

URINARY FREQUENCY IN COMMUNITY-DWELLING WOMEN: BOTHER AND IMPACT OF PELVIC FLOOR DISORDERS.

Hypothesis / aims of study

The aims of this study were: 1) to assess prevalence and degree of bother related to day-time and night-time urinary frequency in a large community-dwelling population of women so that evidence based definitions of normal and abnormal could be confirmed; and 2) to assess the relationship between urinary frequency and the presence of pelvic floor disorders (PFD). We hypothesized that the prevalence of bothersome frequent day-time and night-time voiding would be higher in women with pelvic floor disorders (PFD) than those without.

Study design, materials and methods

In this sub-analysis, the voiding habits of 4,061 community-dwelling women were analyzed from those enrolled in an epidemiologic study that used a questionnaire validated to identify PFD. (1) Day-time urinary frequency was assessed using the question "During waking hours, how frequently do you need to empty your bladder?" Responses were categorized into 1) less than every 6 hours, 2) every 5 to 6 hours, 3) every 3 to 4 hours, 4) every 1 to 2 hours, and 5) more than once per hour. Night-time urinary frequency was assessed with the question "How many times on average do you need to empty your bladder during sleeping hours?" Degree of bother related to each category of day-time and night-time urinary frequency was assessed using a 100 mm visual analog scale (VAS). For the analysis of the association between PFD and abnormal urinary frequency, we defined 'frequent day-time voiding' as more frequently than every 2 hours and 'frequent night-time voiding' as ≥ 2 voids per night. The questionnaire included comprehensive data on participant demographics, medical history and the presence of four PFD; including pelvic organ prolapse (POP), stress urinary incontinence (SUI), overactive bladder (OAB), and anal incontinence (AI). (2) Conditions potentially associated with 'frequent day-time or night-time voiding' including age, race/ethnicity, obesity (body mass index ≥ 30 kg/m²), parity, mode of delivery, hormone/menopausal status, pelvic surgery, depression, neurologic disease, frequent urinary tract infections (UTI); > 3 per year), diabetes, pulmonary disease, smoking, and diuretic or caffeine use were explored using chi-squared and Mann-Whitney U tests. The prevalence of each PFD was compared in women with and without 'frequent day-time voiding' and 'frequent night-time voiding' using chi-square tests while multiple logistic regression was used to assess the relative impact of each PFD on the presence of 'frequent voiding' while controlling for potential confounders. Adjusted odds ratios (OR) and 95% confidence intervals (CI) were reported. Associations at a two-sided p-value of less than 0.05 were considered significant. This was a sub-analysis of data previously collected where power calculations were based on the primary objective of the study to identify the prevalence and risk factors for PFD. Post hoc power calculations determined that the current sample size had greater than 99% power to detect the differences in prevalence of each PFD identified between those with and without 'frequent day-time and night-time voiding'.

Results

Of the 4,061 women in the study more than 97% had adequate responses to accurately assess degree of bother related to day-time and night-time urinary frequency. The median day-time frequency of voiding was every 3 to 4 hours. Overall, 6% of women voided less than every 6 hrs, 16% every 5 to 6 hours, 51% every 3 to 4 hours, 24% every 1 to 2 hours and 3% more than every hour; thus 27% were considered to have 'frequent day-time voiding'. Each interval increase in day-time frequency was associated with significantly increased degree of bother as measured by VAS (Figure 1. $p < 0.001$). Overall the mean VAS for frequency of less than every 2 hours was 23.6 ± 23.7 vs. 51.7 ± 30.1 mm for every 2 hours or more ($p < 0.001$). A total of 72% reported any night-time voiding and 33% had 2 or more episodes per night ('frequent night-time voiding'). Figure 2 shows increasing bother with increasing night-time urinary frequency (mean VAS 27.3 ± 26.3 for 1 time per night vs. 57.3 ± 28.5 for ≥ 2 times per night, $p < 0.001$).

On univariate analysis, multiple factors were significantly associated with 'frequent day-time and night-time voiding' (data not shown). Logistic regression revealed that the presence of any one or more PFD was most significantly associated with 'frequent day-time voiding' (OR, CI) (2.54, 2.15-3.01). Other significant conditions associated with 'frequent day-time voiding' included: frequent UTI (1.38, 1.13-1.70) and obesity (1.20, 1.01-1.44). Separate models substituting each individual PFD revealed that 'frequent day-time voiding' was significantly associated with: POP (2.01, 1.50-2.70), SUI (3.41, 2.78-4.18), OAB (7.06, 5.64-8.84), and AI (1.86, 1.56-2.22). Given the obvious association between 'frequent day-time voiding' and the presence of pelvic floor disorders (especially OAB), we also analyzed separate models excluding PFD, but including all other significant variables. Associations between frequent UTI (1.63, 1.34-1.97) and obesity (1.36, 1.12-1.59) remained, but no other variables were significantly associated. For 'frequent night-time voiding' logistic regression revealed that the presence of any one or more PFD was the condition most significantly associated (2.29, 1.93-2.72). Other associated conditions included increasing age (1.58, 1.45-1.72 per 15 year age group), frequent UTI (1.59, 1.29-1.97), diabetes (1.62, 1.23-2.13), pulmonary disease (1.38, 1.08-1.76), obesity (1.38, 1.14-1.66), and history of pelvic surgery (1.30, 1.08-1.57). Separate models for each individual PFD revealed that 'frequent night-time voiding' was significantly associated with each individual PFD: POP (1.68, 1.22-2.30), SUI (2.71, 2.17-3.38), OAB (5.30, 4.13-6.79) and AI (1.57, 1.31-1.88). Similar models excluding PFD from the equation did not markedly change the other associations.

Interpretation of results

In this cohort of community-dwelling women, most reported a day-time urinary frequency of every 3 to 4 hours and three quarters reported urinating at least once per night. A third of women reported day-time urinary frequency of every 2 hours or more and a similar number reported a night-time urinary frequency of 2 or more per night. These women were nearly twice as bothered by their frequency than those without 'frequent day-time or night-time voiding'. The presence of PFD was the condition most significantly associated with 'frequent day-time and night-time voiding.' Obesity and frequent UTI were also significantly associated with 'frequent day-time voiding' regardless of the inclusion of PFD. Interestingly, common conditions felt to be associated with day-time urinary frequency; including increasing age, diuretic use, and caffeine use were not major contributors to 'frequent day-time voiding.' 'Frequent night-time voiding' was strongly associated with the presence of each of the four PFD, but was also associated

with several other conditions including increasing age, frequent UTI, diabetes, pulmonary disease, obesity and pelvic surgery, suggesting a possible different disease process than 'frequent day-time voiding'.

Concluding message

Bothersome day-time and night-time urinary frequency is common among community-dwelling women, and is associated with pelvic floor disorders. The ICS definition of increased day-time frequency is "the complaint by the patient who considers that he/she voids too often by day." This appears to correlate well with a cut-point of every 2 hours or more given the marked increase in degree of bother related to voiding more frequently than every 2 hours. Similarly, bother related to a night-time urinary frequency of two or more times per night was twice that of women who voided only once per night. Based on these findings, increased night-time frequency should be defined as 2 or more times per night.

Fig 1. Bother related to day-time voiding

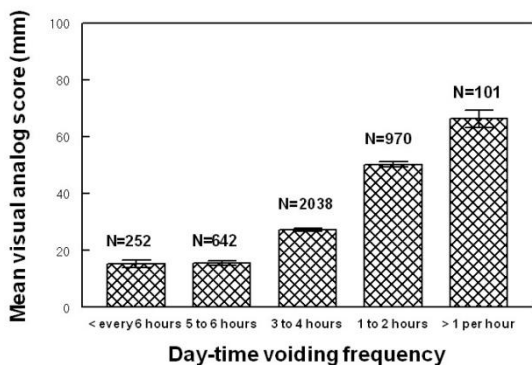
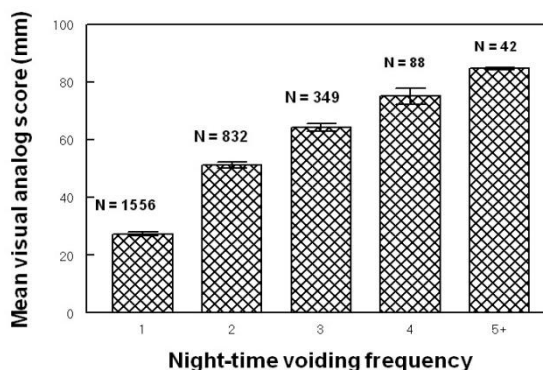


Fig 2. Bother related to night-time voiding



References

[1] Int Urogynecol J Pelvic Floor Dysfunction (2005) 16(4):272-84. [2] Obstet Gynecol (2006) 107(6):1253-6

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Is this a clinical trial?	No
What were the subjects in the study?	HUMAN
Was this study approved by an ethics committee?	Yes
Specify Name of Ethics Committee	Kaiser Permanente Southern California and University of California San Diego institutional review boards
Was the Declaration of Helsinki followed?	Yes
Was informed consent obtained from the patients?	Yes