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# The Efficacy of Physiotherapy Intervention on Core and Pelvic Floor Muscles among Post Hysterectomy Women

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**Abstract:**

**Background:** Hysterectomy is one of the most commonly performed gynecological surgeries worldwide, second only to cesarean section. Despite advancements in surgical techniques, including minimally invasive approaches, postoperative complications affecting pelvic floor function remain prevalent. These complications are often associated with pelvic floor muscle weakness, altered core stability, and reduced functional support to pelvic organs. Following hysterectomy, disruption of pelvic floor musculature and its interaction with core stabilizing muscles can lead to decreased muscle strength, impaired coordination, and compromised lumbopelvic stability, ultimately affecting functional outcomes and quality of life. However, despite growing recognition of these impairments, there is limited consolidated evidence focusing on the combined role of pelvic floor muscle training and core strengthening exercises in post-hysterectomy rehabilitation, highlighting the need for further research in this area.

**Objective:** To evaluate the effectiveness of pelvic floor muscle training combined with core strengthening exercises in reducing urinary incontinence and improving pelvic floor function in post-hysterectomy women.

Method: In order to identify relevant evidence on pelvic floor muscle training and core strengthening following hysterectomy, a PRISMA-guided review was conducted using electronic databases including PubMed, Scopus, Google Scholar, and PEDro (2005–2025). Studies meeting predefined inclusion criteria were screened and selected. Methodological quality of the included studies was assessed using standardized tools, and the findings were synthesized through qualitative and narrative analysis.

**Result:** According to the reviewed literature, pelvic floor muscle training significantly improves pelvic floor strength, muscular endurance, and functional support of pelvic organs following hysterectomy. When combined with core strengthening exercises, greater improvements were observed in lumbopelvic stability, muscle coordination, and overall functional performance. Integrated training approaches demonstrated enhanced outcomes in muscle activation patterns, postural control, and quality of life compared to isolated interventions. The evidence suggests that structured, progressive, and supervised exercise programs yield the most effective results in restoring pelvic floor function. However, despite positive findings, variability in study designs, intervention protocols, and small sample sizes highlight the need for standardized rehabilitation guidelines and further high-quality research.

**Conclusion:** Post-hysterectomy women demonstrate significant improvement with both pelvic floor muscle training and core strengthening interventions. Pelvic floor muscle training enhances muscle strength, support, and functional control, while core strengthening primarily improves lumbopelvic stability and coordination. A combined, individualized, and evidence-based rehabilitation approach appears to be the most effective strategy for optimizing functional outcomes and quality of life. However, further highquality research is required to establish standardized protocols and to determine long-term effectiveness.

**Keywords:** Hysterectomy, Pelvic Floor Muscles, Kegel Exercises, Core Strengthening, Physiotherapy Rehabilitation

## 1. INTRODUCTION

Hysterectomy is the most common gyneocological surgery next to cesarean section. It itself is a surgical challenge, regardless of the route–vaginal, open abdominal, or endoscopic[1]. With time, the laparoscopic route has gained edge to the laparoscopic route of hysterectomy over the abdominal and vaginal route. The indications for hysterectomy have, however, remained the same over the past two decades, mainly, abnormal uterine bleeding, endometrial hyperplasia, adenomyosis, and endometriosis among which abnormal uterine bleeding alone may account for more than 25% of all hysterectomie.[2][3][4][5].

Hysterectomy is the most common non obstetric surgical procedure among women. As such, it is imperative to continue evaluating trends in the performance of this procedure, including factors associated with undergoing different modes of hysterectomy. Many guidelines have been published regarding the optimal manner in which to perform hysterectomy, with both the American Congress of Obstetricians and Gynecologists and the American Association of Gynecologic Laparoscopists endorsing a minimally invasive approach whenever feasible[6][7]. Although the benefits of minimally invasive hysterectomy are well documented[8].

A total hysterectomy refers to removal of the entire uterus and part, or all, of the cervix. A subtotal hysterectomy involves removal of the body of the uterus without removing the cervix. After cesarean section and removal of the fetus and other procedures inducing or assisting delivery, hysterectomy is the most common major surgery performed among women ages 18– 44 years in the United States [9]. when a subtotal hysterectomy is performed, women should continue to be screened for pelvic floor muscle damage and weakness. As a result, it could be a risk factor for pelvic floor dysfunction. According to Lukanovic and Drazic (2010), there were substantially higher incidences of post-operative complications, like urinary incontinence in the group who undertook hysterectomy. The risk of developing urinary incontinence increases to 60% in middle-aged women [10] According to the International Continence Society, Urinary incontinence (UI) is an involuntary loss of urine that affects 25% to 45% of women [11][12]. Causes of UI include pelvic floor muscle weakness or injury, constipation, gynecological surgery, and pregnancy and childbirth because of pudendal nerve damage and/or trauma to the pelvic floor. Hysterectomy is also associated with UI. [13][14]

Pelvic floor muscles have two major functions; they provide 1; support or act as a " floor" for the abdominal viscera including the rectum and 2; constrictor or continence mechanism to the urethral, anal and vaginal orifices (in females).[15] The pelvic floor is comprised of number of muscles and they are organized into superficial and deep muscle layers. the superficial muscle layer and the muscles relevant to the anal canal function are the external anal sphincter, perineal body and possibly the puboperineal (or transverse perinei) muscles The deep pelvic floor muscles consist of pubococcygeus, ileococcygeuys, coccygeus and puborectalis muscles. In fact, puborectalis muscle is located in between the superficial and deep muscle layers, and it is better to view this as the middle muscle layer of the pelvic floor muscles included coccygeus (also referred to as ischiococcygeuys), ileococcygeus and pubococcygeus and these three muscles were felt to constitute the levator ani muscle.The autonomic nerves, sympathetic (spinal nerves) and parasympathetic (pelvic nerves) supply the internal anal sphincter. Sympathetic fibers originate from the lower thoracic ganglia to form the superior hypogastric plexus. Parasympathetic fibers originate from the 2nd, 3rd and 4th sacral nerves to form the inferior hypogastric plexus, which in turn gives rise to superior, middle and inferior rectal nerves that ultimately supply the rectum and anal canal [16].

Among the various treatment methods for females, pelvic floor muscle exercises were recommended as a first initial therapy reinforce the pelvic floor muscle and were found to be successful as physiotherapy. The pelvic floor muscles (PFM) are the only muscle grouping in the body that can offer structural protection to the pelvic organs, genital, and urethral openings. [17]. For Pelvic floor muscles strengthening Kegel exercises including kegel bridges, side clamshell, bird dog, knee folds, dead bug crunches, cat and camel.

The core is defined as an anatomical box which consists of several muscle groups, such as the rectus abdominis at the front, the internal and external obliques on the lateral sides, the erector spinae, lumbar multifidus, and quadratus lumborum at the back, the diaphragm at the upper edge and the pelvic floor, and the iliac psoas at the bottom. [18]. From a practical perspective, the core muscles are the center of the body where most kinetic chains transfer forces to the extremities. However, the transversus abdominis, lumbar multifidus, and quadratus lumborum are considered the key core muscles for fitness and health professionals[19] . Core strengthening exercises including Abdominal hollowing, abdominal crunches, Bilateral knee raise, Bilateral knee raise, Supine extension bridge, Straight leg raise from prone, breathing exercise[20].

### 1.1. Objectives

- To determine the effect of physiotherapy intervention on pelvic floor muscle strength and function in post-hysterectomy women.
- To evaluate the effect of physiotherapy intervention on core muscle strength and lumbopelvic stability in post-hysterectomy women.

## 2. MATERIALS AND METHODS

Source of data: Hospitals near to East Bangalore, rehab centres

Type of study: Literature review Inclusion criteria:

- women who aged between 45 to 55 years old
- post hysterectomy recovery phase
- core and pelvic floor muscles weakness after hysterectomy

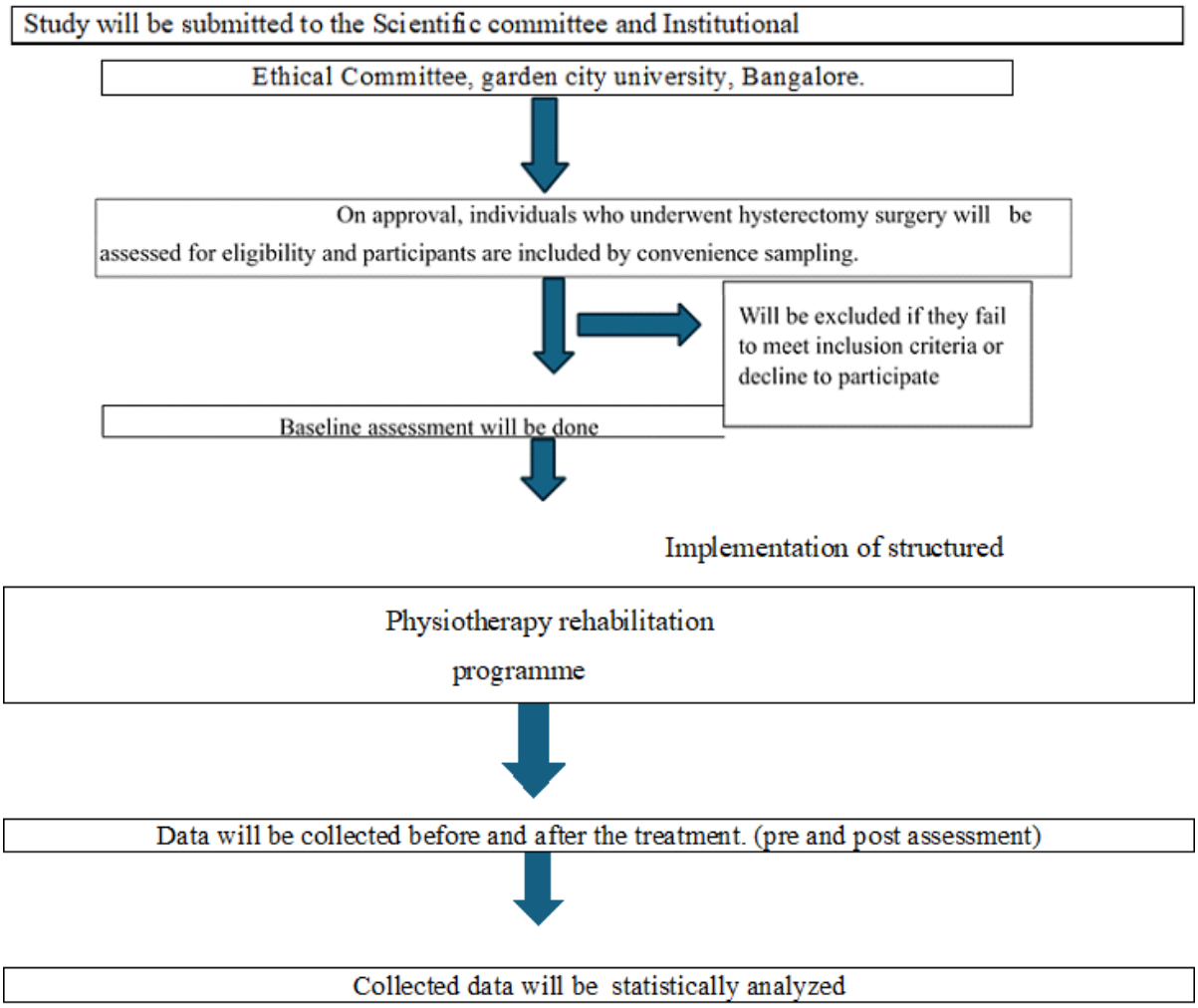
Exclusion criteria:

- age above 55 years old females are excluded
- Radical hysterectomy subjects are excluded
- Hysterectomy performed 1 month ago.

Outcome measures

- OXFORD MUSCLE SCALE
- MMT

## 3. PROCEDURE




## 4. RESULT

The database search identified a total of 72 potentially relevant studies from PubMed, Google Scholar, Scopus, and PEDro. After removal of 14 duplicate articles, 58 studies were screened based on titles and abstracts, out of which 46 full-text articles were assessed for eligibility. Subsequently, 16 studies were excluded due to inappropriate study design (n = 5), inadequate or irrelevant interventions (n = 6), and lack of focus on post-hysterectomy rehabilitation (n = 5), resulting in 30 studies being included in the qualitative synthesis. The included studies, published between 2005 and 2025, comprised 18 randomized controlled trials, 6 quasiexperimental studies, 3 cross-sectional studies, and 3 systematic reviews/meta-analyses, with sample sizes ranging from 20 to 776 participants. The interventions primarily involved

pelvic floor muscle training, core strengthening exercises, and combined rehabilitation approaches, with some studies incorporating adjunct techniques such as biofeedback and breathing exercises. Outcome measures commonly used across studies included the Modified Oxford Muscle Scale for pelvic floor strength and Manual Muscle Testing (MMT) for core muscle assessment, along with functional measures related to stability and quality of life. Overall, the findings consistently demonstrate that physiotherapy interventions are effective in improving pelvic floor strength, core stability, and functional outcomes in post-hysterectomy women, although variability in study designs and intervention protocols highlights the need for standardized approaches and further high-quality research.

| Citation (year) | Design | n (total) | Intervention (brief) | Comparator | Primary balance outcomes | Key findings |
|---|---|---|---|---|---|---|
| Forsgren et al. (2025) | Prospective cohort | 242 | Follow-up after hysterectomy (no structured intervention) | Pre-surgery baseline | Pelvic floor function, sexual function | |
| Brennen et al. (2025) | Cohort study | Not specified | Physical activity + postop monitoring | Pre vs post comparison | Pelvic floor disorders, QOL | |
| Chouhan & Rai (2025) | Experimental | 30 | Core exercises vs pelvic floor exercises | Comparative groups | | |
| Oliveira et al. (2024) | Systematic review & meta-analysis | 776 | Pelvic floor muscle training | No intervention/ control | | |
| Fengping Lai et al. (2024) | Experimental | 81 | Nurse-led remote guided pelvic floor exercises | Regular PFMT | Pelvic floor function, SUI, sexual function | Improved pelvic floor function, reduced SUI, enhanced quality of life |
| Vaishnavi R et al. (2024) | Case-control | Not specified | Physiotherapy (exercise, manual therapy, education) | Standard care | Functional recovery, QOL | Improved recovery, reduced complications, better QOL |
| Yulia Nafizah Mawarni et al. (2024) | Experimental | Not specified | Physiotherapy exercise program | | Pain, pelvic floor strength, function | Reduced pain, improved strength and functional activity |
| Vijaya Krishna Kumar et al. (2022) | Experimental | 20 | Physical therapy exercises | Observation | Quality of life (SF-36) | Significant improvement in QOL in intervention group |
| Meilian Xie et al. (2022) | Experimental | 99 | Psychological intervention + routine care | e care | Psychological status, pelvic floor function | Improved recovery and pelvic floor outcomes |
| Chitraks hi A et al. (2021) | Case study | Not specified | PFMT + core strengthening + breathing | | Pelvic floor function | Early physiotherapy managed postsurgical complications |
| Tejaswini B Fating et al.;(2021) | Case study | 1 | Pelvic floor + core strengthening | | Pelvic floor strength, QOL | |
| Neha N. Bhagdewani et al. (2021) | Case study | 1 | Combined pelvic floor exercises | | Functional recovery | Improved early recovery |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | and daily activities |
| Edgar Manoel Martins et al. (2020) | Systematic review | | Various physiotherapy interventions | | Functional outcomes | Positive effects; need for more high-quality studies |
| Janse van Vuuren et al. (2016) | Experimental | Not specified | PFMT + core stability | Control | Pelvic floor function, QOL | Combined training improved outcomes |

## 5. DISCUSSION

The effectiveness of physiotherapy interventions, particularly pelvic floor muscle training (PFMT) and core strengthening exercises, in improving pelvic floor function among post-hysterectomy women has been explored in several studies over recent years. Early evidence by Janse van Vuuren et al. (2016) demonstrated that combined PFMT and core stability exercises significantly improved pelvic floor function and quality of life compared to control groups, highlighting the importance of integrated rehabilitation approaches. These findings emphasized that targeting both pelvic floor and core musculature is essential for restoring functional stability after hysterectomy.

Research between 2020 and 2022 further reinforced the benefits of physiotherapy interventions. Edgar Manoel Martins et al. (2020), through a systematic review, reported overall positive effects of physiotherapy on functional outcomes, although variability in study quality was noted. Vijaya Krishna Kumar et al. (2022) demonstrated that structured physical therapy exercises significantly improved quality of life, while Meilian Xie et al. (2022) showed that combining psychological intervention with routine care enhanced pelvic floor recovery and overall patient outcomes.

Studies conducted around 2021 highlighted the importance of early and individualized rehabilitation. Chitrakshi A et al. (2021) reported that a combination of PFMT, core strengthening, and breathing exercises effectively managed post-surgical complications and improved pelvic floor function. Similarly, Neha N. Bhagdewani et al. (2021) found that combined pelvic floor exercises led to improved early recovery and better performance in activities of daily living. These studies emphasize the role of early physiotherapy intervention in optimizing recovery following hysterectomy.

Recent research from 2024 has focused on structured and innovative rehabilitation approaches. Fengping Lai et al. (2024) demonstrated that nurse-led remote guided pelvic floor exercises significantly improved pelvic floor function, reduced stress urinary incontinence, and enhanced quality of life. Vaishnavi R et al. (2024) reported that physiotherapy interventions, including exercise, manual therapy, and patient education, resulted in improved functional recovery and reduced complications compared to standard care. Yulia Nafizah Mawarni et al. (2024) further highlighted that physiotherapy exercise programs effectively reduced pain and improved pelvic floor strength and functional activity.

These findings are also supported by cumulative evidence suggesting that combined physiotherapy interventions produce superior outcomes compared to isolated approaches. PFMT primarily improves pelvic floor muscle strength, endurance, and continence, whereas core strengthening enhances lumbopelvic stability, posture, and neuromuscular coordination. Integrated programs involving both components demonstrate better improvements in functional performance and quality of life.

However, despite consistent positive findings, limitations such as small sample sizes, lack of standardized intervention protocols, and limited long-term follow-up remain prevalent across studies. These variations make it difficult to establish uniform clinical guidelines for post-hysterectomy rehabilitation.

Overall, both pelvic floor muscle training and core strengthening exercises are effective in improving outcomes in post-hysterectomy women. However, when combined, these interventions yield greater improvements in pelvic floor function, stability, and quality of life. While PFMT directly enhances muscle strength and continence, core

strengthening supports overall functional stability. Therefore, a structured, individualized, and combined physiotherapy approach appears to be the most effective strategy, though further high-quality research is required to establish standardized protocols and longterm effectiveness.

## 6. LIMITATIONS AND IMPLICATIONS:

The review is limited by the variability and moderate quality of the available evidence, including small sample sizes and inclusion of non-randomized study designs, which may affect the strength and reliability of conclusions. The review process itself may be subject to selection bias, as only studies from selected databases and predominantly English-language publications were included, potentially excluding relevant data. Additionally, heterogeneity in interventions, outcome measures, and study methodologies limits the ability to perform direct comparisons and develop standardized protocols.

In terms of implications for practice, the findings support the use of combined pelvic floor muscle training and core strengthening; however, clinicians should adopt individualized, patient-specific approaches due to the lack of standardized guidelines. From a policy perspective, there is a need to establish evidence-based rehabilitation protocols and integrate physiotherapy into routine posthysterectomy care. Future research should focus on conducting high-quality, large-scale randomized controlled trials with standardized intervention protocols, consistent outcome measures, and longterm follow-up to strengthen the evidence base and guide clinical practice.

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