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EFFECT OF PREOPERATIVE HEALTH EDUCATION ON POSTOPERATIVE OUTCOMES AMONG PATIENTS UNDERGOING LAPAROSCOPIC CHOLECYSTECTOMY

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Abstract

Background: Laparoscopic cholecystectomy is the "gold standard" surgical treatment of symptomatic gall bladder diseases. The study aimed to evaluate the effect of pre-operative education on post-operative outcomes of laparoscopic cholecystectomy patients. **Methods:** Quasi-experimental design including a purposive sample of 100 adult patients. **Results:** 13% of patients had a satisfactory level of pre-operative knowledge which improved to 93% after education. Furthermore, 5% of patients had a satisfactory level of practice which improved to 90% after education. **Conclusion:** Education has a significant positive impact on patients' knowledge and skills. **Recommendation:** Continuous patient education through audio-visual materials, courses and follow-up of patient outcomes. **Highlights: 1.** Before health education, the level of patients' knowledge is unsatisfactory. **2.** Preoperative health education has a positive effect on patients undergoing laparoscopic cholecystectomy. **3.** Patient knowledge and practice was significantly improved after the education. **4.** Continuous patient education through audio-visual materials and regular follow-up sessions are important for improving patients' information and skills.

Keywords: Health Education, Patients' Knowledge, Laparoscopic Cholecystectomy, Preoperative Assessment, Self-Care Practice.

INTRODUCTION

Gallbladder diseases including cholecystitis and gallstones are ever-increasing around the world. Cholecystitis is one of the potentially life-threatening diseases that affects the patient's life. It is often caused by gallstones that may block the ducts [1]. In the United States, cholelithiasis and cholecystitis are the 10th most common of all digestive diagnoses listed from emergency department visits with 1.5 million visits. Furthermore, they represent the 5th most common of all digestive diagnoses listed in US hospitals with 741,000 admissions in 2018. It is most common among women, Hispanics, and older adults [2]**.**

Cholecystitis usually occurs if the path to the small intestine is blocked. As a result, bile gets trapped and components of bile such as cholesterol and bilirubin remain in the gallbladder and harden to form gallstones which cause backflow into the bile ducts causing reflux, and this can irritate the gallbladder leading to cholecystitis [3]**.**

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There are some complications that pose a threat to patients' lives, so a laparoscopic cholecystectomy must be performed. For example, gangrenous cholecystitis, which leads to death of gallbladder tissue, can cause a serious infection that can spread to the entire body. It may lead to perforation of the gallbladder and consequently peritonitis or abscess formation [4].

Laparoscopic cholecystectomy has become the most frequently used procedure in surgical practice for treatment of symptomatic gallbladder diseases worldwide [5]. Although it is considered a safe procedure, some serious complications can result from not having a well-trained team or poor patient condition such as bleeding, internal organ penetration, bile duct injury and post cholecystectomy syndrome [6]. This procedure usually requires a short hospitalization period; however, the patient needs psychological support and medical care to avoid complications. Therefore, one of the most important roles of the nurses is to provide pre-operative self-practice education to enhance postoperative outcomes. This may include breathing exercise, deep vein thrombosis prophylaxis and control of pain, diarrhea, nausea and vomiting [7].

Patient education is a vital item of nursing care. It supplies the patient with the needed knowledge and skills necessary for optimal safe performance, self-care ability, improving outcome, and minimizing complication. The patient needs to know the proper way of home self-care, accordingly, teaching them how to take care of themselves at home is a task for nurses. The nurses must be qualified enough to perform the education that satisfies the patients' needs. They also should have the ability to overcome problems and barriers that may face them in the education process [8]**.**

PURPOSE

The aim of the study was to evaluate the impact of health education before surgery on post-surgery outcomes among patients undergoing laparoscopic cholecystectomy.

METHODS

This research was done in the gastrointestinal surgery center, Mansoura University, which provides health services to patients from the surrounding area at Dakahlia governorate**.** This is a quasi-experimental study. The study included a purposive sample of 100 adult patients of both sexes who attended to the previously mentioned setting, with diverse ages (20-60 years old) and different levels of education.

Data Collection

It was gathered by using the next two tools.

Tool I: Structure Interview Questionnaire Sheet:

It was evolved by the investigator in simple Arabic after reviewing the pertinent literature and divided into next 3 three parts:

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Part I included socio-demographic attributes of studied patient such as gender, age, marital status, education level and residence.

Part II included questions relevant to past and present medical history of the patient and his family as disease onset, manifestations, current medication and previous surgery. **Part III** included patients' knowledge assessment sheet in the form of 13 questions assessing patients' information regarding gallbladder disease; definition, causes, predisposing factors, signs and symptoms. It also discussed laparoscopic cholecystectomy as (definition, difference between open and laparoscopic cholecystectomy, investigations, pre-procedure perpetrations, complications, hospital stay, post-operative warning signs, and post-operative care.

Tool II: Patients' Self-Care Practice Checklist

It was done by the investigator after broad scrutiny of the literature review. It was used to **assess** self-care skills of patients undergoing laparoscopic cholecystectomy. It included 8 main parts covering all aspects of laparoscopic cholecystectomy care and these parts consisted of 47 items. Every correct answer took one degree, while wrong answer took zero. The total score was then turned into a percentage. Total grade ≥75% was considered satisfactory.

Administrative Approval

The study was approved by the Research Ethics Committee, Faculty of Nursing, Mansoura University. A verbal informed consent was taken from the studied patients before starting data collection. The confidentiality of the collected data was emphasized, while giving the patient the choice to accept or to refuse to be included in the study.

Operational Design

The study was validated, and the reliability has been verified by a pilot study and work field.

Validity

The research tools were tested for validity by a commission of five experts; two professors and three assistant professors from Faculty of Nursing, Mansoura University. They analyzed the tools for purity, importance, inclusiveness, applicability, simplicity. Some adjustments were performed related to their propositions and commentaries.

Reliability

The questionnaires were tested and demonstrated good reliability through the Cronbach's Alpha test to be (α = 0.912, 0.890 & 0.875 respectively) and they were considered "very good".

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Pilot Study

The study was done on ten patients. The selection was made randomly from available patients in the surgery department in order to ensure the tool clarity and the extent to which it can be applied. Depending on the findings of the pilot study, adjustments were performed. Selected patients were excluded from the study subject.

Work Field

It included four stages as following:

Stage I: Preparation Stage:

The researcher introduced herself to patients and gave an overview of the aim of the study. Each patient was interviewed to assess his/her information and self-care skills regarding laparoscopic cholecystectomy.

Stage II: Planning Stage (Health Education Development Stage):

The researcher identified patients' needs for improvement by providing health education. This aimed to improve patients' information and skills related to the target procedure. This was implemented in two sessions.

Stage III: Pursuance Stage:

The health education was fulfilled within the time plan of every patient’s scheduled operation time. The patient was admitted to the hospital the day before the surgery and discharged on the first postoperative day. Education was introduced into two sessions (one educational session and one practical training session). The average duration of each session ranged from 30 to 45 minutes. Patients were divided into small groups (6 – 10 patients for each). This stage took three months from mid-May to mid-August 2022.

Stage IV: Appraisal Stage:

The impact of health education on patient’s information and self-care practice was evaluated through comparison of these date in three occasions; pre-education, post-education and at the follow up visit two weeks following surgery.

Statistical Analysis

Data were entered and analyzed using IBM-SPSS software (IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). Quantitative data were initially tested for normality using Shapiro-Wilk’s test with data being normally distributed if $p>0.05$. The presence of significant outliers (extreme values) was tested for by inspecting boxplots. Quantitative data were expressed as mean and standard deviation. For a statistically significant difference, pairwise comparisons were performed with Bonferroni correction for multiple tests. The Spearman’s correlation test was used to determine whether there is a linear relationship / association between two non- normally distributed quantitative data. The result was considered significant if p value < 0.05.

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RESULTS

Study Sample

Sixty-four percent of the studied patients were females and most of them were married (78%). Regarding the age, 50% patients were aged between 30 to **<** 40 years. As regard the level of education, slightly less than two- third of them (61%) had intermediate education level. Two-third of the studied patients had an active work status (66%). Socio-demographic data are illustrated in ***table 1***.

Table 1: Distribution of the Studied Patients Related to their Socio-Demographic Characteristics (n=100)

Characteristic	N	%
Sex		
Male	36	36%
Female	64	64%
Age group (years)		
20 –	21	21%
30 –	50	50%
40 –	19	19%
50 – 60	10	10%
Education level		
Illiterate	22	22%
Intermediate education	61	61%
University education	16	16%
Postgraduate	1	1%
Marital status		
Single	22	22%
Married	78	78%
Occupation		
Working	66	66%
Not working	34	34%
Residence		
Rural	55	55%
Urban	45	45%

Notes Data is count (N) and percentage (%).

Patients' Medical and Surgical Data

Additionally, the results showed that the majority of the studied patients (91%) complained of severe right upper quadrant pain. Slightly less than two-third of them complained of nausea, vomiting (62%) and fever (61%) while the lowest percentage of them (15%) complained of jaundice. ***Table 2*** illustrates different patients' complaints.

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Table 2: Distribution of the Studied Patients Related to their Complaints and Family History of Gallbladder Disease

Characteristic	N	%
Severe right upper quadrant pain	91	91%
Fever	61	61%
Nausea and vomiting	62	62%
Abdominal distension (bloating)	59	59%
Jaundice	15	15%
Fatigue	32	32%

Notes Data is count (N) and percentage (%).

Our study showed that more than half of the studied patients (53%) had chronic diseases. Cardiovascular and endocrine diseases were the most common (32% & 24% respectively) while the lowest rate was (4%) for each of orthopedic, renal and respiratory diseases. Furthermore, 22% of the studied patients had a surgical history particularly orthopedic surgery (11%). Patients' medical and surgical data are illustrated in ***figure 1***.

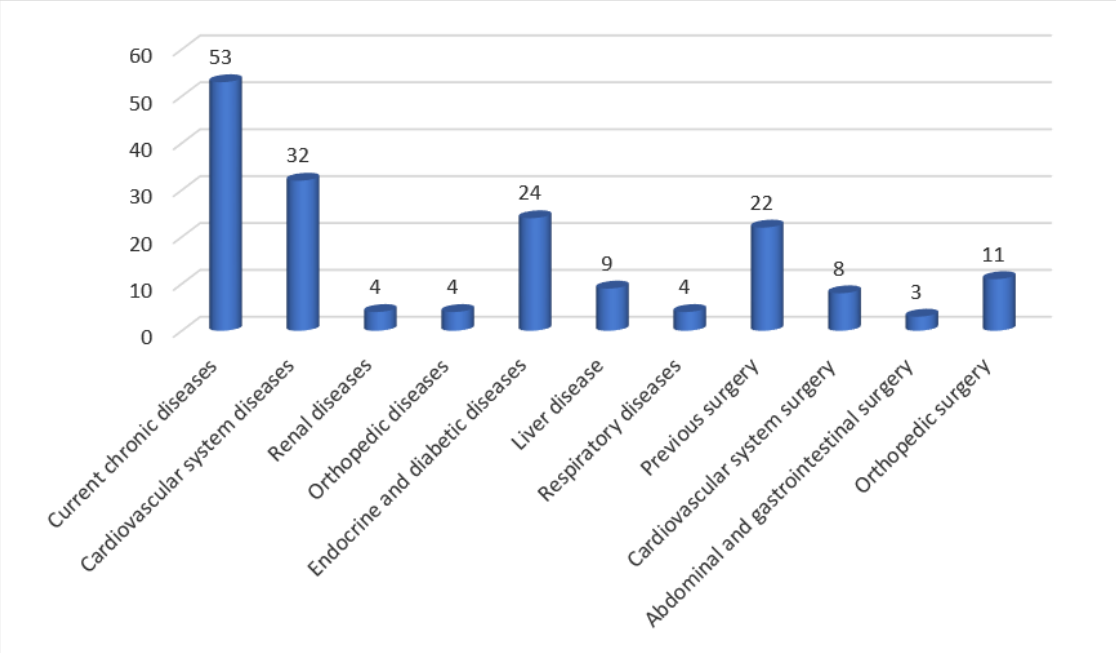

Figure 1: Distribution of the Studied Patients Related to Medical and Surgical Data (Chronic Diseases and Previous Surgeries)

Data Correlation

There was a statistically significant negative relationship between age and baseline total knowledge score (p<0.001). However, a statistically significant positive correlation was found between the level of education and baseline total information score (p<0.001).

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Moreover, the active work status was significantly associated with higher baseline total knowledge score (*p*=0.003) ***(table 3)***.

Table 3: Correlation between Baseline Total Knowledge and Practice with Study Parameters

Parameter	Baseline knowledge score		Baseline practice score	
	Coefficient	p-value	Coefficient	p-value
Age	-0.448	**<.001**	-0.140	.164
***Sex**	-0.125	.214	-0.061	.545
***Marital status**	-0.253	**.011**	-0.075	.461
Education level	0.437	**<.001**	0.141	.162
***Residence**	0.233	**.020**	0.036	.718
***Occupation**	-0.295	**.003**	-0.032	.754
Baseline total knowledge score	-	-	0.412	**<.001**
Post total knowledge score	-0.014	.888	0.122	.225
Follow up total knowledge score	0.008	.941	0.049	.634
Baseline total practice score	0.412	**<.001**	-	-
Post total practice score	0.176	.080	0.218	**.020**
Follow up total practice score	0.129	.202	-0.020	.846

Notes: The test of significance is *Point biserial correlation and Spearman's correlation tests.

There was a statistically significant positive relationship between baseline total knowledge score and baseline total practice score (p<0.001) and a statistically significant positive relationship between baseline total practice score and post-education total practice score (p=0.02).

There was an amelioration of patients' skills from being unsatisfactory at baseline (pre-education) to be satisfactory after education. Interestingly, the level of satisfaction was highest after education with a statistically significant difference from the baseline level (pre-education) and the level at follow up visit ***(figure 2).*** On the same vein, there was a statistically significantly higher total knowledge score and total practice score at post-education time point > follow up time point > baseline (pre-education) time point (P< 0.001) ***(table 4)***.

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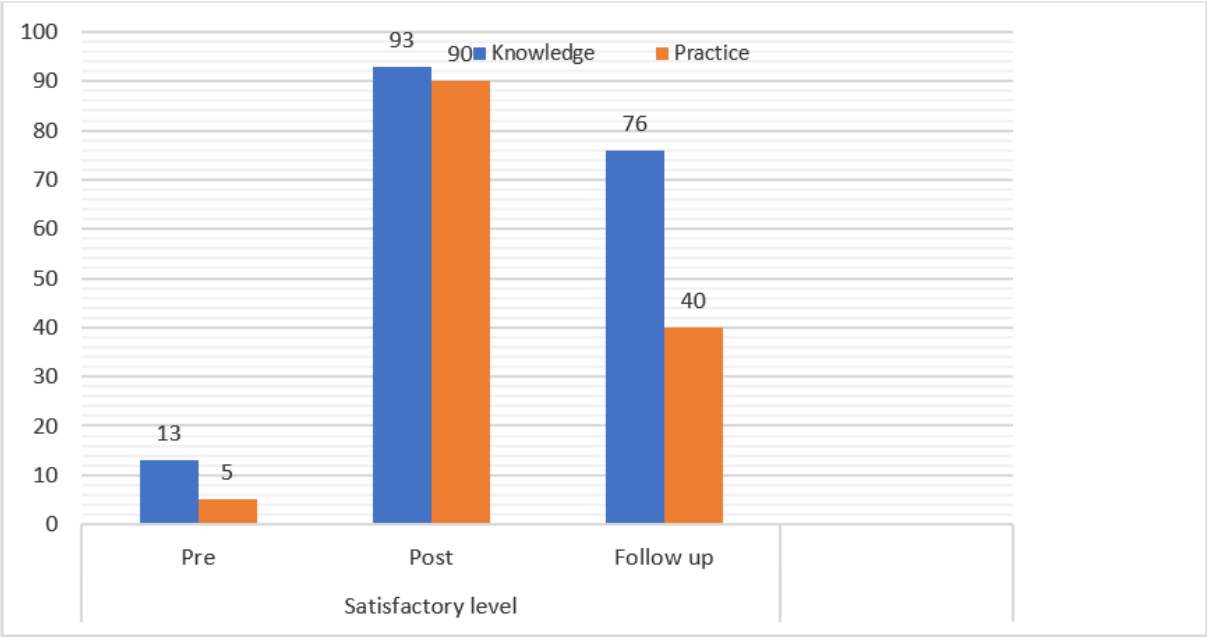

Satisfactory score ≥75% Unsatisfactory score < 75.0%

Figure 2: Satisfactory Level of Total Knowledge and Practice Score

Table 4: Total Knowledge and Total Practice Scores Over Time (n=100)

Parameter	Pre		Post		Follow up		F	p-value	Partial η^2	P1	P2	P3
	Mean	SD	Mean	SD	Mean	SD						
TKS	26.8	7	45	2.3	38.7	3.5	384.4	<.001	0.798	**<.001**	**<.001**	**<.001**
TPS	25.9	6.1	45.5	1.2	32.8	2.7	695.2	<.001	0.875	**<.001**	**<.001**	**<.001**

TKS: Total Knowledge Score **TPS:** Total Practice Score

Notes: SD = standard deviation. P-value by one-way repeated measures ANOVA. P1, P2, and P3 for pairwise comparisons with Bonferroni correction for multiple tests to compare pre vs. post, pre vs. follow up, and post vs. follow up, respectively.

DISCUSSION

Laparoscopic cholecystectomy is the gold standard surgical treatments for gallbladder diseases. Even though it is considered very safe, there may be some complications. Some of these complications can be avoided by teaching patients post-operative self-practice in order to improve outcomes [9]. Therefore, patient education is an effective element of modern health care. Nowadays, providing patients with enough knowledge and proper self-care techniques is a one of the very important roles for nurses. Nurses should be able to assess patients' needs, diagnose of the problems, set a plan to solve them and involve the patient in his rehabilitation plan [10].

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The study findings revealed that the majority of studied patients were females. This is in harmony with studies of Magdaleno et al., and Nyundo et al., [11,12]. The female predominance in calculous cholecystitis may be due to several reasons; including hormonal changes, repeated pregnancies, open appetite, and lack of adherence to a healthy diet. On the contrary, both Abdelsalam et al., and Li et al., showed that most of their study sample were males [13,14].

Additionally, it was noticed that most of studied patients were married and has an active work status and this is similar to the results of Toğaç et al. study [15]. This result may be due to the rapid rhythm of life, which urges work, including spending most of their time outside the home and relying on eating fast food that can lead to overweight and hormonal disturbances. As regards age groups, half of the patients included in the study aged from 30 to less than 40 years. This comes in agreement with Maarof et al., study who showed that most of patient's ages ranged between 34 to 48 years [16]. Nevertheless, Toğaç et al., reported that the average age of the study patients was 48.6, years and older which is inconsistent with our study [15].

Regarding the education, above two-third of study sample had intermediate educational level while nearly one-thirds were illiterate. Although this was in line with Maarof et al., study, this contradicts the study conducted by Nyundo et al., which showed that most of their patients included in the study were university graduates [12,16].

Concerning the patients' complaints, it was noticed that the majority of patients in this study complained of pain in the right upper quadrant of the abdomen, nausea and discomfort followed by abdominal bloating. These findings were supported by Ouyang et al., who reported that most of their patients suffered from biliary colic [17]. Additionally, this study showed that jaundice had the lowest percentage compared to other symptoms and this was in contrary with Weledji et al., who reported that mild to moderate jaundice was frequently seen in patients with acute cholecystitis [18].

According to the patient medical history, cardiovascular diseases, diabetes mellitus and endocrine disorders were the most common reported chronic diseases. This is close to Taki-eldin and Badaw results who reported diabetes mellitus in most of their study sample [19]. They also reported that coronary artery and valvular heart diseases were the least common, however, our study stated that orthopedic and renal diseases were the least reported ones [19].

With regards to patients' knowledge and practice, there was a significance improvement in the post-education time point > follow up educational time point > pre-education (baseline) time point. Consequently, the patient training and education prior to the procedure is expected to improve the patient outcomes.

It was found that, there was a significant correlation between marital status and baseline total information score (higher baseline total knowledge score in single (non-married) patients, which is in harmony with Zarchi et al., 20.

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Regarding educational level, there was a positive statistically significant correlation between education level and total baseline knowledge score. These findings were in accordance with the study conducted by Eskander et al., who reported that there was no significant relationship between educational level and the baseline knowledge level [21].

Additionally, the study noticed that there was a correlation with statistically significance between residence and total baseline knowledge score (the higher the proportion of urban residence the higher the baseline total knowledge score). This result was not in agreement with Lee and Jang who reported that there was no significant relationship between the level of knowledge and their residence [22]. Our study also showed that there was a significant correlation between work status and total baseline knowledge score (higher baseline total knowledge score in patients with an active work status) that was similar to Zarchi's study [20]**.** While these results were in contrary with a study conducted by Lee and Jang who reported no such significant relationship [22].

Finally, it was found that there was a positive statistically significant relationship between total baseline information and skills (practice) scores, and a positive statistically significant correlation between baseline total practice score and post-education total practice score which was agreed with Lee and Jang who illustrated that there was a correlation with highly significance [22]**.**

CONCLUSION

The study concluded that there was a highly statistically significant effect of preoperative health education on laparoscopic cholecystectomy patients' knowledge and self-practice.

RECOMMENDATION

Clear and comprehensive guidelines including the self-care practice and healthy lifestyle should be simply illustrated to the patients. Continuous patient education should be provided through audio-visual material including videos shared with patients. In addition, patients' information and skills should be evaluated regularly. Further larger studies are needed to evaluate the effect of applying health education guidelines for cholecystectomy patients on their performance and outcome.

Conflicts of Interest: None

Funding Sources: None

None of the Material has been published or is Under Consideration for Publication Elsewhere.

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