Urinary incontinence and quality of life among older community-dwelling Australian men: the CHAMP study

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Abstract

Objective: to describe the prevalence and impact on quality of life of urinary incontinence in a population-based cohort of older community-dwelling Australian men.
Introduction

Urinary incontinence (UI) is a common health problem among older adults [1, 2] with prevalence ranging from 17 to 55% in older women and 11–34% in older men [3]. UI imposes a significant financial burden to affected individuals, caregivers and society [4]. In the USA, the annual direct cost of UI in 1995 was estimated to be 26.3 billion dollars for individuals aged ≥ 65 years [5]. UI is associated with a reduced quality of life (QoL), with sufferers reporting embarrassment, distress and depression [6, 7]. Yet some studies have found that those with UI considered urinary leakage as a minor problem and did not restrict daily activities or lower self-esteem [1, 8].

Most studies of UI and its impact on QoL have focused on female incontinence [9, 10]. Moreover, the studies involving men have focused on lower urinary tracts symptoms other than UI [11, 12]. The objectives of the present study were to report the prevalence of UI among a population representative of older Australian men and to evaluate the impact of UI on QoL.

Materials and methods

Study population

Data were obtained from the Concord Health and Ageing in Men Project (CHAMP), a population-based study of older, community-dwelling Australian men [13]. Data were collected between January 2005 and June 2007 from men aged ≥ 70 years living in a defined geographic area in Sydney. Men living in residential aged care facilities were excluded. Men were identified using the electoral roll and contacted by letter and telephone. A total of 1,511 of the 2,815 eligible and contacted men participated in the study (54%). An additional 194 men from the study area volunteered to be in the study. These men were told about the study by friends or read reports about the study in local newspapers.

CHAMP was funded by the National Health and Medical Research Council and the Ageing and Alzheimer’s Research Foundation. The study was approved by the Concord Hospital Human Research Ethics Committee.

Measurement of urinary incontinence

A structured self-administered questionnaire was posted to study participants, which they completed prior to visiting the study clinic. The International Consultation on Incontinence Questionnaire (ICIQ) was used to collect UI data. The ICIQ is easy to complete, has good reliability (Cronbach’s alpha 0.92) and has sufficient construct validity, allowing it to discriminate differences in UI prevalence between men and women in clinic and community samples [14]. The ICIQ comprises three scored items to measure the frequency, quantity and QoL impact of UI and an unscored item to assess the cause of UI. The three scored items are combined into a single summed score (range 0–21). The question measuring the frequency of leaked urine is scored from zero (never leak urine) to five (leak urine all the time). In the question on quantity of leakage, men were asked how much urine they usually leak, with none scored zero, a small amount scored two, a moderate amount scored four and a large amount scored six. Then they were asked to rate how much leaking urine interfered with their daily life using a visual analogue scale, from zero (not at all) to ten (a great deal). The type of UI was assessed using the ICIQ.

There is no agreed criterion to define UI for prevalence studies. In this report, men were defined as having urinary incontinence if they reported that, in the past 4 weeks, they leaked urine at least twice a week. This definition was used because the prevalence of UI is likely to be overestimated if...
UI is defined with as little as one episode of leakage in the past 4 weeks.

**Measurement of quality of life**

The widely used 12-item Short Form Health Survey (SF-12) was used to measure QoL in this study, and its reliability and validity have been well established in large populations [15–17]. The SF-12 produces two scores: a physical component summary (PCS) and a mental component summary (MCS). The scores are summarised with a range from 0 to 100, using recommended scoring algorithms, and standardised to have a mean of 50 and standard deviation of 10 in the US general population [15]. Lower scores represent poorer QoL. Sanderson et al. analysed data from the 1995 Australian National Health Survey and found that the SF-12 predicted at least 90% of variance in both the PCS and the MCS scores of the SF-36 based on scoring using either the Australian normative data or the standard US normative data [18].

**Measurement of potential confounders**

Men were asked whether a doctor or other health care provider had ever told them they had any of a list of 20 medical conditions; the number of conditions was summed to give a co-morbidity score. Men were categorised as having an enlarged prostate or prostate cancer based on self-reported diagnosis by a doctor or other health care provider.

**Statistical analyses**

With a sample size of 1,705 participants, the study had 100% power to detect a five-point difference (SD = 10) in SF-12 scores between incontinent and continent men, and 93% power to detect a difference of 2.5 points.

Descriptive analyses were performed to determine the prevalence of various levels of urinary incontinence and types of incontinence. Student’s t-test was used to determine whether the means of PCS and MCS scores differed between the incontinent (leak urine at least two times a week in the past 4 weeks) and continent groups. Multiple regression models were conducted for the two summary scores of the SF-12 (dependent variable) and UI. Enlarged prostate and prostate cancer were included in models as dichotomous variables. Age and co-morbidity score were considered as continuous variables in models. A univariate model was used to assess whether each of these variables (age, co-morbidity score, enlarged prostate and prostate cancer) was significantly associated with the PCS or MCS score. Mean scores of MCS and PCS were adjusted by including all confounders in multiple regression models. Findings were considered statistically significant if \( P \leq 0.05 \). All statistical analyses were conducted by using the SAS statistical software, version 9.1 (SAS Institute Inc., Cary, NC, USA).

**Results**

**General characteristics**

The demographic and health-related characteristics of the study participants are shown in Table 1. The overall study sample in CHAMP consisted of 1,705 men aged 70–97 years old with a mean age of 76.9 years. Over one-third of men reported they had an enlarged prostate and 10% of men \( n = 180 \) had a diagnosis of prostate cancer.

**Prevalence and type of urinary incontinence**

The prevalence of UI according to age is shown in Table 1. The overall prevalence of UI was 14.8%, increasing from 12.0% for the men aged 70–74 years old to 26.3% among men 85–89 years old but reduced to 16.3% for those aged \( \geq 90 \) years old \( n = 43 \).

Urgency incontinence was the most frequent type of urinary incontinence, with 20% of men reporting leaking urine before getting to the toilet (Table Appendix 2 available to subscribers in Age and Ageing online). About 10% of men experienced post-micturition dribbling and 5% of men reported leaking urine for no obvious reason. Three percent of men reported using pads or other incontinence aids.

Analysis of the data from the ICIQ showed that the frequency of urine leakage was strongly correlated with the quantity of urine leaked \( r = 0.75, P < 0.001 \). Both frequency \( r = 0.59, P < 0.001 \) and quantity \( r = 0.57, P < 0.001 \) of urine leakage were strongly correlated with the

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**Table 1. Prevalence of various levels of UI categorised by age groups**

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>70–74 years (%)</th>
<th>75–79 years (%)</th>
<th>80–84 years (%)</th>
<th>85–89 years (%)</th>
<th>( \geq 90 ) years (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n = 667 )</td>
<td>( n = 524 )</td>
<td>( n = 307 )</td>
<td>( n = 133 )</td>
<td>( n = 43 )</td>
<td>( N = 1,674 )</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>469 (70.3)</td>
<td>353 (67.4)</td>
<td>198 (64.5)</td>
<td>67 (50.4)</td>
<td>28 (65.1)</td>
<td>1,115 (66.6)</td>
</tr>
<tr>
<td>About once a week or less often</td>
<td>118 (17.7)</td>
<td>94 (17.9)</td>
<td>61 (19.9)</td>
<td>31 (23.3)</td>
<td>8 (18.6)</td>
<td>312 (18.6)</td>
</tr>
<tr>
<td>Two or three times a week</td>
<td>47 (7.1)</td>
<td>37 (7.1)</td>
<td>26 (8.5)</td>
<td>15 (11.3)</td>
<td>1 (2.3)</td>
<td>126 (7.5)</td>
</tr>
<tr>
<td>About once a day</td>
<td>12 (1.8)</td>
<td>20 (3.8)</td>
<td>9 (2.9)</td>
<td>11 (8.3)</td>
<td>2 (4.7)</td>
<td>54 (3.2)</td>
</tr>
<tr>
<td>Several times a day</td>
<td>16 (2.4)</td>
<td>17 (3.2)</td>
<td>9 (2.9)</td>
<td>7 (5.3)</td>
<td>3 (7.0)</td>
<td>52 (3.1)</td>
</tr>
<tr>
<td>All the time</td>
<td>5 (0.8)</td>
<td>3 (0.6)</td>
<td>4 (1.3)</td>
<td>2 (1.5)</td>
<td>1 (2.3)</td>
<td>15 (0.9)</td>
</tr>
<tr>
<td>Prevalence of UI</td>
<td>80 (12.0)</td>
<td>77 (14.7)</td>
<td>48 (15.6)</td>
<td>35 (26.3)</td>
<td>7 (16.3)</td>
<td>247 (14.8)</td>
</tr>
</tbody>
</table>

Total = 1,674; missing = 31.

*Men were defined as having UI if they reported leaked urine at least two times a week in the past 4 weeks. Age trend with \( P < 0.001 \).
Impact of urinary incontinence on quality of life

Men with UI rated their general health more poorly than did continent men (44.1 vs 27.4% rating their general health as fair, poor or very poor). The unadjusted mean PCS and MCS scores were significantly (P < 0.001) lower in incontinent men (41.7 and 51.7, respectively) compared with continent men (46.2 and 54.6, respectively) (Table 2).

SF-12 scores decreased with increasing frequency of urine leakage (Table 3). Men who reported leaking urine all the time had a mean PCS score of 37.8, while those who reported leaking urine infrequently (once a week or less) had a mean score of 43.5. There was a 10-point difference in PCS scores, and a six-point difference in MCS scores, between those with no urine leakage at all and those who leaked urine all the time.

After adjusting for age, co-morbidity score, prostate cancer and enlarged prostate in a multiple regression model, UI retained a highly significant association with PCS score (adjusted mean PCS scores 43.6 vs 45.9 for incontinence compared with continent men, P < 0.001; Table 2). Excluding men with a history of prostate cancer (to eliminate the possibility of UI due to radical prostatectomy), the adjusted mean PCS scores were 43.9 in incontinent men vs 45.9 in continent men (P < 0.001).

UI also remained significantly associated with MCS score (P < 0.001) after adjusting for age, co-morbidity score, enlarged prostate and prostate cancer. The adjusted mean MCS scores were 52.2 for incontinent vs 54.6 for continent men (Table 2). Excluding men with a history of prostate cancer, the adjusted mean MCS scores were 52.4 in men with incontinence and 54.5 in men without incontinence.

Discussion

Our study found that the overall prevalence of urinary incontinence in community-dwelling Australian men aged ≥70 years was 14.8%. UI prevalence rates in previous population-based studies range from 9 to 28% (Table Appendix 3 available to subscribers in Age and Ageing online) [1, 2, 4, 6, 19–25]. In a recent study of community-dwelling men, Tennstedt et al. reported a UI prevalence of 10.6% among American men aged 60–79 years old [24]. Anger et al. analysed national survey data from the USA and found that the prevalence of UI among community-dwelling men aged ≥60 years was 17%, where UI was defined as any leakage of urine in the past 12 months [2]. Maggi et al. reported a study from Italy finding that 11.5% of men aged ≥65 years experienced urine leakage [20]. An important reason for differences in the reported prevalence of UI among older men is the different definitions of UI.

The prevalence of UI in our study showed an age-related increase, with a peak in the age group 85–89 years old (26.3%), which is consistent with previous UI studies [19, 20]. The decline in prevalence among men aged ≥90 years in our study may be a chance finding due to small numbers or a survivor bias among the oldest participants in the CHAMP study. Three percent of men reported daily incontinence in our study, which is consistent with the UI study by Maggie et al. [20].

Urgency incontinence had a higher prevalence than stress incontinence in our study, which is consistent with previous studies [24, 25]. Temml et al. found that the prevalence of overactive bladder with urgency incontinence increased with age in both sexes and has a negative impact on QoL [26].

Post-micturition dribbling was the second most common type of incontinence in our study. A community-based study in Australia found that half of the men aged 40–80 years reported terminal dribbling [27]. Post-micturition dribbling was the most frequently reported urinary symptom among older men in Sweden [28].

We confirmed that UI was associated with worse QoL as measured by the SF-12. UI was more strongly associated
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with the physical component than the mental component of the SF-12. We also found that older men with incontinence have poorer self-perceived general health than men who were continent. The difference in adjusted mean PCS scores between men with and without incontinence was 2.3. This difference in PCS scores was greater than the reported impact of musculoskeletal complaints and urinary tract infection [15] on PCS scores but less than the impact of visual impairment, where the difference in age- and sex-adjusted PCS scores between people with and without visual impairment was reported as 4.0 in one study [29]. The difference in adjusted mean MCS scores between continent and incontinent men was 2.4, which was greater than the reported impact of chronic obstructive pulmonary disease, angina and irritable bowel [15].

The perceived impact of UI on daily life as measured by the visual analogue scale in the ICIQ was minimal. This is consistent with another population-based study in Sweden that found that men with UI considered urinary leakage as a minor problem and did not feel that their daily activities were restricted due to UI [1].

A strength of our study is that subjects are representative of older Australian men living in the community [30]. The general demographic characteristics of men in CHAMP are similar to those of a recent Australian national telephone survey of male reproductive health, the MATeS study, which examined a stratified, random, national population-based sample [30].

The SF-12 QoL questionnaire was used in this study. It is acknowledged that the sensitivity of measurement of the impact of UI on QoL may be lower for the SF-12 than for a disease-specific QoL questionnaire; however, using the SF-12 questionnaire allows the comparison between different clinical conditions. A self-completed questionnaire done by subjects in their own homes was used to collect UI data. This mode of question delivery is likely to increase the validity of responses to questions on the sensitive topic of UI.

There are several limitations to this study. The response rate is lower than other population-based studies of UI among the elderly [4, 20, 22]. Nevertheless, the CHAMP study population appears to be representative of older men in the study area [13]. Since men living in a residential or nursing care facility were excluded, it is acknowledged that the study results only apply to older men living in the community. Another limitation is that information on medical conditions, including enlarged prostate and prostate cancer, was obtained through a self-report questionnaire rather than using more rigorous verification methods.

Conclusion

In conclusion, UI is common among older men and is associated with worse QoL. Health care professionals should discuss UI with older men. With an increasingly elderly population, the prevalence of UI will increase. Follow-up of the men in CHAMP will allow us to estimate the incidence of UI and investigate if there is a relationship between UI and development of functional dependence and institutionalisation.

Key points

- Prevalence of urinary incontinence was 14.8%.
- Men with urinary incontinence have lower overall SF-12 scores.
- As the population ages, the prevalence of urinary incontinence will increase.

Supplementary data

Supplementary data mentioned in the text is available to subscribers in Age and Ageing online.

References

Blood rheology and cognition in the Edinburgh Type 2 Diabetes Study

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Abstract

Background: the association between the rheological factors haematocrit and plasma viscosity and cognitive ability has not been extensively studied. It is possible that blood viscosity affects cerebral blood flow and cognitive function. This study...