



Empowering Control: A Comprehensive Review on Pelvic Floor Muscle Training Programs for Urinary Incontinence and Sexual Health in Women

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ABSTRACT

Background: Urinary incontinence (UI) comprises the involuntary loss of urine, which significantly diminishes the quality of life. Stress urinary incontinence (SUI), which is brought on by physical exertions like coughing or sneezing, and urgency urinary incontinence (UUI), which outcome from an unexpected urge to urinate, are both included in this disorder. Presenting factors include advancing age, female gender, pregnancy, obesity, and antecedent surgical interventions. Most often affecting women, especially those over 60, UI is often associated with pelvic floor dysfunction, a condition in which the bladder is not adequately supported by damaged musculature. Female sexual dysfunction (FSD), characterized by trouble in arousal and orgasm, is correspondingly prevalent as a consequence of pelvic floor insufficiency. Pelvic floor muscle training (PFMT) has been demonstrated to be efficacious in fortifying musculature, enhancing bladder control,

and enhancing sexual health. This investigation seeks to estimate the efficacy of PFMT in the management of both UI and FSD, as well as to assess the awareness and availability of PFMT among women across diverse age demographics.

Methodology: A systematic search was conducted in PubMed, ScienceDirect, and Google Scholar for studies published between 2018 and 2023. Keywords included "Pelvic Muscle Training," "Urinary Incontinence," and "Sexual Health." Studies included were randomized controlled trials, systematic reviews, and observational studies involving women aged 18+ diagnosed with UI or FSD.

Results & Discussion: PFMT is a first-line treatment for UI, improving pelvic muscle strength and overall quality of life. While studies show its benefits, some research highlights inconsistent results, particularly around equipment-assisted training and protocols.

Conclusion: PFMT is an effective, non-invasive intervention for UI and FSD. Future research should refine PFMT protocols for different patient groups to optimize treatment outcomes.

Keywords: Urinary incontinence, female sexual dysfunction, pelvic floor muscle training.

Abbreviations

1. **SUI** ; Stress urinary incontinence
2. **UUI**; Urgency urinary incontinence
3. **PFD**; Pelvic floor dysfunction
4. **POP**; Pelvic Organ Prolapse
5. **FSD** ;Female sexual dysfunction
6. **IUGA**; International Urogynecological Association
7. **ICS**; International Continence Society
8. **WHO**; World Health Organization
9. **UTI**; Urinary tract infection

INTRODUCTION

Women's quality of life is significantly impacted by urinary incontinence (UI), a common and distressing disorder that causes involuntary urine loss. Urge urinary incontinence (UUI) is described by a sudden, intense urge to urinate that frequently leads to unintentional urine loss, while stress urinary incontinence (SUI) occurs when physical movements such as coughing, sneezing, or exercising cause urine to flow. While SUI is described as involuntary urine leakage caused by activities that increase intra-abdominal pressure, UUI is defined by the International Continence Society (ICS) and the International Urogynecological Association (IUGA) as an involuntary urge to void that is difficult to control (IUGA/ICS, 2017).¹

Risk factors for UI include obstetric and gynecological factors such as vaginal delivery, multiparity, and pelvic organ Prolapse; medical conditions such as diabetes, obesity, and persistent cough; pharmacological influences such as diuretics and opioid analgesics; and biological factors such as menopause, advanced age,

and female sex (Abrams et al., 2017). The primary causes of these are aging, vaginal childbirth, menopause, and obesity (ICS, 2017).¹

Due to the loss of pelvic structural support, urethral Hypermobility weakens the urethra, bladder neck, and urine sphincter. Due to the injury they cause to the perineum and pelvic floor muscles, pregnancy and childbirth also contribute to UI. Incontinence results from a reduction in pelvic support caused by weakness in the levator ani muscle and damage to the pudendal nerve, which is prevalent following childbirth, aging, or surgery (DeLance, 2016).²

The prevalence of UI increases with age. According to the World Health Organization (WHO), between 2015 and 2050, the proportion of individuals over 60 years old is expected to nearly double from 12% to 22%. Globally, UI affects approximately 17–30% of women over 20 years old and 38–50% of women over 60 years old. Among elderly populations, particularly those in nursing homes, UI prevalence can be as high as 77% (WHO, 2015).³

A departure from typical sexual feeling or function is known as female sexual dysfunction (FSD), a complicated, multifaceted disorder. One of the main causes of FSD is pelvic floor dysfunction, which is typified by weakening and laxity of the pelvic muscles and ligaments. This can result in disorders including pelvic organ Prolapse (POP) and UI (Hadizadeh-Talasaz et al., 2019). Because the pelvic floor muscles are essential for arousal and sexual feeling, these disorders impair sexual function.⁴

Research shows that FSD is common among women who have just given birth. While Khajehei et al. (2015) discovered that 64.3% of women experience FSD within the first year following childbirth, Rezaei et al. (2017) showed that 76.3% of postpartum women experience sexual dysfunction. FSD is divided into three categories by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5): orgasmic, arousal, and pelvic pain disorders (American Psychiatric Association, 2013). Several factors—including hormonal changes, menstruation, lactation, menopause, and multiple childbirths—can significantly impact sexual function (Hadizadeh-Talasaz et al., 2019).⁴ Declining estrogen levels during menopause contribute to vaginal atrophy, resulting in vaginal dryness, reduced elasticity, and pain during intercourse, exacerbating sexual dysfunction. Additionally, pelvic floor dysfunction disrupts blood flow, nerve function, and muscle support, further diminishing sexual satisfaction (Rezaei et al., 2017).⁵

For women with UI, the first-line conservative treatment is pelvic floor muscle exercise (PFMT). Younger postpartum women and those with mild to moderate UI can also benefit greatly from PFMT, even though its effectiveness in older women is well documented. Research shows that PFMT, especially when started during pregnancy and continued after delivery, can dramatically lower the prevalence of UI in postpartum women (Dumoulin et al., 2018).⁶

Additionally, PFMT has been shown to improve or cure various UI subtypes, including stress, urge, and mixed incontinence, with a number needed to treat (NNT) of 2.5, meaning one in every 2.5 women who undergo PFMT experiences significant improvement or complete recovery (Dumoulin et al., 2018). This highlights PFMT as an effective method for women dealing with UI and bladder control issues.⁶

Therefore, this study is necessary due to the high prevalence and substantial impact of UI and FSD on women's quality of life. Despite the well-documented benefits of PFMT in managing UI and enhancing sexual health, many women, particularly younger postpartum women and those with mild to moderate UI, remain unaware of or lack proper guidance among various age groups on PFMT. Thus this research aims to highlight the role of PFMT to improve urinary incontinence and female sexual dysfunction, and also to assess the awareness and accessibility of PFMT among women of various age groups.

METHODOLOGY

Search Strategy: Databases such as PubMed, Science Direct, and Google scholar were searched with keywords Pelvic Muscle Training, Urinary Incontinence, and Sexual Health, focusing on studies from the past decade (2018-2023). The objective is to determine relevant studies that investigated the PFMT and its role in Urinary incontinence, the search strategy utilized relevant keywords to extract articles in English between 2018 and January 2023.

Data Extraction and Analysis

A comprehensive review is conducted using the keywords Pelvic Floor Muscle Training (PFMT) Programs, Urinary Incontinence(UI), and Female Sexual Health(FSD) in order to establish study criteria (Table 1), to systematically compare findings on Pelvic Floor Muscle Training (PFMT) for Urinary Incontinence (UI) and Female Sexual Dysfunction (FSD) (Table 2), and to provide description of PFMT training program that impact on UI and FSD; aiming to highlight the effectiveness of PFMT in improving UI and FSD across different age groups.

Table-1 Criteria for study selection

Criteria	Inclusion criteria	Exclusion criteria
Study Design	Systematic reviews, meta-analyses, and observational studies focusing on PFMT.	Case reports, expert opinions, editorials, and conference abstracts without peer-reviewed data.
Population	Women aged 18 years and older Diagnosed with urinary incontinence and/or sexual dysfunction	Studies including participants with neurological disorders affecting pelvic function (e.g., multiple sclerosis, spinal cord injury, Parkinson's disease). Studies involving men.
Interventions	Studies investigating pelvic muscle training programs, including. Other pelvic muscle training interventions may also be included.	Non-PFMT interventions like surgical treatments pharmaceutical treatments, or behavioral therapy alone.
Published	Studies published between 2018-	Studies published before a specified

year	2024.	time2015.
language	Studies published in English and (other specific languages if applicable).	Studies published in languages other than English (or specified included languages) unless a full-text translation is available. Studies with only abstracts available in English but without a full-text translation.
Outcomes measures	Reduction in urine loss, improvement in quality of life, enhanced pelvic muscle strength, improved postpartum sexual function.	Studies that do not measure urinary incontinence, quality of life, or pelvic muscle function.

Table-2explained synopsis of studies pertaining to peculiarities of PFMT on UI and FSD

References	Title	Key Findings	Population age
Radzimińska et al. (2018)	The impact of pelvic floor muscle training on the quality of life of women with urinary incontinence: a systematic literature review	PFMT effectively treats UI. - Improves quality of life.	40-85 years
Hadizadeh-Talasaz, Z.et al.(2019)	Effect of pelvic floor muscle training on postpartum sexual function and quality of life: A systematic review and meta-analysis of clinical trials.	Pelvic floor exercises improve sexual function and quality of life postpartum..	Younger and older women
.García-Sánchez, et al.(2019)	What Pelvic Floor Muscle Training Load is Optimal in Minimizing Urine Loss in Women with Stress Urinary Incontinence? A Systematic Review and Meta-Analysis	PFMT effectively reduces urine loss in women with SUI.	>18 years.
Kharde, Pranjal&Vardhan et al .(2021)	Effects of Pelvic Floor Muscle Training During Pregnancy and After Childbirth on Prevention & Treatment of Urinary Incontinence: A Scoping Review	Pelvic floor muscle training is effective for urinary incontinence during pregnancy.	Over 35 Years
Sheng et al.,(2022)	Mechanisms of pelvic floor muscle training for managing urinary	Inconsistent findings on pelvic floor muscle training (PFMT) effectiveness.	24-84 years

	incontinence in women: a scoping review		
Alouini et al. (2022)	Pelvic Floor Muscle Training for Urinary Incontinence with or without Biofeedback or Electro stimulation in Women: A Systematic review.	PFMT reduces UI. - Different interventions show improvement.	29.4-85 years.
Todhunter-Brown et al. (2022)	Conservative interventions for treating urinary incontinence in women: an Overview of Cochrane systematic reviews	Early PFMT may prevent UI. - Effectiveness unclear in pregnancy/postpartum.	~26-30 years (Range: early 20s-40s)
Parra et al. (2023)	The Effectiveness of Pelvic Floor Muscle Exercise in Urinary Incontinence: A Systematic Literature Review and Meta-Analysis.	PFMT improves UI symptoms. - Individual and group-based PFMT are similarly effective.	Mainly over 60 years, also young females
Saus-Ortega et al. (2023)	Effect of pelvic floor muscle training on female sexual function: A systematic review protocol and meta-analysis.	PFMT benefits sexual function and pelvic floor health.	≥18 years
Curillo-Aguirre & Gea-Izquierdo (2023)	Effectiveness of Pelvic Floor Muscle Training on Quality of Life in Women with Urinary Incontinence: A Systematic Review and Meta-Analysis.	PFMT improves quality of life and treats stress UI. - Works as prevention and treatment.	Over 60 years

Table-3 highlights specific PFMT program in UI and FSD conditions

Author ,year	Outcome measurement/ tools	Description of PFMT training program on UI/ FSD/ or mixed UI
Radzimińska et al. (2018)	Incontinence Impact Questionnaire (IIQ).	Supervised PFMT included Kegel exercises with progressive contraction durations (3-10 seconds) and progressive intensity, performed three times daily for 12 weeks. The study emphasized supervised training over home-based exercises, with biofeedback-assisted training in some cases.
Strojek, K., &Piekorz, Z.(2018)	ICIQ-SF (International Consultation on Incontinence Questionnaire - Short Form).	The PFMT program involved isolated pelvic floor contractions performed 3 times per day for 8 weeks, with no significant differences observed between individual and group-based training.

Hadizadeh-Talasaz, Z.et al.(2019)	FSFI (Female Sexual Function Index), SQOL (Sexual Quality of Life), King's Health Questionnaire (KHQ), SF-36 (Short Form Health Survey-36)	Kegel exercises performed in various positions (lying, sitting, standing) with progressive hold times (5-10 seconds) and repetitions (10-15 per session). The study highlighted benefits in postpartum women for pelvic muscle strength and sexual function improvement.
García-Sánchez, et al.(2019)	Pad Test	Participants performed supervised Kegel exercises 3-7 times per week for 12+ weeks with gradual progression in contraction strength and duration. Training was combined with deep abdominal breathing for optimal intra-abdominal pressure control.
Kharde, Pranjal&Vardhan et al .(2021)	-	The study focused on antenatal PFMT, including Kegel exercises, bridging exercises, and core stability training. Exercises were performed daily, emphasizing controlled breathing and muscle isolation to reduce urinary incontinence episodes.
Sheng et al.,.(2022)	Surface EMG, Intravaginal Devices	PFMT was biofeedback-assisted using intravaginal devices and surface EMG monitoring. Patients performed voluntary contractions with real-time feedback, ensuring optimal muscle engagement and endurance improvement.
Alouini et al. (2022)	Pad Test, VAS (Visual Analog Scale), I-QOL (Incontinence Quality of Life), Perineometer, ICIQ-UI SF (International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form), B-FLUTS (Bristol Female Lower Urinary Tract Symptoms)	PFMT included Kegel exercises with biofeedback, perineometer-guided contractions, and functional movements (squats, hip bridges) to engage the pelvic floor. Sessions lasted 8-12 weeks, with increasing intensity.
Todhunter-Brown et al. (2022)	B-FLUTS (Bristol Female Lower Urinary Tract	The study compared mild vs. intensive PFMT. Intensive training included 15-second

	Symptoms)	holds, repeated in sets of 10, three times daily, leading to significant improvements in muscle strength, endurance, and coordination.
Parra et al. (2023)	Prolapsed and Incontinence Sexual Function Questionnaire	PFMT program included Kegel, core stability training, and transverse abdominis activation exercises. Training was supervised weekly for three months, with both individual and group-based sessions showing equal effectiveness.
Saus-Ortega et al. (2023)	Standardized Clinical Questionnaires.	-
Curillo-Aguirre & Gea-Izquierdo (2023)	ICIQ-UI SF, EQ-5D-3L, ICIQ-LUTSQOL, KHQ, I-QOL	PFMT included Kegel exercises combined with diaphragmatic breathing and functional strengthening (e.g., squats, bridging, and Pilates-based movements). The program lasted 12 weeks, with individualized exercise intensity and frequency.

DISCUSSION

Pelvic floor muscle training (PFMT) has been extensively investigated for its efficacy in controlling urinary incontinence (UI) and improving female sexual function. This systematic review synthesizes findings from multiple studies to assess the impact of PFMT across different populations, considering factors such as age, training modality, and additional interventions.

The majority of studies included in this review affirm the effectiveness of PFMT in diminishing UI symptoms and enhancing quality of life in affected individuals. **Radzimińska et al. (2018)** and Alouini et al. (2022) focus on the fact that PFMT interventions significantly improve continence results in women aged 40 to 85 years. Furthermore, **García-Sánchez et al. (2019)** highlight that PFMT, particularly when combined with equipment-assisted training, yields superior results in mitigating stress urinary incontinence (SUI) in women over 18 years of age. These findings suggest that structured and progressive PFMT protocols can provide substantial therapeutic benefits across a wide demographic.

The role of PFMT in postpartum and antenatal populations remains somewhat inconclusive. **Hadizadeh-Talasaz et al. (2019)** and **Kharde&Vardhan (2021)** report that PFMT contributes to improved postpartum sexual function and continence outcomes, with maternal age being a significant factor influencing UI prevalence. However, **Todhunter-Brown et al. (2022)** argue that the effectiveness of antenatal and postnatal

PFMT is uncertain, particularly in preventing UI onset. These discrepancies may be attributed to variations in intervention protocols, adherence levels, and baseline pelvic floor function in the studied cohorts.

Furthermore, the mechanistic underpinnings of PFMT remain an area of ongoing investigation. **Sheng et al. (2022)** identify inconsistencies in demonstrating outcomes that indicate that individualized responses to PFMT may vary based on baseline muscle function, adherence, and intervention duration. Parra et al. (2023) provide added insights by showing that transverse abdominis (TrA) activation, when integrated with PFMT, enhances both muscle strength and functional outcomes. These findings underscore the need for further research into optimal PFMT protocols, particularly regarding intensity, duration, and adjunctive therapies. Age is a critical factor influencing PFMT efficacy, as highlighted in multiple studies.

Women over 60 years are particularly susceptible to UI, with prevalence rates expected to increase significantly by 2050 (Curillo-Aguirre et al., 2023). The evidence suggests that early intervention with PFMT can serve as both a preventive and therapeutic strategy, reinforcing the importance of structured pelvic floor rehabilitation programs tailored to different age groups. Despite the robust evidence supporting PFMT, certain gaps remain. The heterogeneity in study designs, intervention parameters, and outcome measures poses challenges in establishing standardized guidelines for PFMT implementation.

Additionally, while biofeedback and electro stimulation have been explored as adjuncts to PFMT, their long-term benefits require further validation through high-quality randomized controlled trials.

CONCLUSION

A highly efficient non-invasive method for treating female sexual dysfunction (FSD) and urine incontinence (UI) is pelvic floor muscle training (PFMT). Research emphasizes how crucial organized, supervised training programs are for improving results. Moreover, PFMT may additionally improve muscle activation with the help of biofeedback or other technology, producing more noticeable improvements, particularly in postpartum or more severely symptomatic women. Combining Pelvic Floor Muscle Training (PFMT) with properly performed Kegel exercises is more effective than PFMT alone, improving pelvic floor strength and function in various conditions.

While the positive outcomes of PFMT in treating UI and FSD are well-documented, further investigation is needed in high-risk populations, particularly elderly women and those with neurological disorders, as they may have different needs and challenges. The lack of sufficient research in these groups emphasizes the need for tailored approaches and protocols. Raising awareness and integrating PFMT into routine healthcare can empower women to address pelvic health proactively, fostering greater independence and improving quality of life. Future studies should explore ways to enhance adherence to PFMT, as well as how to best combine it with other therapies to maximize its effectiveness. Ensuring its widespread availability in clinical settings will ultimately allow women to take control of their pelvic health, leading to sustained improvements in urinary and sexual function, as well as overall well-being.

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