Fluid Intake and Risk of Male Urinary Incontinence

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ABSTRACT

Objective: To investigate whether fluid intake is associated with urinary incontinence (UI) in men. **Methods:** A total of 700 men from 40 to 75 years old were recruited from the community in central and southern Japan. A validated food frequency questionnaire was administered face-to-face to obtain information on habitual beverage consumption. UI status was ascertained using the International Consultation on Incontinence Questionnaire-Short Form. Logistic regression analysis was conducted to assess the relationship between total fluid intake and the prevalence of UI. **Results:** Among the 683 eligible participants (mean age 62 years), 49 men (7.2%) experienced urine leakage for the past 2.6 (standard deviation [SD] 1.9) years. The mean daily fluid intake was slightly higher (p=0.08) among incontinent men (1766, SD 1171 mL) than those without the condition (1460, SD 918 mL). However, the increases in risk of UI at higher levels of fluid intake were not significant after accounting for age and other confounding factors. **Conclusion:** Little association was evident between fluid intake and UI in middle-aged and older Japanese men.

Keywords: fluid intake, male urinary incontinence, risk factors

INTRODUCTION

Urinary incontinence (UI) is a common problem affecting middle-aged and older people. The prevalence of UI is known to be higher for women and increases with age, obesity and tobacco smoking [1-3]. The development of UI symptoms may also be affected by fluid intake [4]. Previous cross-sectional studies have reported a moderate positive correlation between fluid intake and the severity of certain types of UI [5,6]. However, a longitudinal study of women in the United Kingdom found no association between total fluid intake and the risks of stress incontinence or overactive bladder [2]. Another recent prospective study based on Nurses' Health Study cohorts in the USA concluded that higher fluid intake posed no significant risk of incident UI for women [7]. The findings suggested that women without UI should not restrict their fluid intake to avoid the development of the condition [7].

In the literature, focus has been directed to female UI whereas investigation with incontinent males is scant. The present study aimed to ascertain the hypothesis of a positive association between habitual fluid intake and UI among middle-aged, community-dwelling Japanese men. The findings have important implications for the prevention of this distressing condition in men.

MATERIALS AND METHODS

Participants

Seven hundred men from 40 to 75 years old were recruited from the community in central and southern Japan. This convenience sample of subjects was interviewed by the second author at shopping malls, community centres or hospital outpatient clinics when they undertook health checks. Data collection was conducted over 18 months. Subjects were excluded if they were non-residents or outside the desired age range. A total of 683 eligible men were available for analysis after excluding 17 consenting participants who later withdrew or had missing details. No statistically significant differences in characteristics were found between included and excluded subjects. The purpose and procedure were explained to each participant before obtaining their written consent. Confidentiality and the right to withdraw without prejudice were ensured and maintained throughout the interview. Approval of the project protocol was obtained from the Human Research Ethics Committee of Curtin University.

Instruments

A structured questionnaire incorporating the International Consultation on the Incontinence Questionnaire-Short Form (ICIQ-SF) [8] was administered face-to-face to assess UI status. The ICIQ-SF is a robust measure for evaluating the severity of urinary loss and condition-specific quality of life. The reliability, validity, and sensitivity of the instrument have been established [8,9]. It consisted of three components to determine the frequency, quantity, and impact of urine leakage. Frequency was categorized into 0 (never), 1 (about once a week or less often), 2 (two or three times a week), 3 (about once a day), 4 (several times a day), and 5 (all the time). UI was considered present for those subjects in categories 1 to 5. Quantity was measured from 0 (none), 2 (a small amount), 4 (a moderate amount) to 6 (a large amount). The impact of leakage on daily life was scored on an incremental scale from 0 (not at all) to 10 (a great deal). The circumstances of incontinence were recorded via a separate self-diagnostic item, with urge incontinence defined as 'leaks before you can get to the toilet', stress incontinence defined as either 'leaks when you cough or sneeze' or 'leaks when you are physically active or exercising', whereas combinations of these symptoms were regarded as mixed incontinence. Other incontinence referred to 'leaks when you are asleep', 'when you have finished urinating and are dressed', 'for no obvious reason', and 'all the time'. Two questions were appended to the ICIQ-SF to find out how long the subject had the condition and whether he had sought treatment.

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Information on habitual beverage consumption was obtained using a validated food frequency questionnaire developed by the Japan Epidemiological Association [10]. For each beverage type, participants were asked to report the average quantity consumed and frequency of intake in nine levels ranging from 'almost never' to 'ten or more cups per day'. Daily total fluid intake (mL) was calculated by summing the amounts from all beverages including water, tea, coffee, juice, milk, soda and alcoholic drinks (sake, shochu, beer, whisky and wine). The reference recall for beverage consumption variables was set at five years before the interview because estimation beyond five years would be difficult.

The final part of the structured questionnaire collected information on personal and lifestyle characteristics such as age, weight, height, marital status, retirement status and tobacco smoking, as well as health conditions (hypertension, ischemic stroke, diabetes mellitus, depression and cancer). On average each interview took about 45 minutes to complete.

Statistical analysis

Subjects with UI were first identified on the basis of positive outcomes on the ICIQ-SF. After applying descriptive statistics to summarize sample characteristics by UI status, comparisons between the two groups were made using chi-square and t tests. Unconditional logistic regression analyses were then performed to determine the association between total fluid intake and the prevalence of UI, with a test for linear trend to examine the dose-response relationship. To further assess the effect of increasing fluid intake, the quantitative variable was categorized into quartiles based on the distribution of men without UI. Both crude and adjusted odds ratios (OR) were obtained as estimates of relative risk, the latter accounting for the effects of age, body mass index (BMI), tobacco smoking (non-smoker/smoker), alcohol drinking status (yes/no) and presence of a health condition (yes/no). These variables are considered potential confounders of male UI in the literature. All statistical analyses were performed using the SPSS package version 18.

RESULTS

The 683 participants were 62.3 (standard deviation [SD] 7.6) years old on average with a mean BMI of 23.0 (SD 3.1). Most of them were married (89%) and not yet retired (66%). About half of the participants (47%) had a health condition other than UI, 27% were current smokers, and the majority (71%) consumed alcohol on at least a monthly basis. According to the ICIQ-SF criteria, the prevalence of UI was 7.2%. Urine leakage among the 49 incontinent men was typically "a small amount" (85%) and occurred once a week or less often (61%). The mean ICIQ score was 5.98 (SD 2.68). Only three (6%) incontinent men considered the condition to have great interference in their daily life. The distribu-

Table 1. Characteristics of Japanese Men by Urinary Incontinence Status (n=683)

Characteristic	Urinary incontinence	No urinary incontinence	Both	p[a]
n	49 (7.2%)	634 (92.8%)	683 (100%)	
Mean age: years (SD)	64.90 (7.06)	62.05 (7.62)	62.26 (7.61)	0.012
Mean body mass index: kg/m^2 (SD)	23.11 (4.03)	23.02 (3.06)	23.03 (3.14)	0.854
Mean fluid intake: mL/day (SD)	1766 (1171)	1460 (918)	1482 (941)	0.080
Married	42 (85.7%)	567 (89.4%)	609 (89.2%)	0.420
Retired	23 (46.9%)	211 (33.3%)	234 (34.3%)	0.052
Current smoker	16 (32.7%)	167 (26.3%)	183 (26.8%)	0.336
Alcohol drinker	29 (59.2%)	459 (72.4%)	488 (71.4%)	0.048
Presence of health condition[b]	25 (51.0%)	296 (46.7%)	321 (47.0%)	0.558

[a]: Based on chisquare or t test; [b]: Hypertension, ischemic stroke, diabetes mellitus, depression or cancer

Table 2. Risk of Urinary Incontinence for Fluid Intake by Japanese Men

Total fluid intake (mL/day)	Urinary incontinence	No urinary incontinence	Crude OR (95% CI)	Adjusted OR[a] (95% CI)
				p for trend=0.051
< 820	11 (22.4%)	158 (24.9%)	1	1
820 - 1225	9 (18.4%)	158 (24.9%)	0.82 (0.33, 2.03)	0.78 (0.31, 1.96)
1226 - 1950	11 (22.4%)	160 (25.2%)	0.99 (0.42, 2.34)	1.04 (0.43, 2.51)
> 1950	18 (36.7%)	158 (24.9%)	1.64 (0.75, 3.58)	1.61 (0.73, 3.56)
Total fluid intake (mL/day)	Urge urinary incontinence	No urinary incontinence	Crude OR (95% CI)	Adjusted OR[a] (95% CI)
				p for trend=0.164
< 820	6 (23.1%)	158 (24.9%)	1	1
820 - 1225	2 (7.7%)	158 (24.9%)	0.33 (0.07, 1.68)	0.33 (0.07, 1.71)
1226 - 1950	9 (34.6%)	160 (25.2%)	1.48 (0.52, 4.26)	1.73 (0.58, 5.13)
> 1950	9 (34.6%)	158 (24.9%)	1.50 (0.52, 4.31)	1.49 (0.51, 4.38)

[a]: Adjusted for age, body mass index, smoking status (non-smoker, smoker), alcohol drinking (yes, no), and presence of health condition (yes, no)

tion of UI types was as follows: stress (7, 14.3%), urge (26, 53.1%), mixed (2, 4.1%) and other (14, 28.6%). They experienced urine leakage for about 2.55 (SD 1.86) years, but only two men had consulted their physicians about the UI problem.

Table 1 compares the characteristics of Japanese men with and without UI. The incontinent men were about 3 years older on average and less likely to drink alcoholic beverages than their symptom-free counterparts. Their mean daily fluid intake (1766, SD 1171 mL) was also slightly higher than those without the condition (1460, SD 918 mL). However, no significant differences in fluid intake were found among the four UI subgroups (p=0.715). Table 2 presents the logistic regression results. Fluid intake was positively associated with the prevalence of UI, but the increases in risk at the higher levels of intake did not attain statistical significance. To assess the sensitivity of the analysis, a separate investigation was conducted for the urge subtype. Again, little association was evident, with a non-significant dose-response relationship observed.

DISCUSSION

The present study provides the first report specifically investigating the association between fluid intake and male UI using validated instruments. The UI prevalence estimate was comparable with previous reports in Japanese men [11,12]. Although only a few subjects with UI perceived the condition as interfering with daily life, the low number seeking help was of concern. It is possible that the older men were either embarrassed or unaware that the condition is treatable.

The observed increases in UI risk at higher levels of fluid intake may be partially due the diuretic effect of beverages such as coffee and tea which contain caffeine [13]. Despite sex differences in the pathophysiological mechanisms for UI, the lack of a significant association between fluid intake and male UI was consistent with previous findings for women [2,7]. It is possible, however, that some men with developing symptoms may restrict their fluid intake to reduce leaks. To avoid reverse causation, the reference period for habitual beverage consumption was set at five years before the interview. Indeed, the 49 incontinent men had experienced UI for 2.6 (SD 1.9) years on average, while none of the participants reported any change in drinking habits within the past five years.

Several limitations should be considered. The retrospective cross-sectional study design posed a major limitation so that any cause-effect relationship could not be established. Classification of UI status was based on self report via the ICIQ-SF rather than objective measures of urine loss. Nevertheless, the use of psychometrically robust self-completed questionnaires is now a recognized approach for assessing UI. Although information bias on the potential association was unlikely and recall error could not be eliminated, face-to-face interviews were conducted solely by the second author to help recall of beverage consumption and to eliminate bias between interviewers. Selection bias, on the other hand, still existed because our convenience sample comprised voluntary participants from the community. Another concern in this community-based study was the lack of clinical information which could have mediated the findings, such as the use of diuretic drugs, the presence of benign prostatic hyperplasia therapy or a history of prostate surgery, even though the inclusion of more confounding factors would further bias the observed association towards the null hypothesis.

In conclusion, the present study suggested little association between UI and total fluid intake in middle-aged and older Japanese men. Nevertheless, the evidence should be regarded as preliminary and further replications in other countries are needed. Population-based prospective cohort studies and experimental research are recommended to confirm the effects of high volume fluid intake.

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