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The Effect of Abdominal Massage on Pain and Distention in Patients Underwent Colonoscopy – A Randomized Controlled Study

Kolonoskopi Yapılan Hastalarda Abdominal Masajın Ağrı ve Distansiyon Üzerine Etkisi - Randomize Kontrollü Bir Çalışma

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Abstract

Patients may experience abdominal pain and distension due to insufflation during the colonoscopy. Various interventions are implemented to reduce these problems, which may persist to some extent after the procedure. This study aims to determine the effect of abdominal massage that is taught via video-assisted to the patient's relatives and applied to their patients by them on post-procedure pain and distension after colonoscopy. This randomized controlled study was conducted between October 2019-September 2022 with 60 patients who underwent colonoscopy in a university hospital. Patients who underwent colonoscopy were assigned to experimental and control groups according to the order of the procedure. 30 patients who received abdominal massage were included in the experimental group, and 30 patients who received routine care were included in the control group. There was no statistically significant difference between the groups according to sociodemographic characteristics ($p > 0.05$). While the experimental group had a statistically significant decrease in pain levels ($p = 0.006$), there was no statistically significant difference in distension levels between the first and second evaluations ($p = 0.139$ and $p = 0.548$). Abdominal massage can be an effective nursing intervention for post-colonoscopy pain management. The study was registered at ClinicalTrials.gov (NCT05823350).

Keywords: Abdominal distension, abdominal massage, abdominal pain, colonoscopy, patients care

Özet

Kolonoskopi uygulanan hastalar işlem sırasında insüflasyona bağlı karın ağrısı ve distansiyon yaşayabilmektedirler. İşlem sonrasında da bir miktar devam edebilen bu sorunları azaltmak amacıyla çeşitli girişimler uygulanmaktadır. Bu çalışmanın amacı da, hasta yakınlarına video destekli olarak öğretilen ve hastalarına uyguladıkları karın masajının, kolonoskopi hastalarında işlem sonrası ağrı ve distansiyon üzerine etkisini belirlemektir. Bu randomize kontrollü çalışma Ekim 2019 - Eylül 2022 tarihleri arasında bir üniversite hastanesinin endoskopi ünitesinde kolonoskopi yapılan 60 hastanın katılımıyla gerçekleştirilmiştir. Kolonoskopi uygulanan hastalar işlemin uygulanma sırasına göre deney ve kontrol gruplarına atanmıştır. Abdominal masaj uygulanan 30 hasta deney grubuna, rutin bakım alan 30 hasta da kontrol grubuna dahil edilmiştir. Sosyodemografik özellik değişkenlerine göre gruplar arasında istatistiksel olarak anlamlı bir fark olmadığı tespit edilmiştir ($p>0.05$). Deney grubunda hastaların ağrı düzeylerindeki azalma istatistiksel olarak anlamlı bulunurken ($p=0,006$), gruplarda ilk değerlendirme ile ikinci değerlendirme arasındaki distansiyon düzeyindeki fark istatistiksel olarak anlamlı bulunmamıştır ($p=0,139$ ve $p=0,548$). Abdominal masaj kolonoskopi sonrası ağrıyı azaltmada etkili bir hemşirelik girişimi olarak kullanılabilir. Çalışma ClinicalTrials.gov'a (NCT05823350) kaydedilmiştir.

Anahtar Kelimeler: Abdominal distansiyon, abdominal masaj, abdominal ağrı, kolonoskopi, hasta bakımı

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1. Introduction

Colonoscopy is an endoscopic method used to examine the colon in the diagnosis and treatment of colorectal diseases (Waye et al., 2013). During the colonoscopy procedure, CO_2 or ambient air insufflation is applied to the colon to improve the quality of the colon image (Gündüz et al., 2020). These gases given into the colon cause the patients to experience abdominal pain and distension after the procedure (Gündüz et al., 2020). In addition, it is stated that excessive pressure applied externally to the abdomen during the procedure may cause pain and distension (Costello et al., 2023; Decruz et al., 2021).

Mild side effects reported in the first 30 days after colonoscopy include abdominal pain, bloating, diarrhea, constipation, nausea, and vomiting. The most common complaints in the first two days after the procedure are also abdominal pain and distension. The incidence of abdominal pain and distension is reported to be 17.4% and 25%, respectively (Sewitch et al., 2018).

It is reported that the application of various interventions reduces distension and pain in patients undergoing colonoscopy (Hwang & Jung, 2015; Unler et al., 2020; Yu et al., 2018). It is seen that different nursing interventions are included in the literature to reduce pain and distension in patients undergoing colonoscopy. Listening to music during the procedure (Çelebi et al., 2020), watching videos with virtual reality headset (Karaveli Çakır & Evirgen, 2021), using visual distractions (Zhang et al., 2023), applying heat to the abdomen after the procedure (Cankurtaran & Atalay, 2023), performing progressive relaxation exercises (Tanrıverdi & Parlar Kılıç, 2022), and applying abdominal massage with position change (Mutlu et al., 2024) are among the current and effective nursing interventions.

Massage helps to control pain by stimulating the tissue receptors with rhythmic and systematically applied movements (Lamas et al., 2009). Massage is a non-invasive procedure that has no side effects and is easy to learn and apply for patients and their relatives (Olgun, 2016; Öztürk & Gürkan, 2021). Although it is seen in the literature that there are studies evaluating the effectiveness of abdominal massage (Baran & Ates, 2019; Yıldırım et al., 2019), these studies investigated the effects of the abdominal massage on reducing constipation-related symptoms, increasing the frequency of defecation and improving quality of life (Baran & Ates, 2019; Yıldırım et al., 2019). Although it is reported that (Jo & Kim, 2022; Öztürk & Gürkan, 2021), studies investigated the effects of abdominal massage on pain caused by distension after colonoscopy were limited (Jo & Kim, 2022; Mutlu et al., 2024; Öztürk & Gürkan, 2021).

It is stated in the literature that video-assisted patient education can be used for patients undergoing endoscopic procedures (Çevik & Rızalar, 2024) and seen that especially in patients undergoing colonoscopy, video-assisted patient education is suggested for preparation for procedure (Jeon et al., 2019; Ye et al., 2020). A meta-analysis shows that video-assisted patient education is effective in improving the adequacy of bowel preparation (Ye et al., 2020). It is reported that patients feel embarrassed during procedures where they have to take off their clothes and/or a private part of their body is processed (Decruz et al., 2021). It should not be forgotten that massaging the abdominal area after one of these procedures, a colonoscopy, will further violate the privacy of patients and increase their feelings of embarrassment. Cause of that, as a procedure that protects patient privacy, video-

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supported training can be used to teach abdominal massage to the patients and their relatives. However, no study has been found in the literature examining the effectiveness of abdominal massage taught through video-supported training to reduce patients' complaints of pain and distension after colonoscopy.

Inadequate staffing, high workload of the unit, and inappropriate use of existing staff resources are reported as essential reasons for unmet nursing care needs (Güleşen, 2022; İlaslan & Şişman, 2019). It should be thought that the imbalance between the number of nurses and workload, which is frequently encountered, especially in units where daily care procedures such as colonoscopy are applied, and the short discharge times of patients may negatively affect the meeting of care needs. It should be noted that abdominal massage, taught to patient relatives through video-assisted training and applied by them to their patients after coloscopy, can support both the maintenance of privacy for patients and the meeting of care needs for nurses. Also, applying abdominal massage by the patient's relatives can support meeting care needs by helping to manage complications such as pain and distension after the procedure. The purpose of this study is to determine the effect of abdominal massage taught via video-assisted to the patient's relatives and applied to their patients by them on post-procedure pain and distension after colonoscopy patients.

2. Method

2.1. Aim of Study

The purpose of this study is to determine the effect of that taught via video-assisted to the patient's relatives and applied to their patients by them on post-procedure pain and distension after colonoscopy patients.

2.2. Questions of Study

-Is there any effect of abdominal massage on pain in patients undergoing colonoscopy?

-Is there any effect of abdominal massage on distension in patients undergoing colonoscopy?

2.3. Sample of Study

This randomized controlled experimental study was conducted between October 2019 and September 2022 with the participation of 60 patients who underwent colonoscopy in the endoscopy unit of a university hospital. The sample calculation was made by using G Power 3.1.9.4 program (version 3.1.9.4, Franz Faul, Universitat Kiel, Kiel, Germany). In the sample calculation using the study of Hwang & Jung (2015), the minimum number of people to be included in each group in the sample was calculated as 27 with a 0.69 effect size, a 95% confidence level and 80% power. However, considering the possible losses (dropout rate:10%) (Yang et al., 2023), a total of 60 people, including 30 patients in the experimental group who received abdominal massage and 30 patients in the control group who received standard care, were included in the sample.

Adult (≥18) patients who underwent elective total colonoscopy, were accompanied by a relative before and after the procedure, can speak Turkish themselves and/or their relatives, had an American Society of Anesthesiologists Physical Status Score (ASA) ≤2, had no problems that would prevent abdominal

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massage (past abdominal surgery, irritable bowel disease, bowel cancer diagnosis, gastrointestinal or urinary ostomy, etc.), and accepted abdominal massage after the procedure were included in the study.

Patients whose relatives could not learn how to perform abdominal massage and those in whom the procedure could not be performed completely due to inadequate bowel preparation were excluded from the study. During the study's follow-up period, no complications related to colonoscopy were observed in the participating patients. The study was registered at ClinicalTrials.gov (NCT05823350).

2.4. Data Collection and Tools

"Patient Information Form" and “Numerical Rating Scale” (NRS) were used to collect the data.

2.4.1. Patient Information Form

The form was prepared by the researchers and included patient characteristics (age, gender, experience of colonoscopy) 3 questions were included.

2.4.2. Patient Follow-Up Form

The patient follow-up form consists of four questions assessing the pain and distension levels of the patients. The questions investigated the pain and distension levels experienced by patients before and after abdominal massage. This form includes a numerical comparison scale for evaluation of pain and distension (Dreyer et al., 2015).

2.4.3. Numerical Rating Scale (NRS)

NRS is accepted as a reliable, valid, and applicable measure for assessing the severity of pain. It is a unidimensional scale frequently used to measure pain severity. The scale consists of a 10 cm demarcated line in which 0 cm represents no pain, and 10 cm represents unbearable pain. Higher scores indicate more intense pain (Robinson et al., 2024).

2.4.4. Randomization

The number of patients in each group was determined to be equal (30:30) by randomization carried out through the computer program called Research Randomiser (https://www.randomizer.org). The group that received abdominal massage was accepted as the experimental group (Figure 1).

2.4.5. Procedure

In patients who were going to undergo total colonoscopy, bowel preparation was performed as part of the institution's routine procedures before the procedure. The patients were given a clear diet (apple juice, broth/chicken broth soup, etc.) for 3 days before the procedure. As a bowel evacuator, 2 oral sodium phosphate solutions (33 ml) and 2 rectal monobasic and biphasic sodium phosphate solutions (45 ml) were administered. During the colonoscopy, all procedures were performed under conscious sedation given by the anesthesiologist, with the participation of the endoscopist, 2 nurses, and 1 technical personnel. All procedures applied to the patients were performed by the same team and the adult colonoscopy device was used in the procedure. The procedure was started in a left lateral decubitus position and position change was provided when necessary. After the procedure, all patients

were informed that they might have mild pain because air insufflation was applied during the procedures and that they would be relieved by removing the gas given to their intestines.

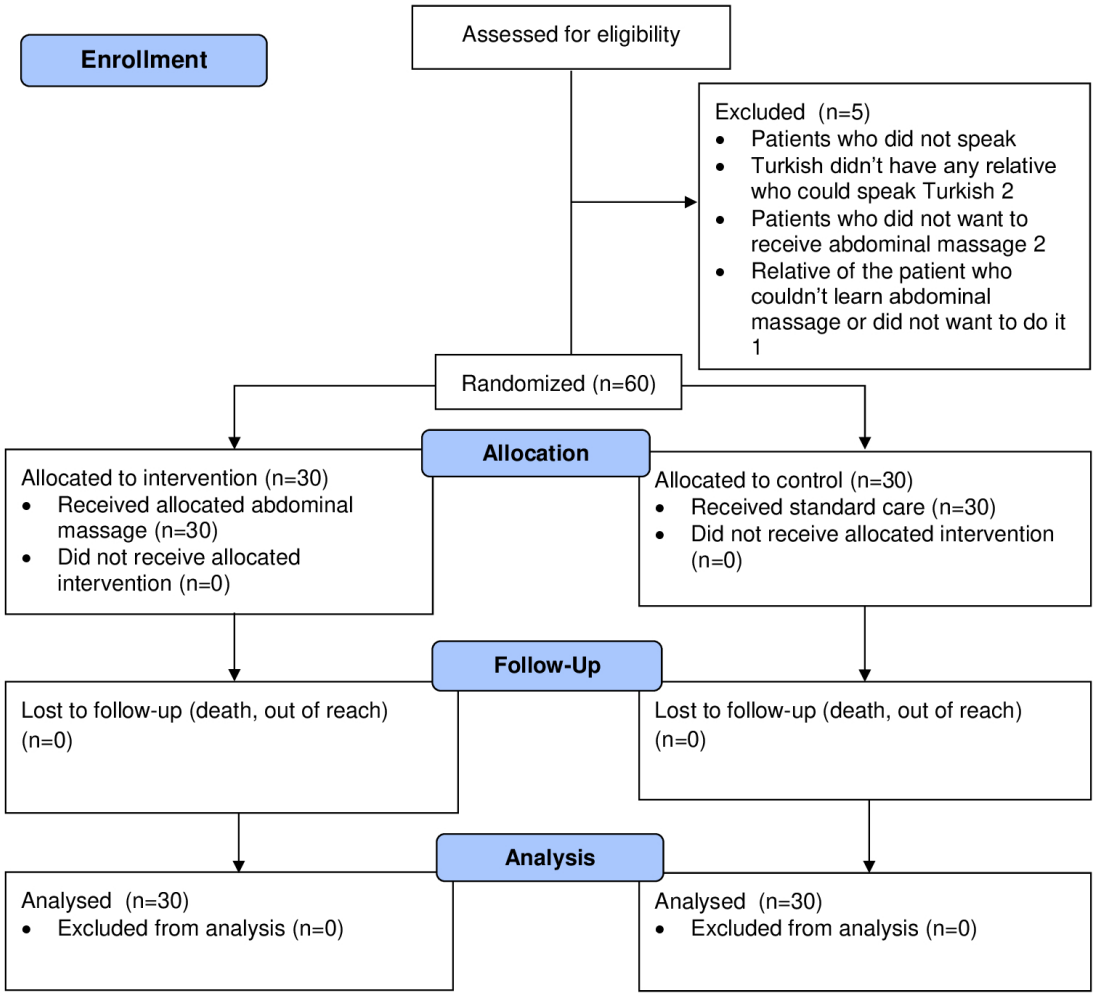

Figure 1. CONSORT Flow Diagram of the Study

Patient information form and patient follow-up form were used for collecting research data. Sixty-five patients who matched the sampling acceptance criteria were prospectively identified before the data collection began. Five patients were excluded from the study (Two patients who did not speak Turkish didn't have any relative who could speak Turkish, two patients who did not want to receive abdominal massage, and a relative of the patient who couldn't learn abdominal massage or did not want to do it). On the day of the procedure, all patients who came to the endoscopy unit for a total colonoscopy were informed by the researcher about the study and then written and verbal informed consent was obtained from the patients.

In the control group, after the procedure, one relative was allowed to accompany each patient who was taken to the recovery room after the endoscopy. The patients who were taken to their beds were asked to evaluate their pain and distension levels according to NRS (0-10) after colonoscopy (first evaluation). The initial pain and distension levels after the procedure were recorded on the form by the researcher. The vital signs of the patients who received standard care were monitored after the procedure and were

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followed up for possible complications. The pain and distension levels of the patients were re-evaluated 20 minutes after the first assessment (second evaluation). After the procedure, patients who met the discharge criteria were given discharge training and allowed to leave the endoscopy unit after the vascular access catheter was removed.

In the experimental group, the relatives of the patients were shown the video in the preparation room before the colonoscopy. In the literature, it is stated that an effective intervention can be provided by giving abdominal massage training to the patient's relatives (Uysal, 2017; Yıldırım et al., 2019). After the procedure, a relative was allowed to accompany each of the experimental group patients who were taken to the recovery room after the endoscopy. The patients who were taken to their beds were asked to evaluate their pain and distension levels after the colonoscopy (first evaluation). The initial pain and distension levels after the procedure were recorded on the form by the researcher. Afterwards, the relatives of the patients in the experimental group were asked to apply abdominal massage to their patients. During the massage application, the patient and their relatives were observed by the researcher, and when necessary, guidance was given to the patient's relatives about the application of the massage. Liquid vaseline was used to ensure the slipperiness of the hands during the massage (Yıldırım et al., 2019). In this supine position, patient's abdomen was massaged with circular movements and different techniques (kneading, vibration, efflorescence, superficial or deep strokes) in the direction of the colon (Fekri et al., 2021; Kayıkcı et al., 2020).

During the massage application, the patients were in the supine position and was massaged clockwisely on the abdominal wall at the level of the intestines. Since the abdominal massage would start anatomically from the ascending colon, the patient's relative was positioned standing and on the patient's right side. The patient's head was elevated 30-45 degrees. A pillow was also placed under the knees to ensure the abdominal muscles relaxed. Liquid vaseline was used during the massage to lubricate the hands and allow them to move easily on the abdomen. During the massage, different massage techniques (kneading, vibration, efflorescence, superficial or deep strokes) with circular movements were applied in order, paying attention to the anatomical position of the colon, from the right anterior superior iliac region to the right upper quadrant, from the right upper quadrant to the left upper quadrant along the transverse colon and to the left anterior superior iliac region.

As suggested in the literature, an abdominal massage lasted 15 minutes (Dehghan et al.,2018; Holey & Dixon, 2014; Yıldırım et al., 2019). When necessary, verbal and visual guidance was provided by the researcher to ensure that the massage was performed with the correct steps and for the required time. After 5 minutes after the massage application, the researcher evaluated the patients' pain and distension levels and recorded the data on the form (second evaluation; 20 minutes after the first evaluation). After the procedure, patients who met the discharge criteria were given discharge training and allowed to leave the endoscopy unit after the vascular catheter was removed.

2.4.6. Video

The video consisted of visual and verbal content about the definition, purposes, application, and importance of the colonoscopy, the purpose of insufflation, pain management during and after the

procedure, and the benefits and application steps of abdominal massage in pain management after the procedure. The video lasted 3 minutes and 19 seconds.

2.5. Ethical Aspects of the Study

Before the study, consents for the study were obtained from the XXX University Ethics Committee for Scientific Research (date: 19.08.2019, no:2019/293, decision: 13/14) and institution (79056779-600 date 30.09.2019). This study was conducted according to the Declaration of Helsinki and ethical principles. Participants were informed about the study before inclusion and written consent was obtained from those who agreed to participate in the study.

2.6. Limitations and Strengths of Study

This randomized study is limited by a small sample size. While some studies reported that colonoscopy was performed under anesthesia, the application of the procedure under conscious sedation to all patients in this study may have affected bowel functions by increasing the stress levels of the patients. The endoscopy team performing the colonoscopy procedure was blinded to the study and participant information throughout the study period. However, due to the nature of the study, patients and their relatives were not blinded to the application of abdominal massage. This may have partially affected the results of the experimental group, depending on the expectations of the patients about the application. Finally, abdominal massage performed by patients' relatives can create different experiences for each patient, and these differences can also affect the patients' pain experience.

2.7. Statistical Analysis

Data obtained from sixty patients were analyzed using the IBM SPSS 22.0 (IBM, Armonk, New York, USA) package program. Normal distribution was determined by the Kolmogorov-Smirnov test. The Mann-Whitney U test was used to compare the pain and distention scores between the two groups. Wilcoxon Signed rank test was used to compare the means of pain and distention scores within the group. The statistical significance level was accepted as $p < 0.05$.

3. Results

The majority of the patients (58.7%) were male and the mean age was 57.1±13.4 years (min. 24 – max. 85). The individual characteristics of the patients were similar ($p>0.05$) (Table 1).

Table 1. Comparison of the patients' sociodemographic variables

		Experimental group (n = 30)		Control group (n = 30)		Statistical value*
Age (Mean±SD)		58.26±8.9		53.26±15.12		p=0.124 t=1.560
		n	**%**	**n**	**%**	
Gender	**Female**	11	36.7	11	36.7	p=1.000 X^2=0.000
	Male	19	63.3	19	63.3	
Experience of colonoscopy	**Yes**	19	63.3	17	56.7	p=0.396 X^2=637.500
	No	11	36.7	13	43.3	

n= Number, %= Percent, SD= Standard Deviation, t= Independent sample t test, X^2= Continuity Correction.

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The decrease in pain levels after massage in the experimental group patients (first evaluation 1.73±2.58; second evaluation 0.93±1.79) was found to be statistically significant (p=0.006). It was determined that the pain scores of the patients in the control group increased compared to the pre-procedure (2.93±1.98 in the first evaluation; 3.00±2.27 in the second evaluation), but this change in pain scores was not statistically significant (p=0.792) (Table 2). Both the experimental group in which abdominal massage was applied (first evaluation 3.00±2.80; second evaluation 2.70±2.79; p=0.139) and the control group (first evaluation 3.96±2.39; second evaluation 3.66±2.18; p=0.548), the change in the distension levels of the patients was not significant (Table 2).

Table 2. Comparison of the patients' colonoscopic output (n=60)

	Variables (Mean±SD)	Experimental group (n = 30)	Control group (n = 30)
Pain (NRS score)	**First evaluation**	1.73±2.58	2.93±1.98
	Second evaluation	0.93±1.79	3.00±2.27
	Statistical value**	p=0.006 Z=-2.733	p=0.792 Z=-0.264
Distention	**First evaluation**	3.00±2.80	3.96±2.39
	Second evaluation	2.70±2.79	3.66±2.18
	Statistical value**	p=0.139 Z=-1.480	p=0.548 Z=-0.601

n=: Number of patient, SD= Standard Deviation, NRS= Numerical Rating Scale, Z= Wilcoxon Signed Ranks test.

4. Discussion

Although colonoscopy is a safe and effective procedure, it is reported that minor complications such as distension and abdominal pain occur due to air being supplied to the intestines during the procedure (Tanrıverdi & Parlar Kılıç, 2022). It is stated in the literature that abdominal massage which is a suggested nursing intervention for relieving abdominal discomfort post-colonoscopy can help relieve pain in patients who have undergone digestive endoscopy and experienced abdominal pain after the procedure (Jin et al., 2020). In this study, it was determined that the application of abdominal massage reduced the pain levels of the patients. Yıldırım et al. (2019) also determined that abdominal massage reduces the severity of pain in patients with opiate-induced constipation. Mutlu et al. (2024) stated that position change and abdominal massage were effective in reducing pain in colonoscopy patients. In the studies of Baran & Ateş (2019), it was reported that abdominal massage applied to elderly patients decreased pain scores during defecation. Results of studies show that application of the abdominal massage helps reduce abdominal pain. When this result is considered in terms of pain transmission physiology, it can be said that the stimuli created by abdominal massage help pain control by changing the transmission of pain. According to the door control theory; it is stated that stimuli such as touch and massage, which activate non-nociceptive nerves, close the door to pain transmission and prevent the perception of pain by blocking painful stimuli to reach higher centers (Uma & Clement, 2020). It is thought that the result obtained in this study may be related to the sensory perception obtained by the abdominal massage applied, as well as the decreased distension and related discomfort in the period after colonoscopy.

In this study, it was determined that massage was not effective in reducing distension levels in colonoscopy patients. Contrary to this finding; Jo & Kim (2022) reported that abdominal meridian

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massage (10 min) reduced distension after colonoscopy in their study of 54 patients. Studies evaluating the effect of different interventions other than a massage in patients undergoing colonoscopy reported that progressive muscle relaxation exercises (Tanrıverdi & Parlar Kılıç, 2022), direct rectal aspiration (Liu et al., 2016) and abdominal binder use during the procedure (Yu et al., 2018) reduce the incidence of distention related to colonoscopy. In addition, it is emphasized that the use of anoscopy after the procedure reduces distension in the evaluation 24 hours after the procedure (Unler et al., 2020). However, it has also been reported that the incidence of distension in patients who received probiotics following the procedure was similar (D'Souza et al., 2017). Study results suggest that abdominal meridian massage and some non-massage interventions can reduce tension. However, the finding of this study that abdominal massage did not significantly reduce distension suggests that additional studies with larger samples are needed to determine the effect of abdominal massage on distension. The fact that the abdominal massage technique (meridian) and duration (10 minutes) used in the study of Jo & Kim (2022) were different from the technique used in this study may have affected the results. Considering the results of our study and other studies, it can be said that the sensory changes caused by interventions such as massage and Transcutaneous Electrical Nerve Stimulation (TENS) are not effective in the distension experienced by patients undergoing colonoscopy but help control pain.

Video-assisted patient education is a patient education method also used for patients undergoing endoscopic procedures (Çevik & Rızalar, 2024). Video-assisted education is utilised in the education of patient relatives as well as patients. Video-assisted education also contributes to reducing the concerns of the patient's relatives in relation to health services and improving the level of knowledge (Bany Hamdan et al., 2022). In this study, it was seen that abdominal massage, which was taught to the relatives of the patients through video-assisted training and applied by them to their patients after coloscopy, contributed to the management of pain after the procedure.

5. Conclusion

After the colonoscopy procedure, patients experience abdominal distension and pain. While the massage was found to be an effective method in reducing post-procedural abdominal pain in patients undergoing colonoscopy, it had no effect in relieving distension. Nurses can benefit from abdominal massage to help reduce abdominal pain that develops after the colonoscopy. Nurses should provide support to patients' relatives by video-supported teaching of this nursing intervention to help patients control their pain after the procedure and at home after discharge. It is recommended that further studies with a larger sample be conducted to examine the effectiveness of abdominal massage in relieving pain and distention experienced after colonoscopy, as well as associated patient problems.

Authors Contributions

Topic selection: SYT, ZKÖ, BY; Design: SYT, ZKÖ, BY; Planning: SYT, ZKÖ, BY; Data collection and analysis: SYT, ZKÖ, BY; Article writing: SYT, ZKÖ, BY; Critical review: SYT, ZKÖ, BY.

Conflict of Interest

No conflict of interest has been declared by the authors.

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