

Prevalence of Female Urinary Incontinence in Singapore – A Matter of Urgency?

Koh ML, Han HC, Chong C

Dr Koh Meiling Serena
MBBS (Singapore)
Resident
Department of Obstetrics and Gynaecology
KK Women's and Children's Hospital, Singapore
E-mail: serena.koh@mohh.com.sg
Telephone: +65 6225 5554

Dr Han How Chuan
MBBS (Singapore), FRCOG (London),
MRACOG (Aust), M Med (O&G) (Singapore),
HMDP in Urogynaecology (London), FAMS (O&G)
Head, Department of Urogynaecology
Senior Consultant
Department of Urogynaecology
Urogynaecology Centre
Department of Obstetrics & Gynaecology
KK Women's and Children's Hospital, Singapore
Telephone: +65 6394 3096

Corresponding Author:
Dr Christopher Chong
MBBS, M Med (O&G), MRCOG (London),
MRACOG (Aust)
Visiting Consultant
Urogynaecology Centre
KK Women's and Children's Hospital, Singapore
Medical Director
Singapore Urogynae Centre Pte Ltd
Gleneagles Hospital
6A, Napier Road, # 02-35, Annexe Block
Gleneagles Hospital, Singapore 258500
E-mail: drchrischong@gmail.com
Telephone: +65 6474 3031

INTRODUCTION

Urinary incontinence (UI) is defined by the International Continence Society (ICS) as the involuntary leakage of urine. Though it is not life-threatening, it has significant psychosocial impact on affected individuals, and may lead to social isolation, lack of self-confidence, shame and feelings of depression^(1,2,3). It may also impose a burden on their carers and public healthcare services. In order to develop effective policies to improve public awareness, assess the healthcare requirements of an ageing population and effectively manage urinary incontinence, it is important to estimate the prevalence of UI.

To date, there has only been one epidemiological study in Singapore investigating the prevalence of UI among the elderly population aged 65 years and above.⁽⁴⁾ This study concluded that there may be scope for the provision of primary health care continence services.⁽⁵⁾ However, there is no local population based study estimating the prevalence of UI across age groups.

Our study aims to establish the prevalence of female UI in community dwelling Singapore women across multiple age groups, and to assess perception of the condition among the local population.

Our data was previously unpublished and as there has been no other prevalence survey performed on a similar scale in the interim, we feel that it is important to report our findings as the demographics have not changed even though the study was conducted a number of years ago.

METHODS

A nationwide, cross-sectional census of 3389 women aged between 15 and 85 years was conducted from July to September 2002. A 26-item interviewer-administered questionnaire was devised to assess each respondent's demographics, self-reported severity of UI symptoms if any, risk factors such as parity and mode of delivery, perception of the condition and awareness of treatment options. Interviewers were employed and received prior standardized training by the principal investigator on how to administer the questionnaire.

Women were approached by the interviewers at randomly selected geographical locations islandwide, at different times of the day, on all days of the week. Verbal consent was obtained prior to questionnaire administration. Respondents were encouraged to clarify with the interviewer if they did not understand any terminology used in the survey. They were reassured of the option to decline to answer any or all questions in the questionnaire if they felt uncomfortable with it. The study was approved by the KK Women's and Children's Hospital review board prior to commencement, and was sponsored by a hospital research grant.

In accordance with ICS recommendations, ⁽⁶⁾we took precautions to ensure that terminology such as "quality of life" and "bother" were not used in the definition of UI, in order that patient's perceptions not be allowed to distort prevalence estimates.

To ensure that our questionnaire was easily understandable, a preliminary questionnaire was piloted among a small number of women ($n = 38$) presenting to outpatient clinics at the same centre. This pilot study was conducted a few months prior to commencement of the actual study, and feedback was obtained from the women regarding possible improvements such as clarification of unfamiliar medical terminology. After reviewing the preliminary results of this pilot study, some questions were revised and an improved, final version was formulated. The results of this pilot study were not included in the final analysis of our results.

The definitions of incontinence as described in the questionnaire are detailed below, in line with ICS definitions:

- Stress incontinence: leakage of urine during sneezing, coughing, laughing, lifting, jumping, jogging, walking
- Urge incontinence: leakage of urine when (you) cannot control the urge to pass urine
- "No Warning" incontinence: leakage of urine not during physical activity nor when having the urge to pass urine
- "Continuous" incontinence: Leakage of urine more or less all the time

The data was entered into a computerised database and analysed using SPSS for Windows version 9 (SPSS Inc, Chicago, USA).

RESULTS

A total of 3389 community dwelling women were surveyed over the study period, with a mean age of 38.7 years (20 to 85 years). The racial distribution is illustrated in Table I.

Table I: Racial distribution of respondents (n=3389)

| Race | Number of respondents | Percentage (%) |
|---------|-----------------------|----------------|
| Chinese | 2270 | 67.0 |
| Malay | 678 | 20.0 |
| Indian | 360 | 10.6 |
| Others | 81 | 2.4 |

The ethnic characteristics of our study population are similar to those of Singapore's resident population in 2000. ⁽⁷⁾ About 40% of our respondents were aged under 30 years old, while the remaining age groups were equally represented by 15% in our respondent population. (Table II).

Table II: Age distribution of respondents (n=3386)

| Age Group (years) | Number of respondents | Percentage (%) |
|-------------------|-----------------------|----------------|
| <30 | 1311 | 38.7 |
| 30 to 40 | 514 | 15.2 |
| 40 to 50 | 533 | 15.7 |
| 50 to 60 | 524 | 15.5 |
| >60 | 504 | 14.9 |

Regarding parity, a total of 2033 women (60.0%) had at least one child, with the mode of delivery shown in Table II.

Table III: Mode of delivery among respondents with at least one child (n=2033)

| Mode of Delivery | Number of respondents | Percentage (%) |
|---------------------------|-----------------------|----------------|
| Normal Vaginal Delivery | 1907 | 93.8 |
| Caesarean Section | 105 | 15.2 |
| Assisted Vaginal Delivery | 21 | 1.0 |

Table IV: Prevalence of urinary urge incontinence and stress urinary incontinence

| Age Group (years) | Number of respondents | Prevalence of UUI within age group (%) | Prevalence of SUI within age group (%) |
|-------------------|-----------------------|--|--|
| <50 | 2358 | 3.0 | 5.9 |
| >50 | 1028 | 9.0 | 35.8 |
| Pooled | 3386 | 4.8 | 13.3 |

Our study corroborates previous research showing that the prevalence of UUI and SUI increases with age.^(8, 9) Overall prevalence of UUI and SUI was 4.8% and 13.3% respectively, with the former doubling and the latter tripling in women aged more than 50 years old. (Table IV). The local prevalence and patterns of female UI are similar to those of other predominantly Chinese populations such as Hong Kong.^(10, 11, 12)

Table V: Age group distribution of respondents among those who perceived incontinence to be normal, to be treatable and who knew where to seek treatment

| Age Group (years) | Perceive that incontinence is a normal part of life (%) | Know that incontinence is treatable (%) | Know where to seek treatment for incontinence (%) |
|-------------------|---|---|---|
| <30 | 44.2 | 39.5 | 33.9 |
| 30 to 40 | 19.5 | 22.2 | 25.7 |
| 40 to 50 | 15.3 | 17.0 | 20.0 |
| 50 to 60 | 9.6 | 12.6 | 12.2 |
| >60 | 11.4 | 8.7 | 8.2 |

Regarding illness perception, we assessed whether women felt that incontinence is a normal part of life, whether they knew that it is treatable and if so, where to seek treatment. Among women who were aware that incontinence is treatable, we observed a linear decrease in awareness with increasing age (Table V). Likewise, a similar pattern was noted in terms of awareness of where to seek treatment.

Among women who perceived that incontinence is a normal part of life (Table V), nearly half were aged <30 years. This may be partially explained by the proportionally larger number of respondents from that age group. Beyond age 60, a proportionally greater number of respondents perceived incontinence to be a normal part of life.

The mean age of natural menopause in our local population is 49.0 years.⁽¹³⁾ Although recent studies have shown that hormone deficiency following menopause is unlikely to play a major role in pelvic organ support⁽¹⁴⁾ or urinary incontinence,⁽¹⁵⁾ stratification of prevalence of urinary urge incontinence (UUI) and stress urinary incontinence (SUI) by age group using a cut off of 50 years showed a statistically significant ($p<0.05$) increase in both UUI and SUI after the age of 50. This corresponds to the literature which also describes an increase of UI with age.^(9, 16, 17)

There was some degree of awareness that UI is not normal and can be treated. Among women aged <30 years old, only 15.4% perceived UI as a normal part of life and 37.1% were aware that it is treatable. Half (52.9%) of their counterparts aged 30-40 years old were aware that incontinence is treatable but only a quarter of them knew where to seek treatment for incontinence. This has important implications in terms of healthcare allocation resources.

Table VI: Treatment seeking behaviour of women with UI

| Age Group (years) | Consulted a primary care physician (%) | Consulted a specialist (%) | Undergone previous incontinence surgery (%) |
|-------------------|--|----------------------------|---|
| < 50 | 15 | 1 | 1 |
| ≥ 50 | 10 | 2.9 | 2.7 |

Across all age groups (pooled data) using a cut-off of 50 years old, the vast majority of women preferentially

consulted their primary care physician as compared to seeking specialist treatment for UI. This may be a manifestation of the stigma associated with UI^(1, 2, 3) and in consequence, has important implications in terms of adequate allocation of healthcare resources to patient and carer education.

In addition, 13% of women reported requiring the daily use of incontinence products such as diapers, pads or undergarments. 17% of women reported restricted social activity due to SUI.

Table VII: Comparison with other studies assessing prevalence of female UI

| Reference | Study population size | Age of respondents (years) | Prevalence of UI in women (%) |
|------------------|-----------------------|----------------------------|-------------------------------|
| Yarnell et al | 1000 | ≥ 17 | 45 |
| Diokno et al | 434 | ≥ 60 | 37.7 |
| Sandvik et al | 1820 | ≥ 20 | 29.4 |
| Samuelsson et al | 491 | 20-59 | 27.7 |
| Hågglund et al | 3076 | 40-80 | 26 |
| Simeonova et al | 2176 | ≥ 40 | 14 |
| Samuelsson et al | 491 | 40-60 | 27.9 |
| Ueda et al | 968 | 20-96 | 53.7 |
| Bortolotti et al | 2767 | ≥ 40 | 11 |
| Moller et al | 2860 | 40-60 | 72 |
| Temml et al | 1262 | 20-96 | 26.3 |
| Sampselle et al | 3258 | 42-52 | 56.9 |
| Burgio et al | 523 | 14-42 | 11.3 |
| Our study | 3389 | 20-85 | 13.3 |

DISCUSSION

Our study highlights an important health problem faced by women in Singapore. Although the data may not be up to date, to our knowledge it is currently the only estimate of the prevalence of female UI in Singapore across multiple age groups in community based women. Pooled estimates of SUI and UUI were calculated across all age groups. (Table IV). When correlated with local

census data,⁽⁷⁾ the number of women with self-reported UI is 186 943, 125 299 of whom are aged above 50. While this highlights the magnitude of the problem, it may not be particularly helpful in terms of health policy decision making; as Chiarelli et al⁽¹⁸⁾ points out, the woman with transient incontinence in the last few weeks of her pregnancy requires different resources compared to the woman living in a nursing home who has dementia and incontinence.

Our age-stratified prevalence rates of UI in Singapore should be interpreted with caution. Firstly, our study population did not include women who were institutionalised. The prevalence of UI among women living in nursing homes may be higher than that of community dwelling women.⁽¹⁹⁾ Secondly, we did not assess whether UI experienced was sporadic or of regular occurrence.

Thirdly, biased response rates may invalidate prevalence estimates.⁽²⁰⁾ We aimed to obtain the highest possible response rates, in order to minimize such bias.⁽²¹⁾ As direct interview generally gets higher response rates as compared to postal or telephone questionnaires,⁽²²⁾ we chose this method of surveying the population. However, the responses elicited by interview questionnaire may be more susceptible to social desirability bias as compared to those elicited by post.⁽²²⁾ Direct interview may also be less standardized, with wide-ranging prevalence estimates reported by different interviewed individuals.⁽²³⁾ In order to decrease such bias, our clinical research staff undertook prior standardized training on questionnaire administration and clarification of any medical terminology prior to the start of the study.

While biased response rates due to data collection methodology may be compensated for during data analysis, unknown response bias, such as the possibility of different response rates between continent and incontinent women, is much more difficult to account for.^(20, 21) For instance, incontinent women may deny UI due to embarrassment, or they may respond to a greater extent than continent women because they find the subject of more relevance.

We collected data on reported symptoms of UI but it is not possible to diagnose incontinence as a condition based on history alone. For instance, the diagnosis of motor urge incontinence or detrusor overactivity (DO) requires the use of urodynamic equipment⁽²⁴⁾. Many authors^(25, 26, 27, 28) conclude that patient history alone is a poor predictor of genuine stress incontinence or DO.

In spite of the limitations of the study, the sample group may be considered representative of the country's female population as the study demographics are comparable to the national census. It is also one of the largest nationwide studies performed globally (Table VII). The interviewers received prior standardized training by the principal investigator on how to administer the questionnaire, to decrease the effect of interviewer bias. We attempted to keep bias to a minimum by interviewing the women at different, randomly selected geographical locations and with temporal variation which included different times of the day on both weekdays and weekends. As Singapore is a multiracial country, and it is plausible that ethnic differences in the prevalence of UI may exist, we had hitherto been hesitant to extrapolate prevalence estimates of other predominantly Chinese populations such as Hong Kong to our local population. Though the data may not be up to date, our study has sound methodology, is the largest of its kind among predominantly Chinese community-dwelling populations worldwide and is the first to demonstrate that overall prevalence and patterns of SUI and UUI are comparable.

For a woman to seek treatment for UI, she first has to identify that it is a problem - that it is not a normal part of life, know that it is treatable and know where to seek treatment for it, without fear of stigmatization. Our study showed that across all age groups, less than half of the women who were aware that incontinence was treatable knew where to seek treatment for it. This illustrates the importance of community based health education for women who may not even perceive that UI is abnormal, let alone know that it can be treated or where to seek treatment. We postulate that the large discrepancy may not be solely due to lack of knowledge; it may actually reflect fear of stigmatization. These suboptimal rates of help-seeking behaviour are not limited to our local population.^(3, 30) While the urogynaecology department in our centre sees a large proportion of women with UI locally, we estimate that at least 70% of women remain untreated.⁽⁷⁾ Help-seeking behaviour may also be impacted by factors such as frequency of contact with primary care services, the gender of the clinician, routine screening questions during consultation and comorbidity.⁽²⁹⁾ Educating patients, their carers and healthcare professionals is key to eliminating stigmatization of the condition.

Our study also paves the way for further research, for instance how the prevalence of UI in our local population may correlate with confounders such as body mass

index (BMI), incidence of falls and quality of life indices including sexual activity.

Obesity is a risk factor for UI in women^(31, 32) and the prevalence of all types of UI (urge, stress and mixed) has been shown to increase with increasing BMI.⁽³³⁾ There is evidence that UI in obese individuals is due to raised intra-abdominal and intravesical pressure as a result of increased weight of the abdominal wall.^(34, 35) The obese diabetic is at particularly high risk of incontinence, if autonomic neuropathy and/or osmotic effects are present. The recent implementation of a nation-wide weight management programme⁽³⁶⁾ to curb rising obesity rates reflects growing concern about obesity as a public health concern, and may indirectly influence the incidence of UI in our local population.

UI is also associated with an increase in falls, both in community dwelling^(37, 38) and institutionalised women. A recent meta-analysis concluded that the odds of falling were 1.45 (95% CI 1.36 to 1.54) in the presence of any type of urinary incontinence among community dwelling women, and recommended that fall prevention programs include an assessment of incontinence and appropriate referral when necessary.⁽³⁷⁾ Early diagnosis and appropriate treatment of urge incontinence may decrease the risk of fracture, which may alleviate the burden on healthcare economics.⁽³⁸⁾

From a public health perspective, adequate allocation of healthcare resources to patient and carer education is paramount. Public health forums, media campaigns and information pamphlets distributed at government polyclinics, general practitioners' and specialist women's clinics all contribute to increasing patient awareness and eliminating the stigma associated with UI. This is of utmost importance as high prevalence estimates among women presenting to primary healthcare services are often compounded by issues of embarrassment or ignorance among physicians and women about the condition.

Our study did not include institutionalised women, hence the true prevalence of UI would be expected to be even higher than reported.⁽⁴⁾ Education and heightened awareness of physicians and medical staff caring for institutionalised women, via continuing medical education (CME) seminars and symposia is crucial. Direct questioning and screening for incontinence symptoms by the physician may be beneficial in overcoming the stigma and embarrassment that women may feel. Similarly, it may also help in correcting women's misconceptions that

it is a normal part of the ageing process, or that it cannot be treated either conservatively or surgically.

Our data (Table VI) illustrates that the vast majority of women preferentially consult primary care physicians about UI. Efforts should therefore be made to engage and educate health partners, primary care physicians and members of allied health services such as nursing staff who provide home visits, to maintain a high index of suspicion at every available contact opportunity.

Healthcare professionals should be aware of the incontinence-specific quality of life scales available for initial symptom evaluation, such as the International Consultation on Incontinence Modular Questionnaire (ICIQ), Bristol Female Lower Urinary Tract Symptoms (BFLUTS) or Urinary Incontinence Quality of Life Scale (I-QOL)⁽⁴⁰⁾. They should also be familiar with first-line management options, including lifestyle interventions such as reduction in caffeine intake or modification of fluid intake assessed from the woman's bladder diary. Women with UI should be informed that a trial of pelvic floor muscle training (PFMT) of at least three months'

duration may be beneficial⁽⁴⁰⁾ and may even help avoid or delay the need for surgery. Women who require incontinence surgery may be reassured that depending on the procedure, continence rates of up to 94% may be achieved.⁽⁴⁰⁾

Consideration should be given to implementing routine screening, particularly in women aged over 50, with validated screening tools such as the UI severity index⁽³⁹⁾ which have been described in the literature. Routine Papanicolaou smear testing presents itself as a regular contact opportunity for the primary care physician to screen women. While performing the smear, clinicians should ask the woman for symptoms of UI, and request her to cough and strain during the pelvic examination, in order to better elicit signs of pelvic organ prolapse and SUI.

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