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Effect of Pelvic Floor Muscle Exercise on Pain Intensity in Women after Colorectal Surgery

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ABSTRACT

Aims Pain is one of the most important complications after colorectal surgery, and recently the use of non-pharmacological methods to reduce this complication researchers' attention has been drawn. This study aimed to determine the effect of pelvic floor muscle exercise on the severity of pain in women after colorectal surgery.

Materials & Methods In this randomized clinical trial, all female patients with one of the benign colorectal diseases were referred to Be'sat, and Shahid Rajaei hospitals of Gachsaran and Shahid Beheshti hospital of Yasuj, Iran, in 2016 were studied. Ninety-six patients were selected by convenience sampling method and randomly assigned to intervention and control groups. Patients in the preoperative intervention group were trained to exercise the pelvic floor muscles, and these postoperative contraction exercises were performed 60-100 times a day. 6, 12, 18, 24, and 48 hours after surgery, pain intensity was collected using a numerical pain scale. Data collected in SPSS 22 were analyzed by independent t-test, chi-square, Fisher's exact, and Mann-Whitney tests.

Findings The mean pain intensity in both intervention and control groups decreased over time after surgery. No significant differences were comparing the means of pain intensity in 6, 12, 18, 24, and 48 hours after the surgery between the two groups ($p>0.05$).

Conclusion Pelvic floor muscle exercise intervention has no effect on the severity of pain in women after colorectal surgery.

Keywords Exercise; Postoperative Pain; Colorectal Surgery

CITATION LINKS

[1] Schwartz's Principles of ... [2] Diagnosis and treatment of ... [3] The acute management of ... [4] Colonoscopy outcome in north of Iran (Guilan) ... [5] Prevalence and clinical associations of hemorrhoids ... [6] Epidemiologic aspects of complete ... [7] Fistula-in-ano: Advances in ... [8] Complications of stapled hemorrhoidectomy: A ... [9] Pain and addiction: An urgent need ... [10] Evidence based management of pain after ... [11] Effectiveness and safety of postoperative pain management: a survey of 18 925 consecutive patients between 1998 and 2006 (2nd ... [12] Virtual reality hypnosis for pain associated with ... [13] Generic drugs of Iran (including imported drugs and the Red Crescent) along with clinical medical ... [14] The effect of self-hypnosis on severity and quality of pain in women with multiple ... [15] Training effect on pain after Kegel ... [16] Danforth's obstetrics and ... [17] Effect of pelvic muscle exercise on sexual satisfaction ... [18] Pelvic floor muscle training in males: ... [19] The effects of short-term Grape Seed Extract (GSE) supplementation on malondialdehyde and serum creatine kinase subsequent ... [20] Can pelvic floor muscle training reverse pelvic organ prolapse and reduce prolapse symptoms? an ... [21] The effect of pelvic floor muscle exercises strengthen the quality of sex life and marital ... [22] The effect of Kegel exercise ...[23] Sensation and distress of pain scales: Reliability, validity ... [24] Pelvic floor muscle training and exercises that can be used by obstetric and ... [25] The effect of postoperative pain management program on improving nurses' knowledge ... [26] Healing advantages of lavender essential oil during episiotomy ... [27] Lavender essence for post-cesarean ... [28] The effect of Kegel exercises perineal pain after episiotomy in nulliparous ... [29] The effects of aerobic training and pelvic floor muscle exercise ... [30] Pelvic floor muscle exercise for chronic low back ...

Introduction

Today, due to the prevalence of colorectal diseases resulting from changes in diet and sedentary lifestyle, the rate of performed surgeries is increasing, and one of the important aspects of postoperative nursing care that needs to be considered is pain relief [1]. Hemorrhoids, anal fissures, anal fistulas, and rectal prolapse are some diseases that can cause in surgery [2]. Pain is also the most common and early problem of patients after colorectal surgery, which is acute in the first and second days after surgery, and this pain is more worrying for the patient than anything [3].

So far, accurate statistics of benign diseases of the colon and rectum have not been published in Iran, and only the results of studies in different cities or regions have provided statistics [4]. According to the results of a study in the United States, the prevalence of hemorrhoids is 4.4-8.6%, and the anal fissure is 1.1 per 1000 people per year, and 235,000 new cases of an anal fissure are reported annually [5]. Also, the prevalence of rectal prolapse is 5.2 per 100,000 people per year, and the anal fissure is 8.6-10% (the ratio of men to women is 8 to 1, respectively) per 100,000 people per year [6, 7]. According to Oughriss *et al.* study in the United States on 105 patients with a mean age of 51 years who underwent complications after colorectal surgery, severe anal pain (2.3%) as early complications, and chronic anal pain (1.5%) as of late complications were reported [8]. On the other hand, extensive clinical observations and reports indicate that pain often occurs after surgery [9]. One of the most important reasons for patients to avoid colorectal surgery is fear of pain and pain control, especially in the first 24 hours after surgery; in addition to increasing patient satisfaction leads to reduced urinary retention and constipation [10]. Inadequate treatment of pain can be a source of discomfort and stress and can also lead to disorders of the immune system and cardiovascular system [11]. In addition, pain can cause spasms, reduce blood flow to the operation site, and delay wound healing [12]. Injectable narcotics and strong painkillers are commonly used to reduce postoperative pain. However, these drugs can cause side effects, e.g., addiction, hypotension, impaired vital functions, drowsiness, gastrointestinal complications, nausea, vomiting, and even shock [13].

The use of non-pharmacological and non-invasive methods to reduce pain or as a complementary method to decrease pain can reduce the use of analgesics and subsequently reduce the side effects of drugs and relieve pain, reduce complications and increase patient satisfaction [14]. One of the non-pharmacological treatments that may effectively reduce pain intensity and prevent recurrence of the disease by affecting the strength and power of the pelvic floor muscles is Kegel exercise [15]. Kegel exercise is the most popular method of strengthening the pelvic floor muscles and non-invasive therapy, first proposed in 1948 by Arnold Kegel. This exercise involves repeated isometric exercises of the pelvic floor muscles at maximum pressure and, in fact, the contraction of certain muscles in the pelvic floor area that control urine flow [16]. These exercises effectively strengthen the genitals, urinary tract, bladder, and anus and have benefits such as increasing power in controlling ejaculation, reducing involuntary urination during sneezing and laughing, and increasing blood flow to the genital area [17, 18]. Increased blood flow following isometric and isotonic exercises is due to the increased need for active tissues and muscles for energy and oxygen [19]. Therefore, due to the faster release of analgesics by increased blood flow, it is likely to reduce pain.

Brækken *et al.* that evaluated the effect of Kegel exercise on post-episiotomy pain in primiparous women showed that the use of these exercises reduces pain [20]. Most of the studies have been done on the effect of Kegel exercise on stress urinary incontinence, postpartum, and postoperative sexual function problems or problems related to pelvic organ prolapse [20, 21]. Therefore, this study aimed to determine the effect of pelvic floor muscle exercise on the severity of pain in women after colorectal surgery.

Materials and Methods

This clinical trial study was performed on patients with one of the colorectal diseases (including hemorrhoids, anal fissure, anal fissure, preanal abscess, and rectal prolapse) who underwent colorectal surgery in the surgical ward of Shahid Beheshti hospital of Yasuj and the surgical ward of the Be'sat and Shahid Rajaei hospitals of Gachsaran in Kohgiluyeh and Boyer-Ahmad Province, Iran, in 2016. Eligible patients were selected as available participants, and the block random allocation method was used for equal distribution of samples between the experimental and control groups. Based on a similar study [22] and considering the parameters of 95% confidence level, test power 80% and the least clinically significant difference (effect size) in the mean scores of the outcome variable 0.8 score (based on Cohen's proposed formula), and the standard deviation of the variable of pain intensity, by considering a 10% of loss, 48 people in each group and a total of the number of 96 people participated in the study. Conscious desire to participate in the study, no history of inflammatory disease and cancer, literacy, no history of drug addiction, no known psychiatric disorder, and no use of immunosuppressive drugs were the inclusion criteria. It was also emphasized that if the patient is reluctant to cooperate at any stage of the intervention or by diagnosing inflammatory diseases and cancer during treatment or the patient's general condition

worsens, it can cause the patient exclusion.

Data collection tools were a demographic information questionnaire and numerical pain scale [23], an international scale to measure patients' pain. Based on the numerical pain scale, the number 0 means painless, and the number 10 the most severe pain; a score between 1 and 4 means mild pain, between 4 and 7 means moderate pain, and scores greater than 7 indicate severe pain. In the study, Good *et al.,* the reliability of this numerical scale was reported 0.72-0.78 [23].

After obtaining permission from the officials and ethics committee of Yasouj University of Medical Sciences, the researcher referred to the participants and explained to them the objectives and how to conduct the research; after obtaining their written consent, the confidentiality of the information and the possibility of accessing the results, if desired, was emphasized, and the participants were asked to complete the questionnaires. For the intervention group, patients were briefly explained about pelvic anatomy and how to identify pelvic floor muscles before surgery. Patients were also instructed to stop the flow of urine when urinating, not repeat it more than two or three times, and thus identify the target muscles. Patients were reviewed and trained on how to do Kegel exercise properly and were advised to do ten contractions while lying down, sitting, and standing twice a day. Participants were also instructed to contract the pelvic floor muscles for 5 to 10 seconds and then relax for another 10 seconds to increase the total number of contractions per day to 60-100. These exercises were performed by patients after surgery. The control group received routine treatments and care [24]. In the study groups, at 6, 12, 18, 24, and 48 hours after surgery, patients' pain intensity was measured before and after exercise.

At the end of the intervention, the data were collected using SPSS 22 software, through descriptive statistics and inferential tests such as independent t, chi-square, Fisher's exact test for demographic variables, and Mann-Whitney test for intergroup pain intensity and was analyzed regarding 95% confidence interval and $p<0.05$. It is worth mentioning that before analyzing the pain intensity data, the status of their score distribution was evaluated using the Kolmogorov-Smirnov test, and due to the lack of normal distribution, the results of the Mann-Whitney non-parametric test were reported.

Findings

The mean age of the subjects was 36.0±9.7 years in the experimental group and 40.4±10.3 years in the control group, and there was no statistically significant difference in demographic variables between the two groups of patients ($p>0.05$; Table 1). In general, the mean pain intensity in both intervention and control groups decreased over time after surgery. Based on the results of the Mann-Whitney test, there was no significant difference in the mean pain intensity at intervals of 6, 12, 18, 24, and 48 hours after surgery between the two groups ($p>0.05$; Table 2).

Table 1) Absolute and relative frequency of demographic variables in experimental and control groups (48 people in each group)

Variable		Experimental	Control
Education rate	Primary school	9 (18.8)	7 (14.6)
	Guidance school	9 (18.8)	16 (33.3)
	High school and diploma	18 (37.5)	16 (33.3)
	Bachelor's degree and higher	12 (25.0)	9 (18.8)
Job	Housewife	29 (60.4)	23 (68.8)
	Employee	8 (16.7)	6 (12.5)
	Other	11 (22.9)	9 (18.8)
History of surgery	Yes	1 (2.1)	3 (6.3)
	No	47 (97.9)	45 (93.7)
Marital status	Single	18 (37.5)	18 (37.5)
	Married	30 (62.5)	30 (62.5)
Diagnosis	Hemorrhoids	14 (29.2)	18 (37.5)
	Anal Fisher	21 (43.8)	19 (39.6)
	Rectal prolapse	11 (22.9)	7 (14.6)
	Perianal abscess and fistula	2 (4.2)	4 (8.2)

Table 2) Comparison between the mean of pain intensity in experimental and control groups at different times after surgery

Time (hour)		Experimental	Control	Mean difference	Statistics	p-value
6	Before intervention	7.1±1.8	7.2±2.5	0.1	1.4	0.2
	After intervention	4.1±2.9	3.2±2.2	1.1	8.3	0.05
12	Before intervention	6.4±2.1	6.7±2.4	0.3	1.7	0.2
	After intervention	4.6±2.3	3.7±2.2	1.1	3.6	0.06
18	Before intervention	5.5±2.2	6.2±2.1	0.7	3.2	0.07
	After intervention	3.3±2.1	3.9±1.9	0.6	1.3	0.3
24	Before intervention	4.8±1.9	5.6±2.2	0.8	3.9	0.06
	After intervention	2.2±2.1	3.2±1.9	1.0	4.9	0.06
48	Before intervention	3.9±1.9	5.1±2.4	1.2	8.1	0.05
	After intervention	2.1±1.2	2.9±1.8	0.8	23.3	0.06

Discussion

This study was performed to evaluate the effect of pelvic floor muscle exercise on the severity of pain in women after colorectal surgery, and the findings showed that pelvic floor muscle training had no significant difference on the severity of female pain at 6, 12, 18, 24 and 48 hours after surgery between the intervention and control groups. Since pain is one of the earliest complications after surgery, if it is not reduced satisfactorily, it can have a negative effect on postoperative recovery [25]. Vakilian *et al.* and Hadi & Hanid have also used non-pharmacological methods to reduce pain. In both studies, the statistical mean of pain scores before the study was the same statistically in both experimental and control groups. However, after the intervention in the experimental group, the mean scores of pain intensity decreased, and the intervention positively affected pain relief [26, 27].

No consistent study with the present study on the effect of pelvic floor muscle exercise on pain intensity

after colorectal surgery was found by searching different sources. The results of a randomized, single-blind clinical trial study by Mobaraki *et al.*, which examined the effect of Kegel exercises on reducing perineal pain after episiotomy in nulliparous women, showed that pain intensity, mean oral analgesia, and mean frequency of drug administration in the experiment group was significantly less compared to the control group [28]. Nasri *et al.* compared the effect of aerobic exercise and pelvic floor muscle exercise on primary dysmenorrhea in adolescent girls and indicated that aerobic exercise and Kegel could improve primary dysmenorrhea [29]. Also, Bi *et al.* showed that pelvic floor exercise, combined with conventional therapies, has significant benefits in terms of pain relief [30].

The results of other studies are inconsistent with the results of the present study. However, the present study was designed with the assumption that Kegel exercise can improve blood circulation in the area, and this leads to increased nutrition and oxygen supply to the tissue, which may result in a reduction in the severity of pain due to surgery, but the results were contrary to the above idea. One of the possible reasons for the ineffectiveness of this intervention is the short duration of the intervention; it takes about three weeks for Kegel exercise to affect the performance of this area. Since the surgical wounds of these patients naturally healed relatively, the pain caused by these wounds gradually decreased; so the continuation of the intervention and performing Kegel exercises in line with the purpose of the study, according to the variable under study, was not relevant for more than this period and this issue was one of the limitations of the present study. Therefore, it can be said that if you want to use the Kegel exercise to strengthen the function of the pelvic floor muscles, it is better to start doing these exercises before surgery to strengthen the muscles enough and get the necessary effect. However, sufficient research is needed to confirm this. It is recommended that this exercise be started and continued for a longer period before rectal and perineal surgeries. Another possible cause could be the variable itself, namely pain. Because part of the exercise was done to contract the pelvic floor muscles, the wound in that area likely prevented the contractions from performing effectively. Despite the training provided to participants before surgery in this regard, controlling the proper performance of these exercises after discharge from the hospital was beyond the researcher, which can also be one of the effective factors and has been one of the limitations of the present study.

Conclusion

Pelvic floor muscle exercise intervention does not affect the severity of pain in women after colorectal surgery.

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Ethical Permissions: This study has been registered in the Research Ethics Committee of the Vice Chancellor for Research and Technology of Yasouj University of Medical Sciences with the ethics code IR.YUMS.REC.1395.21.

Conflicts of Interests: Writers have no conflict of interest.

Authors' Contribution: Pirami F. (First author), Introduction author/Original researcher (35%); Zaboli S. (Second author), Introduction author/Discussion author (15%); Afrasiabifar A. (Third author), Introduction author/Methodologist (25%); Najafi doulatabad S. (Forth author), Introduction author/Statistical analyst/Discussion author (25%).

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