

## **Effectiveness of adoption of positive coping strategies on women's knowledge and practices related to endometriosis**

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### **Abstract**

**Background and Aim:** Endometriosis affects 5 to 15% of women in their reproductive years. It causes a wide range of social, psychological, and emotional issues. The study aimed to evaluate effectiveness of adoption of positive coping strategies on women's knowledge and practices related to endometriosis. **Subjects and Methods:** This study used quasi-experimental research design. The research was carried out in Egypt at the endoscopy section of Zagazig University Hospital and Al Ahrar Hospital. A purposive sample of 150 women with endometriosis was included four tools were used to collected the necessary data. (I) A systematic interviewing questionnaire (II) laparoscopic (III) the Numeric Pain Rating Scale, endometriosis rating by the American Society of Reproductive Medicine and (IV) women's knowledge and practice questioner. **Results:** The study findings revealed that adopting the identified coping strategies women's knowledge and practice with, pain related to endometriosis ( $P < 0.000$ ). **Conclusion:** Adoption of Positive coping strategies had a significant effect on women's knowledge, practices related to endometriosis. **Recommendations:** This study emphasizes the critical significance of nurse education initiatives and programs in promoting awareness, knowledge, and behaviors and practices related to endometriosis among women.

**Keywords:** Endometriosis, Positive Coping Strategies, Women's Knowledge, Women's Practices.

## **Introduction**

The presence of developing endometrial tissue outside of the uterine cavity is known as endometriosis. <sup>(1)</sup> Endometriosis causes a multitude of symptoms in women, including dysmenorrhea, heavy periods, pelvic discomfort, dyspareunia, and infertility, all of which have a significant impact on their quality of life. However, some women show no signs or symptoms.<sup>(2)</sup> Endometriosis affects 3.7 percent of women aged 34 to 39 years in Australia, with some estimates of 560,000 women are affected.<sup>(3-4)</sup> Between 1998 and 2013, the global prevalence of endometriosis grew by 6.4 percent. <sup>(5)</sup> These statistics are based on laparoscopic surgery, and some of them may not be representative of the overall population. <sup>(6-7)</sup>

Endometriosis is commonly misdiagnosed by history and physical examination, however laparoscopic surgery is the gold standard of diagnosis. <sup>(8)</sup> Endometriosis does not have a perfect cure. Treatment options include pain treatments [such as nonsteroidal anti-inflammatory drugs], hormone replacement, preventative surgeries, fertility management, hysterectomy, and ovarian resection. Other possibilities include alternative treatments

(such as acupuncture for pain relief), lifestyle changes, and home remedies. <sup>(9)</sup>

Obtaining advice from families, healthcare workers, and the Website, implementing self-managing procedures and eliminating ineffective lifestyles, selecting activities and habits, and identifying self-management strategies appropriate to women's lives and stages of the disease are all described as coping strategies for women with endometriosis. <sup>(10-11)</sup>

## **The study significance**

In Egypt, the prevalence of endometriosis is unknown, and the diagnosis can only be confirmed with laparoscopy. Endometriosis has numerous effects on a woman's daily life, social relationships, and sexual life. Nurses and other healthcare providers play an important role in implementing positive coping strategies related to endometriosis, an urgent need to enhance women's knowledge and skills by increasing their information and providing ongoing advice on the care of women diagnosed with endometriosis. <sup>(12)</sup>

## **Aim of the study**

The study aimed to evaluate effectiveness of adoption of positive coping strategies on women's knowledge and practices related to endometriosis.

### **Research hypothesis**

Women knowledge and practices, pain related to endometriosis will improve as a result of adoption of positive coping strategies.

### **Subjects and Method**

#### **Subjects**

To achieve the study's aim, a quasi-experimental study design was adopted.

#### **Study Setting**

The study was conducted at the Gynecological laparoscopy Unit at Zagazig University Hospital and Al-Ahrar Hospital, Zagazig. The department of Gynecology includes two internal units and one operating room. It works seven days a week and focuses on the cure and care of women with endometriosis and gynecology issues [internal unit]. The laparoscopy unit staff consists of ten senior gynecologists, five junior experts, and five nurses with a nursing diploma. In the gynecology department, there are no nurses responsible for health education.

#### **Study Subjects**

A purposive sampling of 150 women was selected based on the following criteria: all women diagnosed with endometriosis by laparoscopy during the data collection period and who were willing to participate

in the study, while women diagnosed with other gynecological or medical conditions or issues were excluded from the study.

#### **Sample size**

During the one-year study period [January 1, 2019 to December 31, 2019], 636 women were admitted to the Gynecological Endoscopy Unit for laparoscopic surgery, 150 of whom were diagnosed with endometriosis, according to hospital records.

#### **Methods**

##### **Official approval**

The study was approved by the Dean of Zagazig University's Faculty of Nursing and then passed on to the administration of Zagazig University's hospitals.

##### **Ethical Considerations**

The study was approved by the Scientific Research Ethics Committee, Faculty of Nursing, Zagazig University, and Chairman of the Board of Administrators of Zagazig University Hospitals, pursuant to ethical code number (NUR2019). The researchers, informed each participant at the start of the interview that they had the right to withdraw and would have no influence on the hospital services given. The researcher safeguarded all of the participants'

information, and pseudonyms were utilized to maintain their identity.

### **Tools for data collection**

Data was collected using four tools.

#### **Tool I: A structured interviewing sheet.**

It was developed by the researcher based on relevant literature

**Part (A): Sociodemographic characteristics of women diagnosed with endometriosis.** This contained data such as age [year], educational level, residence, employment status, and income level.

**Part (B): Menstrual and gynaecological history of women diagnosed with endometriosis.** This covered the age of first menstruation [years], period days, menstrual cycle length [days], infertility duration [years], and pelvic surgical history such as laparoscopy or laparotomy.

**Part (C): Endometriosis signs, symptoms and problems.** It comprised questions related to painful periods [dysmenorrhea], pain during intercourse, menstrual cycle irregularity, vaginal bleeding between menstrual cycles, heavy menstruation, infertility, digestive and urinary problems [diarrhea, constipation, bloating, or nausea]. Assessment of endometriotic symptoms included the presence of inner scarring, adhesions, chocolate cysts on the ovaries,

obstruction of the intestines and ureters as well as recurrent absenteeism from work.

#### **Tool II: Degrees, and categories/ classification types of endometriosis diagnosed by laparoscopic.**

The degree of endometriosis was classified as minimal [first degree], mild [second degree], moderate [third degree], and severe [fourth degree] by the American Society for Reproductive Medicine [1979].<sup>[13]</sup>

Endometriosis was classified as unilateral or bilateral ovarian endometriosis, peritoneal endometriosis, endocervical endometriosis, ovarian and rectovaginal endometriosis, intestinal endometriosis, urogenital endometriosis, or extensive invasive peritoneal endometriosis.

**Tool III: Women's knowledge and practice of endometriosis.** It was developed by researchers based on relevant literatures and included two parts:

**Part (A): Women's knowledge of endometriosis.** It included the definition, etiology, manifestations, diagnosis, complications, and therapy of endometriosis.

#### **Scoring system for knowledge:**

- Correct and complete answer scored as (1).

- Incorrect / wrong answer score as (0).

**Total score for knowledge:**

- Good level of knowledge : 60-100 %
- Poor level of knowledge: less than 60%

**Part (B): Women's practice, habits and how they cope with endometriosis.**

A healthy lifestyle included limiting dairy and processed foods, eating less red meat, and eating more fruits, vegetables, and whole grains. Regular exercises also support the body release endorphins and reduce estrogen level. Moreover, extra rest, especially during the menstrual period, and sleeping on one side with the knees pulled over the chest has an important role in relieving the discomfort associated with endometriosis symptoms.

**Scoring system for practice:**

- Always done scored as (1).
- Not done scored as (0).

**Total score of expertise:**

- Correctly done: 60-100 %
- Incorrectly /not done: < 60%.

**Tool IV: Visual Analogue Scale.** It was adopted from **William and Hoggart (2005)**

A 11-point digital rating scale was used to assessed the intensity of pain-related

endometriosis such as dysmenorrhea, dyspareunia, and non-menstrual pelvic pain, and all patients were asked to rate the degree of their pain at the initial interview and follow-up visit.<sup>(14-15)</sup> This pain was graded "from zero to 10, with zero indicating no pain and ten indicating severe pain, using the color scale scheme: Yellow (Grade 0) means no pain, Green (Grade 1-3) means mild pain, Blue (Grade 4-6) means moderate pain, and Red (Grade 7-10) means severe pain."<sup>(16)</sup>

**Validity**

Four specialists in the Fields of Obstetrics and Gynecology from the Faculty of Medicine and Nursing examined the tools for clarity and relevance of content. The tools had not been altered in any way.

**Reliability**

The Cronbach alpha-coefficient test was used to test reliability, and the internal consistency of visual analogues scale was found to be  $r = 0.83$ .

**Pilot study**

A pilot study was done on a sample of 10% (15 women) of the study sample prior to data collection to assess the clarity and applicability of the tools, the feasibility of the study, and the period needed to collect

data. The main study sample included the pilot sample.

### **Data collection**

Interviews with women were done by the researchers. Each interview lasted 30 to 40 minutes and twice a week [on Saturday and Wednesday] between 9 a.m. and 3 p.m. from January to December 2019.

**Phases of the study.** The study interference was carried out through three phases as follows:

#### **1. Assessment phase**

Women who met the inclusion criteria and were accepted to join in the study were interviewed two times individually. At the start of the interview, the researcher greeted the endometriosis-affected women, described the purpose of the study, and obtained their verbal consent. In the pre-and postoperative phase, the researchers filled out pre-prepared questionnaires before and after the intervention.

#### **2. Planning phase**

Different methods of teaching were developed and used. A guidance brochure on endometriosis was designed in easy Arabic to suit the diverse educational levels of women based on the findings of the assessment phase, related literature, and educational sessions addressing

endometriosis. This was presented through video and PowerPoint presentations on a laptop, as well as discussion sessions and an informative booklet. The lecture covered the definition, etiology, pathophysiology, and stages of endometriosis, as well as endometriosis symptoms and effects, diagnosis, and pharmacological and surgical treatment options. Further, the coping strategies were discussed.

#### **3. Implementation phase**

Positive coping strategies were educated for women diagnosed with endometriosis. The content was presented by researchers jointly with the educational tools (brochure, videos, PowerPoint presentation and laptop) and using different educational methods as lectures and discussion.

**Problem-solving approaches session.** This included knowledge regarding restricted physical exercise, increased knowledge about endometriosis (heard about endometriosis before it was diagnosed, foods or exercise schedules), work or home activities, and social relationships during menstruation, as well as self-managing approaches (relaxation or exercises)<sup>(17)</sup>

**Strategies that concentrated on emotions session.** This included accepting the illness

by knowing how to deal with endometriosis, adopting proper behavior, talking with self, encouraging relaxation, and spiritualists (praying and beseeching God) are important methods of dealing with endometriosis symptoms.<sup>(17)</sup>

**Coping strategies for a healthy lifestyle session.** It included information to help relieve pelvic muscle spasms, take a warm bath or place a heating pad or hot water bottle in the lower abdomen, and massage the pelvic area before menstrual period to reduce menstrual discomfort associated with endometriosis.<sup>(17)</sup>

#### **4. Evaluation phase**

One month following the intervention, assessment was carried out using the same pre designed tools of data collection [I, II, III, and IV]. A month was selected in order to most women were expected to be in the same phase of their menstrual cycle, which can be associated with endometriosis symptoms.

#### **Statistical analysis:**

The IBM SPSS statistical program, version 22, was used to enter and analyses the data. The categorical variables were described using the mean, standard deviation, and percentages. The difference between the

quantitative variables was determined using the t-test. To examine the relationship between categorical variables, the Chi-Square test was performed. The p-value was deemed to be significantly at lower than 0.05 and highly significant at 0.001

#### **Results**

Table 1 illustrations that nearly two thirds of the studied women [65.3 % and 40% respectively] were under the age of 20 and had just an elementary education. Furthermore, 60.7 % of them lived in cities and slightly more than three-quarters (75.3 % and 77.3 %, respectively) were unemployed and had insufficient income.

Table 2 shows that the mean age at first menstruation, menses days, and menstrual cycle length were  $11.2 \pm 1.2$  year,  $7.3 \pm 1.3$  day, and  $26.2 \pm 2.7$  day, respectively. Furthermore, the mean duration of infertility was 5.5–2.3 years, and 44% of them had undergone pelvic surgery.

Table 3 revealed that more than three-quarters of the studied women(79.3 % and 77.3 % respectively) suffer from painful periods (dysmenorrhea) and pain with intercourse. Furthermore, at any point of their menstrual cycle, 48 % and 50.7 % respectively reported menstrual irregularity and vaginal bleeding between menstrual

cycle and, more than half of them [53.3 %] infertile. Concerning problem associated with endometriosis nearly one third of the studied women had adhesions [32.7 %] and a quarter of them had chocolate ovarian cyst (20 %).

Table 4 demonstrates that about half of the women (47%) had a moderate degree, a mild degree (22.7%), and a severe degree (12%) of endometriosis. As regards to categories of endometriosis diagnosed by laparoscopy, 26.7 % had unilateral endometriosis and 24.7 % had bilateral endometriosis.

Table 5 shows that 79.3% and 80.0% of women had a poor level of knowledge and incorrect practices of endometriosis before adopting coping strategies, respectively. However, 54.7% and 86.7% of them had a good level of knowledge and correct practice of endometriosis after adopting coping strategies. In addition, before adopting coping strategies, the average knowledge and practice scores for endometriosis were  $5.91 \pm 2.93$  and  $7.85 \pm 4.43$ , respectively, compared to  $35.81 \pm 3.27$  and  $36.25 \pm 4.51$ ,

respectively, with significant improvement after adopting coping strategies ( $P \leq 0.0001$  and  $P \leq 0.0001$  respectively).

Table 6 illustrates that 54.0% of women had moderate pain intensity with the mean pain score was  $8.32 \pm 17.61$  regarding endometriosis symptoms before coping strategies were adopted. While after adopting coping strategies, 60.7% of them had mild pain with a mean pain score of  $3.11 \pm 14.97$ , respectively. There is a significant difference in the pain score before and after the adoption of coping strategies ( $P < 0.000$ ).



**Table 1. Characteristics of women diagnosed with endometriosis (n=150).**

Item	Frequency	Percent
<b>Age [years]</b>		
18-<20	98	65.3%
20-<30	22	14.7%
30->40	30	20.0%
<b>Educational level</b>		
Illiterate	10	6.7%
Primary school	60	40.0%
Secondary school	50	33.3%
College or above	30	20.0%
<b>Place of Residence</b>		
Urban	91	60.7%
Rural	59	39.3%
<b>Working status</b>		
Worked	37	24.7%
Not worked	113	75.3%
<b>Level of income</b>		
Sufficient	34	22.7%
Insufficient	116	77.3%

**Table 2. Menstrual and gynecological history of women diagnosed with endometriosis (n=150).**

Items	Mean ± SD	
Age of first menstruation [years]	11.2± 1.2	
Menses [days]	7.3 ± 1.3	
Length of the menstrual cycle [days]	26.2 ± 2.7	
Duration of infertility [years]	5.5 ± 2.3	
	Frequency	Percent
History of pelvic surgery		
Yes	66	44%
No	84	56 %

**Table 3: Signs, symptoms, and problems of women diagnosed with endometriosis (n=150).**

Items	Frequency	Percent
<i>Symptoms of endometriosis</i>		
Dysmenorrhea (Painful periods)	119	79.3
Dyspareunia (Pain with intercourse)	116	77.3
Irregularity of the menstrual cycle	72	48.0
Vaginal bleeding between menstrual cycle	76	50.7%
Heavy menstruation	56	37.3
Digestive symptoms	57	38.0
Urinary symptoms	45	30.0
<i>Signs of endometriosis</i>		
1ry Infertility	80	53.3
2nd Infertility	71	47.3
<i>Problems of endometriosis</i>		
Internal scarring	6	4.0
Adhesions	48	32.0
Frequent absence from work	27	18.0
Ureteral obstruction	10	6.7
Intestinal obstruction	24	16.0
Chocolate cyst on the ovaries	30	20.0

**N.B:** The total is not exclusive because some women had more than one problem and symptom.

**Table 4. Endometriosis degrees and classifications as determined by laparoscopic examination [n=150].**

Items	Frequency	Percent
<b>Degrees of endometriosis diagnosed by laparoscopy</b>		
Minimal [1 <sup>st</sup> degree]	27	18%
Mild [2 <sup>nd</sup> degree]	34	22.7%
Moderate [3 <sup>rd</sup> degree]	71	47.3%
Severe [4 <sup>th</sup> degree]	18	12.0%
<b>Categories of endometriosis diagnosed by laparoscopy</b>		
Unilateral ovarian endometriosis	40	26.7
Bilateral ovarian endometriosis	37	24.7
Pelvic endometriosis	12	8.0
Rectovaginal endometriosis	13	8.7
Ovarian and rectovaginal endometriosis	13	8.7
Bowel endometriosis	5	3.3
Urinary tract endometriosis	10	6.7
Deep infiltrating pelvic endometriosis	12	8.0
More than one	7	4.7

**N.B:** The total is not exclusive because some women had more than one category.

**Table 5. Knowledge and practice of women with endometriosis before and after adopting coping strategies (n=150).**

Items		Adopting coping strategies				X <sup>2</sup> -test	P-value
		Before		After			
		No	%	No	%		
<b>Level</b>						10.39	0.001
<b>Knowledge</b>	Poor	119	79.3	23	15.3		
	Good	31	20.7	127	84.7		
<b>Practice</b>	Incorrectly done/not done	120	80.0	31	14.	9.55	0.02
	Correctly done	30	20.0	129	86.0		
<b>Mean ±SD</b>						<b>t-test</b>	<b>P-value</b>
<b>Knowledge score</b>		5.91±2.93		35.81±3.27		-81.658	< 0.0001
<b>Practices score</b>		7.85±4.43		36.25±4.51		-58.250	< 0.0001

**Table 6: Pain related to endometriosis symptoms in women before and after adopt coping strategies (n=150).**

Pain related with endometriosis symptoms	Adopting coping strategies				X <sup>2</sup> -test	P-value	
	Before		Before				
	No	%	No	%			
<b>Severity of pain</b>						11.67	0.04
Mild	16	10.7%	91	60.7%			
Moderate	81	54.0%	45	30.0%			
Severe	53	35.3%	14	9.3%			
<b>Mean score of pain</b>						<b>t-test</b>	<b>P-value</b>
Mean ±SD	8.32±17.61		3.11±14.97		11.049	<0.000 <sup>*</sup>	

## Discussion

Endometriosis is a recurrent and chronic illness. It affects 6-10% of women of reproduction age, with 20-50% of those affected infertile and 71-87 % are suffering from persistent pelvic pain. <sup>[19]</sup>

Endometriosis is characterized by both specific and generalized symptoms. Dymenorhea, cyclic and non-cyclic pelvic discomfort, dyschezia, dysuria, and dyspareunia are some of the specific symptoms. Intestinal and bladder problems, pain spreading into the legs, and associated complaints such as vomiting, headache, dizziness, painful periods, irregular pelvic pain, lower back pain, and persistent exhaustion are the nonspecific symptoms. Chiantera, V., et al (2017)<sup>(20)</sup>.

According to the present findings, nearly two thirds of women were between the ages of 18 and 20. Eisenberg, V. H., et al (2018)<sup>(21)</sup>. on the other hand, concluded that a significant percentage of endometriosis was found among women aged 25 to 39. The current findings showed that most women with primary education and those living in urban regions had the highest percentages of endometriosis. Furthermore, the majority of them were unemployed and had insufficient income. These findings contrast with those

of Peters, K. M., et al (2014)<sup>(22)</sup> who found that endometriosis was common in educated women. This may be due to cultural differences and barriers as Arab women are less likely to see and consult a gynecologist, and a lack of education leads to a delay in endometriosis diagnosis.

The mainstream of women with endometriosis experienced dysmenorrhea, pain during sexual intercourse, irregular menstrual cycles, vaginal bleeding between menstrual cycles, and primary infertility, according to the current study. This conclusion supports up the findings of Parazzini, F., et al (2013)<sup>(23)</sup> who found that endometriosis is associated with menstrual cycle duration, the intensity of menstrual flow, and dysmenorrhea.

Markham, R., et al. (2019)<sup>(24)</sup> ,who studied 529 women with endometriosis and 208 women without an existing gynecological complaint, found that all pain manifestations were common among women with endometriosis. They also stated that endometriotic patients had dysmenorrhea, dyspareunia, lower back pain, ovulatory pain, pelvic pain not related to menstruation, dysuria, and rectal pain. In addition, there was a strong association between the

intensity of dysmenorrhea, frequency of dyspareunia, and other pain symptoms.

Furthermore, Saha, R., et al (2017)<sup>(25)</sup> found a link between profound dyspareunia and endometriosis. Women with endometriosis had more complaints of pain with sexual relation, dyschezia, and dysuria, according to Schliep, K. C., et al (2015)<sup>(26)</sup>. Women with endometriosis rated their pain as "strong and progressing during menstrual and non-menstrual stages" in a qualitative research conducted by Moradi, M., et al (2014)<sup>(27)</sup>. Endometriosis symptoms include persistent pelvic pain, dysmenorrhea, dyspareunia, and infertility, according to Luciano & Luciano (2011)<sup>(28)</sup> reported that endometriosis can induce symptoms arising from other organs such as dyschezia, tenesmus, dysuria, and hematuria.

According to the results of the current study, adhesions and chocolate ovarian cyst were the most common signs of endometriosis. These results are comparable with a study of 480 patients with endometriosis by Hao, M., et al (2009)<sup>(29)</sup> examining the incidence of pelvic adhesions and the relationship between pelvic adhesions and pain symptoms in women with endometriosis. They found that the majority of peritoneal adhesions were specific to endometriosis.

Nurses must design and develop realistic techniques to manage pain related to symptoms of endometriosis. Positive coping strategies for endometriosis pain were found to have a significant effect on pain relief in women with endometriosis symptoms. According to Roomaney, R., and Kagee, A (2016)<sup>(17)</sup> patients can organize activities and plan for coping with the diseases because endometriosis discomfort is repetitive.

The majority of women with endometriosis diagnosed by laparoscopy had a moderate degree of endometriosis (3rd degree). This agrees with Shah and Adlakh (2014)<sup>(30)</sup> who discovered that the majority of women had endometriosis in stages III and IV. This consistency in findings could be due to the fact that most women with endometriosis present late. This study also shows that most of women with endometriosis diagnosed by laparoscopy had ovarian endometriosis, which is in agreement with ---. Ovarian endometriosis was more common among women in their reproductive years, Zhu, J., et al. (2018)<sup>(31)</sup>.

According to the current study, women's knowledge improved significantly after they adopted coping methods, with statistically significant improvements (P 0000). This conclusion is consistent with a research

conducted at EL Mansoura University by Abd El-Mouty, S. M., et al. (2016)<sup>(32)</sup> to educate 160 female workers from various faculties about endometriosis. They detected a significant difference in the participants' level of knowledge after the educational and follow-up sessions than before the educational sessions. Women's knowledge of endometriosis increases significantly as a result of the endometriosis education and health sessions that are planned and implemented.

Similarly, Jacobsson, L. R., et al. (2012)<sup>(33)</sup> who reported that women with endometriosis benefit from more information and support in order to improve their coping ability. As a result, the study suggests that health care providers should provide women with knowledge about how to deal with endometriosis such as limited physical activity, healthy diet or exercise schedules, as well as work or home activities, social relationships during menstruation, and self-managing approaches (relaxation or exercises). These practices have a significant effect in controlling and dealing with symptoms of endometriosis.

The practices of women with endometriosis improved after adoption of the positive coping strategies with a statistically

significant difference ( $P < 0000$ ) according to the current study. Similarly, Roomaney, R., and Kagee, A (2016)<sup>(17)</sup> conducted a study in South Africa on coping strategies used by women with endometriosis in the public health care system. They found that problem-solving and emotion-management strategies helped them cope with endometriosis. The present study findings also support those of Gaston-Johansson, F., et al. (2013)<sup>(34)</sup> who found that self-statements, prayer, and positive behavior activity were the most popular coping strategies utilized by breast cancer patients receiving chemotherapy. The present research findings proved that nurses and other health care providers can help women with endometriosis to adopt positive coping strategies through health education to improve their health and wellbeing.

### **Conclusion**

Adoption of Positive coping strategies had a significant effect on women's knowledge, practice related to endometriosis. So, the research hypothesis is met based on the finding of the present study.

### **Recommendations**

The findings point to the importance of researching and adopting coping strategies and ways that can assist women in dealing

with endometriosis and referring them to relevant resources.

### **Limitations of the study**

Because many women were unaware of endometriosis symptoms and were discharged from the hospital within 2-3 hours of laparoscopic surgery, this study was limited by its small sample size. However, it is generalizable in the same conditions and locations

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