

EFFECTIVENESS OF PELVIC FLOOR MUSCLE EXERCISES ON QUALITY OF LIFE IN ELDERLY ELDERLY WITH URINARY INCONTINENCE: LITERATURE REVIEW

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Abstract

Background: Urinary incontinence in the elderly has serious physical, psychological, and social impacts, and reduces quality of life. Pelvic Floor Muscle Exercise (PFME) is recommended as an effective non-pharmacological intervention, but its implementation is still limited. *Objective:* To evaluate the effectiveness of PFME on quality of life in elderly with urinary incontinence. *Methods:* A systematic literature review based on PRISMA guidelines of 15 primary articles published between 2014–2024, with inclusion criteria focusing on the elderly, PFME interventions, and quality of life measurements. *Results:* PFME consistently reduced the frequency of incontinence, increased voiding control, and improved physical and psychological quality of life. In elderly women, PFME reduced the frequency of incontinence by 74% ($p > 0.05$); in post-prostatectomy men, the combination of PFME with an oscillating rod increased the continence rate from 43% to 74% ($p < 0.01$). PFME was also effective in older adults with mild cognitive impairment, reducing daily episodes from 3.3 to 1.7 ($p < 0.001$), as well as increasing self-efficacy and decreasing depression scores ($p < 0.01$). Online approaches such as “teleGROUP” also showed positive long-term results (73% symptom reduction, $p < 0.001$). *Conclusion:* PFME has been shown to be an effective, safe, and adaptive intervention for the management of urinary incontinence in older adults, with a significant impact on quality of life. Educational support, technology, and an individualized approach can enhance its successful implementation.

Keywords: Effectiveness, Pelvic floor muscle training, Urinary incontinence, Elderly

INTRODUCTION

Urinary incontinence is a common health problem among the elderly, particularly women, and its prevalence increases with age (Ardiansyah et al., 2024). According to World Health Organization (WHO) data, approximately 13–56% of older adults experience urinary incontinence, including urgency incontinence, stress incontinence, and mixed incontinence (Rustiana Kusumawati et al., 2024). This condition occurs due to weakened pelvic floor muscles, postmenopausal hormonal changes, and other degenerative factors that lead to reduced bladder control (Anggraini et al., 2023). Its impact extends beyond impaired elimination function to psychological aspects such as stress, depression, decreased self-confidence, and limitations in social activities.

The reduced quality of life of older adults with urinary incontinence has become a serious concern in nursing and public health. Previous research has shown that older adults with urinary incontinence have lower quality of life scores, particularly in the physical and psychosocial domains (Rustiana Kusumawati et al., 2024). Elderly individuals in rural areas tend to face greater challenges in accessing health services and educational information related to urinary incontinence, coupled with the inherent social stigma that makes them reluctant to seek medical help (Ardiansyah et al., 2024). This situation is exacerbated by the lack of trained health workers capable of providing appropriate education and interventions, as well as the limited attention to this issue in community-level promotive and preventive programs. Therefore, a more

comprehensive, sustainable, and accessible approach is needed to address this issue, particularly through interventions oriented towards improving the quality of life of older adults.

One form of non-pharmacological intervention that has been widely used and proven effective in treating urinary incontinence in the elderly is pelvic floor muscle exercises (PFME), also known as Kegel exercises (Ardiansyah et al., 2024). These exercises involve repeatedly contracting and relaxing the pelvic floor muscles, which serves to strengthen the urethra and bladder muscles to improve urinary control (Sultoni et al., 2022). PFME has also been recommended by the European Association of Urology (EAU) as a first-line therapy for treating urinary incontinence in the elderly population (Sultoni et al., 2022). A study conducted by Milios et al. (2019) showed that patients who underwent PFME for 3 months experienced a significant reduction in incontinence symptoms and an increase in quality of life scores (Sultoni et al., 2022).

Despite numerous studies showing positive results, the implementation of PFME in the elderly in the community still faces obstacles such as low awareness, lack of family support, and limited healthcare professionals capable of properly and consistently guiding these exercises (Ardiansyah et al., 2024). Community-based interventions such as training of integrated health post (Posyandu) cadres and family education have begun to be developed as alternative sustainable approaches in rural areas (Rustiana Kusumawati et al., 2024). On the other hand, in the elderly population with neurodegenerative conditions such as Alzheimer's, the implementation of PFME still faces cognitive challenges, but the combination of PFME and bladder training shows potential to continue to improve symptoms and quality of life (Firmanda et al., 2024).

Therefore, a comprehensive literature review is needed to summarize the latest scientific evidence regarding the effectiveness of Pelvic Floor Muscle Exercise (PFME) on the quality of life of older adults with urinary incontinence, from a physiological, psychological, and social perspective. This literature review aims to evaluate the impact of PFME on older adults with urinary incontinence and identify supporting and inhibiting factors for its implementation in a community context. It is hoped that the results of this review can be used as a basis for developing evidence-based interventions in geriatric nursing practice and improving the overall well-being of older adults.

This study will focus on three main questions: 1) To what extent is Pelvic Floor Muscle Exercise effective in improving the quality of life of elderly people with urinary incontinence? 2) What factors support or hinder the successful implementation of PFME in elderly people, especially in rural communities? 3) What is the most appropriate intervention strategy to increase the participation and compliance of elderly people in carrying out PFME on an ongoing basis?

METHOD

This study is a systematic literature review that aims to evaluate the effectiveness of Pelvic Floor Muscle Exercise (PFME) on the quality of life of elderly people with urinary incontinence. This study was prepared based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and replicability in the review process. The research stages include formulating an article search strategy, establishing inclusion and exclusion criteria, selecting and assessing the eligibility of articles, and preparing a thematic synthesis of the results of eligible studies. The article search was conducted through four main databases, namely PubMed, ScienceDirect, Google Scholar, and ResearchGate, using the following Boolean combination keywords: "geriatric" AND "pelvic floor muscle training" OR "pelvic floor exercises" AND "urinary incontinence" OR "stress urinary incontinence" AND "quality of life". The search was limited to articles published in the last ten years (2014–2024), and in the initial stage a total of 11,024 articles were found, consisting of 2,593 articles from PubMed, 6,271 articles from ScienceDirect, and 2,160 articles from Google Scholar and ResearchGate. Articles were screened using inclusion criteria in the form of primary research with a Randomized Controlled Trial (RCT) design, quasi-experimental, or pure experiment, involving elderly subjects (age ≥ 60 years) with urinary incontinence, the main intervention being PFME (with or without a combination of bladder training),

results evaluating physical, psychological, or social quality of life, written in Indonesian or English, and fully accessible free of charge.

Exclusion criteria included articles that did not specifically involve the elderly, studies that combined PFME with other interventions without separate evaluation, articles that did not assess quality-of-life outcomes, narrative reviews, articles with fewer than 10 respondents, publications outside the last 10 years, and paid articles. The article selection process was carried out in stages following the PRISMA process, starting from initial identification, title and abstract screening, duplication removal, and final selection based on a comprehensive full-text review. Eligibility was evaluated by assessing study characteristics, number of respondents, intervention design, main results, and reported conclusions.

This search strategy refers to the PICOT approach, with details: Population (elderly with urinary incontinence), Intervention (PFME), Comparison (no intervention or other intervention), Outcome (effectiveness on symptoms and quality of life), and Time (publication in the last 10 years). The final results of eligible articles were thematically synthesized and presented in a summary table that includes author name, year, study design, sample size, intervention method, and main results. The entire review process was carried out collaboratively by the author team to ensure objectivity and scientific integrity in data analysis.

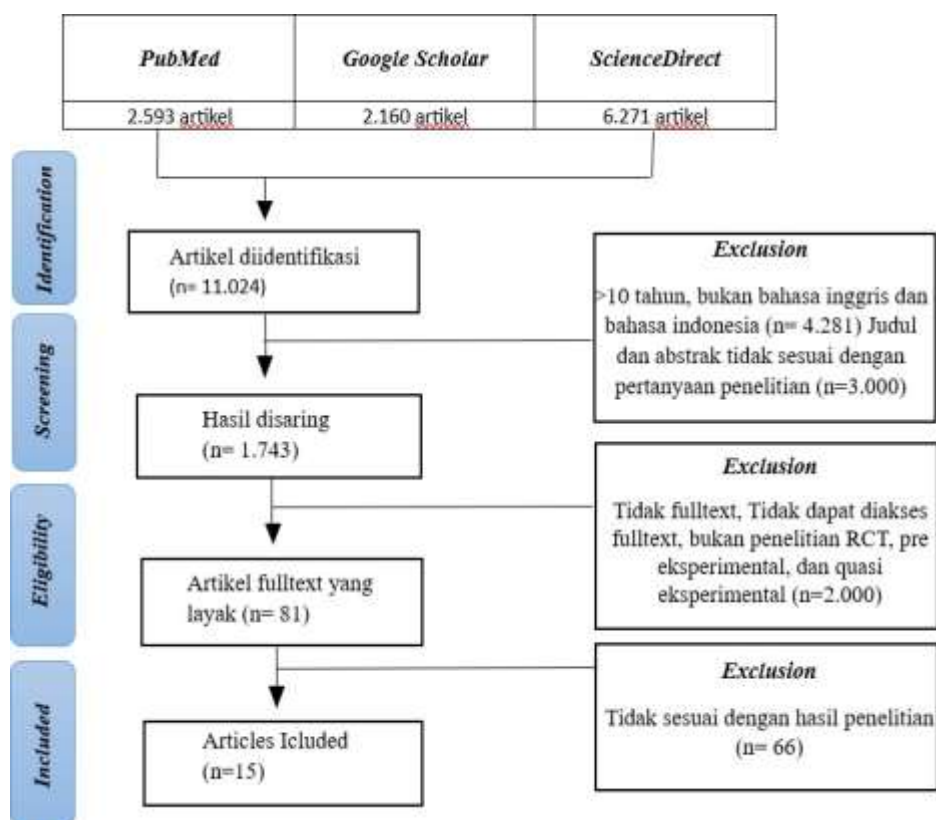


Figure 1. Prisma Flowchart

Table 1. Summary Table

No	Title & Author	Types of research	Intervention	Urinary Incontinence Sample	Results
1	<i>Group-based pelvic floor telerehabilitation for urinary incontinence in older women: A six-month follow-up pilot study</i> Le Berre, M., Filiatrault, J., Reichetzer, B., Kairy, D., Lachance, C., & Dumoulin, C. (2025).	This research is a longitudinal pilot study without a control group, which evaluated the long-term effects of an online group pelvic floor muscle training program (teleGROUP) in older women with urinary incontinence. Evaluations were conducted before the program (PRE), immediately after the program (POST), and six months after the program. and (6MO).	Pelvic floor muscle training (PFMT) is a 12-week program, with weekly one-hour online sessions via Zoom. After the main program, participants continue the exercises independently without supervision for six months. Each session includes education and physical exercises. Before the program, participants undergo a pelvic floor muscle contraction evaluation by a physiotherapist using digital palpation.	Thirty-two women completed the six-month follow-up. The median age was 69 years (interquartile range 67–73 years). Ninety-four percent had mixed urinary incontinence; the remainder had stress incontinence.	A median reduction of 73% (range 38–88%) from baseline to six months after the program. An online group pelvic floor muscle training program (teleGROUP) has been shown to be effective in reducing urinary incontinence symptoms and improving quality of life in older women.
2	<i>Modified lumbo-pelvic exercise to alleviate mild stress urinary incontinence in middle-aged females</i> (Money et al., 2023)	This research using experimental quantitative research type with randomized trial design	This intervention consists of rhythmic pelvic rotation movements that combine pelvic floor muscle contractions, abdominal breathing techniques (ADIM), as well as the use of Music is used to maintain rhythm and increase participant engagement. Each session consists of a 10-minute warm-up and a 45-minute main workout, performed to music with a tempo of 56–64 bpm.	This study involved 30 postmenopausal women aged 55–66 years who experienced mild stress urinary incontinence. They were divided randomly into two groups, namely the intervention group which followed modified lumbo-pelvic exercise for 16 weeks, and the control group which did not receive any exercise treatment.	The results showed that the experimental group experienced significant improvements in pelvic floor muscle function, lung vital capacity, and a decrease in symptoms. incontinence such as urinary leakage frequency, ICIQ-UI score, quality of life (I-QOL) score, and pad test results. Furthermore, this exercise also improved body composition (e.g., visceral fat and waist circumference). In contrast, the control group showed no changes.
3	<i>Pelvic Floor Muscle Rehabilitation in the Management of Post-Prostatectomy Urinary Incontinence</i> Ijaz, A., Naz, S., Osama, M., & Aslam, S. (2023).	Study This study uses an experimental quantitative research type with a randomized controlled trial (RCT) design.	The PFMT intervention was conducted for 12 weeks, both in the form of individual training and group, guided by Professional physiotherapists. Evaluations were conducted before, after, and 6 months after the intervention, using the International Consultation on Incontinence Questionnaire–Urinary Incontinence (ICIQ-UI) and the King's Health Questionnaire (KHQ) to assess incontinence	This study involved 200 men aged 50–75 years who experienced urinary incontinence after undergoing radical prostatectomy due to prostate cancer. Participants were divided into two groups: the intervention of 100 people who received pelvic floor muscle training (Pelvic Floor Muscle Training/PFMT), and a control group of 100 people.	The results showed that the group intervention experience significant reduction in ICIQ-UI and KHQ scores, both after the intervention and at the 6-month evaluation. ICIQ-UI scores decreased from 12.6 to 7.2 ($p < 0.001$), and KHQ scores from 36.9 to 28.4 ($p < 0.001$).

				symptoms. Andq uality of life.	100 people who only received standard post- operative care.
4	<i>Benefits of Pelvic Floor Muscle Training to Improve Urinary Incontinence in the Elderly (Wahyuni & Zartika, 2022)</i>	Study This use design pre-experimental with a one-group design pretest-posttest. This means there is only one group treatment without a control group, where participants are measured before and after the intervention to assess the changes that have occurred	The main intervention is Pelvic Floor Muscle Training (PFMT), a pelvic floor muscle contraction training program guided by a healthcare professional. The program is conducted over three weeks, three times per week. In the first week, participants begin with five sessions of basic contractions, then increase the dose and frequency of contractions each week for a total of 21 days of training.	The initial population was 42 members of the gymnastics group.	Doing PFMT for three weeks showed results effective in improving urinary incontinence symptoms in elderly women (aged 60–74 years) in the elderly exercise group in Manggar City, as evidenced by a significant decrease in the RUIS (Received Urinary Incontinence Scale) score post-intervention ($p = 0.000$).
5	<i>Randomized-Controlled Trial Examining The Effect of Pelvic Floor Muscle Training in the Treatment of Stress Urinary Incontinence in Men after Laparoscopic Radical Prostatectomy Pilot Study (Stroje ket al., 2021)</i>	This study is a randomized controlled trial clinical experiment of the pilot study type with a pretest–posttest design in two groups (experimental and control) which are reported. according to CONSORT	The experimental group (EG) underwent guided Pelvic Floor Muscle Training (PFMT): 24 individual sessions over 12 weeks (twice a week), starting two weeks after radical prostatectomy. Each session included posture correction, sacroiliac mobilization, breathing exercises, and pelvic floor muscle contractions (fast and slow fibers) accompanied by transversus abdominis muscle activation, performed in	Of the 76 patients screened, 37 men were randomized to EG ($n=19$) and CG ($n=18$), and 34 men (EG 19, CG 15) completed the study. The mean age of the EG was 61.4 ± 7.4 years (range approximately 54–69 years), while that of the CG was 64.2 ± 4.5 years (range approximately 60–69 years). All participants were diagnosed with stress urinary incontinence after laparoscopic prostatectomy.	Structured PFMT significantly reduced myostatin biomarker, improved quality of life, and decreased depressive symptoms in elderly men with post-prostatectomy stress urinary incontinence compared to no intervention, supporting its adoption as a standard of care.
			standing, sitting, and lying positions with duration and repetitions adjusted to individual function. The control group (CG) received no specific physiotherapy intervention.		
6	<i>Add-On Effect of Postural Instructions to Abdominopelvic Exercise on Urinary Symptoms and Quality of Life in Climacteric Women with Stress Urinary Incontinence. A Pilot Randomized Controlled Trial (Fuentes- Aparicio,</i>	This study was a pilot randomized controlled trial (RCT), which is a small-scale randomized controlled trial that aimed to evaluate the effectiveness of adding postural instructions to an abdominopelvic muscle training program in climacteric women with stress incontinence.	The intervention consists of two programs: 1. AEP (Abdominopelvic Exercise Program): exercise musclepelvic floor and abdominal muscles. 2. AEPPI (Abdominopelvic Exercise Program With	Inclusion criteria were climacteric women (transition period towards menopause) aged between 46 and 75 years and experiencing stress urinary incontinence (SUI). or mixed urinary incontinence with dominant stress (stress-predominant	Both exercise programs, abdominopelvic exercise alone (AEP) and combined with postural instruction (AEPPI), have been shown to be effective in improving urinary incontinence-related quality of life (UI-QoL) and patient satisfaction in climacteric

	Balasch-Bernat, & López-Bueno, 2021)	urine (stress urinary incontinence (SUI). This study was conducted experimentally by randomly dividing two intervention groups.	Postural Instructions): the same exercises plus Postural instructions such as cervical alignment, scapular relocation, and neutral pelvic position based on the biomechanical principles of "neutral spine" posture.	Mixed Urinary Incontinence/MUI).	women with stress urinary incontinence (SUI).
			Both groups participated in 12 40-minute training sessions over 12 weeks, plus independent practice at home.		
7	<i>Effects of voluntary pre-contraction of the pelvic floor muscles (the Knack) on female stress urinary incontinence—a study protocol for a RCT</i> (Fitz et al., 2021)	Study This This is a prospective, double-blind, randomized controlled trial (RCT) protocol study designed to evaluate the effectiveness of The Knack technique (voluntary contraction of the pelvic floor muscles before increasing intra-abdominal pressure) in treating stress urinary incontinence (SUI) in women.	The study compared three intervention groups: 1. The Knack alone (a conscious contraction of the pelvic floor muscles before and during activities such as coughing, sneezing, or lifting) 2. Pelvic Floor Muscle Training (PFMT) only (pelvic floor muscle strength training program that progressive (in supine, sitting, standing positions)). The Knack + PFMT combination (a combination of the two techniques above).	Participants were women aged 18 to 70 years with mild to moderate stress urinary incontinence, including mixed urinary incontinence with predominant stress. Inclusion criteria required pelvic floor muscle strength of at least grade 2 (according to the Oxford scale). A total of 210 women were planned to be recruited and randomly assigned to three intervention groups.	Group F MT demonstrated a higher objective cure rate than The Knack group alone, but the difference was not statistically significant (p-value = 0.592). However, The Knack group alone demonstrated a cure rate of 50%, which is considered quite promising for a simple intervention.
8	<i>Assessment of the Effectiveness of Pelvic Floor Muscle Training (PFMT) and Extracorporeal Magnetic Innervation (ExMI) in Treatment of Stress Urinary Incontinence in Women: A Randomized Controlled Trial</i> (Weber-Rajek et al., 2020)	This type of research is a Randomized Controlled Trial (RCT). This study involved randomizing subjects into three groups. 1. EG1: Group with Pelvic Floor Muscle Training (PFMT) intervention 2. EG2: Group with Extracorporeal Magnetic Innervation (ExMI) intervention 3. CG: Control group	The interventions provided are 1. EG1 (PFMT): 12 sessions of pelvic floor muscle training, 45 minutes each, 3 times a week for 4 weeks. Exercises are done in group small with physiotherapist supervision. EG2 (ExMI): 12 therapy sessions using the ExMI chair (NeoControl), each lasting 15 minutes, 3 times a week for 4 weeks. The magnetic field intensity was increased from 20%	The study involved 111 women with stress urinary incontinence aged 45 to 78 years, with a mean age of 1. EG1 (PFMT): n=40, #age 60–78years (average 70.12 years) 2. EG2 (ExMI): n=37, age 45–76years (mean 66.71 years) CG (control): n=34, age 60–78 years (mean 69.79 years)	This study indicates that both types of therapy, pelvic floor muscle training (PFMT) and extracorporeal magnetic innervation (ExMI), have been proven to be able to reduce the severity of urinary incontinence based on the RUIS assessment, relieve depressive symptoms as measured by the BDI-II, and improve the quality of life of patients in various aspects covered by King's Health. Q uestionnaire, including social limitations,

		(no intervention)	to 100% as tolerated by the patient.		emotional state, and symptom severity. Interestingly, a significant increase in self-efficacy was only noted in the group receiving ExMI therapy. In contrast, the control group showed no changes.
					Significant on all measured parameters.
9	<i>Group-Based vs Individual Pelvic Floor Muscle Training to Treat Urinary Incontinence in Older Women: A Randomized Clinical Trial (Dumoulin et al., 2020)</i>	This research uses an experimental quantitative research type with a randomized noninferiority clinical trial design.	Pelvic Floor Muscle Training (PFMT) is a 12-week program, conducted individually or in groups. Each session lasts one hour per week, consisting of 15 minutes of education and 45 minutes of physical exercise. The exercises focus on strengthening, improving endurance, coordination, and integrating pelvic floor muscles into daily activities (e.g., coughing or lifting light weights).	The study involved 362 women aged 60 years and older with stress or mixed urinary incontinence. They were randomly assigned to two groups: individual pelvic floor muscle training and group-based pelvic floor muscle training.	The results showed that after 1 year, both groups experienced a significant reduction in the frequency of incontinence, with a median reduction of 70% in the individual group and 74% in the group group.
10	<i>The Effect of Pelvic Floor Muscle Strengthening Exercise on Urinary Incontinence and Quality of Life in Patients after Prostatectomy: a Randomized Clinical Trial (Jalalinia, Raei, Naseri-Salahshour, & Varaei, 2020)</i>	Study This uses an experimental quantitative research type with a randomized clinical trial design.	Exercise interventions begin before surgery, in the form of pelvic floor muscle contraction exercises in various positions (lying down, sitting, standing), starting from	This study was a randomized clinical trial conducted on 60 male patients aged 50–75 years who experienced post-operative urinary incontinence. suprapubic	The results of the study showed that this exercise was effective. At three months after surgery, the intervention group showed a significant reduction in the degree of
		(randomized clinical trial/RCT)	Holding a contraction for 3 seconds, then increasing to 10 seconds, three times daily for 12 weeks, with a goal of 100 contractions per day. The exercises were monitored daily using a self-checklist and supported through weekly visits and daily phone calls.	They were divided into two groups: an intervention group that received pelvic floor muscle strengthening exercises (PFME), and a control group that only received routine hospital education.	Urinary incontinence compared to the control group. Furthermore, there was a significant improvement in the quality of life of the intervention participants in psychological, social, and avoidance behavior aspects.
11	<i>Does trunk muscle training with an Oscillating rod improve urinary incontinence after radical prostatectomy? A prospective randomized controlled trial (Heydenreich et al., 2020)</i>	This study is a prospective randomized controlled clinical trial (RCT).	There are two intervention groups: 1. Intervention Group (IG): Received standard PFMT exercises for 30 minutes daily for 3 weeks plus trunk muscle coordination training body using an oscillating rod (Bioswing Improve 150). 2. Control Group (CG):	The study involved 97 men with a mean age of 63 years and a standard deviation of 7 years, so most of the participants were between the ages of 56 and 70. As with the first study, most of the participants could be categorized as early elderly. All participants were men who were undergoing radical prostatectomy and did not have any	The results showed that at 12 weeks post-surgery, 74% of participants in the intervention group had achieved full continent status (no urinary leakage), compared to only 43% in the control group. Furthermore, pelvic floor muscle function, as measured by real-time ultrasound, improved significantly in the intervention group, and participants' quality of life also improved.

			Receive PFMT training	prior history of prostate cancer.	
	group comparison (control).				The severity of urinary incontinence in the elderly. This intervention can reduce symptoms from moderate-severe to mild within one month.
13	<i>Pelvic floor muscle training in radical prostatectomy: a randomized controlled trial of the impacts on pelvic floor muscle function and urinary incontinence</i> Milios, JE, Ackland, TR, & Green, DJ (2019)	Type study This was a prospective randomized controlled trial (RCT). The study compared an intervention group with intensive pelvic floor muscle training (PFMT). Which started before prostatectomy surgery radical, with control group that received standard (low-volume) PFMT training.	The study involved two groups: an intervention group that underwent standard PFMT for 30 minutes daily for three weeks and supplemented it with trunk coordination exercises using the Bioswing Improve 150 device, and a control group that received the same PFMT but without the oscillating rod, and instead was only given a relaxation session in the form of listening to music while lying down for 30 minutes.	Participants in this study consisted of 184 men, with an average age of 64.1 years and a standard deviation of 6.94 years. This means that the majority of participants were between 57 and 71 years old, so most of them can be categorized as early elderly according to WHO standards. All participants were post-radical prostatectomy patients who experienced mild to severe urinary incontinence. currently (urine loss between 1–200 g in a 1-hour pad test), and had not participated in pelvic floor muscle training before surgery.	The results showed that the group receiving the combination of PFMT and oscillatory bar exercises experienced a decrease in urine weight in the 1-hour pad test from an average of 22.6 grams to 8.5 grams, while the control group only decreased from 23.0 grams to 18.1 grams. In addition, quality of life scores as measured by the FACT-P increased more in the intervention group compared to the control group. Overall, the combined intervention of PFMT and trunk muscle training with oscillatory bar exercises proved more effective in accelerating recovery.
					urinary incontinence and improved quality of life compared to PFMT exercise alone.
14	<i>The Effect of Pelvic Floor Muscle Training On Incontinence Problems After Radical Prostatectomy</i> (Ayдын Sayılan & Özbaş, 2018)	Study This is a randomized controlled trial (RCT). The design aimed to evaluate the effectiveness of pelvic floor muscle exercise (PFME) on urinary incontinence in men after radical prostatectomy (RP).	The intervention (experimental) group received pelvic floor muscle training (Kegel exercises) three times daily for six months. The exercises were performed in various positions (lying, sitting, and standing), with monitoring and feedback using abdominal ultrasound to ensure proper muscle contraction. The control group received no PFME training, but only basic education and breathing exercises.	A total of 60 men aged 30–75 years who had undergone prostate removal surgery participated in this study. They were divided into two groups: 30 in the experimental group who received pelvic floor muscle training (PFME) and 30 in the control group. The average age of the experimental group was 63.0 years (± 8.6), while the control group was 59.93 years (± 6.98). All participants had no history of urinary problems before surgery. After surgery, the types of incontinence experienced included	The experimental group's score decreased significantly from an average of 9.03 at month 3 to 6.17 at month 6. In contrast, the control group's score increased to 14.63 at month 6, indicating worsening of the condition ($p < 0.01$). Pelvic floor muscle training (PFME) has been shown to be statistically effective in improving urinary control in men after prostatectomy. This intervention provides significant benefits in reducing symptom severity, decreasing dependence on pads, and improving incontinence-related quality of life (ICIQ-SF) scores.

			68% stress incontinence, 25% urgency, and 7% mixed incontinence.	
15	<i>Effects of Pelvic Floor Muscle Exercise on Urinary Incontinence in Elderly Women With Cognitive Impairment (Lee et al., 2017)</i>	This study was a prospective, randomized controlled clinical trial. The method used was to randomly assign participants into two groups: the intervention group (PFME) and the control group.	The intervention group received six sessions of pelvic floor muscle training (PFME) over 12 weeks, using vaginal palpation techniques and verbal feedback, as well as education about urinary incontinence and bladder training. The control group received only education without physical training.	After 12 weeks, the PFME group experienced a significant reduction in daily urinary incontinence frequency (from 3.3 to 1.7 episodes), compared with the control group (from 3.4 to 2.9 episodes). Supervised pelvic floor muscle training effectively reduces urinary incontinence symptoms in older women with mild cognitive impairment.

RESULTS AND DISCUSSION

Based on the analysis of 15 research articles, Pelvic Floor Muscle Training (PFMT) has been shown to have a significant positive impact on the management of urinary incontinence (UI) in both elderly women and men after prostatectomy, including those with cognitive impairment. PFMT interventions consistently reduce the frequency of urinary leakage, improve bladder control, and improve quality of life (QoL). In elderly women with stress or mixed incontinence, 12 weeks of group PFMT showed a 74% reduction in incontinence frequency, similar to the 70% reduction in individual intervention, with statistically non-inferior results ($p > 0.05$). Meanwhile, in postmenopausal women with mild UI, modified PFMT with the addition of rhythmic pelvic rotation and breathing techniques improved pelvic floor muscle function and significantly reduced ICIQ-UI and I-QoL scores ($p < 0.05$).

In men after prostatectomy, the combination of PFMT with oscillatory bar training resulted in faster and greater improvements in urinary control. One study showed that 74% of participants in the intervention group achieved full continence at 12 weeks postoperatively compared to 43% in the control group ($p < 0.01$). Furthermore, 1-hour pad-test results showed a significant decrease in urine weight from 22.6 g to 8.5 g ($p < 0.05$). Intensive PFMT, conducted preoperatively, was also shown to significantly reduce the degree of incontinence at 3 months postoperatively and improve psychological, social, and behavioral QoL ($p < 0.001$).

PFMT remains effective in specific groups, such as older women with mild cognitive impairment or Alzheimer's disease. A 12-week intervention with verbal feedback and vaginal palpation reduced the frequency of daily incontinence episodes from 3.3 to 1.7 ($p < 0.001$). Innovative approaches such as online group training ("teleGROUP") also yielded promising long-term results, with a 73% reduction in symptoms at the 6-month post-program evaluation ($p < 0.001$). Furthermore, posture-guided PFMT exercises (AEPPi) and simple techniques such as "The Knack" provided additional effectiveness, although progressive PFMT continued to show higher objective recovery rates than other interventions ($p = 0.592$).

PFMT also has a positive impact on psychological aspects. In men after prostatectomy, a 12-week PFMT intervention not only significantly reduced ICIQ-SF scores from 9.03 to 6.17 ($p < 0.01$), but also reduced depressive symptoms and improved QoL scores. Alternative methods such as ExMI (extracorporeal magnetic innervation) have been shown to be comparable to PFMT in improving symptoms and quality of life, even showing a significant increase in self-efficacy ($p < 0.01$), which was not seen with standard PFMT.

Overall, PFMT is a safe, effective, and flexible intervention for various populations, including the elderly and post-surgical patients. The ideal duration ranges from 4–16 weeks, with a minimum frequency of 3 sessions per week and a variety of exercise positions. The addition of assistive devices such as oscillating bars, breathing techniques, rhythmic music, and online approaches has been shown to improve

engagement, self-efficacy, and clinical outcomes. Although some studies have limitations in design or sample size, the available evidence supports PFMT as a primary non-pharmacological approach in the management of urinary incontinence, both from a physical and psychosocial perspective.

DISCUSSION

The Effectiveness of Pelvic Floor Muscle Exercise on Quality of Life in Elderly People with Urinary Incontinence

Theoretically, Pelvic Floor Muscle Exercise (PFME) is the recommended first-line intervention for managing urinary incontinence, particularly stress incontinence. These exercises are designed to strengthen and improve control of the pelvic floor muscles, which are responsible for resisting intra-abdominal pressure during physical activities such as coughing or sneezing. Furthermore, PFME also plays a role in improving neuromuscular coordination and muscle endurance, which ultimately can reduce urinary leakage episodes and improve quality of life (Cho & Kim, 2021).

Evidence-based data suggests that an 8-week, twice-weekly PFME program significantly strengthens pelvic floor muscles and reduces urinary incontinence symptoms in women, as reflected in decreased ICIQ-SF scores and improved quality of life based on the PFIQ-7 and PFDI-20 questionnaires (Molina-Torres et al., 2022). Similar results were found in women who combined PFME with core stability training, showing a decrease in urinary leakage frequency and an improvement in King's Health Questionnaire scores (Nipa et al., 2022).

As a group, we believe that PFME is an effective and affordable non-pharmacological intervention for older adults. This intervention not only improves physiological function but also has broad psychosocial impacts. Therefore, PFME should be an integral part of rehabilitation programs for older adults with urinary incontinence.

Factors Affecting the Success of Pelvic Floor Muscle Exercise in Elderly People with Urinary Incontinence

Theoretically, the success of PFME is largely determined by several factors, including the ability to recognize pelvic floor muscles, accurate contraction technique, self-motivation, and consistency of exercise. Adoption of behavioral theories such as the Health Belief Model and Self-Efficacy Theory explains that older adults' perceptions of the benefits of PFME, along with social and healthcare support, can improve exercise adherence and success (Sawettikamporn et al., 2022).

Evidence suggests that effective contraction duration ranges from 5 to 10 seconds per contraction, with 8–12 repetitions per session, performed at least 3 times per day during the intervention period (Cho & Kim, 2021). In a study by Molina-Torres et al. (2022), hypopressive exercises were also shown to improve pelvic floor muscle strength when performed regularly for 8 weeks. However, barriers such as lack of self-discipline, doubts about their effectiveness, and ignorance of how to perform them correctly hinder success (Sawettikamporn et al., 2022).

We believe that to achieve maximum success, PFME training needs to be accompanied by ongoing education and professional supervision. Family support and a community-based approach also need to be strengthened so that the exercises can become part of the older adult's daily routine.

Recommendations for Further Research regarding the Effectiveness of Pelvic Floor Muscle Exercise on Elderly People Experiencing Urinary Incontinence

Theoretically, future development of PFME interventions should consider individualizing programs based on the age, functional status, and medical conditions of older adults. Furthermore, the use of technologies such as tele-rehabilitation and mobile applications can be effective strategies for increasing older adults' engagement and adherence to PFME exercises (Molina-Torres et al., 2022).

Meta-analyses of studies have shown that intervention duration and exercise quality significantly influence the effectiveness of PFME. Kazeminia et al. (2022) stated that the effects of PFME increased with increasing intervention duration and training quality. Furthermore, the combination of PFME with

core stability exercises was shown to be superior to PFME alone in improving continence control and quality of life (Nipa et al., 2022).

As a group, we recommend that future research explore community-based and digital PFME interventions, with a focus on long-term evaluation. Furthermore, quantitative research should be combined with qualitative approaches to better understand older adults' subjective experiences during PFME, allowing for more responsive and holistic program design.

IMPLICATIONS

The results of this study indicate that Pelvic Floor Muscle Exercises (PFME) have significant potential as a non-pharmacological rehabilitative intervention to improve the quality of life of older adults with urinary incontinence. Practical implications of these findings include the potential integration of PFME as part of a holistic approach to managing continence disorders in older adults, specifically strengthening pelvic floor muscles, improving bladder control, and improving psychological outcomes such as self-confidence and reducing the social stigma associated with urinary incontinence. In addition to physical benefits, PFME also contributes to improved sleep quality, social participation, and independence in daily activities for older adults. With its low risk and simple implementation, PFME is a safe, affordable therapy option that can be implemented in various healthcare settings.

In the context of theory development, these results support the integration of PFME into a biopsychosocial model-based gerontic rehabilitation framework, which emphasizes the interrelationships between physiological function, psychological well-being, and social participation in older adults. This intervention reinforces the importance of a multidimensional and personalized approach to managing urinary incontinence in older adults.

From a policy perspective, these findings provide a baseline for evaluating the potential implementation of PFME as part of elderly rehabilitation programs at the primary care level, including in areas with limited medical facilities. PFME can also be developed as part of promotive-preventive programs at elderly health posts (posyandu), community rehabilitation centers, and home care services. Technology-based innovations such as tele-rehabilitation, mobile applications, or online modules for self-training can also increase the accessibility of PFME for older adults in remote areas or with limited mobility.

In the research realm, implications of this study include the importance of conducting further studies with randomized controlled trials that include longer intervention durations, standardized exercise frequencies, and evaluation of long-term effects on quality of life and independence for older adults. Local research in Indonesia is also essential to assess the effectiveness of PFME within the cultural, social, and national healthcare system contexts, and to tailor interventions to the demographic characteristics and needs of older adults in various regions.

RESEARCH LIMITATIONS

Although the findings of this study show promising results, there are several limitations that need to be considered. 1) Most of the reviewed studies still had relatively small sample sizes and were uneven in terms of participant demographic characteristics, such as age, gender, level of incontinence, and comorbid conditions that can affect exercise outcomes. This may limit the generalizability of the findings to a broader and more diverse elderly population. 2) Variations in the duration, frequency, and method of implementation of Pelvic Floor Muscle Exercises (PFME) between studies resulted in significant heterogeneity in the interventions. Some studies used self-guided exercises, while others were conducted under the supervision of a healthcare professional or physiotherapist. This inconsistency makes it difficult to develop a standardized PFME protocol that is effective and universally applicable. 3) Some studies did not use uniform measurement tools to evaluate quality of life, bladder control, or psychosocial impact, which limits comparisons between studies. Furthermore, most intervention effect measurements were conducted over a short period (4–12 weeks), so the long-term impact of PFME exercises on quality of life in older adults remains largely unknown. 4) Reporting bias and limitations in blinding participants or

evaluators are also methodological constraints that can potentially impact the internal validity of some studies. Blinding is difficult in exercise-based interventions, but it remains crucial to minimize subjective influences on outcome assessment.

CONCLUSION

The conclusion of this study indicates that Pelvic Floor Muscle Exercise (PFME) is an effective non-pharmacological intervention in improving the quality of life of elderly people with urinary incontinence. Based on the results of a review of various studies, PFME has been proven to reduce the frequency of urine leakage, increase pelvic floor muscle strength, improve bladder control, and have a positive impact on the psychological and social aspects of the elderly. The application of PFME also shows an improvement in the quality of life in the physical, emotional, and social domains, both in elderly women and men after prostatectomy. Furthermore, the combination of PFME with other approaches such as core stability training, bladder training, and online-based technology provides more optimal results in increasing compliance and effectiveness of the exercises. These findings confirm that PFME can be an important part of geriatric rehabilitation programs and community health services because it is safe, simple, and relatively affordable.

However, this study still has several limitations, such as heterogeneity in intervention methods, variations in exercise duration, relatively small sample sizes, and the use of different assessment instruments across studies. Most studies also focused on short-term evaluations, so the long-term effectiveness of PFME cannot be fully elucidated. Therefore, future research is recommended to use a randomized controlled trial design with a larger sample size, standardized exercise protocols, and long-term evaluation of the quality of life of older adults. Community-based research and digital technology also need to be developed to make PFME interventions more accessible to older adults in various regions. Practically, the results of this study can serve as a basis for healthcare professionals, particularly nurses and physiotherapists, to integrate PFME into promotive, preventive, and rehabilitative programs to improve the well-being and independence of older adults with urinary incontinence.

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