Evaluating the Effect of Pelvic Floor Muscle Training on Bladder Symptoms Severity and Quality of life among Patients with Overactive Bladder

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Abstract

Background: The high prevalence and under-treatment of overactive bladder (OAB) symptoms among adults in Egypt underscore a pressing public health concern. Pelvic Floor Muscle Training (PFMT) offers a non-pharmacological, low-cost option for symptom relief and enhances the quality of life for these patients. **Aim:** Evaluate the effect of pelvic floor muscle training on bladder symptoms severity and quality of life among patients with overactive bladder. **Methods:** A quasi-experimental study (two groups) was conducted at the urology outpatient clinic of Minia urology and kidney University Hospital in Egypt., involving 60 adult patients diagnosed with overactive bladder. Data collected through five tools were used: Socio demographic and clinical data, Overactive Bladder Questionnaire, The Patient Perception of Bladder Condition, Intensity of Urgency Scale, and the quality-of-life questionnaire. **Results:** Most of the intervention group had mild bladder symptoms, whereas the majority in the control group continued to report severe symptoms post-intervention of pelvic floor muscle training exercise, with highly statistically significant differences. The results demonstrated notable improvements in quality of life for the intervention group following pelvic floor muscle training compared to the control group. These differences were statistically significant. **Conclusion**: Pelvic floor muscle training significantly reduces bladder symptom severity in patients with overactive bladder and make enhancement in overall quality of life. These findings underscore PFMT as an effective non-pharmacological intervention for OAB. **Recommendations**: Healthcare providers should implement nurse training programs to teach pelvic floor muscle exercises to OAB patients. Health organizations must develop tailored educational materials, public awareness campaigns, and ensure urology clinics have specialized nurses for patient guidance. Further research should assess OAB prevalence in Egypt and validate findings through larger-scale studies.

Keywords: Pelvic floor muscle training, overactive bladder, bladder symptoms severity, quality of life

Introduction

The worldwide prevalence of OAB affects over 500 million people ranges from 11.8% to 35.6%. Also, the worldwide prevalence of OAB is predicted to continue to increase because of overall population growth and aging **(Mullen& Kaplan., 2021, Santander et al .,2022).** An estimated 17.0% of American women and 18.6% of Taiwanese women suffer from overactive bladder (OAB). The prevalence of female OAB has been steadily growing over time, contributing to the increasing average life expectancy**(Liu et al., 2024).**

Overactive bladder can significantly impact women's quality of life by affecting emotional well-being, social and sexual relationships, and work productivity **(Mourad et al., 2019).** Globally, several international studies have found that OAB affects millions of people, with an overall prevalence of 27.4%—22% in men and 32.4% in women. In the United States, they were higher at 43% in women and 27% in men. Although the exact etiology of OAB remains unclear, it is widely believed to be multifactorial in origin **(Kuo & Kuo, 2023&Qudah et al., 2024).**

According to previous studies, the following variables influence the occurrence of OAB: age, education level, employment, prior disease, and parity, childbirth delivery method, elevated body mass index (BMI), race or ethnicity, geographic location, eating habits, and environmental factors. On the other hand, OAB was found to be unrelated to factors such as sex, education, parity, racial identity, menopause, marital status, smoking, or alcohol intake in one study (**Radwan et al., 2023).**

In individuals with OAB, bladder training helps them manage their urgency by distracting them with mental math exercises or contractions of the pelvic floor muscles, promoting relaxation with deep breathing exercises, and eventually extending the voiding interval by fifteen minutes. The patient might eventually be able to void every three to four hours without feeling the need to urinate all the time **(Funada et al., 2023).**

Pelvic Floor Muscle Training (PFMT) has been shown to be an effective first-line treatment for managing bladder symptoms, including urinary incontinence and overactive bladder (OAB). PFMT works by strengthening the pelvic floor muscles, which enhances urethral closure and bladder support, ultimately reducing symptoms such as urgency, frequency, and urine leakage. Regular, guided PFMT not only improves continence but also contributes to a better quality of life. Recent evidence highlights that individualized, supervised training programs yield greater improvements than unsupervised exercises. PFMT significantly improves urinary symptoms and is particularly beneficial when combined with behavioral therapy or biofeedback, supporting its role as a cornerstone in conservative bladder management strategies **(Imamura et al. 2022).** Overactive bladder (OAB) can significantly impact an individual's quality of life by causing distressing symptoms such as urinary urgency, frequency, nocturia, and urge incontinence. These symptoms can lead to physical discomfort, sleep disturbances, emotional distress, and social embarrassment, ultimately affecting daily activities, work productivity, and psychological well-being. Many individuals with OAB report avoiding social situations or limiting fluid intake, which can further impair their health and lifestyle. Timely diagnosis and effective management are crucial for patients with OAB since it is associated with a lower health-related quality of life, greater anxiety and depression, and a higher risk of falls especially among older adult **(Coyne et al., 2022)**.

Significance of the study

The high prevalence and under-treatment of overactive bladder (OAB) symptoms among adults in Egypt underscore a pressing public health concern. A population-based survey conducted during 2018–2019 reported a 30% prevalence of OAB among Egyptian adults **(Mourad et al., 2019).** Despite the considerable burden of OAB on physical, emotional, and social well-being, many individuals neither seek medical attention nor receive appropriate treatment. This study is significant as it highlights the need for effective, accessible interventions such as Pelvic Floor Muscle Training (PFMT), which offers a non-pharmacological, low-cost option for symptom relief. Emphasizing conservative management strategies can improve clinical outcomes, alleviate the healthcare system's burden, and enhance the quality of life for individuals suffering from OAB in both community and clinical settings.

Aim of the study:

This study aimed to evaluating the effect of pelvic floor muscle training on bladder symptoms severity and quality of life among patients with overactive bladder.

Research Hypotheses:

- **H1:** Patients who apply pelvic floor muscle training will have a greater improvement in bladder symptoms severity than the control group who don't apply it.
- **H2:** Patients in the pelvic floor muscle training group will report a better quality of life compared to those in the control group who do not engage in this exercise.

Patients and Method:

Research Design: This study used a quasi-experimental design by dividing participants into study and control groups. When comparing two groups where subjects are not randomly assigned to

either the intervention or control groups is not feasible, this approach is usually employed **(Iwahori et al., 2022).**

Settings: The study was carried out at the outpatient urology clinic of Minia urology and kidney University Hospital in Egypt. that provides public nonpaid services. The urology outpatient clinic consists of 1 room that contains 1 bed, with 1 doctor and 1 nurse**.**

Subject: A purposive sample of 60 adult patients admitted to the above-mentioned setting and diagnosed with overactive bladder were employed for the study. They were allocated randomly into two equal groups; the first was the intervention group (30 patients) who received pelvic floor muscle training. The second group was the control group (30 patients) who were exposed to standard hospital care only**.**

Sample size calculation: For a paired t-test (pre post design), the sample size can be calculated using the following formula **(Williams et al.,2020):**

n= [(Zα/2+Zβ)/Effect Size)]2Where:

- Zα/2: (1.96) is the Z-score for (alpha = 0.05\) (two-tailed).
- Zβ: (0.84) is the Z-score for 80% power.
- Effect size = 0.34 based on study conducted by Shareb et al., (2024). Thus, the calculated sample size was approximately 57.8 participants. To ensure robustness and account for potential dropouts, the sample size was rounded up to 60 participants.

Inclusion criteria:

- Age 18 years or older.
- Adequate literacy to finish the training procedures and assessment forms.
- During the past month, they were taking the regular medication (mirabegron, a β3 agonist) that the urology clinic had advised, but they were still experiencing OAB symptoms.

Acute infection or cancer, neurologic dis orders, mental disorders that could impair collaboration, pregnancy or breastfeeding, and ceasing tre atment were **all criteria for exclusion**.

Tools of data collection:

Tools of the study: Five tools were utilized to gather the data needed for the study:

Tool (I): Socio-demographic and clinical data

The researchers designed this tool after reviewing relevant literature to gather baseline data. (**Shareb et al., (2024)**; **Karaaslan et al., (2018)**. It was divided into two sections: Patients` Sociodemographic and Clinical Data, which included the patient's body mass index, age, marital status, occupation, occupation, and residence.

Tool (II): Overactive Bladder Questionnaire [OAB-V8])

The Overactive Bladder Questionnaire is widely employed for assessing the degree of severity of OAB symptoms and has been shown by **(Tarcan et al., 2012)** to be a valid and reliable measure for OAB. Each question's response is assigned a score ranging from 0 (not bothered at all) to 5 (bothered a great deal). A global score between 0 and 40 is obtained by adding the item scores. More severe OAB symptoms are indicated by a higher overall score.

Tool (III): The Patient Perception of Bladder Condition (PPBC)

A patient's overall perception of their bladder-related problems can be assessed using this single-item patient-reported outcome measure. Among patients with OAB, the PPBC performs well as a valid and responsive global measure of bladder status (**Coyne et al., 2006**).

Patient Perception of Bladder Condition (PPBC) uses a 6-point Likert scale range from 1 to 6 (higher scores = worse perceived bladder condition).1= (My bladder condition does **not cause me any problem**),2=(My bladder condition causes me **some very minor problems**),3=(My bladder condition causes me **some minor problems**),4(My bladder condition causes me **(some) moderate problems**),5(My bladder condition causes me **severe problems**)and 6=(My bladder condition causes me **many**

severe problems. **Scoring** The lower scores (1–2) means minimal or no symptoms, mid scores (3–4) means moderate impact and Higher scores (5–6) means Severe impact.

Tool (IV): Intensity of Urgency Scale

An assessment of urgency was conducted using the Patient Assessment of Intensity of Urgency Scale **(Cartwright et al., 2011)** According to this scale, urge urine incontinence is represented by a score of 4, moderate urgency by a score of 2, strong urgency by a score of 3, and no urgency by a score of 0. On this scale, participants were asked to rate their overall sense of urgency.

Tool (V):_The quality-of-life questionnaire I-QOL:

(Wagner et al., 1996) created it to assess health-related quality of life issues that those with incontinence suffer. It involves 22 negatively framed items in the 3 dimensions of psychological effects (9 items 5, 6, 7, 9, 15, 16, 17, 21, and 22), avoidance behaviors (8 items 1, 2, 3, 4, 10, 11, 13, and 20) and social embarrassment effects (5 items 8, 12, 14, 18 and 19). Each item was assigned a score between 0 to 110 using a five-point Likert scale (1 being excessively, 2 being quite a bit, 3 being somewhat, 4 being a little, and 5 being not at all). A higher quality of life was indicated by higher ratings. 88 < 110 satisfied 66 < 88 is mostly satisfied, 44 < 66 is moderate, 22 < 44, mostly not satisfied Disappointed 1 < 22.

Educational Information and Training Practices for Pelvic Floor Muscle Training (PFMT)

The structure of the PFMT program was based on previous research in the literature **(Tarcan et al., 2005)**; **(Kaya t al,. 2014); (Karaaslan et al., 2018**); **(Fikry et al., 2020)**. Following the assessment, it was specifically designed to include five collections of contractions each day, each consisting of ten repetitions (10 slow contractions and 10 quick contractions). Every week, five sets of exercises were included until the level of voiding control was reached, and then this number remained constant. For six weeks, a rigorous PFM program that included daily quick and slow muscular contractions that progressively grew in number was put into place, as advised by the literature: One exercise set consists of 10 quick and 10 slow contractions. In the first week, there are 5 sets (100 contractions) per day, and after 6 weeks, there are 30 sets (600 contractions). Participants were encouraged to modify the exercises to fit into their everyday routines and specifically target their pelvic floor muscles to make them easier to remember and conduct. Participants were told to execute the pelvic floor exercises in a variety of postures, including squatting, standing, sitting, and supine. To improve adherence and promote proper exercise performance, a diary for exercising was utilized, and each participant received an information brochure regarding PFMT.

Administrative process: After explaining the purpose of the study and the date and time of data collection, the hospital's administration granted permission to conduct the research, and the study protocol was authorized by Minia University's Faculty of Nursing Ethical Research Committee and take code number REC202521.

Validity and reliability of tools:

The study instruments were either developed by the researchers (tool I) or adjusted (tools II, III, IV, and V). Five experts in medical-surgical nursing and community health nursing evaluated the generated tools for content validity, item clarity, Arabic translation appropriateness, and making the required adjustments. Cronbach's alpha was used to measure the internal consistency of the items to test the tools' reliability. The corresponding values were 0.90, 0.95, and 0.88.

Pilot study:

In order to assess the research instruments' applicability, clarity, and feasibility as well as to estimate the time needed to complete them, a pilot study was conducted on six OAB patients who were not selected as study participants. Adaptations were made in response to the results of the pilot study.

Field work:

The researchers met the patients who matched the eligibility requirements and agreed to take part in the research when they attended the previously described study location. The researchers were first introduced to the patients, after which the purpose of the study was explained. Subsequently, the patients provided their verbal consent to participate.

Three days a week, from 9:00 am to1 pm, the researchers met with the patient after they had finished their examination and follow-up appointments at the outpatient clinic. The current study was conducted from the first of February, 2025 to mid-June 2025, for a total of four months for data collection too achieve the study's goal.

The study was conducted as follows: Phase I: Assessment phase:

To gather baseline patients data, tools I, II, III, IV, and V were used to interview each patient in the intervention and control groups separately. About 30 to 45 minutes were spent on this interview.

Phase II: Planning and development phase:

After the patients' needs were evaluated, the Pelvic Floor Muscle training program was formulated based on reviewing relevant literature and identifying patients' needs. To improve patients' comprehension, the material was arranged in a practical learning sequence that progressed from simple to complex. After examining all pertinent material, the researchers created an instructional brochure (**Tarcan et al., 2005**); **(Kaya t al,. 2014); (Karaaslan et al., 2018**). It includes information about the disease (definition, signs & symptoms, causes & risk factors, its complications and methods of treatment) The definition and advantages of pelvic floor muscle strengthening exercises, how to practice them, factors that increase muscular strength, and the structure and function of the pelvic floor muscles. Additionally, it includes simple and illustrative images. During preparation, simple, concise, and unambiguous language for instruction was taken into consideration. Each adult patient in the intervention group received one of thirty booklets that were printed.

Implementation phase:

- **The control group:** Only routine hospital treatment had been provided to the control group. The researchers encouraged them to continue taking the medicine as prescribed by their physician.
- **Intervention group:** All intervention groups began receiving instruction and training. Each of the four sessions, which lasted roughly 25 to 30 minutes each, involved the personalized and private application of exercises that strengthen the muscles of the pelvic floor.
- The researchers gave each patient a private, one-on-one explanation of the study's purpose at the first session. The patient was instructed about the definition of OAB, the anatomy and function of the pelvic floor muscles, and the bladder and urethra, how to strengthen the muscles, and the advantages of pelvic floor muscle exercises using anatomically accurate models and illustrations. This material is provided in an instructive brochure that was previously developed. The patients were instructed in strengthening exercises for the pelvic floor muscles in a variety of functional situations, including standing up straight and lying down. Standing, sitting, and supine with bent knees were among the positions in which the pelvic floor muscles were contracted during these activities. - Prior to steadily increasing the time of contractions to 10 seconds, the patients were instructed to conserve contractions for 3 seconds, followed by 5 seconds of break. For six weeks in consecutive weeks, these exercises were done three times a day, with the duration progressively increasing to 600 contractions per day. Additionally, patients were instructed to execute the exercises daily at home and while engaging in their regular activities, such as coughing, squatting on the ground, getting up from a chair, or raising objects. Each day, the patients engaged in 600 contractions at home. -

For six weeks, the routine exercise plan was maintained.

- The third session focuses on the patient performing and repeating this exercise to ensure that the patient is doing it correctly.
- In the fourth session, each patient in the intervention group received an instructional brochure to supplement the instruction and aid in reviewing their performance on the exercises at home.
- **Evaluation phase:** Using tools II and III, IV and V, all 60 patients were systematically evaluated prior to intervention and followed up with in an outpatient clinic at 6 weeks to determine the effect of exercise implementation. Through weekly patient telephone conversations, the researchers were making sure the patients were following their exercise regimens and resolving any possible issues.

Ethical considerations:

Patients were educated about the study's goal and potential benefits before providing their signed oral informed consent to participate. Concerns about the confidentiality and privacy of the information received were maintained. Furthermore, reassure them that they are free to withdraw from the research whenever they choose without facing consequences.

Statistical analysis:

After data collection, it was revised, coded and fed to statistical software SPSS version 26. Two-tailed tests with an alpha error of 0.05 were used for all statistical analyses. For this investigation, a significant level of P equal to or less than 0.05 was used.

Results

Table 1 shows that 36.7% of the intervention group, compared to 40.0% of the control group, had an age range between "40– 50" years old. Additionally, 70.0% of the intervention groups, as compared to 76.7% of the control group, were female patients, and 86.7% of the intervention groups, as compared to73.3% of the control group, were married. The majority of the samples studied came from rural areas, with an educational level less than half of the intervention group, compared with two-thirds of the control group who were read and right.

Regarding smoking status, less than two-thirds of the intervention groups, compared with more than two-thirds of the control group, were nonsmokers. While 56.7% of the intervention group, as compared to 63.3% were occupied as housewives. Regarding the body mass index, two-thirds of the intervention groups, compared with half of the control group, were overweight. Finally, the demographic characteristics of the intervention and control groups did not show any statistically significant changes.

Table 2 (A) shows that the frequent urination during the daytime hours, 73.3% of the post intervention group had a little bit, as compared to 83.3% of the control group had a great deal, with a highly statistically significant difference, p=0.0003. Regarding an uncomfortable urge to urinate 50% of the intervention group had a little bit, as compared to 73.3% of the control group had a great deal, with a highly statistically significant difference, P=.0007.

Concerning an unexpected, little-to-no warning urge to urinate, 60.0% of the intervention group had A little bit, as compared to 66.7% of the control group had a great deal, with a highly statistically significant difference, P=.0001. Regarding accidental loss of small amounts of urine, 80% of the intervention group had A little bit, as compared to 50.0% of the control group had a very great deal, with a highly statistically significant difference, P=.0001.

Table 2 (B) Demonstrate that the total mean severity of overactive bladder symptoms was decreased in the post intervention group as compared to the control group (2.1±0.4, 4.8±0.7), respectively. Regarding Nighttime urination, 50% of the intervention group had A little bit, as compared to 63.3% of the control group had a great deal, with a highly statistically significant difference, P=.0001. Regarding waking up at night because you had to urinate, 63.3% of the intervention group had somewhat, as compared to 40% of the control group had a great deal, with a highly statistically significant difference, P=.0004.

Concerning an uncontrollable urge to urinate, 60% of the intervention group had a little bit, as compared to 50% of the control group had a great deal, with a highly statistically significant difference, P=.0004. Regarding urine loss associated with a strong desire to urinate, 53.3% of the intervention group had a little bit, as compared to 40% of the control group had a great deal, with a highly statistically significant difference, P=.0001.

Figure 1 displays the distribution of the intervention and control groups post–pelvic floor muscle training exercise, regarding their overall score of overactive bladder symptom severity. 83.3% of the intervention group had mild bladder symptoms as compared to 86.7% of the control group had severe bladder symptoms post-intervention of pelvic floor muscle training exercise, with highly statistically significant differences, P=.0002.

Table 3 shows a comparison between the intervention and control groups pre- and post–pelvic floor muscle training exercises according to their perception of bladder condition. 63.3% of the intervention group had some minor problems, as compared to 53.3% of the control group had severe problems related to perception of bladder condition post-intervention of pelvic floor muscle training exercise, with highly statistically significant differences, P=.0005. Also, there is a highly statistically significant difference in the total mean score of patient perception of bladder condition post-intervention of pelvic floor muscle training exercise in the intervention group as compared to the control group (2.7±0.5 and 5.2±0.6) with a p value of =0.005.

Table 4 illustrates findings related to a comparison between the intervention and control groups pre- and post–pelvic floor muscle training exercises according to patient perception of intensity of urgency scale. 63.3% of the post intervention group had non-pressing need for urination as compared to 50.0% of the control group had urged urinary incontinence post-intervention of pelvic floor muscle training exercise, with highly statistically significant differences, P=.0008.

Table 5 reveals a comparison between the intervention and control groups pre- and post–pelvic floor muscle training exercises based on their average score domains of incontinence quality of life. There is a highly statistically significant difference in the mean score of avoidance behaviors among the intervention group with a higher quality of life as compared to the control group post-intervention of pelvic floor muscle training exercises (36.87±8.12 and 13.6±2.9), respectively, with a p value of =0.005.

Also, there is a highly statistically significant difference in the mean score of psychological effects and social embarrassment among the intervention group with a higher quality of life as compared to the control group post-intervention of pelvic floor muscle training exercises (40.87± 7.04 and 16.07±6.6) (17.3±5.0 and 7.9±2.8) respectively, with a p value of 0.001.

Table 6 shows that there is a highly statistically significant positive correlation between overactive bladder symptom severity, The patient perception of bladder condition and intensity of urgency which means increase bladder symptoms severity led to an increase intensity of urgency and vice versa among control and intervention group. Also, this table shows that there is a statistically significant negative correlation between quality of life, overactive bladder symptom severity, The patient perception of bladder condition and intensity of urgency which indicating that higher levels of urgency and patient perception of their bladder condition are associated with worse quality of life.

Table (1): - Frequency distribution of the intervention and the control group according to their socio-demographic characteristics (n=60)

Demographic data	Groups				χ^2	*P* – value
	Intervention (n=30)		Control (n=30)			
	No.	%	No.	%		
Age / years						
▪ 20- <30	4	13.3%	5	16.7%	.549	
▪ 30-<40	8	26.7%	6	20.0%		.966 NS
▪ 40-<50	11	36.7%	12	40.0%		
▪ 50 - <65	7	23.3%	7	23.3%		
Mean ± SD	42.3±8.6 years		42.4± 9.3years		t=.072	. 943 NS
Gender						
▪ Male	9	30.0%	7	23.3%	.341	.771 NS
▪ Female	21	70.0%	23	76.7%		
Marital status						
▪ Single	1	3.3%	2	6.7%	**FET** 2.199	
▪ Married	26	86.7%	22	73.3%		.710 NS
▪ Widow	2	6.7%	5	16.7%		
▪ Divorce	1	3.3%	1	3.3%		
Residence						
▪ Rural	25	83.3%	23	76.7%	.417	.748 NS
▪ Urban	5	16.7%	7	23.3%		
Educational level						
▪ Illiterate	5	16.7%	2	6.7%	**FET** 3.946	
▪ Read and right	14	46.7%	20	66.7%		.301 NS
▪ Secondary school and diploma	7	23.3%	3	10.0%		
▪ University	4	13.3%	5	16.7%		
Occupation status						
▪ Employee	5	16.7%	7	23.3%	**FET** 1.946	
▪ Penson	3	10.0%	2	6.7%		.667 NS
▪ Housewife	17	56.7%	19	63.3%		
▪ Farmer	5	16.7%	2	6.7%		
Smoking Status						
▪ Active	5	16.7%	2	6.7%	**FET** 1.722	
▪ Passive	6	20.0%	5	16.7%		.440 NS
▪ Non smoker	19	63.3%	23	76.7%		
BMI						
▪ Normal	7	23.3%	10	33.3%	1.742	
▪ Overweight	20	66.7%	15	50.0%		.494 NS
▪ Obese	3	10.0%	5	16.7%		

NS= not significant (p >0.05).
FET: Fisher exact test.
χ 2 : Chi square test

Table (2 A) Frequency distribution of the intervention and the control group pre and post – pelvic floor muscle training exercises according to their Overactive Bladder Symptom Severity (n=60)

Overactive Bladder Symptom Severity	Intervention(n=30)				Control(n=30)				χ2(p1)	χ2(p2)
	pre		post		pre		post			
	No	%	No	%	No	%	No	%		
1.Frequent urination during the daytime hours?										
▪ Not at All	0 0.0	0 0.0	4	13.3%	0 0.0	0 0.0	0 0.0	0 0.0	2.150 (p=0.362) NS	59.116 p=0.0003**
▪ A little bit	0 0.0	0 0.0	22	73.3%	0 0.0	0 0.0	0 0.0	0 0.0		
▪ Some what	0 0.0	0 0.0	2	6.7%	0 0.0	0 0.0	0 0.0	0 0.0		
▪ Quite a bit	5	16.7%	2	6.7%	4	13.3%	1	3.3%		
▪ A great deal	21	70.0%	0	0 0.0	25	83.3%	20	66.7% %%%		
▪ A very great deal	4	13.3%	0	0 0.0	1	3.3%	9	30.0%		
2. An uncomfortable urge to urinate?										
▪ Not at All	2	6.7%	7	23.3%	5	16.7%	1	3.3%	3.725 P=.641 NS	60.051 P=.0007**
▪ A little bit	1	3.3%	15	50.0%	0	0.00	0	0.00		
▪ Some what	3	10.0%	6	20.0%	2	6.7%	0	0.00		
▪ Quite a bit	3	10.0%	2	6.7%	2	6.7%	2	6.7%		
▪ A great deal	18	60.0%	0	0.00	20	66.7%	22	73.3%		
▪ A very great deal	3	10.0%	0	0.00	1	3.3%	5	16.7%		
3. A sudden urge to urinate with little or no warning?										
▪ Not at All	0	0.00	10	33.3%	2	6.7%	2	6.7%	5.953 P=.306 NS	48.428 P=.0001**
▪ A little bit	3	10.0%	18	60.0%	3	10.0%	2	6.7%		
▪ Some what	1	3.3%	2	6.7%	3	10.0%	1	3.3%		
▪ Quite a bit	1	3.3%	0	0.00	4	13.3%	1	3.3%		
▪ A great deal	20	66.7%	0	0.00	16	53.3%	20	66.7%		
▪ A very great deal	5	16.7%	0	0.00	2	6.7%	4	13.3%		
4 .Accidental loss of small amounts of urine?										
▪ Not at All	0	0.00	4	13.3%	0	0.00	0	0.00	1.910 P=.657 NS	66.203 P=.0001**
▪ A little bit	0	0.00	24	80.0%	0	0.00	0	0.00		
▪ Some what	2	6.7%	2	6.7%	1	3.3%	1	3.3%		
▪ Quite a bit	3	10.0%	0	0.00	2	6.7%	4	13.3%		
▪ A great deal	15	50.0%	0	0.00	20	66.7%	10	33.3%		
▪ A very great deal	10	33.3%	0	0.00	7	23.3%	15	50.0%		

χ2: Chi square test
NS= not significant
*** p = ≤.05 (statistical significance)**
**** p = ≤.01 (highly statistical significance**
p1: p-value for pre-intervention comparisons between the groups
p2: p-value for comparing the groups after pelvic floor muscle training intervention

Table (2 B) Frequency distribution of the intervention and the control group pre and post – pelvic floor muscle training exercises according to their Overactive Bladder Symptom Severity (n=60)

Overactive Bladder Symptom Severity	Intervention(n=30)				Control(n=30)				χ2(p1)	χ2(p2)
	Pre		post		pre		post			
	No	%	No	%	No	%	No	%		
5 .Nighttime urination?										
▪ Not at All	0	0.00	3	10.0%	0	0.00	1	3.3%	4.297 P=.364 NS	41.799 P=.0001**
▪ A little bit	2	6.7%	15	50.0%	4	13.3%	2	6.7%		
▪ Some what	10	33.3%	10	33.3%	4	13.3%	2	6.7%		
▪ Quite a bit	5	16.7%	0	0.00	8	26.7%	1	3.3%		
▪ A great deal	10	33.3%	0	0.00	12	40.0%	19	63.3%		
▪ A very great deal	3	10.0%	2	6.7%	2	6.7%	5	16.7%		
6 .Waking up at night because you had to urinate?										
▪ Not at All	0	0.00	0	0.00	0	0.00	0	0.00	2.291 P=.768 NS	38.972 P=.0004**
▪ A little bit	1	3.3%	9	30.0%	3	10.0%	3	10.0%		
▪ Some what	2	6.7%	19	63.3%	2	6.7%	3	10.0%		
▪ Quite a bit	2	6.7%	2	6.7%	2	6.7%	3	10.0%		
▪ A great deal	15	50.0%	0	0.00	17	56.7%	12	40.0%		
▪ A very great deal	10	33.3%	0	0.00	6	20.0%	9	30.0%		
7 .An uncontrollable urge to urinate?										
▪ Not at All	0	0.00	5	16.7%	0	0.00	0	0.00	5.734 P= .223 NS	54.099 P=.0004**
▪ A little bit	2	6.7%	18	60.0%	6	20.0%	2	6.7%		
▪ Some what	4	13.3%	5	16.7%	2	6.7%	1	3.3%		
▪ Quite a bit	3	10.0%	2	6.7%	5	16.7%	0	0.00		
▪ A great deal	11	36.7%	0	0.00	13	43.3%	15	50.0%		
▪ A very great deal	10	33.3%	0	0.00	4	13.3%	12	40.0%		
8 .Urine loss associated with a strong desire to urinate?										
▪ Not at All	3	10.0%	12	40.0%	3	10.0%	2	6.7%	2.546 P= .800 NS	48.604 P= .0001**
▪ A little bit	5	16.7%	16	53.3%	7	23.3%	1	3.3%		
▪ Some what	9	30.0%	2	6.7%	7	23.3%	3	10.0%		
▪ Quite a bit	3	10.0%	0	0.00	5	16.7%	2	6.7%		
▪ A great deal	5	16.7%	0	0.00	6	20.0%	12	40.0%		
▪ A very great deal	5	16.7%	0	0.00	2	6.7%	10	33.3%		
Total Mean ± SD	4.5±0.7		**2.1±0.4**		4.2±0.8		**4.8±0.7**		t=1.181 p=.221 NS	t=16.005 P= .0006**

χ2: Chi square test
t: Student t-test
NS= not significant
*** p = ≤.05 (statistical significance)**
**** p = ≤.01 (highly statistical significance**
p1: p-value for pre-intervention comparisons between the groups
p2: p-value for comparing the groups after pelvic floor muscle training intervention

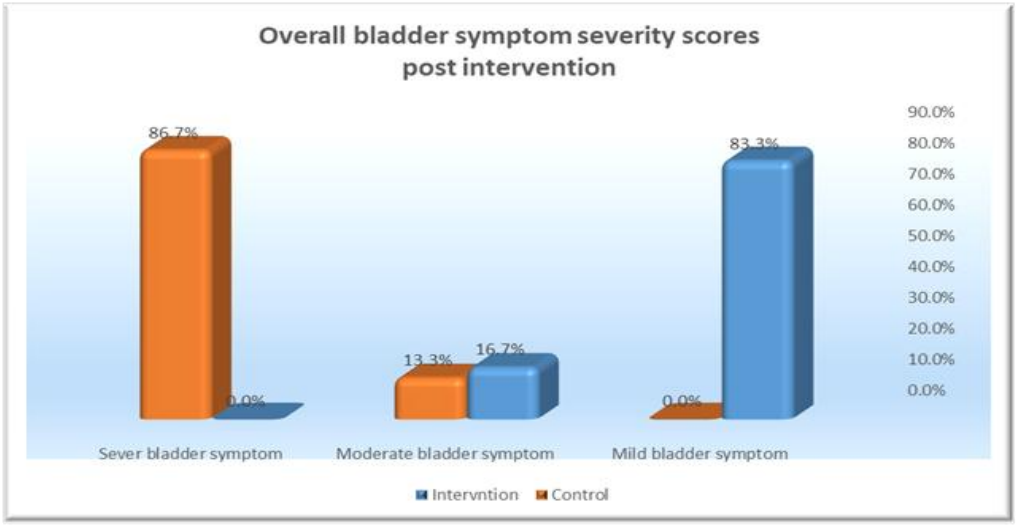

Figure (1): Percentage distribution of patients in the intervention and control groups based on their overall bladder symptom severity scores after implementing pelvic floor muscle training (n= 60)

Table (3) Frequency distribution of the intervention and the control group pre and post – pelvic floor muscle training exercises according to their Perception of Bladder Condition (PPBC) (n=60)

Patient Perception of Bladder Condition (PPBC)	Intervention(n=30)				Control(n=30)				χ2(p1)	χ2(p2)
	pre		post		pre		post			
	No	%	No	%	No	%	No	%		
▪ My bladder condition does not cause me any problems at all	0	0.00	0	0.00	0	0.0	0	0.00	2.944 P= .433 NS	63.487 P= .0005**
▪ My bladder condition causes me some very minor problems.	0	0.00	9	30.0%	0	0.0	0	0.00		
▪ My bladder condition causes me some minor problems.	2	6.7%	19	63.3%	0	0.00	0	0.00		
▪ My bladder condition causes me (some) moderate problems.	3	10.0%	2	6.7%	3	10.0%	4	13.3%		
▪ My bladder condition causes me severe problems.	15	50.0%	0	0.00	20	66.7%	16	53.3%		
▪ My bladder condition causes me many severe problems.	10	33.3%	0	0.00	7	23.3%	10	33.3%		
Tota score Mean ± SD	5.1±0.6		2.7±0.5		5.1±0.8		5.2±0.6		t= 0.179 p= .859 NS	15.244 P= .0005**

χ2: Chi square test t: Student t-test
NS= not significant
*** p = ≤.05 (statistical significance)**
**** p = ≤.01 (highly statistical significance)**
p1: p-value for pre-intervention comparisons between the groups
p2: p-value for comparing the groups after pelvic floor muscle training intervention

Table (4) Frequency distribution of the intervention and the control group pre and post – pelvic floor muscle training exercises according to their Intensity of Urgency Scale (n=60)

Patient Perception of Intensity of Urgency Scale	Intervention(n=30)				Control(n=30)				χ2(p1)	χ2(p2)
	pre		post		pre		post			
	No	%	No	%	No	%	No	%		
▪ No sense of urgency	0	0.00	3	10.0%	0	0.0	1	3.3%	1.360 P= .735 NS	45.499 P= .0008**
▪ Non-pressing need for urination	5	16.7%	19	63.3%	3	10.0%	2	6.7%		
▪ Moderate sense of urgency	7	23.3%	8	26.7%	5	16.7%	3	10.0%		
▪ Intense urgency	9	30.0%	0	0.00	12	40.0%	9	30.0%		
▪ urge urinary incontinence.	9	30.0%	0	0.00	10	33.3%	15	50.0%		
Total Mean ± SD	3.7±1		2.1±0.6		3.4±0.9		4.0±1		t= .882 p= .381 NS	8.860 P= .0002**

χ2: Chi square test
t: Student t-test
NS= not significant
*** p = ≤.05 (statistical significance)**
**** p = ≤.01 (highly statistical significance**
p1: p-value for pre-intervention comparisons between the groups
p2: p-value for comparing the groups after pelvic floor muscle training intervention

Table (5) Distribution of the intervention and the control group pre and post – pelvic floor muscle training exercises according to their mean score incontinence quality of life domains (n=60)

Mean score incontinence quality of life domains QOL domains	Intervention(n=30)		Control(n=30)		t (p1)	t (p2)
	Pre	post	pre	post		
Avoidance behaviors (Total score 8-40)						
▪ Min. – Max.	8.0-16.0	15.0-40.0	9.0-17.0	10.0-18.0	0.704 P=0.819 NS	16.253 P= 0.005**
▪ Mean ± SD.	11.77±3.22	36.87±8.12	11.97±3.47	13.6± 2.9		
▪ Median	11.0	39.5	11.5	13		
psychological effects (Total score 9-45)						
▪ Min. – Max.	9.0 – 30.0	12.0 – 41.0	9.0 – 27.0	10.0 – 29.0	0.178 P=0.887 NS	12.253 P=0.001 **
▪ Mean ± SD.	16.07±7.2	40.87± 7.04	16.03±6.5	16.07±6.6		
▪ Median	15	43	14	14.5		
Social embarrassment (Total score 5-25)						
▪ Min. – Max.	5.0-10.0	5.0 - 25.0	5.0-12.0	5.0-17.0	.972 P= .335NS	t=-8.905 P= 0.001**
▪ Mean ± SD.	6.7±1.1	17.3±5.0	7.2±1.3	7.9±2.8		
▪ Median	6.5	18.5	7.0	7		

t: Student t-test
NS= not significant
*** p = ≤.05 (statistical significance)**
**** p = ≤.01 (highly statistical significance**
p1: p-value for pre-intervention comparisons between the groups
p2: p-value for comparing the groups after pelvic floor muscle training intervention

Table(6): Correlations matrix between study variables (Overactive Bladder symptom severity, The Patient Perception of Bladder Condition (PPBC), Intensity of Urgency Scale and quality of life) on 6th weeks post-intervention among intervention and control groups(n=60)

		Overactive Bladder Questionnaire		The Patient Perception of Bladder Condition (PPBC)		Intensity of Urgency Scale	
		Control	intervention	control	intervention	control	intervention
Overactive Bladder Questionnaire							
The Patient Perception of Bladder Condition (PPBC)	r	.721**	.480**				
	p	0.000	.007				
Intensity of Urgency Scale	r	.796**	.745**	.603**	.427*		
	p	0.000	.000	.000	0.019		
The quality of life	r	-.411*	-.365-*	-.442-*	-.559-**	-.611**	-.681-**
	p	0.024	.048	.014	.001	0.000	0.000

***Correlation is significant at the 0.05 level) **: statistically highly significant (p<0.01)**

Discussion:

The results of the present study revealed that more than one third of the intervention group, compared with less than half of the control group, had an age ranged between "40– 50" years old with mean age ± SD of (42.3±8.6) and (42.4± 9.3) years, respectively and the largest proportion of the studied patients in both groups were female patients. A complicated combination of hormonal, anatomical, and life-course variables, many of which are specific to female physiology, contributes to the higher incidence of overactive bladder in women than in males. A female's vulnerability to urinary tract infections—a recognized cause of bladder hyperactivity and irritative symptoms—is heightened by anatomical factors such as a shorter urethra and closer closeness to the vagina and rectum. Birth and other reproductive life events place a great deal of mechanical and neurological stress on the pelvic floor. A lack of control over one's bladder, including symptoms like urgency, frequency, and urge incontinence, can be a consequence of damage to the pelvic floor muscles and pudendal nerve, which is more common in vaginal deliveries. The current study results are consistent with **(Shareb et al. 2024),** who indicated that the largest proportion of the studied patients in the control and study groups were females.

Also, the current study's findings were consistent with **(Al Edwan et al. 2021)**, who revealed that women aged 40 years or older had a high prevalence of overactive bladder.

The findings of the present study showed that more than half of the intervention groups, as compared to nearly two-thirds of the control group, were housewives. From the point of view of the researchers, Although OAB can affect anyone, housewives may be at a higher risk for developing it due to factors such as lifting heavy objects repeatedly, bending over, and squatting for long periods of time (e.g., when cleaning or carrying children). Another risk factor is that many housewives put their families' needs before their own, which can delay medical consultations and cause bladder issues to go untreated. Lastly, many housewives are mothers, which can weaken pelvic support structures during pregnancy and childbirth, particularly vaginal delivery.

These results were in the same line with (**Zhu et al., 2019)** who stated that there was a significant negative association between employment status and OAB. Also, (**Eladyed et al. 2018)** found that nearly two-thirds of the studied OAB patients were housewives. This finding was contradicted by **(Chuang et al. 2019)** reported that there were no significant differences in OAB prevalence according to work status.

The present study indicated that the majority of the studied patients came from rural areas. From the researcher's viewpoint, there are a number of factors that could explain why rural residents are more likely to suffer from overactive bladder, including limited access to healthcare, lower levels of education, unhealthy lifestyle choices, stress at work, and other medical issues. Fewer experts, higher travel distances, and a lack of diagnostic facilities are some of the major obstacles that rural residents encounter when trying to get healthcare. The consequence is an increase in the frequency of bladder symptoms due to the underdiagnosis or inadequate treatment of underlying causes of OAB, such as diabetes or neurological problems. This result was in line with **(Eladyed et al. 2018),** who stated that over half of the studied women were from rural regions, and increasing the level of education can improve management of OAB syndrome and help women to seek medical advice and treatment. While this study finding was contradicted by **(Przydacz et al. 2020),** who stated that more OAB patients resided in urban than in rural regions.

The existing study finding indicated that the majority of the studied patients in the two groups were married. This finding was supported by **(Alshehri et al. 2022)** found that there was a significant difference in the grades of urinary incontinence based on the marital status of the participants, with the highest prevalence of severe urinary incontinence among those who were married. On the other hand, this finding was contradicted **by (Zhu et al., 2019)**, who suggested that marital status is not a risk factor for OAB.

The current study results revealed that the post-intervention group had decreased severity of overactive bladder symptoms as compared to the control group. More than two-thirds of the post-intervention group had little concern regarding

frequent urination during the daytime hours, as compared to the majority of the control group had a great deal. Also, half of the post-intervention group had little concern regarding uncomfortable urge to urinate, as compared to more than two-thirds of the control group had a great deal. The greater control over the detrusor muscle and the development and endurance of the pelvic floor muscles are probably the underlying mechanisms of these changes. The pelvic floor muscles support the urethra and the bladder. The improvement of inhibitory reflexes in the central nervous system, that helps in the suppression of involuntary detrusor contractions, may be one reason why PFMT is helpful. There may be fewer instances of urge incontinence and urgency if the muscles of the pelvic floor are better coordinated with bladder function. This finding was supported by (**Santander et al. 2022),** who stated that the most bothersome symptom associated with a moderate to severe impact on quality of life was urinary urgency.

Regarding to overall scoring of bladder symptom severity, the current study results found that pelvic floor muscle training exercise significantly reduced overactive bladder symptoms in the intervention group, with most Patients experiencing only mild symptoms after the intervention. In contrast, the majority of the control group continued to have severe bladder symptoms, showing no improvement. This highlights the substantial positive impact of PFMT. The findings strongly advocate for PFMT as a non-invasive and cost-effective treatment for OAB, as it strengthens the muscles supporting the bladder, urethra, and pelvic organs, thereby improving bladder control and managing urinary urgency and frequency.

The current study results is consistent with **(Wang & Xu, 2018)** who stated that educational programs for developing healthy toileting habits, improving bladder symptoms, or enhancing OAB-specific or general health-related quality of life showed significant relief the OAB symptoms and decreased the likelihood of being wet and the intensity of urgency. This result was consistent with **(Fitz et al., 2017)**, who examined individuals with OAB who performed PFMT for 12 weeks under a physiotherapist's supervision for 40 minutes at a time, twice a week, along with an extra at-home program. Following treatment, there was a notable improvement in a few quality-of-life metrics, as well as a decrease in the frequency of incontinence, nocturia, and the intensity of OAB symptoms. Also, **(Xu et al., 2015)** study of individuals with OAB,1 group received PFMT (3setsperdayand15-20repetitions per session) and the other group received standard treatment. The group getting PFMT experienced a considerable rise in PFMS when compared to the group receiving standard treatment. Additionally, the intensity of bladder symptoms and quality of life were greatly improved.

Regarding to patient perception of bladder condition, the current study revealed significant improvements in the perception of bladder condition among patients in the intervention group following pelvic floor muscle training exercises, as compared to the control group. Specifically, a substantially higher proportion of the intervention group reported only minor bladder problems post-intervention, in stark contrast to the control group, where a majority still experienced severe issues. This dramatic difference, supported by a highly significant p-value of 0.0005, strongly suggests the efficacy of pelvic floor muscle training in mitigating negative perceptions associated with bladder dysfunction.

Furthermore, the significantly lower mean total score of patient perception in the intervention group compared to the control group, with a p-value of 0.005, reinforces that the training actively improved participants' subjective experience of their bladder health. These findings align with previous literature emphasizing the benefits of pelvic floor muscle training for various bladder conditions. For instance, **(Ruseckaite et al., 2022),** similarly reported improved patient-reported outcomes after structured pelvic floor rehabilitation. Our results corroborate the evidence presented by **(Sheng et al., 2022)** who highlighted the importance of these exercises in enhancing quality of life related to urinary symptoms.

Regarding patient perception of the intensity of urgency scale, the current study results indicate a significant improvement in the intensity of urgency levels for the intervention group post-pelvic floor muscle training (PFMT). Notably, about two-thirds of the intervention group reported a non-pressing need for urination

after completing the training, while only half of the control group showed urges for urinary incontinence. This difference is statistically significant (P = 0.0008), indicating that PFMT exercises have a meaningful effect on reducing urination urgency in the intervention group.

Pelvic floor muscle training has been well-documented as an effective intervention for managing urinary incontinence and related symptoms, such as urgency. The increased proportion of participants in the intervention group reporting a non-pressing need for urination aligns with **Cross, (2023),** who indicate that pelvic floor muscle training can significantly reduce the frequency and severity of urinary urgency. According to **(Kulaksizoğlu, et al., 2015)** who concluded that the right PFMT can be prescribed as first-line treatment or in combination with medical therapy in more severe situations because it increases functional bladder capacity and improves OAB symptoms.

Regarding the mean score incontinence quality of life domains, the current study results revealed the intervention group presented a highly statistically significant improvement in the avoidance behaviors domain, with an increase in their mean score from 13.6 ± 2.9 pre-intervention to 36.87 ± 8.12 post-intervention. This improvement indicates that the intervention successfully reduced the impact of urine incontinence on participants' everyday lives and social interactions. It appears that the individuals in the intervention group were able to take part in more physical, social, and everyday activities without experiencing incontinence-related problems. Reducing avoidance behaviors is essential for improving overall quality of life and increasing independence.

Also, the intervention group also showed significant improvements in the social embarrassment domain, with a post-intervention mean score of 17.3 ± 5.0 compared to the control group's 7.9 ± 2.8. Social embarrassment is a key concern for individuals suffering from incontinence, as the fear of leakage or accidents can limit social interactions and isolate individuals from their communities. The current study results are constant with (**Karaaslan et al., 2018**); **(Toprak et al,. 2022)** who concluded that for women with OAB, PFMT with or without CTM may be useful in improving PFMS and quality of life while minimizing OAB symptoms. A different study by **(Lucio et al., 2011)** assessed how PFMT affected the quality of life and lower urinary tract symptoms (LUTS) of women with multiple sclerosis. The results of all LUTS and quality of life questionnaires showed statistically significant improvements after 12 weeks of PFMT, according to the authors. Additionally, the results of studies by **(Geraerts et al., 2013) and (Fikry et al., 2020)** showed that pelvic floor muscle exercises significantly improved a person's quality of life, social participation, and the negative consequences of urine incontinence on their life.The study found that there was a significant inverse correlation ($p<0.05$) between OAB symptom severity, the patient perception of bladder condition and intensity of urgency and quality of life post intervention the training program. These results are in line with those of (**Qudah et al., 2024)** who found that there was a strong negative association between health related quality and all OAB symptoms . Quality of life is negatively impacted by the severity of bladder symptoms, the intensity of urgency, and the patient's perception of their bladder state.

Conclusion

The current study's findings indicate that using pelvic floor muscle training for intervention group leads to highly significant improvement on degree of bladder symptom severity (including frequency, urgency. nocturia and incontinence) among patients diagnosed with overactive bladder. In comparison to the control group, the quality of life is higher for all patients in the intervention group who strengthen their pelvic floor muscles.

Recommendation

These recommendations are based on the results of the current research: **For health care providers:** Development of an in- service training program for nurses and other health care providers to be able to teach OAB patients pelvic floor muscles training. **For health organization:** Development of health education programs for patients with OAB that use individualized educational materials to facilitate self-management, add simple instructions and images to a manual booklet to make it a teaching tool for people with overactive bladders. Publicize factual

information in the newspaper, television, and online media, as well as in specialized instructional programs to help patients to seek care at the onset of symptoms and incorporation of OAB knowledge in curricular education, provide each urologic clinic with qualified nurses to give information for overactive bladder patients about behavioral therapy and lifestyle modifications.

For further studies: - Conducting pelvic floor muscle training is necessary for determining the incidence and prevalence of overactive bladder in Egypt. Replication of the study on large proportional sampling to attain more generalized results.

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