

# Short term effects of home-based bladder training and pelvic floor muscle training in symptoms of urinary incontinence

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## Summary

**Aim:** The aim of this non-controlled trial was to investigate the effects of a home-based pelvic floor muscle training (PFMT) and bladder training (BT) in urinary incontinence (UI) among women. **Patients and methods:** The study included 25 individuals who were diagnosed with UI. PFMT which strengthens pelvic floor muscles was described to patients in litotomy position with using digital palpation method. PFMT was given as home-based exercise program for six weeks, 7 days a week and ten times a day. BT was planned according to the symptoms of the patients. Assessments were done at the beginning and at the end of the six weeks exercise program. The outcome measures were UI severity measured by pad test and QoL measured by King's Health Questionnaire. The secondary outcome measure was lower urinary tract symptoms and sexual health measured by Bristol Female Lower Urinary Tract Symptoms Index. **Results:** Pre- and post-treatment assessments done with pad test showed that there was a statistically significant decrease in the severity of UI ( $p = 0.002$ ). The difference between pre- and post-treatment QoL scores ( $p = 0.001$ ) and lower tract symptom scores were also statistically significant ( $p = 0.000$ ). **Conclusions:** When PFMT and BT were given together there was a decrease in the symptoms and increases the QoL.

**KEY WORDS:** Urinary incontinence; Pelvic floor muscle training; Bladder training; Physiotherapy.

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## INTRODUCTION

International Urogynecological Association and the International Continence Society (IUGA/ICS) defined urinary incontinence (UI) as the complaint of involuntary loss of urine. There are three main types of UI in women: stress urinary incontinence (SUI), urgency urinary incontinence (UUI), and mixed urinary incontinence (MUI).

SUI is defined as the involuntary loss of urine during sneezing, coughing, or other types of physical effort; UUI is characterized by involuntary loss of urine related with urgent conditions; MUI is the mixture of stress and urge UI (1).

Although UI is not a life-threatening problem among women, it effects the physical and psychological aspects of social life. Because of these reasons the problem should be handled meticulously (2).

UI is more common in women than in men. Studies

from different countries report a prevalence of UI in the range of 25% to 45% in adult women (3). UI was reported as 38.7% of women and 9.9% of men in Turkey (4). Although many conservative approaches are available for treating female UI, pelvic floor muscle training (PFMT) and bladder training (BT) are the most popular, of which PFMT is recommended as the first-line therapy.

Numerous studies have reported the effectiveness of either BT or PFMT singly for treating the female UI.

At present, only one randomized clinical trial and one pragmatic non-randomized controlled trial have been conducted regarding the efficacy of adding PFMT to BT for treating UI (5, 6).

In this study, we aimed to investigate the effects of a six week home based PFMT and BT program in women with UI.

## MATERIALS AND METHODS

### Design

The study was approved by the local ethics committee of Health Sciences University Dr. Lutfi Kirdar Training and Research Hospital (Istanbul, Turkey; approval no: 2014/05, 514/43/6), and all participants submitted written informed consent.

Our study started with thirty-six patients and ended up with twenty five patients who completed the 6-week program (Figure 1).

The UI was diagnosed by the urologist and the assessment and the therapy were done by the physiotherapist.

### Patients

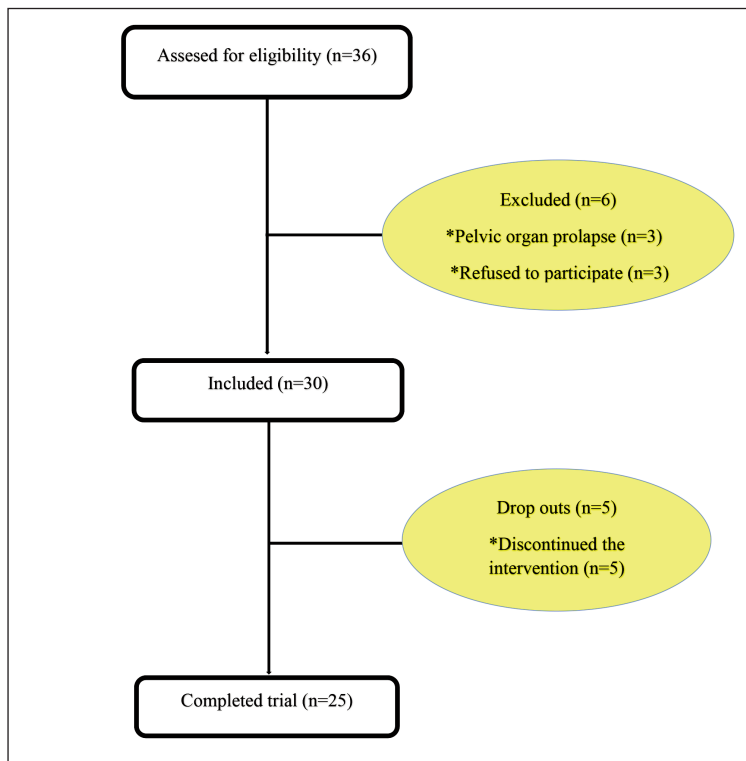
Women in the 25-75 age range, with UI diagnoses were included in the study. Those who had cancer, neurological disorders, pregnancy, pelvic organ prolapse, mental retardation or uro-gynecologic operation in the last six months were excluded.

### Evaluation

Patients age as year and body mass index (BMI) as kg/cm<sup>2</sup> were recorded. Patients were questioned about their education, profession and smoking habits. Their obstetric histories were also recorded. Quality of life (QoL) and

No conflict of interest declared.

**Figure 1.**  
Flow of participants.



UI effects were tested by *King's Health Questionnaire* (KHQ), severity of incontinence by pad test, lower urinary tract symptoms and sexual health conditions by *Bristol Female Lower Urinary Tract Symptoms Index* (B-FLUTS). The patients were assessed in the beginning and at the end of the program. They filled out an exercise follow up chart during home exercises and these charts were examined at the end of the 6-week program. KHQ consists of 8 sections. These are role limitation, physical limitation, social limitation, personal relationship, emotions, sleep, energy and incontinence severity (5). B-FLUTS is a questionnaire used for the assessment of lower track urinary system symptoms, sexual health and QoL (7).

Pad test is one of the most objective tests which shows the existence of UI and its severity. It is used extensively in the diagnosis of incontinence and in the evaluation of the therapy. The 1-hour pad test which was standardized by ICS in 1983 is the most frequently used test (8).

The patients, after taking 500 cc water, were asked to use pre-weighed pads during the test period. During the test period the patients were asked to cough, sit to stand and climb stairs several times which increase the abdominal pressure or stimulate detrusor contractions. At the end of the test, if the weight difference of the pad was less than 2 grams it was rated as normal; if it was between 2-10 grams as mild, 10-50 grams as moderate, over 50 grams as severe incontinence (9).

#### Treatment

The patients were informed about the structure and function of the lower urinary system. PFMT which

strengthens pelvic floor muscles was described to patients in lithotomy position by using digital palpation method.

Patients completed a home-based exercise program consisting of strength and endurance training.

They were taught both fast (5-s) and slow *voluntary pelvic floor muscle contractions* (VPFMCs). One slow contraction took 15 s (5-s contraction, 5-s hold, 5-s relaxation). One set of exercises involved ten fast and ten slow VPFMCs. During the program, patients were instructed to perform ten sets of exercises per day.

The patients were asked to do the exercise in the supine, seated, and upright positions. They were supposed to integrate these exercises into their daily living activities. PFMT chart was given to every patient to remind them of exercise and to discipline them.

The aim was to decrease the frequency of urination and to increase the capacity of the bladder. Special BT was planned according to the patients' urgency symptoms.

In BT the patients were asked to keep away from bladder irritant fluids (coffee, tea, coke, lemonade etc.) and not to limit the water intake. Extension of the urination intervals were done gradually during the six weeks period. In order to help increase the intervals, the patients were taught some control techniques for urgencies. In these techniques the patients were asked to contract the pelvic floor, to take deep and slow breaths and to think of something different in order to repress the feeling of urgency.

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#### Statistical analyses

Statistical analyses were performed using SPSS software (*Statistical Package for Social Sciences*) version 21.0. During the evaluation of the data Student's t-test, Paired sample t-test, Wilcoxon signed-rank test were used for comparison of quantitative data along with descriptive statistical methods (mean, standard deviation, frequency). McNemar's test was used for comparison of qualitative data. Multiple regression analysis was used to determine risk factors. Confidence interval which was 95% and  $p < 0.05$  were considered significant.

#### RESULTS

Mean age, BMI, number of births, abortions and miscarriage were respectively:  $47.6 \pm 10.12$  years (min 28 - max 73);  $30.8 \pm 5.88$  kg/m<sup>2</sup> (min 20.2 - max 42.97);  $3 \pm 2.1$  (0-10);  $1.04 \pm 1.24$  (0-4);  $0.2 \pm 0.64$  (0-3). 92% gave birth at least one child with 76% giving natural birth and 16% with sectio. 8% did not give birth (Table 1). 15 women had SUI, 7 women UUI, 8 women MUI.

Pre- and post-treatment assessments with pad test showed that the incontinence severity decreased statistically and KHQ showed significant increase in the QoL (Table 2).

The difference between pre- and post-treatment scores of UI was statistically significant. Statistical analyses

**Table 1.**  
Characteristics of individuals.

Characteristic	Mean	SD*
Age (years)	47.6	10.12
BMI (kg/m <sup>2</sup> )	30.8	5.88
Parity	3	2.1
Abortion	1.04	1.24
Misscarriage	0.2	0.64

\*Standard deviation.

**Table 2.**  
Outcomes of pre&post treatment on incontinence severity, Quality of life and lower urinary tract symptom.

	Before treatment				After treatment				P*
	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max	
Pad Test (g)	36.24	46.19	0	213	13.28	16.65	0	70	0.002
KHQ scores	544.26	185.14	150	888.8	361.31	237.73	0	900	0.001
B-FLUTS scores	51.04	13.3	18	72	37.04	14.2	11	72	0.000

\*Comparison between pre and post treatment. S.D: Standard deviation.  
KHQ: King's Health Question. B-FLUTS: Bristol Female Lower Urinary Tract Symptoms Index.

showed us that an increase in BMI can cause increased of incontinence severity. Participants reported that their urination frequency had decreased and sexual health had improved as well.

## DISCUSSION

The aim of the study was to investigate the effects of a home-based PFMT and BT in UI among women. It was found that 6-week PFMT and BT was effective in the decrease of UI symptoms and increase in QoL.

In a study by *Fan et al.* the mean of age was 52.3 years and they found that age did not have any influence on the effectiveness of PFMT. Our mean age was 47.6 years and we found similar results as far as the mean age and the effectiveness were concerned (10).

In their study *Kaya et al.* compared BT with the BT+PFMT complex and showed that a short term (6 weeks) complex approach was more effective, which was also supported by our results (5).

*Ahlund et al.* chose digital palpation technique in order to teach their patients to contract their pelvic floor muscle in the most accurate way. In their study they also gave information about anatomy and physiology of the pelvic floor and UI to their patients. They informed that they achieved accurate muscle contraction in 66% of their patient (11). *Moen et al.* informed that they achieved accurate muscle contraction in 70% of their patients by digital palpation (12).

In our study we used digital palpation in order to teach pelvic floor muscle contraction. We gave information about anatomy and physiology of the pelvic floor. Even though it was not evaluated statistically, we observed that our patients learned accurate contraction of pelvic floor muscle.

*Mommsen et al.* showed that BMI was related to UI values (13). Our study showed that BMI increases severity of UI and supported the literature.

*Kaya et al.* reported an increase in the QoL of the patients (5) and our study showed the same result.

*Vaz et al.* conducted a combined PFMT and CT program in the same manner as us and reported positive results in the quality of life and incontinence in 6 weeks. They also stated that there was no difference in efficacy between home-based program and health center treatment. Our study similarly demonstrated the success of the 6-weeks home-based program (6).

In our study, we used the KHQ to evaluate the symptom-specific QoL. The validity and reliability of the Turkish version of this questionnaire, which was first developed in urinary incontinence, had been proved by *Akkoç et al.* (7). The KHQ was used in studies in pelvic floor muscle strengthening exercises designed similarly to our study. *Neumann et al.* used the KHQ to determine changes in the QoL before and after treatment (14).

B-FLUTS, which we used to evaluate filling, voiding and incontinence symptoms and sexual functions, was found to be valid and reliable by *Gökkaya et al.* It is an effective index to determine the success of the treatment (8). *Bø et al.* used BFLUTS to investigate the effects of pelvic floor muscle exercises in QoL and sexual problems (15). Also *Ahlund et al.* used BFLUTS to evaluate urinary incontinence symptoms and sexual functions (10).

In our study, BFLUTS was used to evaluate the symptoms of lower urinary tract before and after treatment and a statistically significant difference was observed which also supported by the literature.

*Ahlund et al.* reported that their patients had decreased UI symptoms based on their feedback. Based on their patients' feedbacks *Ahlund et al.* reported that the UI symptoms had reduced (10). We also had the same results from the feedbacks of our participants that reported that they were feeling better.

When we overviewed the limitations of our study, one of them was that the patients were not statistically classified and evaluated according to their incontinence type. If we had greater number of patients we would have stronger statistical results.

The other limitation of our therapy program was that long-term results were not evaluated along with the short-term results. In order to reach a definitive conclusion, randomized controlled trials with larger sample numbers are needed.

## CONCLUSIONS

To sum up, pelvic floor muscle training and bladder training, together result in reducing the symptoms and in increasing the quality of life. By combining these two approaches a home based exercise program, the therapy becomes more effective, cheaper, safer and quicker in achieving the result.

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## REFERENCES

- Haylen BT, De Ridder D, Freeman RM, et al. International Urogynecological Association (IUGA)/International Continence Society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol Urodyn*. 2010; 29:4-20.
- Can T, Yagci N, Cavlak U. Effects of urinary incontinence on depressive symptoms and quality of life in women with reproductive age. *Fizyoter Rehabil*. 2012; 23:83-89.
- Milsom I, Altman D, Cartwright R, et al. Epidemiology of urinary incontinence (UI) and other lower urinary tract symptoms (LUTS), pelvic organ prolapse (POP) and anal (AI) incontinence. In: Abrams P, Cardozo L, Wagg A, Wein, A. (Eds) *Incontinence 6<sup>th</sup> Edition*. ICI-ICS. International Continence Society, Bristol UK, ISBN: 978 0956960733; 2017.
- Zumrutbas AE, Bozkurt AI, Tas E, et al. Prevalence of lower urinary tract symptoms, overactive bladder and urinary incontinence in western Turkey: Results of a population-based survey. *Int J Urol*. 2014; 21:1027-1033.
- Kaya S, Akbayrak T, Gürsen C, Beksac S. Short-term effect of adding pelvic floor muscle training to bladder training for female urinary incontinence: a randomized controlled trial. *Int Urogynecol J*. 2015; 26:285-93.
- Vaz CT, Sampaio RF, Saltiel F, Figueiredo EM. Effectiveness of pelvic floor muscle training and bladder training for women with urinary incontinence in primary care: a pragmatic controlled trial. *Braz J Phys Ther*. 2019; 23:116-24.
- Akkoc Y, Karapolat H, Eyigor S, et al. Quality of life in multiple sclerosis patients with urinary disorders: reliability and validity of the Turkish version of King's Health Questionnaire. *Neurol Sci* 2011; 32:417-421.
- Gokkaya CS, Öztekin CV, Doluoglu OG, et al. Index validation of Turkish version of Bristol Female Lower Urinary Tract Symptom Index. *J Clin Anal Med*. 2012; 3:415-8.
- Kaya S. Comparison of different treatment modalities in patients with idiopathic detrusor overactivity: physical therapy and rehabilitation, medical treatment. Degree MSc., Hacettepe University, Ankara, Turkey; 2008.
- Fan HL, Chan SSC, Law TSM, et al. Pelvic floor muscle training improves quality of life of women with urinary incontinence: a prospective study. *Aust N Z J Obstet Gynaecol*. 2013; 53:298-304.
- Ahlund S, Nordgren B, Wilander E, et al. Is home-based pelvic floor muscle training effective in treatment of urinary incontinence after birth in primiparous women? A randomized controlled trial. *Nordic Federation of Societies of Obstetrics and Gynecology, Acta Obstet Gynecol Scand*. 2013; 92:909-915.
- Moen MD, Noone MB, Vassallo BJ, Elser DM. Pelvic floor muscle function in women presenting with pelvic floor disorders. *Int Urogynecol J Pelvic Floor Dysfunct* 2009; 22:654-8.
- Mommsen S, Foldspang, A. Body Mass Index and Adult Female Urinary Incontinence. *World J Urol* 1994; 12:319-322.
- Neumann PB, Grummer AK, Grant RE, Gill VA. Physiotherapy for female stress urinary incontinence: a multicentre observational study. *Aust N Z J Obstet Gynaecol*. 2005; 45:226-232.
- Bø K, Talseth T, Vinsnes A. Randomized controlled trial on the effect of pelvic floor muscle training on quality of life and sexual problems in genuine stress incontinent women. *Acta Obstet Gynecol Scand* 2000; 79:598-603.

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