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Conservative Interventions for Urinary Incontinence in Frail Community-Dwelling Older Adults: A Literature Review

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Abstract

PURPOSE—This systematic literature review aimed to identify conservative interventions for reducing urinary incontinence (UI) in non-institutionalized frail older adults.

METHOD—Randomized and quasi-experimental studies published in English reporting outcomes on UI frequency, severity, or quality of life were included and rated for quality. Studies reporting improvements over 50% in UI outcomes were considered clinically significant.

RESULTS—Seven studies with 683 participants (75% female) were eligible. Multicomponent behavioral interventions including pelvic floor muscle exercises and bladder training had the strongest evidence for reducing UI. There was limited evidence that suggested that comprehensive geriatric assessment with multicomponent behavioral interventions, pattern urge response training, and toilet skills training may be beneficial.

CONCLUSIONS—There is insufficient evidence to derive firm conclusions regarding the use of conservative interventions. Clinical trials are needed on a variety of interventions to guide practice on UI prevention and management in frail community-dwelling older adults.

Problem Statement and Purpose

Urinary incontinence (UI) is a costly condition impacting many older adults. It affects more women, and becomes more common with advancing age and with increasing frailty. For community-dwelling adults age 65 years and older, approximately 44% of women and 29% of men have UI. These percentages increase to 57% for women and 43% for men age 80+. Nursing home residents experience more UI than independently living older adults with prevalence ranging from 60-78% for women and 23-72% for men.¹ It affects more than half of older homebound adults,² home-health care recipients,^{3, 4} and adult daycare participants.⁵ In 2000, it cost over \$14 billion dollars to manage UI in the community and \$5 billion in nursing homes exceeding the cost of treating pneumonia, influenza, and breast cancer.⁶

UI treatments in frail older adults require special consideration because UI is more likely to develop from the interaction of age related changes in the urological system, co-morbidity, declining physical and cognitive function, and environmental barriers.¹ Since many frail adults can not tolerate antimuscarinic medications and surgical interventions, treatment

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starts with conservative behavioral and lifestyle interventions.⁷ Pelvic floor muscle exercises⁸ improve UI in independently living older adults and habit training,⁹ timed¹⁰ and prompted voiding^{11, 12} improve UI in nursing home residents.

There are few clinical guidelines for the prevention and treatment of UI in frail older adults. Most are written for the general adult population and are becoming outdated. The Agency for Healthcare Research and Quality (AHRQ) has not updated their guidelines since 1996.¹³ The International Consultation on Incontinence^{7, 14, 15} has the most current and comprehensive guidelines, yet most of their recommendations are based on frail older adults living in nursing homes and it is unclear how these could be implemented in settings where nursing support is not available 24 hours a day. Given the difference in nursing resources available between settings, understanding which interventions are effective outside of the nursing home will help develop programs to prevent or delay nursing home placement triggered by UI. Therefore, the purposes of this paper were to identify conservative interventions effective at preventing or managing UI in frail older adults who do not live in nursing homes, to rate the quality of this evidence, and to identify clinical guidelines to guide practice.

Methods

A comprehensive search of the literature performed in 2007 was updated and experimental and quasi-experimental studies on conservative (non-drug and non-surgical) treatments of UI for frail older adults identified.¹ PubMed was searched using the MESH terms “urinary incontinence/epidemiology,” “urinary incontinence/prevention and control,” and “urinary incontinence/rehabilitation.” The search was limited to English language journal articles published between 1965 and 2010 with participants age 65 years and older. All abstracts were dually screened for eligibility. The Cochrane Database and National Guideline Clearing House were searched for practice guidelines using the term “urinary incontinence.”

Eligible studies reported outcomes on UI frequency, volume, severity, or quality of life (QOL) in samples including non-institutionalized frail adults age 60 years. Frail was defined as having functional impairments, being homebound, or requiring assistance with daily activities. Studies enrolling only participants with a specific disease (e.g., Parkinson’s) were excluded. To be consistent with current recommendations for conducting research with frail older adults, samples with significant cognitive impairment were excluded because they pose methodological challenges that are specifically addressed in the dementia literature.¹⁶ Samples had significant cognitive impairment if the mean score on standardized screening tests equaled diagnostic thresholds or more than one-third of participants had dementia. The heterogeneity of the interventions and study outcomes precluded meta-analysis to pool efficacy results; therefore a narrative review was undertaken. Studies reporting statistically significant improvements greater than 50% in UI outcomes were considered to have clinically significant findings.^{17, 18} The US Preventative Services Task Force evidence stratification system was used to assess study quality because it provides criteria for rating the internal and external validity of intervention trials.¹⁹ A table summarizing the quality of eligible studies is available on-line.

Results

Interventions

Seven studies including 683 participants were eligible. Figure 1 identifies the reasons for exclusion. Table 1 summarizes the study characteristics and findings. There were three randomized controlled trials^{20, 21, 22} and four quasi-experimental studies.²³⁻²⁶ Five studies targeted multicomponent behavioral strategies including: pelvic floor muscle exercises

(with²⁰ and without²³⁻²⁶ biofeedback assistance), bladder training,^{20, 22-25} modification of caffeine and fluid intake,²³⁻²⁶ constipation management,^{23, 26} and strategies to suppress urgency and stress symptoms.^{20,23, 24} One study investigated comprehensive geriatric assessments²⁶ and another focused on improving toileting skills.²¹ The interventions were provided by nurses, physical and occupational therapists, physicians, and interdisciplinary teams. Most providers were nurses.

Three multicomponent behavioral studies including pelvic floor muscle exercises and bladder training found similar significant improvements of 75-80% in UI episodes in homebound older adults.^{20, 23, 25} Only one of these three studies was a randomized controlled trial providing Level I support for a home-based nurse practitioner delivered intervention combining biofeedback-assisted pelvic floor muscle exercise, bladder training, urge and stress suppression, and management of modifiable health conditions and environmental barriers.²⁰ The other two studies followed a single group over time and provided level II-3 support for multi-component interventions provided by home health care nurses²³ and for the A+ Links Bladder Retraining program provided by continence nurse specialists and physical therapists.²⁵ The study investigating the A+ Links Bladder Retraining program was the only one to examine QOL reporting improvements ranging from 9-19% ($p < .0001$).²⁵ A fourth study with a weak design did not support a clinically significant change in UI (Level III). In this study only 30-35% of participants in a 1-hour group education program with optional individualized assessments reported improvements in urgency, emptying their bladders, control of sudden leakage, decreased UI and fewer trips to the toilet.²⁴

One study found that combining multicomponent behavioral strategies with comprehensive geriatric assessments performed by an interdisciplinary care team in a clinic setting resulted in 67% of their 112 homebound patients reporting improved or resolved UI at program end.²⁶ The interdisciplinary care team consisted of a continence nurse specialist, consultant geriatrician and physician and registered nurse trainees.

One randomized controlled trial of an 8 week physical and occupational therapy toileting skills program resulted in a non-statistically significant decrease of 8-38% in UI volume as measured by pad tests (Level I). However, there was a trend toward improvements in daytime ($p = .05$) and nighttime toileting skills ($p = .06$).²¹

Pattern Urge-Response Toileting (PURT) a type of habit training was taught to participants or participant caregivers and reduced the number of incontinent episodes over 24 hours by 18% (mean number of episode decreased from 4.9 to 4.0, $p < .02$) and reduced the volume of UI over 24 hours by 39% (mean volume decreased was 188 mls, $p < .04$).²²

Clinical Guidelines

Only two clinical practice guidelines from the International Continence Society's (ICS) Fourth International Consultation on Incontinence^{7, 14, 15} and Assessing Care of Vulnerable Elders (ACOVE)^{27, 28} included recommendations specific to frail older adults. Both guidelines recommend addressing the multiple factors that contribute to UI in frail older adults. Assessment starts with identifying the type, frequency, amount, and timing of UI (a bladder diary can be used). Treatment considerations include: level of cognitive and functional abilities, degree of bother in implementing the treatment for both the older adult and their caregiver, goals for care, cooperation, overall prognosis, and life expectancy. Behavioral strategies should be attempted first and be combined with comorbid disease and medication management, optimization of functional limitations, and environmental modification.

Discussion

There is scant literature with low levels of evidence to guide UI management in frail older adults not living in a nursing home. No studies investigated prevention of UI and only one included QOL as an outcome. Multicomponent behavioral interventions including pelvic floor muscle exercises and bladder training had the strongest evidence for improving UI frequency.^{20, 23, 25} However, only one study provided the highest level of support for these interventions.²⁰ Comprehensive geriatric assessments combined with multi-component behavioral interventions resulted in a majority of participants reporting improved or resolved UI, but determining if they had clinically significant improvements was not possible because UI frequency and severity were measured with categorical variables. Habit training with or without caregiver assistance and toileting skills training resulted in modest reductions in UI that were either not statistically or deemed clinically significant.^{17, 18}

Despite clinical guideline recommendations, none of the studies included interventions to improve functional impairments. Since functional impairments with gait speed, balance, and leg strength have been associated with UI in frail older adults,²⁹ interventions targeting functional impairment may optimize continence status. Functional incident training which combines mobility and transfer training with prompted voiding has reduced UI in nursing home residents.^{30, 31} Programs combining physical activity and conservative continence treatments should be tested outside the nursing home setting.

Limitations with the studies in this review include inconsistent definitions of frailty and variable measures of UI. Future research should use standardized measures of frailty and UI. The International Consultation on Incontinence⁷ recommends using the Vulnerable Elders Survey to measure frailty.³² Other frailty instruments measuring accumulation of deficits,³³ and the frailty phenotype³⁴ are also available. Standardized measures of UI should include severity, patient goals and preference, condition-specific QOL, and economic considerations.⁶

In conclusion, there is need for more randomized clinical trials to demonstrate the efficacy of conservative treatments to guide clinical practice in the prevention and management of UI in frail older adults. This need is especially critical given the rapidly aging population who face a high risk of UI with its associated psychosocial and economic burdens.

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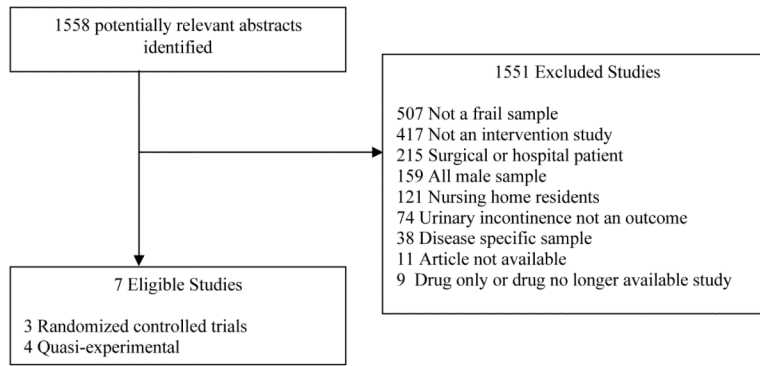


Figure 1. Number of Articles Identified in the Literature Search and Reasons for Exclusion

Table 1
 Summary of Study Characteristics, Intervention Components and Urinary Incontinence(UI) Outcome by Setting

Study and Intervention	Design	Sample Characteristics	Frail Definition and Level of Cognitive Impairment	Urinary Incontinence Outcome	Level of Evidence*
HOMEBOUND					
McDowell 1999 ²⁰ Biofeedback assisted pelvic floor muscle exercises, urge and stress suppression, bladder training for 8 weeks vs. social interaction	Randomized controlled trial with delayed-treatment group	N=105 91% women 77 mean age	Homebound Mini Mental Status Exam Score = 24	75% (p<.001) improvement in daily episodes per diary	Level I
Rose 1990 ²³ Pelvic floor muscle exercise, habit training, biofeedback, relaxation exercises, diet modification, and bowel regimens for 4 weeks	Single group pre/post test	N=39 85% women 77 mean age	Homebound Adequate cognitive capability to implement behavior change	78% (p<.02) and 79% (p<.0005) improvement in weekly episodes per diary	Level II-3
Karon 2005 ²⁵ Individualized bladder training, pelvic floor muscle exercises, education on adequate hydration and caffeine reduction for 3 months	Single group pre/post test	N=50 68% women 68 mean age	Homebound Adequate cognitive capability to implement behavior change	79-80% (p<.001) improvement in daily episodes per diary	Level II-3
Harari 2009 ²⁶ Comprehensive geriatric assessment, pelvic floor muscle exercises, bladder training, caffeine reduction, fluid consumption, prompted voiding, chronic disease management for 6 weeks	Single group pre/post test	N=112 78% women 80 mean age	Homebound 33% of participants had dementia diagnosis or Abbreviated mental test score = 7/10	23% reported UI resolved 44% reported UI improved 30% reported UI unchanged 3% reported UI worse	Level III
ASSISTED LIVING & SENIOR APARTMENTS					
Schrim 2004 ²⁴ 1-hour group education with optional individualized treatment	Single group post test	N=180 85% women 47-100 age range	Adults living in independent & assisted living facilities Cognitive function not reported	30-33% reported improvement	Level II-3
ADULT DAY CARE & HOMES FOR THE ELDERLY**					
van Houten 2007 ²¹ Toilet skills training for 8 weeks vs. no treatment control	Randomized controlled trial	N=57 100% women 83 mean age	Mild/moderate impairment on performance oriented timed toileting instrument No evident dementia	24 hour pad test improved 8% (p=.07) 24 hours 22% (p=.47) daytime 35% (p=.15) nighttime	Level I
COMMUNITY DWELLING FRAIL					
Colling 2003 ²² Pattern Urge Response Training for 6 weeks	Randomized controlled trial with delayed-treatment group	N=78 81% women 76 mean age	Requires assistance with 2+ activities of daily living Mean Short Portable Mini-mental status Questionnaire score = 2.4	18% (p .02) improvement in UI episodes over 24 hours 39% (p .04) improvement in UI volume over 24 hours	Level I

* Level I evidence from properly designed randomized controlled trial; Level II-1 evidence from well-designed controlled trials without randomization; Level II-2 evidence from well-designed cohort or case-control analytic studies; Level II-3 evidence from multiple time series with or without the intervention; Level III opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.¹⁹

*** Sample included combination of adult day care participants, residents of homes for the elderly and nursing homes.