



Published in final edited form as:

J Urol. 2009 August ; 182(2): 596–600. doi:10.1016/j.juro.2009.04.005.

Mixed Urinary Incontinence: Greater Impact on Quality of Life

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Abstract

Purpose—We compared the impact of mixed, stress and urge urinary incontinence on quality of life in middle-aged or older women.

Materials and Methods—We analyzed cross-sectional data from a population based cohort of 2,109 ethnically diverse middle-aged or older women. Among participants reporting weekly incontinence, clinical type of incontinence was assessed by self-reported questionnaires and disease specific quality of life impact was evaluated using the Incontinence Impact Questionnaire. Multivariable logistic regression was used to compare the odds of greater quality of life impact from incontinence, defined as an Incontinence Impact Questionnaire score in the 75th percentile or greater in women with stress, urge and mixed incontinence.

Results—More than 28% (598) of women reported weekly incontinence, including 37% with stress, 31% with urge and 21% with mixed incontinence. Unadjusted Incontinence Impact Questionnaire scores were higher for women with mixed vs urge or stress incontinence (median score 29 vs 17 and 13, respectively, $p < 0.01$). Adjusting for age, race/ethnicity, health status and clinical incontinence severity, women with mixed incontinence were more likely to report a greater overall quality of life impact compared to those with stress incontinence (OR 2.5, 95% CI 1.4–4.3), as well as a greater specific impact on travel (OR 2.2, 95% CI 1.3–3.7) and emotional (OR 1.8, 95% CI 1.0–3.4) Incontinence Impact Questionnaire domains. The overall impact of urge incontinence did not differ significantly from that of stress (urge vs stress OR 1.6, 95% CI 0.9–2.7) or mixed incontinence (mixed vs urge OR 1.6, 95% CI 0.9–2.8) in adjusted models.

Conclusions—In middle-aged or older women mixed incontinence is associated with a greater quality of life impact than stress incontinence independent of age, race, health or incontinence severity. Identification of women with mixed incontinence symptoms may be helpful in discovering which women are most likely to experience functional limitations and decreased well-being from incontinence.

Keywords

urinary incontinence; quality of life; cohort studies

[†]Supported by Grant KL2RR024130 from the National Center for Research Resources, a component of the National Institutes of Health Clinical and Translational Science Award for Medical Research.

[‡]Financial interest and/or other relationship with Pfizer, Inc.

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Urinary incontinence is a common problem in middle-aged or older women, with up to 25% of reproductive age women and 50% of postmenopausal women reporting at least weekly incontinence.¹ While incontinence does not lead to death it can have a profound effect on quality of life^{2,3} comparable to that of stroke, arthritis and chronic obstructive pulmonary disease.⁴ In addition, incontinence accounts for more than \$20 billion in annual expenditures in the United States, an amount greater than the annual direct costs of breast, ovarian, cervical and uterine cancers combined.⁵

To date, most studies examining the impact of incontinence on quality of life have not distinguished among stress, urge and mixed incontinence. Additionally, many prior studies have been limited by a focus on specialized clinical populations^{3,6,7} or the use of quality of life instruments that are not disease specific^{6,8} and, thus, are less sensitive in measuring the specific impact of incontinence.⁹ As a result we do not know whether the impact of incontinence on women in the community differs substantially by type of incontinence, independent of age and other clinical characteristics.

To address this gap we assessed the impact of different clinical types of incontinence on quality of life in a population based cohort of middle-aged or older women with weekly or more frequent incontinence. Clinically validated, disease specific measures were used to elucidate the variable impact of each type of incontinence on different dimensions of quality of life.

MATERIALS AND METHODS

We performed a cross-sectional analysis of women reporting at least weekly incontinence participating in the Reproductive Risks of Incontinence Study at Kaiser. The RRISK is a cohort of 2,109 middle-aged or older women enrolled in the Kaiser Permanente Medical Care Program of Northern California, an integrated health care delivery system serving approximately 25% to 30% of the northern California population. Previous studies have found Kaiser Permanente Medical Care Program of Northern California members to be representative of the race/ethnicity and demographic characteristics of the region served, although on average they are slightly more educated, and underrepresent the poor and the wealthy.¹⁰

To be eligible for the RRISK women had to be between 40 and 69 years old on January 1, 1999; to have been continuously enrolled in a Kaiser Permanente clinic since age 18 years and to have given birth to at least half of their children within the Kaiser Permanente system. Details on the sampling process used to construct this cohort with a race/ethnicity composition of 20% black, 20% Latina, 20% Asian and 40% white have been previously described.¹¹

Demographic characteristics, medical histories, incontinence symptoms and quality of life impact of incontinence were assessed in the RRISK using self-reported questionnaires, and were supplemented by in-person interviews in which interviewers reviewed and clarified participant answers to questions about incontinence. A bilingual interviewer was available for women who preferred to be interviewed in Spanish but this option was selected by less than 1% of the participants. The RRISK study was approved by the institutional review boards of the University of California, San Francisco and Kaiser Permanente.

To assess incontinence symptoms participants were asked, "During the past 12 months, on average, how often have you leaked urine, even a small amount?" Women reporting at least weekly incontinence were asked to recall the number of episodes in the last 7 days occurring "with an activity like coughing, lifting, sneezing, or exercise" to distinguish stress incontinence and the number of episodes in the last 7 days occurring "with a physical sense of urgency" to distinguish urge. We classified women as having stress incontinence if more than half of incontinence episodes in the last 7 days were associated with physical activity, and as having urge incontinence if more than half of incontinence episodes were associated with a sense of

urgency. Women with an equal number of stress and urge incontinence episodes were classified as having mixed incontinence. Women who reported that incontinence was not associated with physical activity or a sense of urgency were labeled as having other incontinence and were excluded from analysis. This self-report diagnostic approach has been validated by previous studies and correlated reasonably well with urodynamic findings.¹² Clinical severity of incontinence was determined based on incontinence frequency and the amount of urine lost per episode using the validated Sandvik Severity Scale.¹³

The impact of incontinence on quality of life was measured using the Incontinence Impact Questionnaire, a validated self-administered instrument that uses 30 multiple choice questions to assess impact in 4 separate domains (physical activity, emotional health, social relationships and travel), and assigns domain specific and overall impact scores.¹⁴ Possible answers included none, some, moderate and severe, which score 1, 2, 3 and 4 points, respectively. The average score for each subscale is converted to a number between 0 and 100 by subtracting 1 and multiplying by 100/3. The total IIQ score is the sum of each subscale score and can range from 0 to 400, with higher scores indicating a greater impact on quality of life. One item from the physical domain of the IIQ (“Has urine leakage affected your physical health?”) was not included to avoid duplication with other questions elsewhere on the RRISK survey. In computing the physical activity subscale and overall IIQ scores we imputed the average of the other 5 items in the physical activity subscale for this missing item. For the purposes of our analysis we decided a priori to consider women with IIQ scores at or above the 75% percentile for the entire sample of women with weekly incontinence as having a greater quality of life impact from incontinence.

Analyses of the impact of incontinence on quality of life were confined to the 530 women who reported at least weekly incontinence and met our criteria for having stress, urge or mixed incontinence. Among these women we first compared the demographic and clinical characteristics of participants with stress, urge and mixed incontinence using chi-square tests (table 1). We then compared the unadjusted IIQ scores as well the 4 IIQ subscale scores (travel, social, emotional and physical) among women with each type of incontinence using Wilcoxon rank sum tests (table 2).

We then compared the likelihood of having a greater quality of life impact of incontinence, defined as an IIQ score in the 75th percentile or greater for all participants with weekly incontinence, in women with urge vs stress incontinence, mixed vs stress incontinence and mixed vs urge incontinence using logistic regression. We first examined unadjusted associations between clinical type of incontinence and quality of life impact, and then adjusted our estimates for those characteristics that differed significantly by type of incontinence and greater quality of life impact (ie race/ethnicity, overall health and clinical severity of incontinence). Age was also retained in the models despite the fact that it was not associated with quality of life impact in our initial univariate analysis, given that multiple other studies reported a positive association between age and quality of life impact.^{3,6} All analyses were performed using SAS® software version 9.1.

RESULTS

More than a quarter (598) of women reported at least weekly incontinence. Of these women 37% (221) reported stress incontinence, 31% (185) reported urge incontinence and 21% (124) reported mixed incontinence. In addition, 11% (68) did not meet criteria for stress, urge or mixed incontinence and were labeled as having other incontinence. Mean (\pm SD) age of subjects with weekly incontinence was 57 (\pm 9) years, and nearly 50% of the participants were nonwhite including 18% black, 17% Asian and 17% Latina women. Approximately 45% (272) of

participants with weekly incontinence were classified as having moderate incontinence while 55% (329) had severe incontinence.

Table 1 compares the demographic and clinical characteristics of participants with at least weekly stress, urge or mixed incontinence. Compared to women with urge or mixed incontinence, participants with stress incontinence tended to be younger. There were also significant differences in the racial/ethnic distribution of participants by type of incontinence, in that the greatest proportion of black women exhibited urge incontinence, while white women and Latinas most frequently reported stress incontinence. Additionally, women with mixed incontinence were more likely to report fair or poor overall health and to exhibit greater clinical severity of incontinence compared to those with urge or stress incontinence. There were no statistically significant differences between women labeled with other incontinence and the remainder of the participants for any of the demographic or clinical characteristics.

The median (IQR) total IIQ score of women with at least weekly incontinence was 17 (4 to 52) (table 2). The total IIQ score varied by type of incontinence, with the median score for mixed incontinence being 12 and 16 points higher than for urge and stress incontinence, respectively ($p < 0.01$). Scores for the IIQ travel, social, emotional and physical domains also varied by incontinence type. Women classified as having mixed and urge incontinence had higher scores in the travel domain of the IIQ ($p < 0.01$) compared to those with stress incontinence (table 2). Women with mixed incontinence also had higher scores in the social and emotional domains of the IIQ than those with urge and stress incontinence ($p < 0.01$).

Women with mixed incontinence had a 2.5-fold greater odds of reporting greater overall quality of life impact from incontinence compared to those with stress incontinence (table 3). Relative to women with stress incontinence, those with mixed incontinence were also more likely to report IIQ scores in the 75th percentile or greater for each of the subdomains of the IIQ (travel, social, emotional and physical) even after adjustment for other demographic and clinical characteristics.

Although women with urge incontinence were more likely to report a greater quality of life impact from incontinence compared to those with stress incontinence in unadjusted models, the overall difference in self-reported impact between women with urge vs stress incontinence did not persist after adjustment for age, race, self-reported health and incontinence severity (table 3). Nevertheless, women with urge incontinence did report a significantly increased impact on the travel and emotional domains of the IIQ compared to those with stress incontinence after adjustment. There were no significant differences in the quality of life impact between urge and mixed incontinence on multivariate analysis.

DISCUSSION

In this population based, ethnically diverse cohort of middle-aged or older women with weekly incontinence we found that mixed incontinence was associated with a substantially greater overall impact on quality of life compared to stress incontinence independent of age, race/ethnicity, health status and clinical severity of incontinence. In contrast, there was no significant difference between mixed incontinence and urge incontinence, or between urge and stress incontinence after adjusting for other demographic and clinical characteristics. These findings suggest that women who have a mixture of stress and urge incontinence may be at especially high risk for experiencing functional limitations or decreased well-being as a result of urinary symptoms regardless of comorbid factors.

At this time assessment of incontinence type is recommended as part of the standard evaluation of incontinence in women, primarily because different types of incontinence call for different types of treatment. However, our findings suggest that evaluation of incontinence type may

also be important in identifying those women with mixed symptoms who are most likely to find their incontinence symptoms to be functionally or psychologically burdensome. This is important because not all women are equally bothered by their incontinence symptoms, and previous studies have shown that women who experience a greater quality of life impact related to incontinence are more likely to seek and adhere to treatment for incontinence.¹⁵

Interestingly, compared to women with stress incontinence, women with mixed and urge incontinence tended to report a greater specific impact on the travel and emotional domains of the IIQ. Both findings persisted after adjustment for other demographic and clinical characteristics, and arguably highlight an important difference in how different clinical types of incontinence restrict women's activities and affect their emotional state. It is plausible that the unpredictable nature of urge incontinence offers an explanation for the disproportionate impact on the travel and emotional domains of quality of life seen in women with mixed and urge incontinence. The travel domain assesses women's ability to travel by vehicle away from home or to go to places where they are unsure of restroom availability, while the emotional domain assesses feelings including fear, nervousness, frustration and embarrassment. It is logical that women with unpredictable episodes of urge incontinence would be reluctant to travel to locations where they could not easily reach a restroom. Similarly, not knowing when to expect an episode of incontinence may incite fear or anxiety, while leakage at an inopportune time would result in frustration and embarrassment. In contrast, women with stress incontinence can more easily anticipate and avoid inciting factors of their incontinence even when unable to get to a restroom. Other aspects of women's functioning and well-being may be less likely to be affected by the timing and context of their incontinence symptoms.

Our findings are consistent with those of 3 other population based studies that concluded that mixed and urge incontinence have a greater effect on quality of life than stress incontinence,^{2,8,16} although they are in contrast to 2 studies that found stress incontinence to have a greater impact than urge incontinence.^{3,7} However, the majority of these earlier studies were significantly smaller, with less than half the number of incontinent participants,^{2,7,8,16} and/or did not use disease specific measures of quality of life.^{7,8} Additionally, most other existing studies were based on samples of clinic patients, which tend to over select for women who seek treatment for symptoms that are especially disruptive.^{3,6,7}

Using self-report to determine the clinical type and severity of incontinence could be considered a limitation of the study. However, the questions used to distinguish stress from urge incontinence have been shown to correlate well with urodynamic classification and to be reproducible.^{12,17} Furthermore, trained interviewers reviewed women's answers to self-reported questionnaires to ensure that they understood questions about the clinical type of incontinence.

CONCLUSIONS

We found that middle-aged or older women with mixed incontinence were 2 to 3 times more likely to experience a greater quality of life impact from incontinence compared to those with stress incontinence. Identification of women with mixed incontinence symptoms may be helpful in discovering which women are most likely to experience functional limitations and decreased well-being from incontinence.

Abbreviations and Acronyms

IIQ, Incontinence Impact Questionnaire; RRISK, Reproductive Risks of Incontinence Study at Kaiser.

Acknowledgment

RRISK was supported by the National Institute of Diabetes and Digestive and Kidney Diseases Grant DK53335 and the National Institute of Diabetes and Digestive and Kidney Diseases/Office of Research on Women's Health Specialized Center of Research Grant P50 DK064538.

Supported by an independent research grant from Pfizer, Inc.

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Demographic and clinical characteristics

Table 1

| | No. Clinical Type of Incontinence (%) | | | | p Value* |
|---|---------------------------------------|---------|----------|----------|----------|
| | Total | Mixed | Urge | Stress | |
| Total | 530 | 124 | 185 | 221 | |
| Age: | | | | | 0.03 |
| 40-59 | 104 (20) | 19 (15) | 32 (17) | 53 (24) | |
| 50-59 | 207 (39) | 48 (39) | 73 (39) | 86 (39) | |
| 60+ | 219 (41) | 57 (46) | 80 (43) | 82 (37) | |
| Race/ethnicity: | | | | | <0.01 |
| Black | 87 (16) | 14 (11) | 49 (26) | 24 (11) | |
| Asian | 59 (11) | 14 (11) | 25 (14) | 20 (9) | |
| White | 267 (50) | 61 (49) | 82 (44) | 124 (56) | |
| Latina | 108 (20) | 33 (27) | 27 (15) | 48 (22) | |
| Employment status: | | | | | 0.99 |
| For pay | 319 (60) | 75 (60) | 111 (60) | 133 (60) | |
| Not for pay | 211 (40) | 49 (40) | 74 (40) | 88 (40) | |
| Household income/yr: | | | | | 0.16 |
| Less than \$40,000 | 137 (28) | 34 (30) | 47 (27) | 56 (27) | |
| \$40-\$79,000 | 204 (41) | 50 (44) | 75 (44) | 79 (38) | |
| \$80,000 or More | 154 (31) | 30 (26) | 50 (29) | 74 (35) | |
| Body mass index (kg/m ²): | | | | | 0.16 |
| Less than 25 | 127 (24) | 22 (18) | 46 (25) | 59 (27) | |
| 25-29 | 158 (30) | 37 (30) | 57 (31) | 64 (29) | |
| 30-34 | 118 (22) | 33 (27) | 35 (19) | 50 (23) | |
| 35-39 | 73 (14) | 20 (16) | 28 (15) | 25 (11) | |
| 40 or Greater | 50 (10) | 10 (8) | 18 (10) | 22 (10) | |
| General health: | | | | | 0.01 |
| Excellent | 69 (13) | 8 (6) | 26 (14) | 35 (16) | |
| Very good/good | 360 (68) | 83 (67) | 129 (70) | 148 (67) | |
| Fair/poor | 101 (19) | 33 (27) | 30 (16) | 38 (17) | |
| Clinical severity of incontinence: [†] | | | | | <0.01 |

| | No. Clinical Type of Incontinence (%) | | | | p Value* |
|-----------------------|---------------------------------------|---------|----------|----------|----------|
| | Total | Mixed | Urge | Stress | |
| Moderate | 383 (72) | 75 (60) | 137 (74) | 171 (77) | |
| Severe | 124 (23) | 41 (33) | 38 (21) | 45 (20) | |
| Very severe | 23 (4) | 8 (6) | 10 (5) | 5 (2) | |
| Parity: | | | | | 0.27 |
| Nulliparous | 78 (15) | 14 (11) | 32 (17) | 32 (14) | |
| Cesarean section only | 20 (4) | 8 (6) | 9 (5) | 3 (1) | |
| Vaginal × 1 | 78 (15) | 16 (13) | 30 (16) | 32 (14) | |
| Vaginal × 2 | 130 (25) | 32 (26) | 41 (22) | 57 (26) | |
| 3+ Vaginal | 211 (40) | 53 (43) | 67 (36) | 91 (41) | |

Data reflect missing values for race (9), household income (35), body mass index (4) and parity (13). Percentages may not add to 100 due to rounding.

* For overall difference by clinical type of incontinence using chi-square tests.

† Assessed by the Sandvik Severity Index.

Table 2

IIQ scores by clinical type of incontinence

| IIQ Scale | IIQ Range | Median Score (IQR) | | | | p Value* |
|-----------|-----------|--------------------|-----------|-----------|-----------|----------|
| | | Overall | Mixed | Urge | Stress | |
| Total | 0-400 | 17 (4-52) | 29 (7-85) | 17 (4-52) | 13 (0-38) | <0.01 |
| Travel | 0-100 | 0 (0-11) | 6 (0-22) | 6 (0-17) | 0 (0-6) | <0.01 |
| Social | 0-100 | 0 (0-10) | 3 (0-16) | 0 (0-7) | 0 (0-7) | <0.01 |
| Emotional | 0-100 | 8 (0-21) | 13 (2-29) | 8 (0-25) | 4 (0-17) | <0.01 |
| Physical | 0-100 | 0 (0-7) | 0 (0-13) | 0 (0-7) | 0 (0-7) | 0.04 |

* Test of heterogeneity based on the Wilcoxon rank sum test.

