

The Effect of Preoperative Educational Intervention on Preoperative Anxiety And Postoperative Outcomes In Patients Undergoing Open Cholecystectomy

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Abstract: Despite progress in surgery, anxiety remains an important problem, which may affect the surgical outcomes; one cause of anxiety might be due to lack of information about what will happen before, during or after the procedure. Aim: to examine the effect of preoperative educational intervention on preoperative anxiety and postoperative outcomes for patients undergoing open cholecystectomy. A quasi-experimental research design was utilized in the current study. The study was conducted in General Surgical Unit of Menoufia University Hospital, Egypt. Tools: An interviewing questionnaire sheet for demographic data, Beck Anxiety Inventory (BAI), Amsterdam Preoperative Anxiety and Information Scale (APAS), Visual analogue pain scale and Postoperative patient's outcome sheet. Results: No statistically significant differences were existed between both study and control groups in relation to scores of BAI and APAIS pre-intervention. While there were a significant decrease in the scores of BAI and APAIS in the study group compared to control group post-intervention. There were significant differences existed between both groups regarding to nausea and vomiting, stability of vital sings, postoperative pain, and postoperative mobility. Conclusion: The planned educational intervention preoperatively diminished preoperative anxiety and leads to better surgical outcome as early recovery, effective pain control and early mobility. Recommendations: planned preoperative educational intervention and supply of knowledge through illustrated material such as simple booklet about preoperative preparation, surgery, anesthesia, postoperative practice, nutrition and life style modifications should be offered to patients preoperatively.

Keywords: Anxiety, Open cholecystectomy, Preoperative educational intervention, Postoperative outcomes

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I. Introduction

Cholecystectomy is the surgical removal of the gallbladder. It is a common treatment of symptomatic gallstones and other gallbladder conditions. Surgical options include laparoscopic or open Cholecystectomy. There are many postoperative complications that may occur such as pneumonia, wound infection, and blood clots....etc. [1]. Prevention of these postoperative complications considered as a high medical priority. There are many studies which support that, the preoperative education of patients including provision of education about physical care preparatory information about the correct behaviors after surgery could improve the postoperative outcomes and decrease complications [2, 3].

The complete surgical incident is known as perioperative period. It is include three phases; preoperative, intraoperative and postoperative phase. The initial phase involves the interpreting of nursing care to the patients who are planned to have surgery [4]. It was evident through literature that during this phase; assessment and education of the patient mainly is the responsibility of health care providers to minimize the risk during the surgery and to have better outcomes of the patients. Preoperative primary care is associated with minimal perioperative morbidities, better satisfaction with the surgical experience and decrease length of the hospital stay [5, 6].

Patients who are physically and psychologically prepared for surgery tend to have better surgical outcomes. The patients were capable of managing postoperative pain more effectively. Preoperative teaching must meet the patient's need for information related to the surgical experience, which may help in alleviating most of his or her fears. Patients who are more knowledgeable about what to expect after surgery and who have an opportunity to express their goals and opinions, often cope better with postoperative pain and decreased mobility. Preoperative care is extremely important prior to any surgical procedure [7].

Preoperative teaching includes instruction about the preoperative period, the surgery itself and the postoperative period. Instructions about the preoperative period deal primarily with the arrival time, where the patient should go on the day of surgery and how to prepare for surgery. For example, patients should be told how long they should be nothing by mouth, which medications to take prior to surgery, and the medications that should be brought with them (such as inhalers for patients with asthma). Instructions about the surgery itself include information about anesthesia what will be done during the surgery, and how long the procedure is expected to take. The patient should be told where the incision will be ^[6].

Knowledge about what to expect during the postoperative period, instructions about expected activities can increase compliance and helps in the prevention of the complications. This includes the education about practice of coughing and deep breathing exercises, use an incentive spirometer and practice splinting the incision. Additionally the patient should be informed about importance of early ambulation. The patients should also be learned that the respiratory interventions decrease the occurrence of pneumonia ^[8].

Patients also should be informed that early leg exercises and ambulation can reduce the risk of deep vein thrombosis. Moreover they may have sequential compression stockings on their legs to reduce blood clots until they start ambulating. The patients also should be informed about the tubes and equipment that they will have which may include multiple intravenous lines, drainage tubes, dressings, and monitoring devices. The teaching should include discharge instructions such as self-care activities, life style modifications, follow up and when he or she seeks medical help ^[8].

The patient should have information about the pain management strategies that they will use postoperatively. They should be encouraged to ask for or take pain medications before the pain becomes unbearable and they should be informed how to rate their discomfort on a pain scale, these instructions allow the patients and others who may be assessing them to evaluate the pain consistently. The patients should be informed about the use of alternative methods to control the pain ^[9].

Anxiety disorders are frequently observed in patients who are hospitalized for undergoing any type of surgeries. It can affect the patient's perception of postoperative pain and has a negative impact on recovery from anaesthesia ^[10]. Patients are often fearful or anxious about having surgery. So this fear is often helpful for them to express their concerns to health care workers and it can be especially beneficial for patients who are having a high-risk procedure. The family needs to be included in psychological preoperative care to enhance feeling of patient security. Patients and families who are prepared psychologically tend to cope better with the patient's postoperative course. Decreasing anxiety can result in less postoperative pain and earlier post anesthetic care unit (PACU) discharge times ^[11, 12, and 13].

The most researches have demonstrated that patients have a significantly better recovery when they were prepared before the time of operation by attending a preoperative education class. Preparation may be beneficial for the outcomes, postoperative pain, and behavioral recovery ^[14, 15].

So the aim of the present study was to examine the effect of preoperative educational intervention on preoperative anxiety and postoperative outcomes for patients undergoing open cholecystectomy.

Operational definition:

Postoperative outcomes are the experience that of postoperative symptoms and postoperative patient's condition. It included symptoms such as pain, nausea, vomiting, and patients' condition in the surgical ward. Moreover wound infection and length of the hospital stay.

The significance of the study:

It observed today that the patients often enter surgical procedures without receiving complete information about the procedure, anaesthesia methods, the correct behaviours the patients should have followed postoperatively this may be increase anxiety and disturb the patients emotionally and physically ^[16]. It is good for the patients to be involved in their care. Many researches showed that when the patient was prepared for surgery through preoperative education classes or visit with surgeons, nurses or anaesthesiologists, this helped a patient improve knowledge, reduce anxiety, and lead to better postoperative outcomes ^[17, 18]. **So** the current study aimed to test the effect of preoperative educational intervention on the preoperative anxiety and postoperative outcomes in patient undergoing open cholecystectomy.

Aim of the study:

To examine the effect of preoperative education on preoperative anxiety and postoperative outcomes for patients undergoing open cholecystectomy.

Research hypotheses:

The following research hypotheses were formulated in an attempt to achieve the aims of the study:

1. The study group subjects who receive a preoperative educational intervention show a significant reduction in anxiety level compared to control group subjects.
2. The study group subjects who receive a preoperative educational intervention experience less postoperative symptoms as nausea, vomiting, constipation and diarrhea than control group.
3. The study group subjects who receive a preoperative educational intervention experience earlier recovery, less postoperative pain an earlier postoperative mobility compared to the control group subjects.
4. The study group subjects who receive a preoperative educational intervention show a significant reduction in postoperative hospital stay compared to the control group subjects.
5. The study group subjects who receive a preoperative educational intervention show a significant reduction in wound infection compared to the control group subjects.

II. Subjects and Method

Research Design: A quasi experimental research design was utilized to achieve the aim of the current study.

Setting: The current study was conducted at the general surgical unit of Menoufia University Hospital– Menoufia Governorate - Egypt.

Sample: A purposive sample including 100 patients who admitted to the general surgical unit for undergoing open cholecystectomy who agreed to participate in the study and fulfill the inclusion criteria. The study subjects were divided randomly and alternatively into two equal groups 50 patients in each as follow:

- **The study group (I):** received routine hospital care and instructions in additional to a detailed preoperative education about disease, surgery, preoperative preparation, anesthesia, postoperative practice and complications, etc.
- **The control group (II):** received the routine hospital care and instructions only.

Inclusion criteria: Adult subjects of both sexes (male and female) admitted to the general surgical unit, at Menoufia University Hospital scheduled for undergoing open cholecystectomy.

Exclusion criteria: All patients having anxiety disorders, patients with mental disabilities, and/or who unable to understand the information and instructions were provided by researchers.

Sample size: Sample size was statistically calculated by using the following equation at 95% confidence power of the study. The sample size was calculated to be 98 patients, that was increased to be 100 to increase the power of the study.

$$Ss \text{ (sample size)} = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)

p = percentage picking a choice, expressed as decimal

(.5 used for sample size needed)

c = confidence interval

Tools: Five tools were utilized by the researchers to achieve the aim of the study and to collect the necessary data. These tools were as follow:

Tool I: Structured Interviewing Questionnaire:

It was developed by the researchers to collect demographic data of the subjects. It was comprised of two parts related to patient's sociodemographic characteristics such as age and sex etc. and past medical history of all patients such as previous surgeries.

Tool II: Beck Anxiety Inventory (BAI):

It was adopted by **Beck, Epstein, Brown and Steer (1988)** ^[19] and used by the researchers to measure the severity of anxiety. It consists of 21- item scale such as numbness or tingling, feeling hot, wobbliness in the leg, nervous and dizzy or lightheaded, etc.

Scoring system: the questionnaire is a four point likert scale rated from zero to three ranged from not at all to severe anxiety. In which zero means not at all, one means mild, two means moderale, while three means severe experiences of the anxiety symptoms. The total score was summed; higher total scores indicate more severe anxiety symptoms, the possible score ranged from zero to sixty-three and patients were categorized into four

groups based on their scores in which a score from 0–9 denoted normal anxiety, a score from 10–18 denoted mild anxiety, a score from 19–29 denoted moderate anxiety and a score from 30–63 denoted severe anxiety.

Reliability: Fydrich, Dowdall, and Chambless (1992) ^[20] tested the reliability of the questionnaire and found that this questionnaire had high internal consistency (Cronbach's alpha = 0.94) with high test re-test reliability.

Tool III: The Amsterdam Preoperative Anxiety and Information Scale (APAIS):

It was adopted by **Dutch group of Moermann (1996)** ^[21]. It used by the researchers to measure the severity of preoperative anxiety. This questionnaire consists of six items; these items are rated on a five point Likert scale with the end poles "not at all" (1) and "extremely" (5). It represents the two scales anxiety (Item 1, 2, 4 and 5) and need-for-information (Items 3 and 6).

Reliability: Miller, Wysocki, Cassady, Cancel, and Izenberg (1999) ^[22] tested the reliability of the scale and found that the retest reliability bases on 42 persons was $r = 0.92$ for the scale anxiety and $r = 0.62$ for the scale need-for-information (both $p < 0.001$).

Tool IV: Visual Analogue Pain Scale (VAS):

It is an adopted scale by **Bain et al. (2005)** ^[23]. Which provides a simple way to record subjective estimates of pain intensity. The measurements is from zero to ten to rate the patient's level of pain. The measurement parameters included five items. A score of 0 means no pain while a score of 1-3 denoted mild pain, a score of 4-6 indicated moderate pain, a score of 7-9 illustrated severe pain, while 10 means worst pain.

Reliability: Boonstra et al., (2008) ^[24] tested the reliability of the scale and found that the retest reliability was $r = 0.84$ and reported that the visual analogue pain scale had excellent test-retest reliability. However, the VAS was the most reliable, with the smallest errors in the measurement acute pain.

Tool V: Postoperative Patient's Outcomes Questionnaire:

It was constructed by researchers based on the relevant review of literature which provides a description of postoperative symptoms and patient's condition. It included postoperative symptoms such as nausea, vomiting, constipation, diarrhea, pain and patients' condition in the surgical ward. Moreover wound infection and length of the hospital stay.

Methods

- **Formal approval:** An official permission was obtained from hospitals' director and the head nurses of the General Surgical Unit after an explanation of the aim of the study.
- **Tools development:** After reviewing the literature extensively, the study tool I and study tool V were developed by the researchers while the second and third tools were adopted by **Beck, Epstein, Brown and Steer (1988)** ^[19] and **Dutch group of Moermann (1996)** ^[21] respectively. Additionally tool IV was adopted by **Bain et al. (2005)** ^[23]. They were tested for their contents validity by a panel of five experts specialized in Medical Surgical Nursing to ascertain relevance and completeness.
- The reliability of the interviewing questionnaire and postoperative patient's outcome sheet were measured using a test and retest method and Pearson correlation coefficient formula to ascertain relevance and consistency of the tools to measure their items. The values were $r = 0.86$ and 0.89 respectively.
- **Ethical considerations and human rights:** A written consent to participate in the study was obtained from all participants after explaining the aim of the study, and they were assured that all collected data would be absolutely confidential and only will be used for the study's aim. The researchers emphasized that participation in the study is entirely voluntary and anonymity of the patients were assured through coding data. Subjects were also informed that refusal to participate in the study would not affect their care.
- **Pilot study:** A pilot study was conducted prior to data collection on 10 patients (10%) to test all tools for clarity, objectivity, feasibility and the applicability of the tools. Also, it was conducted to identify any problem associated with administering the tools and measure the time needed for data collection then the necessary modifications were carried out accordingly. Data included in pilot study was excluded from the current study.
- **Data collection Procedure: -**
 - Data was collected over a period of nine months from the beginning of December 2017 to the end of August 2018.
 - The participants of the study were selected and divided randomly and alternatively into two equal groups. **Study group (I)** received a detailed preoperative education about surgery, anesthesia, etc., along with routine medical care such as preoperative preparation and preoperative medications such as prophylactic antibiotics. While **Control group (II)** was exposed only to routine medical care and instructions which were given by the hospital.
 - All the participants were interviewed individually in the general surgical unit of Menoufia University Hospital.

- An interview was carried out by the researchers for all participants of both study and control groups for collecting baseline sociodemographic data, anxiety level and preoperative anxiety and information scale by using the tools I, II, III respectively. It took about 20 to 30 minutes.
- The researchers conducted one teaching session for each participant of study group I at the one or two days before surgery. The session took about 30 minutes in general surgical department. The session was conducted using lectures, discussion, demonstration, and re-demonstration. Information about the disease, surgery, anesthesia, preoperative medications, preoperative preparation, and postoperative complains, symptoms and activities were provided during the session. At the end of the session, the patient received a simple Arabic booklet contains all previous information.
- At day of surgery each participant in both study and control groups was assessed for anxiety level and preoperative anxiety and information scale using tool II, and III.
- During postoperative period all participants for both study and control groups were assessed for postoperative symptoms, stability of vital sings, pain score, first gas passage, mobility, duration of the hospital stay and occurrence of wound infection by using tool IV and tool V respectively.
- A comparison between both study and control groups was carried out to evaluate the effect of preoperative educational intervention on preoperative anxiety and postoperative outcomes for patients undergoing open cholecystectomy.

III. Statistical Analysis

The collected data were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 19, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, which describe a categorical set of data by frequency, percentage or proportion of each category, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between means of two groups of parametric data of independent samples, student t-test was used. Correlation between variables was evaluated using Pearson's correlation coefficient (r). Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance^[25].

IV. Results

Table (1) showed that the mean age of both study and control groups were 49.35 ± 12.2 and (50.11 ± 11.12) respectively, and most of the studied subjects in both groups were females. Moreover 90% of the study group and 86% of the control group were married. The majority of them have enough income. More than two-thirds didn't have history of previous surgery. The common cause of preoperative fears among patients was fear of death; it was found in 40% of patients.

Figure (1) illustrated that there was a significant improvement in anxiety scores in the study group subjects compared to the control group subjects after preoperative educational intervention.

Table (2) revealed that no statistically significant difference was existed between both study and control groups before educational intervention in relation to mean score of anxiety. However, after intervention a highly significant difference was existed between the both groups.

Table (3) revealed that no statistically significant differences were existed between both groups regarding to APAIS before education while after education the mean scores of APAIS were deceased in the study group subjects compared to the control group subjects at P value > 0.05 .

Table (4) explained that, the relationship between both study and control groups regarding to postoperative symptoms; it showed that a statistically significant difference was found between the two groups regarding to nausea and vomiting, but no a statistically significant difference was existed concerning to the other symptoms as diarrhea or constipation.

Table (5) obviously noted that a statistically significant difference was found between study and control groups concerning the mean time needed for stability of vital signs, postoperative pain score, mean time needed for mobility outside the bed while there was no statistically significant difference was found between both groups regarding to first gas passage and duration of hospital stay.

Table (6) concerning the wound infection, no statistically significant difference was found between the both study and control groups in relation to wound infection.

Table (7): it's cleared from the table that there was a positive correlation between post intervention anxiety score and postoperative pain score.

Table (1): Distribution of both groups regarding demographic characteristics (n=100)

Variables	Study group (I) (No = 50)		Control group (II) (No = 50)	
	No.	%	No.	%
Age (years)				
• 25-40	16	32	14	28
• 40-55	24	48	23	46
• 55+	10	20	13	26
X ± SD	49.35. ± 12.2		50.11 ± 11.12	
Sex				
• Male	21	42	22	44
• Female	29	58	28	56
Marital status				
• Single	4	8	7	14
• Married	46	92	43	86
Living				
• The country side	35	70	34	68
• The city	15	30	16	32
Educational Levels				
• Illiterate	31	62	25	50
• Primary education	4	8	10	20
• Secondary education	10	20	13	26
• High education	5	10	2	4
Income				
• Enough	38	76	37	74
• Not enough	12	24	13	26
Occupation				
• work	29	48	27	54
• Not work	21	42	23	46
Previous surgery				
• Yes	15	30	8	16
• No	35	70	42	84
Causes of fear				
• No fear	7	14	6	12
• Complications	10	20	8	16
• Anesthesia	13	26	14	28
• Death	20	40	22	44

Figure (1): Comparison between Anxiety Levels for both study and control groups pre and post educational intervention (n = 100)

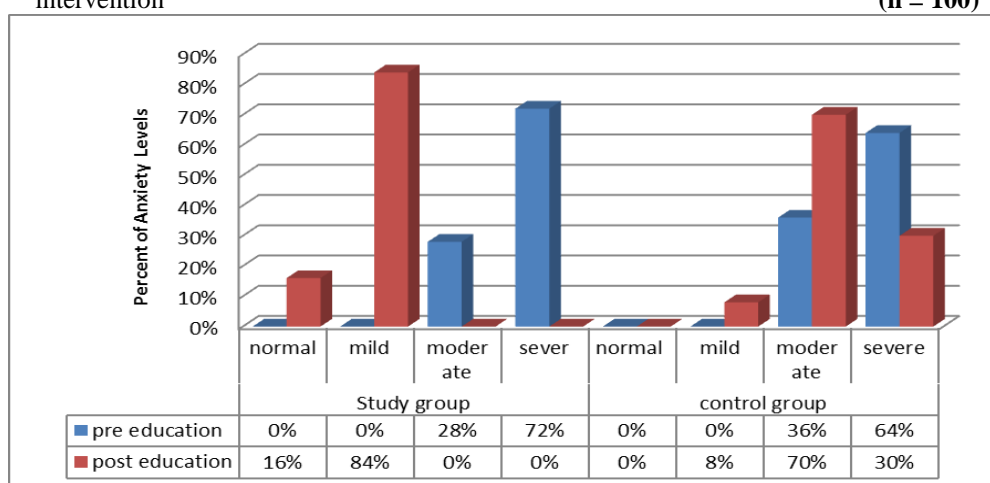


Table (2): The differences in anxiety scores among both study and control groups pre and post preoperative educational intervention (n = 100)

Intervention	Study (n = 50)	Control (n = 50)	P value
	Mean ± SD	Mean ± SD	
Pre education	31.32 ± 3.15	30.68 ± 3.63	0.941
Post education	11.6 ± 1.62	24.6 ± 3.85	0.000*

(*) Statistically significant at $P < 0.05$

Table (3): The differences in APAIS among both study and control groups pre and post preoperative educational intervention (n= 100)

APAIS Components	Pre education		t P value	Post education		t P value
	Study (n = 50) Mean ±SD	Control (n = 50) Mean ± SD		Study (n= 50) Mean ± SD	Control (n= 50) Mean ± SD	
Anesthesia components anxiety	7 ± 1.01	7.04 ± 1.01	-.198 0.843	2.68 ± 1.02	6.58 ± 1.01	-19.20 0.001*
Surgical components anxiety	8.58 ± 1.37	8.60 ± 1.33	-0.074 0.941	3.62 ± 1.23	8.16 ± 1.36	-17.52 0.001*
Combined components anxiety	15.58 ± 2.06	15.64 ± 1.99	-0.148 0.883	6.30 ± 1.59	14.74 ± 1.80	-24.78 0.001*
Information components desire	8.72 ± 1.03	8.66 ± 1.02	0.2920.771	2.58 ± 0.99	7.42 ± 1.59	-18.25 0.000*
Total score	24.3 ± 2.64	24.30 ± 2.53	0.000 1.00	8.88 ± 2.06	22.16 ± 2.56	-26.49 0.000*

(*) Statistically significant at $P < 0.05$

Table (4): The distribution of postoperative symptoms among the subjects in both study and control groups (n = 100)

Symptoms	Study (n = 50)	Control (n = 50)	P value
• Nausea and Vomiting (%)	6%	28%	0.00*
• Constipation (%)	10%	14%	0.07
• Diarrhea (%)	6%	7%	0.54

(*) Statistically significant at $P < 0.05$

Table (5): The differences between both study and the control groups as regards to postoperative outcomes parameter (n=100)

Postoperative outcomes parameters	Study (n = 50) Mean ± SD	Control (n = 50) Mean ± SD	P value
• Time for stable vital signs / hours	2.1 ± 0.52	2.98 ± 0.71	0.001*
• Postoperative pain score	4.76 ± 0.591	5.32 ± 0.978	0.001*
• Time of first gas passage / hours	17.6 ± 3.54	18.2 ± 2.88	0.12
• Hospital stay duration /days	8.51 ± 2.12	8.99 ± 3.1	0.24
• Time for mobility outside the bed /days	0.8 ± 0.33	1.3 ± 2.9	0.002*

(*) Statistically significant at $P < 0.05$

Table (6): The comparison between both groups regarding to wound infection (n =100)

Items	Study (n = 50)	Control (n = 50)	P value
Wound infection (%)	8%	6%	0.61

(*) Statistically significant at $P < 0.05$

Table (7): Correlation between postoperative pain score and BAI score after preoperative educational intervention (n=100)

Item	r	P value
Anxiety and pain	0.206	0.04*

(*) Statistically significant at $P < 0.05$

V. Discussion

The nursing care today focuses on psychological care and anxiety management, which became an important base of nursing care in surgical patients. The preoperative education is beneficial where the well-versed surgical patient experiences less fear, anxiety and good surgical outcomes and fewer complications [26, 27].

The discussion of study findings focused on the following frame of references; demographic variables, anxiety and APAIS score before and after education. It also discussed postoperative symptoms, patients' outcomes in the surgical ward and wound infection among both groups. Finally, it discussed the correlation between post intervention anxiety score and postoperative pain.

The findings of the current study told that the largest number of the patients in the both groups their ages were ranged between 40 to 55 years and this supported by **Gaharwar (2013)** [28] who conducted a study to assess factors affecting cholelithiasis among population in North Indian, who reported that the number of cases in the mentioned study were in the age group of 41-50 years. In addition to **Khan et al., (2017)** [29] also conducted a study about cholelithiasis and said that most of patients with cholelithiasis disease in their study were over 35 years. In relation to gender the present study reported that most of studied subjects in both groups were

females. The findings also agreed **Eslick et al., (2014)** ^[30] and **Alves et al., (2016)** ^[31] who reported that female gender was a risk factor for cholelithiasis disease.

Regarding to the anxiety, the current study revealed that the study group had improvement in the anxiety levels and a significant lower anxiety score compared to the control group after education. This might be due to the effect of pre-operative education that the patients were received. This is in line with **Lin et al., (2016)** ^[32] who concluded that perioperative anxiety was significantly reduced in the intervention group which received preoperative education about laparoscopic cholecystectomy through video. This also agrees the results of **Alanazi, (2014)** ^[33] who illustrated that the education before operation reduced preoperative anxiety significantly in clients scheduled for surgical procedures.

Looking to the total score of APAIS and its components, the current study findings showed significant lower scores in the APAIS and its components in the intervention group compared to control group. This indicated an improvement of APAIS score in the study group; this might be due to the effect of preoperative education about surgery and anesthesia. These findings fairly similar with **Priya et al. (2014)** ^[34] who measured the effectiveness of planned preoperative education on anxiety and patients' satisfaction in patients undergoing uterine fibroid surgery using APAIS, they informed that a combined anxiety component of APAIS after giving education was found to be significantly reduced in group X (intervention) than group Y (control). While among the other components, the surgery related anxiety was found to be significantly reduced in group X. The anesthesia related anxiety also decreased in group X as compared to group Y but it was not found to be statistically significant. In both groups, the information desire component showed a marginal reduction but it was also not found to be statistically significant. So they concluded the planned pre-operative education can have a significant impact on patient anxiety. With respect to the findings of BAI and APAIS scores, the hypothesis number one was reinforced which listed the preoperative educational intervention decreases anxiety score.

In the present study the patients in the study group had significantly lower range of nausea and vomiting postoperatively than the control group. About one-third of control group suffered from nausea and vomiting but only six percent of control group had nausea and vomiting. This reinforced by **Sadati, (2013)** ^[35] who conducted a study to evaluate the effect of preoperative nursing visit on preoperative anxiety and postoperative complications in candidates for laparoscopic cholecystectomy they conveyed that the preoperative teaching prior to laparoscopic cholecystectomy resulted in decrease in the postoperative nausea and vomiting in the intervention group. So the second hypothesis was supported which stated the study group subjects who receive a preoperative educational intervention experiences less postoperative symptoms but in relation to nausea and vomiting only.

The participants in the study group had significantly lower pain score during the first 48 hours after surgery this might be because the patients practice of pain strategies control, coughing exercise and wound support in an effective way. These results were the same as results obtained by **de Aguiar-Nascimento, (2014)** ^[36] who studied whether preoperative education for patients undergoing to open cholecystectomy would reduce the incidence of postoperative symptoms. They told that the intervention group had significantly lower pain score than the control group. The finding disagreed with **Magdaleno et al., (2018)** ^[37] who conducted similar study and said that they didn't find any differences between the intervention and control groups they rationalized that by presence of effective preoperative hospital protocol.

The subjects in the study group had significant lowering in the time needed for stabilization of vital sings and get outside the bed and able to walk on foot earlier than control group, this might be rationalized by better understanding of the benefits of mobility and more efficient walking. There may also be less interfering of anxiety and pain with the patient's daily function, leading to fewer symptoms this results is in the same line with **Sadati, (2013)** ^[35]. With respect to these findings; the results can conclude that the third hypothesis was supported which stated that the study group subjects who receive a preoperative education experiences earlier recovery, less postoperative pain an earlier postoperative mobility.

In the current study duration of the hospital stay and wound infection did not differ significantly between both groups. This might be because the both groups followed hospital protocol in these points. This agreed with **Sadati, (2013)** ^[35] who told that no significant differences were found the study and the control groups after intervention. These results didn't support 4th and 5th hypotheses about the length of hospital stay and wound infection.

The current findings also showed positive correlation between preoperative anxiety score and postoperative pain after intervention. These results Parallel to **Kavakci et al., (2012)** ^[38] who telling that the anxiety levels were moderately correlated with the visual pain scores during the first 24 hours after operation ($r = 0.30, P < 0.05$).

The previous findings reflect that, the beneficial impact of planned education before open cholecystectomy on reducing preoperative anxiety and improving the surgical outcomes as early recovery, fewer postoperative symptoms, good postoperative pain control and early mobility.

VI. Conclusion

Based on the results of current study, it was concluded that the planned education preoperatively diminished preoperative anxiety and lead to better surgical outcome as fewer post-operative symptoms, early recovery, effective pain control, and early mobility.

Recommendations

Based on the findings of the current study, the following recommendations can be suggested:

- Planned preoperative education should be presented through interview as a part of routine hospital preoperative care before open cholecystectomy.
- Concise and illustrated booklet should be provided for patients before surgery containing brief facts about the preoperative preparation, nature of surgery, anesthesia, postoperative pain control, breathing and coughing exercises, mobility, activity, and nutrition and life style modifications.
- Conducting of similar studies on larger samples to achieve generalization of the results.

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