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Original article

INFLUENCE OF PREOPERATIVE PHYSIOTHERAPY ON FUNCTIONAL CAPACITIES IN PATIENTS AFTER TOTAL HYSTERECTOMY IN THE EARLY POSTOPERATIVE PERIOD

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ABSTRACT:

Introduction: Hysterectomy is a surgical intervention that a large part of the female population undergoes. The postoperative period is associated with a number of complications, some of which are infections, severe pain, adhesions, pelvic floor dysfunction, etc. Postoperative physiotherapy is used to prevent all of them, which is widely described in the scientific literature, however, the role of preoperative physiotherapy in such patients remains unclear, and the literature data on it are scarce and insufficient.

The aim of the present study is to study the effect of preoperative physiotherapy on pain and functional capabilities of patients in the early postoperative period who underwent total abdominal hysterectomy.

Materials and methods: In the period September 2024 - May 2025, a total of 30 women who underwent total abdominal hysterectomy were studied, divided into two groups of 15 each. The working group performed preoperative physiotherapy, and the control group did not. Postoperative physiotherapy was applied to both groups during the hospital stay.

Results: Comorbidities and age were recorded. Pain intensity at rest and during movement was examined in patients from both groups at the 12th, 24th, and 48th postoperative hours. Regarding the Barthel Index, the following results were obtained when it was measured on the 1st and 3rd postoperative days. Postoperative recovery using the Standing and Sitting Test was assessed, too.

Discussion: The observed pattern suggests that preoperative physiotherapy may facilitate early postoperative recovery primarily by improving pain-related mobility and basic functional performance. The significant advantages in sit-to-stand ability and walking capacity, together with the absence of a clear effect on the Barthel Index, indicate that its earliest benefits may be more specific to movement-related tasks than to broader activities of daily living.

Conclusion: The present study demonstrated that preoperative physiotherapy leads to effective and rapid functional recovery in patients undergoing total abdominal hysterectomy. The presented physiotherapy program model and its algorithm are suitable for in clinical application to improve early postoperative functional recovery.

Keywords: postoperative physiotherapy, preoperative physiotherapy, total hysterectomy, functional capacity,

INTRODUCTION

The second most frequently performed surgical intervention in women is hysterectomy [1, 2]. In essence, it is a surgical removal of the uterus and cervix [3]. The frequency of hysterectomies in the USA reaches 600,000 per year [4]. Various postoperative complications after total abdominal hysterectomy, such as risk of mortality, intra-abdominal adhesions, postoperative infections, pelvic organ dysfunction and thromboembolic events are well known and are extensively reviewed in the scientific literature [5, 6]. The surgical intervention and subsequent bed rest, which are a prerequisite for the occurrence of potential postoperative complications, undoubtedly require the implementation of rehabilitation measures [7].

A number of clinical studies have demonstrated the role of postoperative physiotherapy in contributing to the optimal restoration of functional capacity in patients after hysterectomy [8, 9]. The use of targeted exercises, manual therapy and patient training in pelvic floor muscle training reduces postoperative complications, such as pain and weakness, while also preventing pelvic organ prolapse and incontinence [10, 11, 12, 13]. Through early postoperative mobilization, physiotherapy plays a key role in accelerating the recovery process and improving the patient's overall quality of life [14, 15].

The success of postoperative physiotherapy after total abdominal hysterectomy is often due to well-structured preoperative physiotherapy, about which, however, there is almost no or very little information in the scientific literature reviewed by us in the period 2015 - 2025 in the scientific databases of PubMed, Scopus and Google Scholar. In order to investigate the effect of preoperative physiotherapy in such a contingent of patients, we conducted the present study.

MATERIALS AND METHODS

The present study was conducted in the clinical base of the Department of Obstetrics and Gynecology at the University Hospital "Kaneff" AD - Ruse in the period September 2024 - May 2025. The study included 30 women who underwent a total abdominal hysterectomy.

Inclusion criteria: Women aged 20–70 years who had undergone a total abdominal hysterectomy for uterine fibroids, endometrial carcinoma, or ovarian carcinoma. The majority of women had retained uterine appendages (98.3%). All women included in the study had their uterus and cervix removed (total hysterectomy).

Exclusion criteria: Women under 20 and over 80 years of age, with a preserved cervix or with another type of surgical access (vaginal, laparoscopic), are not included in the study due to incomparability of functional results. The operative approach in 26 patients was through a Pfannestiel incision of the abdominal wall, and in 4 patients through a mid-abdominal incision of the abdominal wall. The patients had concomitant diseases, the highest percentage being arterial hypertension and diabetes mellitus. All women had at least one birth: 97% were partus normalis, 3% gave birth by section caesarea.

The working contingent was randomly divided into two groups – control and working, each consisting of 15 patients. The patients in the working group received a preoperative physiotherapy program, while the patients in the control group did not.

Preoperative physiotherapy was performed with the patients in the working group three days before the surgical intervention, twice a day, in a hospital setting. The physiotherapy program was based on:

- information for the problem and the upcoming postoperative and resuscitation procedures;
- training in correct and painless verticalization;
- breathing exercises and training in diaphragmatic breathing;
- strengthening the muscles of the pelvic floor, abdomen and buttocks;
- general developmental exercises;
- walking training;
- Training in proper coughing and expectoration.

RESULTS

The SPSS program, version 2.0.1, was used for the statistical processing of the obtained results.

The present study was conducted in the clinical base of the Department of Obstetrics and Gynecology at the University Hospital "Kaneff - AD", Ruse, where for the study period September 2025 - May 2026, a total of 976 women underwent surgical treatment, of which 250 women underwent gynecological intervention and 87 women underwent total abdominal hysterectomy.

Of a total of 1459 women, 67.3% were patients who underwent surgical intervention, of which 25.6% were as a result of a gynecological problem, and 8.9% were women who underwent a total abdominal hysterectomy.

In the working group, the patients were treated according to our proposed algorithm and methodology of preoperative physiotherapy. We conducted the classes from the day of their hospitalization until the moment of their discharge from the hospital - the 3rd postoperative day. Table 1 shows their diagnosis, age and concomitant diseases. The patients had an average age of 57.27 years in the working group and 54.93 years in the control group (Table 1).

Table 1. Information about the age and comorbidities of patients (n = 30)

Indicator	Task Force (n = 15)	Control group (n = 15)
Age (years)‡	57.27 SD ± 15.55	54.93 SD ± 10.12
Comorbidities		
Arterial hypertension and ischemic heart disease	11	12
Type 2 diabetes mellitus	2	2
Thyroid gland	-	2
No concomitant diseases	3	2
‡ There was no statistically significant difference in the age of the two groups of patients (p > 0.05)		

It is striking from the data that the patients in both groups are of similar age and have approximately the same comorbidities, which makes both groups homogeneous and comparable.

Pain intensity at rest and during movement was examined in patients from both groups at the 12th, 24th, and 48th postoperative hours.

Table 2. Pain intensity in the two study groups, reported at the 12th, 24th and 48th postoperative hours.

Pain		Working group	Control group	P - Valio
Postoperatively at rest	12th hour	4.87 SD ± 0.99	7.07 SD ± 0.8	P < 0.001
	24th hour	4.4 SD ± 0.91	6.07 SD ± 0.80	P < 0.001
	48th hour	3.27 SD ± 0.8	4.67 SD ± 0.82	P < 0.001
Postoperatively during movement	12th hour	7.8 SD ± 1.08	9.07 SD ± 0.70	P < 0.001
	24th hour	6.53 SD ± 0.99	7.93 SD ± 0.70	P < 0.001
	48th hour	5.13 SD ± 1.19	6.67 SD ± 0.82	P < 0.001
† The within-group difference for each hour is statistically significant – P < 0.001 ‡ The within-group difference for each hour is statistically significant – P < 0.001				

The results obtained show significantly lower pain values, both at rest and during movement, in the patients from the working group, compared to the patients from the control group, even at the initial assessment of the degree of pain at the 12th hour after the surgical intervention. This trend is maintained when it is assessed at the 24th and 48th postoperative hours, with high statistical reliability of all indicators P < 0.001. These results give reason to believe that the preoperative physiotherapy program, including exercises for training in correct coughing, turning in bed and verticalization after surgical intervention of the abdomen, is highly effective and efficient in terms of postoperative pain management.

Regarding the Barthel Index, the following results were obtained when it was measured on the 1st and 3rd postoperative days (Table 3).

Table 3. Results in average values of the Barthel Index on the 1st and 3rd postoperative days

	Control group		Working group	
	1st postoperative day	3rd postoperative day	1st postoperative day	3rd postoperative day
Average value	87	74	92	82.33
SD	± 18.30	± 20.37	± 5.91	± 13.47

The results obtained from the Barthel Index show slightly higher values in the patients from the working group in both studied periods (1st and 3rd postoperative day). However, they are small, with low statistical reliability, which does not prove the effectiveness of the preoperative physiotherapy program in terms of the activities included in the Barthel Index, such as the ability to independently dress and undress, defecate, incontinence, independently feed and other activities of daily living.

We also assessed postoperative recovery using the Standing and Sitting Test (Table 4). In order to be statistically processed, the scores from the Standing and Sitting Test were converted to quantitative values as follows:

0 – I can't

1 – can with difficulty

2 - they can do well

Table 4. Postoperative recovery assessment

Pain:	Working group	Control group	P - Valio
Sit-stand test	1.8 SD ± 0.41	1.33 SD ± 0.72	p = 0.038

The results obtained show a significant difference in favor of the working group (1.8) compared to the control group (1.33), with high statistical reliability. These values prove the effectiveness of preoperative physiotherapy in terms of the patients' ability to transfer from sitting to standing and back in the early postoperative period.

The ability to move on flat, smooth terrain for a duration of 6 minutes was monitored in patients from both groups on the 3rd postoperative day using the 6-Minute Walk Test (Table 5).

Table 5. Values in both groups, reported in the 6-Minute Walk Test

Parameter	Working group	Control group	Difference
6 Minute Walk Test (meters)	327.65 SD ± 83.02	230.18 SD ± 74.64	p = 0.003

And in this test, the average distance travelled (meters) in the working group (327.65) exceeds that of the control group (230.18), with high statistical reliability (0.003). The results obtained thus show the ability of the patients in the working group to walk much longer distances in the early postoperative period, compared to the patients in the control group, the difference being almost 100 meters. These data give us reason to believe that preoperative physiotherapy has a positive effect on the ability to move in the postoperative period. We believe that the reason for this is the good management of postoperative pain, as well as the correct training in walking after abdominal surgery, carried out in the preoperative physiotherapy sessions with the patients in the working group.

DISCUSSION

The findings support the view that preoperative physiotherapy can influence the earliest phase of recovery after total abdominal hysterectomy, particularly in domains directly related to pain-controlled movement. The intervention combined education with rehearsal of breathing, coughing, bed mobility, verticalization and walking before surgery. This may have reduced uncertainty during the first postoperative mobilizations and allowed previously learned motor strategies to be used when pain and abdominal-wall protection would otherwise restrict movement. Such an interpretation is compatible with enhanced recovery principles in gynecologic surgery, where multimodal pain management, patient education and early mobilization are integrated rather than treated as isolated measures [2].

The functional pattern is consistent with contemporary evidence on surgical prehabilitation. McIsaac et al. reported that prehabilitation can improve functional recovery after surgery, while also emphasizing variation in certainty across outcomes [16]. In major abdominal surgery, Jain et al. found benefits of multimodal prehabilitation for functional capacity and postoperative outcomes, although protocols differed considerably between studies [17]. Skoøepa et al. similarly reported favorable effects in frail and high-risk patients, including improvement in walking performance [18]. These populations are not identical to women undergoing total abdominal hysterectomy, but they provide a plausible broader framework for interpreting the present findings.

The contrast between the mobility tests and the Barthel Index deserves particular attention. Sit-to-stand performance depends directly on coordinated lower-limb and trunk activity and can be strongly affected by pain, confidence and familiarity with the movement strategy. Rehearsing verticalization before surgery may therefore produce an early motor-learning advantage. The Barthel Index, by comparison, covers heterogeneous activities such as feeding, dressing, continence and personal care. During a short hospital stay, several of these domains may be shaped by nursing assistance, urinary catheterization, and institutional routines, making the instrument less sensitive to a brief mobility-oriented preoperative intervention.

Walking capacity provides another clinically relevant perspective because ambulation requires the integration of pain tolerance, balance, lower-limb endurance and confidence. Evidence from major abdominal surgery indicates that exercise-based prehabilitation can improve 6-minute walking performance [17, 18]. In gynecologic oncology, Li et al. demonstrated that a short-term hospital-based multimodal prehabilitation program can improve perioperative functional capacity, supporting the feasibility of intervention even when the preoperative period is limited [19]. A recent systematic review also reported good adherence to prehabilitation and improvement in the 6-Minute Walk Test after major abdominal surgery [20]. Direct comparison with the present study remains limited because preoperative baseline values for walking capacity were not available.

Physiotherapy literature after hysterectomy has focused predominantly on pelvic floor dysfunction, urinary symptoms, sexual function and quality of life [10, 12]. The systematic review by Fachini de Oliveira et al. showed that pelvic floor muscle training may benefit some post-hysterectomy outcomes, while evidence for several other domains remains uncertain [12]. The current study addresses a different, less investigated stage of care by examining preparation before surgery and immediate postoperative mobility. This distinction is important because preoperative training is intended not to replace postoperative rehabilitation, but to prepare patients for the functional demands that begin immediately after the operation.

CONCLUSION

The present study demonstrated that preoperative physiotherapy leads to effective and rapid functional recovery in patients undergoing total abdominal hysterectomy. The presented model of preoperative physiotherapy program and its algorithm, based on preoperative training in pain control, verticalization and movement techniques, are suitable for application in clinical practice for better early postoperative functional recovery.

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