Educational and Behavioral Modification Programs for Urinary Incontinence among Older Women: A Systematic Review

NEW YORK MEDICAL COLLEGE
School of Health Sciences and Practice
—and—
INSTITUTE OF PUBLIC HEALTH

Rhea P. Olegario[1], MPH, CHES, SRAS and Chia-Ching Chen[2], EdD, MA, MS, CHES, SRAS

Department of Epidemiology and Community Health, School of Health Sciences & Practice, New York Medical College, Valhalla, New York; [1]E-mail: Rhea_Olegario@nymc.edu; [2]E-mail: Chia-Ching_Chen@nymc.edu

BACKGROUND

- ✓ Urinary incontinence (UI) is the inability to control the release of urine out of one's bladder
- ✓ UI is a condition that is prevalent among older women in the US (Sempselle et al., 2004)
- ✓ UI can affect many aspects of a woman's physical, psychological, and social life, which in turn affect overall quality of life (QoL)
- ✓ It is often an unrecognized medical problem by primary care clinicians and in the field of public health
- ✓ Few studies have focused solely on primary preventive methods of education and behavior modification techniques of stress, urge, and mixed UI (the most common forms of UI among older women) in middle-aged (45-64 years) and elderly (65+) women (Wyman, 2003)
- ✓ It has been estimated that the total economic cost of UI was about $12 billion in the United States in 2000 (Hu et al., 2003)

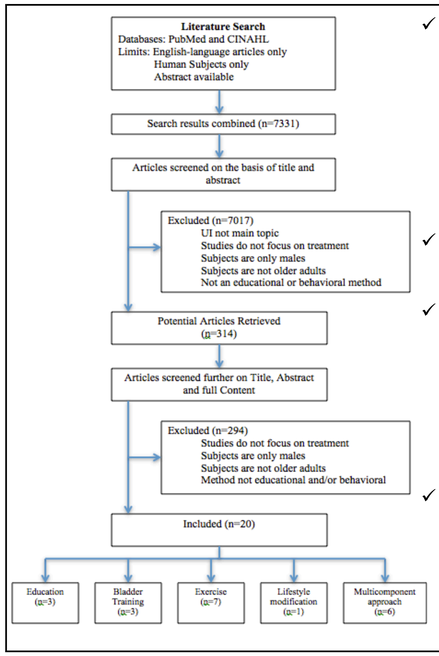
PURPOSE & LEARNING OBJECTIVES

The purposes of this study are to (1) analyze evidenced-based, primary preventive approaches to UI among women aged 45 and older, (2) examine the efficacy of such evidenced-based interventions, (3) identify gaps and directions in conducting future research, and (4) make policy recommendations for public health practice among middle-aged and older women

Learning Objectives

1) Assess the efficacy of evidence-based educational and behavior modification programs on stress, urge, and mixed UI among older women
2) Identify potential future directions on research and health policy related to UI among older women

METHODS



- ✓ Inclusion Criteria:
  - At least 50% female subjects
  - At least 50% of subjects who were 45 years or over
  - Utilized only the primary preventive methods of education and behavioral modification programs
  - Focused only on stress, urge, or mixed UI
- ✓ The search was conducted on studies published from 1973-January 2013
- ✓ The search involved using key terms (e.g. *urinary incontinence* and *urinary leakage)* for education, monitoring, exercises, lifestyle changes, or multicomponent primary preventive approaches to UI
- ✓ All studies included outcome measures such as UI frequency and quantity, QoL, help-seeking behavior, and knowledge attained (often measured subjectively)

RESULTS

TABLE 1. Summary of Studies on Educational, Monitoring, and Lifestyle Modification Programs on UI among Older Women

#	Study	UI Type	Sample	Objective	Methods	Results	Limitations	Discussion
EDUCATIONAL PROGRAM								
1	O'Connell et al. (2006) Descriptive and Exploratory	UI, in general	N=111 70% Females Mean age=61	To review whether participants who were given a continence education package, which included a Continence Educational Brochure (CEB), and who indicated that there were bothered by incontinence symptoms changed their health-seeking behaviors about their incontinence problem because of being given the brochure	Participants in the sample bothered by a continence problem were interviewed 3 months after being given the CEB	-2/3 of total sample participants (n=111) sought help for their continence problem -44.1% discussed issue of bladder and bowel problems directly due to the information from brochure -94% believed that the brochure would be helpful to other people	-Participants who could not speak English, not communicate verbally, or were assessed by a health professional to be confused were excluded -Biases affect generalizability	-CEB prompted individuals to discuss their continence problem and in fewer cases seek professional help -Continence education package can be a valid health promotion strategy
2	Niewijk & Weijts (1997) Post-test design Netherlands	UI, in general	N=134 69% female Mean age=63	To describe an evaluation of the Telaac course, a multimedia course (television lessons, textbook, radio lessons) to inform people who suffer from UI, the condition's causes, options for treatment, and prevention	-A written questionnaire was given to participants -An additional qualitative assessment through personal interviews was given to some participants suffering from UI	-70% of participants indicated that they "learned a lot from the course" -66% practiced exercises regularly after the course -63% discussed urine loss with other persons -26% consulted a professional -51% experienced an improvement of UI due to participation in course	-Pre-posttest design and control group would have been preferable -Self-reported surveys	-Dutch population is aging, so can be a potential way to reach a larger population -Consider methods of internet, video tapes to be distributed by physicians, or possibly the internet
3	Van Eijken et al. (2003) Randomized controlled trial	UI, in general	N=687 55% female Mean age=75	To determine the effects of a health education (includes UI, hearing impairment, visual impairment, depression, and Lower Urinary Tract Symptoms education) strategy for older adults living at home on GP attendance	Random assignment to treatment (health education on 5 potentially treatable health outcomes including UI) or control group	-Health education did not change the GP attendance of older adults -No significant change in discussing UI with GP -Older people found health education useful but did not change their health behavior	-Follow-up period may have been too short (3 months) -Recall bias -Selection bias (dropouts had lower education level, large number of women, and poorer health status)	-Information from questionnaires such as the one conducted in the study can be used to target interventions on groups with specific health problems -Further research to explore ways to reach older adults in GP practice, and research ways to overcome unnecessary barriers for not seeking help
MONITORING								
4	Subak et al. (2002) Randomized controlled trial	UI, in general	N=152 100% female Mean age=69	To evaluate the effect of a low-intensity behavioral therapy program on urinary incontinence in older women	-Random assignment to behavior therapy group (6 weekly sessions on bladder training and individualized voiding schedules) or control group (no instruction, only bladder diaries for 6 weeks)	-After intervention, treatment group reported 50% reduction in mean number of UI episodes compared to 15% reduction in control group -1/3 believed that the program helped them a great deal with UI problem	-Selection bias -Generalizability issues due to one location of study -Type of UI based on participants' description	-Best intervention is one that is low risk, inexpensive, effective, and can be initiated effectively and easy by health care providers
5	Yoon et al. (2003) Randomized, controlled trial	UI, in general	N=44 100% female Age range=35-55	To compare the effectiveness of BT and Pelvic Floor Muscle Training (PFMT) in the treatment of UI in women	Random assignment to BT intervention, PFMT intervention, or control group	-BT was more effective in reducing UI frequency and increasing voiding volume -PFMT was more effective in increasing the peak and average of pressures of PFM contraction	-Comparison study—does not just focus on BT-	-Further research to explore the relationship among the various outcome measures of UI
6	Fantl et al. (1991) Randomized controlled trial Japan	Stress, Urge, and Mixed	N=131 100% female Mean age=67	To evaluate the efficacy of a BT program on older women with UI	-Participants stratified into group with Stress UI and group with Mixed UI -Each strata received a random assignment to treatment (six week BT protocol) or control group -Control group received BT protocol after 6 week trial	-After treatment, UI episodes were significantly decreased—all UI types -BT reduced quantity of fluid lost and associated irritative symptoms as frequent daytime and nighttime urination	-Limited generalizability due to homogenous characteristics of study population -Possible selection bias -Relation between "objective" and "subjective" improvement	-BT provides an potential cure or improvement to UI without significant risks, burdens, or complications -BT should follow evaluation if additional therapies may be necessary
LIFESTYLE MODIFICATION								
7	Subak et al. (2009) Randomized controlled trial Weight Loss US	Stress, Urge, and Mixed	N=338 100% female Mean age=53	To determine whether a behavioral weight-reduction intervention for overweight and obese women with incontinence would result in greater reductions in the frequency of incontinence episodes at 6 months as compared with a control group	Random assignment (2:1) to an intensive 6 month behavioral weight-loss program or to a structured education program (control)	-After intervention, weight-loss group had a 47% decrease in UI episodes per week. -Women in weight loss group perceived a greater decrease in UI frequency and lower urine volume loss	-Generalizability limited due to participants being selected for their potential to adhere to behavioral weight-loss intervention -Participants not blinded -Self-reported incontinence episodes	-Future studies should focus on weight-loss combined with other incontinence interventions (PFMT) -Weight-loss can be a first-line treatment for overweight and obese women with UI

The search yielded 20 evidenced-based studies on educational and behavioral modification programs that were relevant for this review.

Educational Programs (Table 1)

- ✓ All 3 studies included a focus on improving UI awareness and knowledge (overview, prevention, and treatment) and promoting help-seeking behavior.
- ✓ Positive outcomes were seen in the studies that focused on improved help-seeking behavior and knowledge.
- ✓ Furthermore, findings revealed a great potential in positive outcomes with the utilization of advanced technology to facilitate UI awareness and knowledge.

Monitoring (Table 1)

- ✓ UI monitoring involves bladder training (BT) and bladder diaries.
- ✓ One study found that BT was more effective than pelvic floor muscle training (PFMT) in reducing UI frequency and increasing voiding volume.
- ✓ Overall, BT had decreased volume of urine loss and UI frequency among the studies.
- ✓ BT offers itself as a method that is low cost, low risk, and relatively easy for both individuals to carry out and healthcare providers to promote.

Lifestyle Modification (Table 1)

- ✓ A decrease in weight loss among obese women was shown to significantly reduce UI frequency and volume loss.

Exercise (Table 2)

- ✓ The exercises described in this review include mostly pelvic floor muscle training (PFMT) and circular muscular exercise to address UI.
- ✓ PFMT is simple, non-invasive, and inexpensive nature, and works to strengthen the muscles of urination.
- ✓ UI episodes were reported to have been reduced or improved in all 7 studies involving PFMT
- ✓ Many of the studies highlighted results of positive perceptions of PFMT that can be categorized as improved self-efficacy in managing UI.

Multicomponent Approach (Table 3)

- ✓ Studies that utilized multicomponent approaches to addressing UI recorded a greater majority of statistical significance and reductions in UI episodes than those studies conducted with one approach.
- ✓ All studies incorporated PFMT, and most also include BT along with an educational aspect.
- ✓ Findings on this section support existing studies on UI on the greater efficacy of multicomponent approaches.

TABLE 2. Summary of Studies on Exercise Programs on UI among Older Women

#	Study	UI Type	Sample	Objective	Methods	Results	Limitations	Discussion
8	Arvonen, Fianu-Jonasson, & Tyni-Lenne (2001) Randomized controlled trial	Stress	N=37 100% female Age range=25-65	To compare PFMT with and without vaginal balls and to collect information on women's subjective feelings about the two training modes	-Random assignment to PFMT program or to PFMT program with weighted vaginal balls for 4 months	-Both training with vaginal balls and PFM training alone reduced urinary leakage and increased muscle strength -Improvement in urinary leakage was significantly better in training with vaginal balls than with PFM training alone -After end of intervention, 26% in PFM training alone and 50% in PFM with vaginal balls had no demonstrable urinary leakage	-Not blind study -Outpatient activity and no daily training diaries may affect their motivation for daily training	Both methods decreased urinary leakage but training with vaginal balls was shown to be more effective -PFM training alone was satisfactory because it could be performed as part of other activities -Need for further studies to focus on optimal training modes for women with Stress UI
9	Kim et al. (2007) Randomized crossover trial Japan	Stress	N=70 100% female Age ≥ 70 yrs.	To evaluate the effectiveness of PFM and fitness exercises in reducing urine leakage in elderly women with stress UI	-Random assignment to PFM and fitness exercise intervention or control group -Crossover occurred for the control after 3 months for which the intervention was delivered	-No significant changes in control group -Maximum walking speed and adductor muscles strength increased significantly in intervention -More than half in intervention and about one-tenth of control reported being continent after 3 months of exercise	-Data do not support a positive correlation between strengthening of adductor muscles and improvement of UI -Self-reported data on urinary leakage -PFM not measured	-Decrease in BMI and increase in walking speed may reduce stress UI in older women
10	Kim et al. (2011a) Randomized controlled trial Japan	Stress, Urge, and Mixed	N=127 100% female Age ≥ 70 yrs.	To determine the effects of multidimensional exercise treatment on reducing urine leakage in elderly Japanese women with stress, urge and mixed UI	Random assignment to multidimensional (stretching, PFM, and fitness) exercise treatment or to general education classes (control)	-Significant differences in UI and functional fitness among groups -Intervention showed to be significantly effective in stress, urge and mixed UI	-Self report for UI type and UI episodes -PFM strength was not measured	-Multidimensional exercises may be effective in for the main types of UI -Compliance and BMI reduction were a consistent predictor for effectiveness of treatment
11	Kim et al. (2011b) Randomized controlled trial Japan	UI, in general	N=61 100% female Age ≥ 70 yrs.	To evaluate the effects of multidimensional exercises targeted at reducing symptoms of functional decline, UI, and fear of falling in community-dwelling Japanese elderly women	Random assignment to multidimensional (muscle strength, walking ability and PFM) exercise intervention or general health education class (control)	-UI for intervention group decreased after intervention—control group did not	-Self-report of functional decline, UI, and fear of falling and not confirmed by objective and clinical methods -No explanation for the mechanism of how increasing physical fitness improves MSGS	-Multidimensional strategies can be effective for reducing geriatric syndromes in in elderly population
12	Liebergall-Wischnitzer et al. (2009) Randomized controlled trial	Stress	N=245 100% female Mean age=48	To examine whether the circular muscle exercise (Paula) and PFMT methods are equivalent in reducing Stress UI and to evaluate the effectiveness of the methods in terms of QoL and other symptoms	Random assignment to 12 weeks of circular muscle exercise group or PFMT group	-Circular muscle exercise and PFMT method reported a decreased in urinary leakage and improved subjective assessments of Stress UI and QoL -15% more cures in circular muscle exercise than PFMT method	-Self-report to determine type of UI -27% dropout rate	-Paula method is 10x more expensive than PFMT method -Further research on the mechanism of Paula method
13	Pereira, Correia, & Driusso (2011) Randomized controlled study	Stress	N=49 100% female Mean age=61	To compare the effects of PFMT performed during group treatment sessions (GT) and individual treatment sessions (IT) to a control group of women with Stress UI	Random assignment to PFMT protocol in GT for six weeks or IT or to control group	-Significant reduction in urinary loss in IT group after treatment -Significant increase in pressure by PFM in GT and IT -Significant improvements in QoL scores for GT and IT groups	-Therapist who carried out evaluation and treatment was not blinded -Small sample size -Absence of urodynamic diagnoses	-Studies on low cost treatments contributes to the development of efficient treatment protocols with less expense for the public health system -GT as opposed to IT may be a way to carry out high quality treatment with lower investment
14	Williams et al. (2006) Randomized controlled trial United Kingdom	Stress and Mixed	N=238 100% female Age ≥ 40 yrs.	To assess the efficacy and cost-effectiveness of pelvic floor muscle therapies (PFMT) in women aged ≥ 40 years with stress and mixed UI	Random assignment to intensive PFM training, vaginal cone therapy, or continue with primary behavioral prevention (informational packet with advice on PFM exercises)	-No statistical significant difference among groups, although all had moderate reduction in UI episodes, and marginal improvements in voiding frequency	-Participants recruited were not treatment seeking—so might excluded those with severe cases of UI that sought help -PFMT delivered by trained skilled nurses and not expert physiotherapists -More intensive PFMT might have been more effective	-Continuing behavioral therapies can imply further improvement for stress and mixed UI -Addition of PFMT and vaginal cone therapy does not appear to contribute to further improvement

RESULTS

TABLE 3. Summary of Studies on Multicomponent Approaches to UI among Older Women

#	Study	UI Type	Sample	Objective	Methods	Results	Limitations	Discussion
15	Diokno et al. (2004) Randomized controlled trial Education, BT, PFMT	UI, in general	N=359 100% female Age ≥ 55 yrs.	To determine whether a behavioral modification program, BMP, taught to groups of continent older women would decrease the incidence of urinary incontinence, increase pelvic muscle strength and improve voiding control	Random assignment to behavioral modification program [BMP] to control, no treatment group	-At 12 months the BMP group had statistically better continence results than control group -Efficacy and feasibility of BMP for treating UI	-Blinding did not occur—possibly bias by nurse interviewer -Large dropout rate in treatment group	-One of the first RCT studies to use BMP in preventing UI among older women -Feasible and efficacious study
16	Hines et al. (2007) Randomized controlled trial BT, PFMT	UI, in general	N=359 100% female Age range=55-80	To assess factors predictive of high adherence to a behavioral intervention (PFMT and BT) to prevent UI	Random assignment into treatment group (PFMT and BT group education session) or control	-Those who adopted the approach of doing PFMT at routine times of the day had a 12-fold likelihood of achieving adherence during initial 3 months, and a 2.7-fold greater likelihood of maintaining a high level of adherence out to the end of the first year of follow-up	-Limitation of open-ended survey	-Adherence levels likely reflect to some extent the context of a clinical trial where participants have committed to the intervention for research purposes -PFMT and BT regiments might be used to address real symptoms rather than primary prevention as regimens intended in the parent study
17	Karon (2005) Single group, pre-posttest Education, BT, PFMT	UI, in general	N=50 68% female Mean age=68 New Zealand	To assess the effectiveness of a bladder retraining program via client outcomes	-Kings Health Questionnaire on incontinence and Abbreviated Mental Test Score were given to participants -Randomly selected for telephone prompts on complying to exercise program	-23% reported UI resolved -44% reported UI improved	-No data collected on regimen of PFMT or holding techniques -Participants had high co-morbidities so very individualized action plan -More accurate assessments of severity of UI	-This method had a long-term impact and could be a valuable strategy to reduce UI in homebound adult populations
18	Kincade et al. (2007) Randomized controlled trial Diet, PFMT	UI, in general	N=224 100% female Age ≥ 18 yrs.	To assess the efficacy of self-monitoring techniques to reduce urine loss and increase quality of life for women with UI	Random assignment to self-monitoring (taught self-monitoring techniques) group or to waitlist group, that was taught the intervention after 3-week waiting period	-Intervention demonstrated a significant effect on urine loss -For intervention and control groups who received intervention urine loss decreased and QoL improved	-Self-report in bladder diary of episodes of urine loss	-Self-monitoring techniques are simple, safe, inexpensive, and within the scope of practice for most health professionals -Self-monitoring should be considered the first steps to treat women with UI
19	Oh et al. (2005) Quasi-experimental, pretest/posttest design Education, BT, PFMT Korea	UI, in general	N=60 100% female Age range= 38-59	To examine the effectiveness of a behavioral intervention program combining pelvic floor muscle exercise with bladder training for UI and also to conduct follow-up assessment after self-training	Intervention (incontinence education, PFM exercise, and bladder training) and non-equivalent control group	-Significant differences in UI symptoms and psycho-social well-being related to UI in treatment and control group	-Small sample size -Cultural assumptions that UI is part of aging, and result of childbirth, so less motivated to treat	-Further studies of long-term effects of behavioral treatment for UI -Program effective in treating UI and psycho-social well-being due to UI
20	Sampselle et al., 2005 Randomized, controlled trial BT, PFMT	UI, in general	N=359 100% female Mean age= 66	To describe the BMP participants' acquisition of BT and PFMT knowledge and motor skill immediately following group instruction and to document adherence over 1 year	Randomized to treatment group education session by one brief individualized session of 10 min, or control, no instruction for 12 months	-Mean BT and PFMT knowledge was 90% and 86%, respectively -68% demonstrated correct PFMT technique without additional instruction ~Adherence for BT was 58-67% and 63-82% for PFMT	-Did not obtain baseline levels of BT and PFMT knowledge -Self-report	Group instruction should be supplemented with brief individual instruction as needed in effective teaching method for BT and PFMT

CONCLUSIONS & DISCUSSION

- ✓ The review of the literature highlights the overall success that the primary preventive methods of educational and behavioral modification (lifestyle modification, monitoring, exercise, and multicomponent approach) programs have on preventing or improving UI conditions
- ✓ Among the different approaches, multicomponent approaches were shown to be most efficacious in preventing UI and improving UI awareness and conditions.
- ✓ UI is a major issue that many older women face, yet it is often left unaddressed, which only worsens the condition.
- ✓ UI treatments should utilize primary preventive approaches before more invasive methods as devices, surgery, and prescriptive drugs.
- ✓ Public health policymakers and researchers should prioritize the issue of UI and increase UI awareness among women.
- ✓ Future research and community-based interventions on UI should utilize multicomponent approaches at the primary prevention level.

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