables, African-American women demonstrated the lowest risk for uterine prolapse, cystocele and rectocele. Hispanic women have the highest risk for uterine prolapse. Asian women have the highest risk for cystocele and rectocele. Parity and obesity were strongly associated with increased risk for uterine prolapse, cystocele and rectocele.

In 1999, Bland reported the prevalence of POP in a series of 241 women who responded to an advertisement for a soybean supplement study. She reported prolapse stage 0 in 73%, stage 1 in 23%, stage 2 in 4%, and 0 for stages 3 and 4;⁶ however, Swift reported the prevalence of POP among 497 women undergoing routine gynecologic examination. He reported stage 0 in 6.4%, stage 1 in 43.3%, stage 2 in 47.7%, stage 3 in 2.6%, and 0 for stage 4.⁷ The greater severity of prolapse in the Swift study is probably reflected by the fact that the Swift series was from patients in a gynecologic clinic whereas the Bland series was from women volunteers from a community who probably had no gynecologic complaints. In future studies on POP, it is imperative that the technique of measuring the severity of POP be standardized by adopting the pelvic organ prolapse quantification (POPQ) method of staging the POP.⁸

POP is significantly correlated with UI. Bai et al. reported that 62% of those with POP had SUI.⁹

Incidence and Remission Rates

The abundance of cross-sectional studies of UI is in stark contrast to the paucity of longitudinal studies. The most comprehensive longitudinal study of UI is the Medical, Epidemiologic and Social aspects of Aging (MESA) report, but this is limited to a community population of 60 years and older.¹⁰ In this survey, the incidence rate for women in the first year of follow-up (one-year incidence) was 22.4%. For those who remained continent after the first year follow-up, the incidence in the second year was 20.2%. The MESA remission rate following the first year of follow-up (one-year remission rate) was 11.2%. Likewise, the remission rate in the second year was 13.3%.

In another series reported by Moller and Samuelson, the one year incidence for young and middle age

women was 6% and 3%, respectively.^{11,12} In a five-year follow-up study by the same author, the mean incidence was 2.9% with the rate of severe incontinence at 0.5%. The remission rate was 5.9%. These rates, although varying, are suggestive that incidence increases with age. The remission rates also suggest a certain instability and transient nature of UI.

Risk Factors for UI

A number of potential risk factors have been identified among several epidemiologic studies undertaken for UI in various population groups; however, the temporal relationship of these factors with onset of UI has not been fully investigated. A prospective design to establish temporal relationship is still required.

Age

In their survey of 3,114 Danish women aged 30–59, Elving et al., demonstrated a steady increase in the incidence of UI. They reported that the incidence of SUI decreased with age from 0.55% to 0.43% per year, whereas the incidence of UUI increased from 0.08% to 0.2%.¹³

Pregnancy

Evidence of the relationship of childbearing with UI is supported by several studies.^{13,14} UI is reported to occur most likely with parous rather than nulliparous women. Age is reported to be a confounder in studying parity. In a cross sectional study involving 27,900 women, the strongest association of UI was found in the 20–34 age group with relative risk (RR) (95% confidence interval (CI) 1.2, 2.6) for primiparous women, and 3.3 (2.4, 4.4) for grand multiparous women.¹⁵

Other factors such as vaginal delivery compared with Cesarean section have been explored. Evidence supports that vaginal delivery may predispose women to UI compared with Cesarean section. Virtrup stated that Cesarean section seemed to protect against the development of SUI after delivery.¹⁶ Rortveit reported the risk of UI is higher among women who had Cesarean section than nullipari and is even higher among women who had vaginal delivery.¹⁷

Menopause

The evidence is inconsistent in describing the role of menopause and estrogen loss to UI. Thom and Brown reviewed the literature published from 1966 to 1997 regarding the association of hysterectomy, menopause, estrogen therapy and later UI.¹⁸ One study reviewing 45-year-old women showed no difference in the reports of UI in pre- and post-menopausal women. A

second study found women who had undergone menopause to be less likely to have UI. Prevalence rates in another study revealed a significantly lower prevalence of post-menopausal women (35%), compared with pre-menopausal women (47%). Oral estrogen provides little short-term clinical benefit and is associated consistently with increased risk of incontinence in women aged 60 and older.^{19,20}

Hysterectomy

The role of hysterectomy in relation to UI remains inconsistent. Some studies report association in a univariate analysis while others find no significant association/relationship in multivariate analysis.^{20,21} A review of literature by Thom and Brown concluded that most studies did not find an increase in UI in the first two years after surgery but cross sectional epidemiological studies, such as the Netherlands study of 2,322 women aged 35–70, consistently found increased risk many years later.¹⁸ Weber examined the prevalence of SUI and UUI before, and one year after, hysterectomy and found no detrimental changes.²²

Obesity

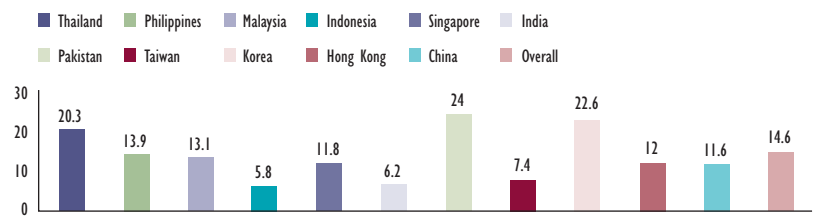
Obesity is an established factor than can contribute to the severity of UI. Bump et al. confirmed that there is both subjective and objective resolution of stress as well as UUI following bariatric surgery.²³ There was a reduction of SUI from 61% to 12% of the group who underwent bariatric surgery. There is therefore strong evidence to support the causal role of excess weight in the development of UI.

Prevention of UI

One of the benefits of epidemiological studies include not only learning the extent of the condition and the factors that may be contributing to its occurrence, but also using the knowledge gained to establish strategy that may help prevent its occurrence. Currently, there are limited randomized controlled trials (RCT) in efforts to prevent UI.²⁴ All but one trial is directed to prevent UI in pregnant and postpartum women. The prevention trials among pregnant and postpartum women report evidence that a behavioral modification program as a preventive measure is effective in reducing the risk of incontinence in these group of women.²⁵

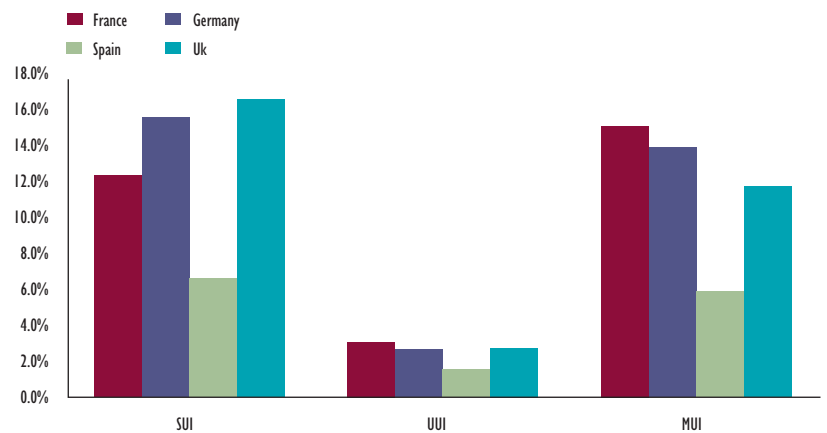
The only RCT in the prevention of UI in healthy continent women 55 years and older was recently reported.²⁶ The study compared one group of women

Figure 1: Prevalence of Urinary Incontinence Among Females in Asia



Source: Lapitan C, Chye P L, Asia-Pacific Continence Advisory Board, "The epidemiology of overactive bladder among females in Asia: a questionnaire survey", *Int. Urogynecol. J.* (2001);12(4): pp. 226–231.

Figure 2: Types of Urinary Incontinence in Four European Countries



Kinchen K et al., "Prevalence and frequency of stress urinary incontinence among community dwelling women", presented at the European Association in Urology (EAU) Annual Meeting, (February 2002); Birmingham UK, *Eur. Urol. I (Suppl 1):85*, (2002).

who, in a group session ranging in number from five to 25, received a two-hour lecture regarding a behavioral modification program with a group who received no instruction or lecture. The treated group (who attended the two-hour session) was seen once two to four weeks later with an individualized evaluation to test knowledge, adherence, and skills in behavioral techniques and provide a brief re-enforcement of the technique as needed. The result of this preventive RCT showed that the behavioral modification program taught to a group with one brief follow-up visit was effective in improving the strength of the pelvic floor muscles, maintaining or improving continence status and improving bladder control, in contrast to the control no treatment group. This strategy of group session followed by one brief re-enforcement visit has the potential to slow down the incidence of incontinence. It also has the potential benefit that prevention of UI may be accomplished in an inexpensive way by incorporating groups rather than individualized sessions, thereby benefiting not only the participants but the caregiver as well. ■

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