

# A Community-Based Education Program for Overactive Bladder in a Predominantly Minority Older Female Population: A Pilot Study

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## Keywords

Urinary bladder · Overactive bladder · Independent living · Education

## Abstract

**Introduction:** Knowledge gaps regarding available treatment and social stigmatization are barriers to care in patients with overactive bladder (OAB). We assessed the feasibility of an OAB education program targeting older community-dwelling females. **Methods:** Community-dwelling women over 55 years old were recruited. Eligible participants underwent an education program covering continence-promotion strategies. The Overactive Bladder Questionnaire-Short Form and Short Form-12 were completed at baseline, 1 week, 3 months, and 6 months post-intervention to measure symptom bother and condition-specific and general quality of life (QoL). Data were analyzed using a linear mixed-effects model for repeated measures. **Results:** Thirty-seven female patients with OAB symptoms at baseline were assessed with the majority from Latino/Hispanic or Black/African American ethnic/racial backgrounds. For our youngest subgroup ( $\leq 68$  years old), significant improvements were observed at 3 and

6 months compared to 1 week post-intervention for symptom bother (3 months,  $-22.75$ ,  $p = 0.006$ ; 6 months,  $-25.76$ ;  $p = 0.001$ ) and condition-specific and health-related QoL subscale scores for concern (3 months,  $+23.76$ ,  $p = 0.006$ ; 6 months,  $+22.15$ ,  $p = 0.011$ ) and social interaction (3 months,  $+21.11$ ,  $p = 0.017$ ; 6 months,  $+20.51$ ;  $p = 0.021$ ). For all age subgroups, improvements in general QoL measures for mental health were seen at 3 and 6 months compared to baseline (3 months,  $+7.57$ ,  $p = 0.02$ ; 6 months,  $+6.70$ ;  $p = 0.048$ ). **Conclusions:** Statistically significant improvements in symptom bother, condition-specific, and general QoL measures were observed following an OAB education program pilot study in a predominantly minority female population. Further studies are needed to support efficacy and optimize program design.

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Published by S. Karger AG, Basel

## Introduction

Overactive bladder (OAB) is highly prevalent in older females, with over 40% of individuals aged 65 and older reporting symptoms such as frequency, urgency, noctu-

ria, and incontinence [1]. OAB can have a significant negative impact on quality of life (QoL) and daily functioning, and is associated with multiple comorbidities in the older patient population [2–4]. First-line therapy for OAB is conservative and includes bladder training, pelvic floor exercises, and lifestyle modification [5]. These interventions are safe, improve overall health, and may be sufficient to treat milder cases. However, lack of knowledge about OAB and its treatment has been identified in elderly individuals and those with lower levels of education [6]. Such knowledge gaps may contribute to misinterpretation and underreporting of OAB symptoms [7]. Elderly patients may view OAB as an inevitable outcome of aging and normalize symptoms without seeking treatment [8]. Shame and embarrassment stemming from social stigmatization of bodily functions and fear of surgery are other cited factors for underreporting [9]. It has been estimated that less than one-half of patients with OAB symptoms seek help [10].

Patient perception of symptom severity and degree of bother have been identified as reasons for patients eventually seeking help [11, 12]. However, patients may adapt to symptoms and live with them for long periods of time, only consulting a physician when symptom bother has crossed a certain threshold [11, 12]. It appears that an improved educational model regarding OAB in older patients is warranted, and that it should extend beyond individual office visits, given the identified barriers to help-seeking behavior. Few studies have assessed the efficacy of continence programs in the community. The aim of this pilot study was to assess the feasibility of an educational continence-promotion program implemented in older community-dwelling individuals.

## Materials and Methods

### *Participants and Educational Program*

Participants for this prospective study were recruited from community centers and senior centers in a large metropolitan area from May 2015 through October 2016. Inclusion criteria included women who were over 55 years of age, were fluent in English, and had symptoms of OAB. Main exclusion criteria included neurological impairment or diagnosis of psychiatric disorder that would prevent appropriate understanding of consent, inability to comply with site personnel instructions, and previous diagnosis of OAB to control for the level of OAB knowledge at baseline. Approval was obtained from the Institutional Review Board of Weill Cornell Medicine. Prior to participation, all participants provided informed written consent.

Individuals eligible for the study participated in a classroom-based educational program covering bladder health and self-management of OAB symptoms. The educational session was led by a

**Table 1.** Baseline characteristics of study population

Characteristic	N = 37
Age, years, mean (range)	73.77 (57–94)
Ethnicity, N (%)	
Asian or Pacific Islander	2 (5.41)
Latino/Hispanic	20 (54.14)
Native American	1 (2.70)
Black/African American (non-Hispanic)	12 (32.43)
Caucasian/white	1 (2.70)
Other	1 (2.70)
Education, N (%)	
No formal education	2 (5.41)
Some high school	8 (21.62)
High school diploma and/or equivalent	14 (37.84)
Some college or associate degree	9 (24.32)
Bachelor's degree	2 (5.41)
Master's degree	2 (5.41)

trained urologist in person at a community center and lasted approximately 1 h. The program consisted of a slide presentation covering the following topics: bladder function, lower urinary tract anatomy, pathophysiology of OAB, effect of OAB on QoL, pelvic floor muscle (PFM) exercise training, bladder training, and instruction in evidence-based OAB behavioral strategies. For a baseline assessment of OAB knowledge, patients were asked to complete a questionnaire about utilization of OAB behavioral management strategies before the slide presentation (see online suppl. Document 1; for all online suppl. material, see [www.karger.com/doi/10.1159/000522646](http://www.karger.com/doi/10.1159/000522646), which demonstrates the utilization questionnaire used). After the slide presentation, participants received multiple materials to take home, including a pamphlet summarizing lifestyle and behavioral changes to improve urinary incontinence, frequency, and urgency.

### *Primary and Secondary Outcomes*

The primary outcome was change in OAB symptoms as measured over time using the Overactive Bladder Questionnaire-Short Form (OAB-q SF) symptom bother section, a standardized and validated self-assessment measure for urinary symptoms [13]. Secondary outcomes were condition-specific and health-related QoL (HRQL) assessed using the OAB-qSF HRQL section and the Short Form-12 (SF-12) [14], respectively.

### *Study Timeline and Follow-Up*

Patients were followed up to 6 months after the educational workshop. All primary and secondary outcomes were assessed at baseline (immediately prior to the educational workshop) and reassessed at 1 week, 3 months, and 6 months after the workshop. Patients also completed the utilization questionnaire at each of the follow-up visits to assess for the durability of the intervention. To ensure that none of the patients received additional drug therapy for OAB, patients were asked if there was a change in their medication during each study visit.

**Table 2.** Utilization of bladder management techniques over time

Group responses, frequency, n (%)				
technique	baseline	1 week	3 months	6 months
Management of fluid intake	26 (70.27)	32 (86.49)	29 (78.38)	33 (89.19)
Scheduled voids	6 (16.22)	13 (35.13)	6 (16.22)	11 (29.73)
Pelvic floor exercises	18 (48.65)	27 (72.97)	26 (70.27)	23 (62.16)
Other strategy	13 (35.14)	19 (51.35)	16 (43.24)	20 (54.05)

**Table 3.** Summary of generalized linear mixed-model results for utilization of bladder management techniques

Generalized linear mixed-model results					Pairwise comparisons <i>p</i> value <sup>b</sup>					
technique	factor	df	$\chi^2$	<i>p</i> value <sup>a</sup>	baseline to 1 week	baseline to 3 months	baseline to 6 months	1 week to 3 months	1 week to 6 months	3 months to 6 months
Management of fluid intake	(Intercept)	1	19.0182	<0.001**						
	Time	3	7.7963	0.050 <sup>†</sup>	0.257	0.481	0.059 <sup>†</sup>	0.970	0.542	0.353
Scheduled voids	(Intercept)	1	12.1587	<0.001**						
	Time	3	5.3685	0.147	0.221	0.996	0.366	0.329	0.989	0.497
Pelvic floor exercises	(Intercept)	1	9.0607	0.003**						
	Time	3	7.9482	0.047*	0.079 <sup>†</sup>	0.066 <sup>†</sup>	0.339	0.999	0.856	0.799
Other strategy	(Intercept)	1	0.0198	0.8881						
	Time	3	5.4048	0.144	0.264	0.616	0.123	0.926	0.965	0.707

<sup>a</sup> *p* value associated with type 3 tests of fixed effects. <sup>b</sup> *p* value adjusted for post hoc multiple comparisons using Tukey's method. \*\* Statistically significant value (*p*<0.01). \* Statistically significant value (*p*< 0.05). <sup>†</sup> Near-significant value (*p*<0.10).

### Statistical Considerations

Data were analyzed using R [15]. Descriptive statistics were used for demographical information. To prevent listwise deletion of survey responses due to occasional missing data, we built a linear mixed-effects model for repeated measures to analyze change in OAB-qSF and SF-12 scores over time and generalized linear mixed model to analyze change in binary responses for the utilization questionnaire. For the linear mixed-effects model, we entered fixed effects for time, education level and age, and the interactions between time and each of these effects into the model. Participants were entered as a random intercept. To prevent arbitrary age group categorization, age was stratified into quartiles using the minimum, median, interquartile range, and maximum age values of the study population. For the generalized linear model, we used time as a fixed effect for time and participants as a random intercept. There were no obvious deviations from homogeneity or normality upon the visual inspection of residual plots. *p* values for the fixed effects were obtained by analysis of variance. *p* values for the pairwise comparisons between the different levels of fixed effects were obtained using a least-squares analysis function and adjusted for multiple comparisons using Tukey's method. A 0.05 alpha level was used to evaluate statistical significance.

### Results

Forty-two community-dwelling individuals participated in the educational program. Of these, 37 (88.09%) reported experiencing OAB symptoms at baseline. Five participants reported no OAB symptoms at baseline. Since the goal of the study was to assess change in OAB symptoms among participants experiencing OAB symptoms following intervention, these 5 patients were excluded from data analysis. At 6 months, 3 patients were lost to follow-up for unknown reasons.

Baseline cohort characteristics are depicted in Table 1. Mean (range) age of the studied cohort was 73.77 (57–94) years. Participants were represented across ethnicities and education levels. However, the majority were from Latino/Hispanic (54%) or Black/African American (32%) ethnic/racial backgrounds and had a high school degree as their highest level of education (38%). Utilization of bladder management techniques across the study period can be seen in Table 2. Prior to the intervention, 6 patients (16%) had not tried any technique and 13 patients (35%)

**Table 4.** Summary of mean outcome scores over time

Group scores, mean (SD), N				
outcome measure	baseline	1 week	3 months	6 months
Symptom bother	25.71 (16.50) N = 35	28.20 (22.30) N = 37	18.04 (14.60) N = 32	22.25 (20.33) N = 34
Total HRQL	84.48 (16.77) N = 32	81.88 (24.33) N = 36	89.84 (12.01) N = 33	87.39 (18.08) N = 34
HRQL: concern	84.85 (19.93) N = 32	80.18 (25.58) N = 36	89.70 (14.94) N = 33	86.71 (18.78) N = 34
HRQL: cope	86.66 (15.99) N = 32	84.26 (24.54) N = 36	92.73 (12.06) N = 33	90.09 (18.79) N = 34
HRQL: sleep	95.56 (14.98) N = 32	89.31 (27.04) N = 36	95.76 (11.22) N = 33	94.02 (17.71) N = 34
HRQL: social	74.31 (22.66) N = 32	77.39 (25.40) N = 36	83.23 (20.08) N = 33	81.42 (21.75) N = 34
SF-12 MCS	45.53 (7.32) N = 32	46.16 (7.33) N = 35	49.12 (6.69) N = 31	47.05 (7.82) N = 34
SF-12 PCS	39.11 (6.23) N = 32	40.23 (5.81) N = 35	36.64 (6.86) N = 31	38.95 (6.16) N = 34

SD, standard deviation; HRQL, health-related quality of life; SF-12, Short Form-12; MCS, mental component score; PCS, physical component score.

had utilized only one technique. Analysis of variance indicated a statistically significant effect of time on pelvic floor exercise utilization ( $\chi^2[3] = 7.95$ ,  $p = 0.047$ ) and a near-significant effect of time on fluid intake management ( $\chi^2[3] = 7.80$ ,  $p = 0.050$ ). Post hoc pairwise comparisons indicated that the increase in utilization was marginal for pelvic floor exercises at 1 week ( $p = 0.079$ ) and 3 months ( $p = 0.066$ ) compared to baseline. See Table 3 for generalized linear mixed-model results as well as post hoc comparisons.

Results for the outcome measures can be seen in Table 4 and Table 5. For OAB-q SF symptom bother scores, there was a significant time by age interaction ( $F[9, 70.074] = 2.65$ ,  $p = 0.011$ ,  $\eta_p^2 = 0.25$ ). The interaction was the result of significant improvement in symptom bother scores for patients ages 57–68 at 3 months ( $-22.75$ ,  $p = 0.006$ ) and 6 months ( $-25.86$ ,  $p = 0.001$ ) compared to 1-week post-intervention. There was no significant difference for the other age groups. For HRQL concern subscale scores, there was a significant main effect of age ( $F[3, 25.57] = 3.27$ ,  $p = 0.038$ ,  $\eta_p^2 = 0.30$ ) and a marginal time by age interaction ( $F[9, 69.88] = 1.91$ ,  $p = 0.065$ ,  $\eta_p^2 = 0.20$ ). Post hoc pairwise comparisons for the main effect of age revealed that HRQL concern subscores were high-

er for patient ages 69–73 compared to 57–68 ( $+12.36$ ;  $p = 0.024$ ). The marginal interaction between time and age was the result of improved HRQL concern subscale scores at 3 months ( $+23.76$ ,  $p = 0.006$ ) and 6 months ( $+22.15$ ,  $p = 0.011$ ) compared to 1 week post-intervention for patient ages 57–68. There was no significant difference for the other age groups. For HRQL social interaction subscale scores, there was a marginal time by age interaction ( $F[9, 70.12] = 2.01$ ,  $p = 0.050$ ,  $\eta_p^2 = 0.21$ ). The marginal interaction was the result of significant improvement in HRQL social subscale scores for patient ages 57–68 at 3 months ( $+21.11$ ,  $p = 0.017$ ) and 6 months ( $+20.51$ ,  $p = 0.021$ ) compared to 1 week post-intervention. There was no significant difference for the other age groups. For the mental component score (MCS) of SF-12, there was a significant main effect of time ( $F[3, 66.69] = 3.30$ ,  $p = 0.026$ ,  $\eta_p^2 = 0.13$ ). Post hoc pairwise comparisons revealed that MCS improved at 3 months and 6 months compared to baseline (3 months,  $+7.57$ ,  $p = 0.020$ ; 6 months,  $+6.69$ ,  $p = 0.048$ ). There were no significant main effects or interactions for the mean physical component score (PCS) of SF-12, total HRQL scores, and HRQL subscale scores for coping and sleep.

**Table 5.** Summary of linear mixed-model results for outcome measures

Linear mixed-model analysis with interactions					
outcome	factor	df	df.res	F value	p value <sup>a</sup>
Symptom bother	(Intercept)	1	24.28	49.34	<0.001**
	Time	3	68.59	0.64	0.594
	Age	3	25.98	1.76	0.179
	Education	5	25.07	2.07	0.103
	Time × age	9	90.07	2.65	0.011*
	Time × education	15	69.25	0.63	0.843
Total HRQL	(Intercept)	1	23.74	2,151.31	0.001**
	Time	3	67.98	0.17	0.913
	Age	3	25.70	2.66	0.069 <sup>†</sup>
	Education	5	25.12	2.10	0.098 <sup>†</sup>
	Time × age	9	69.50	1.3415	0.232
	Time × education	15	68.571	0.4521	0.956
HRQL: concern	(Intercept)	1	32.52	82.06	0.001**
	Time	3	68.35	3.27	0.775
	Age	3	25.57	3.27	0.038*
	Education	5	24.92	2.04	0.108
	Time × age	9	69.88	1.91	0.064 <sup>†</sup>
	Time × education	15	68.96	0.7	0.779
HRQL: cope	(Intercept)	1	24.19	1,245.67	<0.001**
	Time	3	67.26	0.16	0.92
	Age	3	25.89	1.96	0.145
	Education	5	25.44	1.99	0.114
	Time × age	9	68.7	1.14	0.347
	Time × education	15	67.8	0.342	0.988
HRQL: sleep	(Intercept)	1	24.09	727.27	<0.001**
	Time	3	67.42	0.54	0.544
	Age	3	25.86	1.41	0.260
	Education	5	25.37	1.1	0.380
	Time × age	9	68.89	0.96	0.478
	Time × education	15	67.97	0.364	0.984
HRQL: social	(Intercept)	1	23.36	237.92	<0.001**
	Time	3	68.59	0.27	0.847
	Age	3	25.47	2.18	0.116
	Education	5	24.77	0.89	0.500
	Time × age	9	70.12	2.01	0.050 <sup>†</sup>
	Time × education	15	69.21	0.67	0.797
SF-12 MCS	(Intercept)	1	26.65	803.23	0.001**
	Time	3	66.69	3.3	0.026*
	Age	3	25.36	0.62	0.610
	Education	5	25.66	1.36	0.271
	Time × age	9	67.12	1.47	0.176
	Time × education	15	66.49	1.44	0.153
SF-12 PCS	(Intercept)	1	26.58	429.99	0.001**
	Time	3	65.89	1.7	0.177
	Age	3	25.55	0.76	0.527
	Education	5	25.76	1.68	0.175
	Time × age	9	66.47	0.77	0.644
	Time × education	15	65.84	1.43	0.161

SD, standard deviation; HRQL, health-related quality of life; SF-12, Short Form-12; MCS, mental component score; PCS, physical component score; df, degrees of freedom in the model; df.res, residual degrees of freedom. <sup>a</sup> p value associated with type 3 tests of fixed effects. \*\* Statistically significant value ( $p < 0.01$ ). \* Statistically significant value ( $p < 0.05$ ). <sup>†</sup> Near-significant value ( $p < 0.10$ ).

## Discussion

This study demonstrated statistically significant improvements in OAB symptom bother across a cohort of older minority females, specifically ages 57–68, following a community-based education program for OAB behavioral management strategies. The minimum important difference for the OAB-q SF has not been established, minimizing conclusions that can be drawn about the magnitude of improvement seen in our study. However, the intervention was low cost and low risk, and was easily implemented in a group of individuals who had been living with symptoms without diagnosis or treatment. Despite the significant morbidity and undertreatment of this disease, there remains a paucity of data exploring the utility of such educational programs, particularly in the non-clinical, community setting. Although we cannot draw cause-and-effect conclusions from our study, we believe that it outlines a preliminary model for further exploration. Our cohort was made up of all-comers from an older female population, of whom nearly 60% reported utilizing only one or no self-management techniques. Similar education programs could be implemented in larger patient populations as a safe initial management approach, after which patients could seek higher level treatment if necessary. Bladder education may push more patients with OAB to pursue medical treatment at an earlier juncture before disease progression.

Our findings demonstrated increased and sustained utilization of bladder management techniques, supporting the efficacy of our educational program. Of note was the increase in utilization of PFM exercises over time. PFM training (PFMT) is an accepted first-line treatment for OAB symptoms. Teaching methods for PFMT vary, but commonly include vaginal or anal palpation or bio-feedback in order to properly educate patients on the correct technique for PFM exercises [16]. The evidence also suggests that patients receive most benefit from individualized training [17]. In our study, however, it appears that some patients still derive benefit without more intensive, invasive training. Although a single group-based education program with only verbal PFMT will not lead to improvement in all patients, it may offer a beneficial first step in management.

In our study, a statistically significant improvement was seen in general QoL measures for mental health at 3 months post-intervention with sustained effects at 6 months post-intervention. We did not see a difference in general QoL measures for physical health. This could be attributed to a relatively low level of baseline physical im-

pairment in these patients. OAB has been shown to have a clinically significant impact on both mental and physical general QoL as measured by the SF-12 [18], and given the characterization of OAB as a progressive disease, it may imply that our cohort was comprised of participants with early, mild physical symptoms. Nevertheless, mild physical OAB symptoms may cause significant mental distress and our study indicates that an educational intervention can improve mental health associated with the disease. Patients may only seek clinical treatment for OAB at lower levels of physical QoL and when functional adjustments no longer control symptoms [12]. Utilizing a community-based educational program may capture symptomatic patients prior to progression of disease, likely reducing patient distress, decreasing cost burden, and improving long-term outcomes.

Few studies have evaluated the efficacy of education programs for OAB, especially among minority patient populations. Xu et al. [16] reported improvement in OAB symptoms compared to control following an educational program on toileting behaviors in an outpatient setting, and Dugan et al. [17] also reported improvement in OAB symptoms following a bladder training and PFMT education program in older women in residential facilities. In one of the only community-based studies, McFall et al. [19] reported symptom improvements following an education program in older women, although the study focused on urinary incontinence. Diokno et al. [20] implemented a one-time education session in older women with urinary incontinence and reported modest improvements in ICIQ-SF scores compared to control over a 1-year period. However, these studies are heavily imbalanced toward highly educated women with a post-secondary education [20, 21]. Our pilot is unique in that most participants came from primary and secondary educational backgrounds. Furthermore, the majority were from Hispanic/Latino and Black/African American ethnic/racial backgrounds, which are patient populations known to have high prevalence of OAB [1]. Our study provides evidence that a community educational program for OAB can benefit these patients.

This study was subject to several limitations. The single-group pretest-posttest design and relatively small sample size limit our ability to provide statistically compelling inferences. Second, over 90% of participants reported OAB symptoms at baseline, suggesting a self-selection bias that may limit generalizability of our findings. However, it should be noted that much of our education program covered management techniques targeted at patients with OAB symptoms and was not intended primar-

ily as a preventative measure. Third, we did not assess participant perception of program effectiveness and impact on their symptoms, which would more robustly support program efficacy. Our study outcomes were also based on participant perception of symptom improvement without inclusion of more objective measures, although it should be noted that the OAB-q SF is a validated measure of symptoms. Further long-term controlled studies implemented in larger populations will help construct an optimal educational model through analysis of participant identification methods, training techniques, education program content and length, and follow-up process.

## Conclusion

A community-based OAB education program is a feasible method for improving QoL and symptoms of OAB in older minority females. Larger randomized controlled studies are needed to provide evidence of durability and optimal program design.

## Statement of Ethics

Approval was obtained from the Institutional Review Board of Weill Cornell Medicine (IRB # 21-06023703). The procedures in this study adhere to the tenets of the Declaration of Helsinki. Written informed consent was obtained from all subjects who participated in the study.

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## Conflict of Interest Statement

John Richard Lee, MD, receives research support under an investigator-initiated research grant from BioFire Diagnostics, LLC, and holds patent US-2020-0048713-A1 titled “Methods of Detecting Cell-Free DNA in Biological Samples.” Bilal Chughtai, MD, and Dean Elterman, MD, are consultants for Medi-Tate Ltd., Olympus, Boston Scientific, and MedeonBio. The other author has no conflicts of interests to disclose. The other authors have no conflicts of interest to declare.

## Funding Sources

Weill Cornell Clinical and Translational Science Center Grant support (CTSC GRANT UL1 TR000457). This funding source had no role in the preparation of data or the manuscript.

## Author Contributions

Susana Martinez Diaz: data analysis and manuscript writing/editing. Hudson Pierce: data analysis and manuscript writing/editing. John Richard Lee: data analysis and manuscript editing. Tirsit Asfaw: manuscript editing. Andrew Abram: data collection. Naeem Bhojani: manuscript editing. Dean Elterman: manuscript editing. Kevin Zorn: manuscript editing. Bilal Chughtai: project development, manuscript writing, and editing.

## Data Availability Statement

Data generated and used for the study are not publicly available because it contains information that may compromise the privacy of our study participants. Data are available from the corresponding author upon reasonable request.

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