Correlation between Preoperative Anxiety and Postoperative Pain in Patients Undergoing Laparoscopic Cholecytectomy

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Abstract: Admission to the hospital is an anxious event for any individual and is extremely anxiety-provoking especially in case of surgical patients. The aim of this study was to determine the impact of pre-operative anxiety on postoperative pain in patients undergoing laparoscopic cholecystectomy. The correlation research design was used. A purposive sample of 100 laparoscopic cholecystectomy(LC) patients were recruited. Three tools were utilized; the first tool was a semi-structured interview questionnaire, Beck Anxiety Inventory (BAI), and Wong-Baker-Faces Pain Rating Scale. The study findings showed a significant correlation (r =0.156; P= 0.021) between preoperative anxiety and postoperative pain. Age insignificantly associated with anxiety and pain. Significant differences were found between male and female in relation to postoperative pain (t=0.581; P= 0.03). Level of education is significantly associated with anxiety. Future work is needed to incorporate appropriate preoperative information and assessment into a routine preoperative nursing practice for patients with LC. The researchers of the current study recommended development of personalized discipline specific clinical pathway such as enhanced recovery programmes in postoperative period in order to reduce length of hospital stay and preoperative anxiety .

INTRODUCTION

Anxiety frequently observed in patients who are hospitalized for surgery (Chul-Hayun, Ki-Cheor, Kyung, Ilseon, & Jon, 2013) .Recent data suggest that 75 % of patients facing surgery are anxious, despite anxiety decreasing measures and it can produce aggressive reactions that make the management more difficult (Henok, Mulatu, Mezinew, Getenet, & Tesfu, 2018). Preoperative anxiety can increase the level of postoperative pain and approximately 40–65 % of patients experience moderate to severe pain after surgery (Ali,2018). The patients experience anxiety because of invasive procedures, wound, intra operative anesthesia, postoperative pain and these considered as a natural response to the unexpected threatening events that patients face in preoperative period; especially with first admission to the hospital. (Alvarez,2018).

The International Association for the Study of Pain (IASP) widely used definition of pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" however; due to it being a complex, subjective phenomenon, defining pain has been a challenge. In medical diagnosis, pain is regarded as a symptom of an underlying condition (Treede, 2018).Pain is the most common reason for physician consultation in most developed countries , it is a major symptom in many medical conditions and can interfere with a person's quality of life and general functioning (Moore, 2015). Although pain is an expected clinical manifestation of the postoperative experience, there is considerable inter-individual variation in pain perception even after a standardized surgical stimulus. However the

reasons for this variation remain elusive, the role of psychological factors for the development of post surgical pain was also confirmed in a cohort study conducted by Mimic *et al.,* (2018) , the researchers noted that preoperative pain, anxiety, age, and type of surgery were important independent predictors of postoperative pain and opioid consumption. In the current study, it is observed during the clinical experience that the majority of patients undergoing LC are anxious in the preoperative period and according to research this could be had an impact on postoperative pain which may cause longer hospital stay and need for a pharmacological pain reliever and consequently cause an economic burden on the hospital.

Laparoscopic surgery has many advantages compared with open surgery. These advantages include reduced pain in the post-operative period, smaller incision size, shorter hospital stay, faster recovery and earlier return to activity of daily living. In fact, reduced postoperative pain is considered one of the biggest advantages of LC .However, postoperative pain is not completely disappeared and is still considerable (Coccolini *et al.*, 2015). Pain can increase morbidity and is the primary reason for prolonged hospitalization after LC. Patients frequently complain of back, shoulder region pains and discomfort of port site incisions (Morsy& Abdalla,2014). Shoulder and sub-diaphragmatic pain occurs in about 12% to 60% of patients (Alkhamesi, Peck, Lomax, & Darzi,2007). Peak of pain intensity is during the first few postoperative hours and usually declines after 2 or 3 days (Karim, Mohammad, Daryoush, & Shahrzad,2016). The etiology of pain after LC is multifactorial. One suggested cause of pain after laparoscopy is the peritoneal insufflations

with CO_2 and phrenic nerve irritation in the peritoneal cavity (Wills & Hunt,2000). Additional contributing factors include psychological, sociocultural status, and individual factors (Alkhamesi *et al.,*2007).

Preoperative anxiety and pain have a negative impact on morbidity and development of complication (Ali, Altun, Oguz, & Ilan, 2014). In previous studies conducted in UK indicated that patients may require more preoperative information to reduce anxiety and gender differences associated with waiting before surgery may need to be given greater consideration. In-addition a significant correlation was found between preoperative anxiety and postoperative morbidity(Mitchell, 2013).Other study conducted in Istanbul highlighted that a high preoperative anxiety negatively affects the postoperative pain(Ali *et al.,*2014).So, it is essential to prevent the concerned complications through providing standardized nursing care. The standardized nursing care for patients recovering from LC is comprehensive and include monitoring, evaluation, and treatment. Nurses can provide effective care through identifying patient's needs, provide reassurance and education to patients to decrease anxiety during the recovery process (Alam, 2016).

Nurses must be ready to prevent postoperative complications, not waiting to treat them. So nurses working in postoperative care units must have knowledge of the clinical manifestations of complications such as postoperative pain, and risk factors. Identifying patients at high risk for adverse outcomes allows the nurse to expect the needs of the patient and offer a less stressful postoperative experience. In Egypt few studies were investigated the association between preoperative anxiety and post-operative pain so the current study will determine the correlation between preoperative anxiety and postoperative pain for patients undergoing LC

Research Question:

What is the impact of preoperative anxiety on post-operative pain in patients undergoing laparoscopic cholecystectomy?

SUBJECTS AND METHODS

Research design:

A descriptive correlation design was utilized to conduct the current study. The purpose of this design gives an indication of how the preoperative anxiety may have impact on postoperative pain in the form of correlation without establishing causation of the research findings (Wood and Haber, 2015). More specifically, the correlation research design is a type of non-experimental study in which relationships are assessed without manipulating independent variables or randomly assigning participants to different conditions.

Setting:

The proposed study was conducted in the surgical units at Kasr El-Einy Hopsital. This unit aims to provide care for LC patients to meet the highest international standards. The Hospital is a research and teaching hospital in Cairo, Egypt. This hospital is affiliated with Faculty of Medicine, Cairo University.

Sample:

A purposive sample consisting of 100 patients scheduled for LC and accepted to participate in the study. The inclusion criteria included patients who were having anxiety scored 22 to 36 according to objective validated Beck Anxiety Inventory scale (Beck, Epstein, Brown, & Steer, 1988). Adult male and female patients above 18years, stay in the hospital at least 2 days, surgery not postpone and no drug and alcohol abuse. The exclusion criteria included patients who were having disturbance on conscious level and had sensory deficit were excluded from the study.

Tools for data collection: *The following tools were used for data collection*

1- Structured Interview schedule: It was developed by the researchers. This tool was consists demographic data covering questions related to (age, gender, level of education, occupation and marital status,…etc)

2- The Wong-Baker Faces Pain Rating Scale is a pain scale that was developed by Wong and Baker (2002).The scale ranging from zero which represents "no hurt" to 10 which represents "hurts like the worst pain imaginable". On the scale the patients asked to choose the face that describes their level of pain .This pain scale is appropriate for patients who do not know how to count and acceptable across different cultures (Wong-Baker Faces Pain Rating Scale Foundation, 2019).

3- Beck Anxiety Inventory (BAI): developed by Beck , Epstein, Brown, & Steer (1988). BAI is a questionnaire containing 21 statements that indicate how much the patients have been bothered by that anxiety symptoms during the past month and including day of data collection. The patients were asked to circle a number from 0 to 3, depending on how appropriate they felt the statement applied to them. As regard anxiety level a low value indicated not at all and a high value indicated severely it bothered me a lot. A total score is calculating by adding the sum of 21. A score of 21- 36 indicated the presence of anxiety. The score was aggregated by researcher to three levels mild anxiety level (≤ 21) , moderate anxiety level (22 - 35) , potentially concerning levels of anxiety (≥ 36).

Content validity:

The study tools were reviewed by panel of experts in the field of medical-surgical nursing and surgery to ensure clarity of and objectivity the tools of the content.

Pilot Study:

A pilot study was conducted on 10% of the sample; to ensure objectivity, clarity, feasibility and reliability of the study tool and determine the time required for data collection. Necessary modifications were done and the sample of the pilot study was not exclude from the study sample.

Data collection Procedure:

The study conducted over a period of 6 months started from February to August 2019.Tools of data collection was translated into Arabic language by the researchers. The purpose and nature of the study was explained for the patients in surgery units to gain their cooperation. Patients' informed consent was obtained from the entire study

sample. Demographics data and health history were obtained from patient files. Structured interview was conducted over 30 minutes in the preoperative period in quite environment to collect the BAI scale. Pain scale was obtained in postoperative period after 24 hours of performing LC and took around 30 minutes for each patient.

Ethical consideration:

Written official permission was obtained from Head of the Department of Surgery Units at Kasr Al-Ainy Hospital, Cairo University. Also each patient was informed about the purpose and nature of the study. The researcher emphasized that the participation in the study is entirely voluntary and any patient has the right to withdraw at any time from the study. Anonymity and confidentiality was assured through gathering the data. Then an informed oral consent was taken from the patient who met the inclusion criteria and accepted to participate in the study.

Statistical design:

Collected data was analyzed using statistical package for the social science (SPSS) program, version 22. A descriptive statistics such as frequency, percentage, mean and standard deviation were utilized. Inferential statistics such as the Pearson product moment correlation coefficient (r) was used to assess the association between anxiety and pain variables. Inferential statistics (One way ANOVA and independent t-test) were used to assess the differences between anxiety and pain in association with demographic variables. Level of significance was adopted at p <0.05.

RESULTS

Table1: Characteristics of the patients (N=100)

Variables	Values	No	%
Age	18 <30	26	26
	30-44	43	43
	45-59	20	20
	> 60	11	11
Gender	Male	61	61
	Female	39	39
Residence	Rural	42	42
	Urban	58	58
Marital Status	Single	64	64
	Married	20	20
	Widowed	11	11
	Divorced	5	5
Education	Cannot read and write	18	18
	Can read and write	51	51
	University education	31	31
Occupation	Housewife	38	38
	Employed	47	47
	Unemployed	15	15

Table 1 revealed that 43% of the patients their age ranged between 30-44 years while 11% of them were above 60 years. Also the same table showed that 61% of patients under the study were male and 39% of them were female. The table also indicated that more than half (58%) of patients were from urban areas in Egypt and (51%) of them can read and write.

Table 2: Frequency distribution of anxiety levels (N=100)

	Low	moderate	High
	%	%	%
Anxiety level	56	37	7

Table 2 showed that (37%) of patients had moderate pre-operative anxiety while the minority (7%) of them had high level of anxiety.
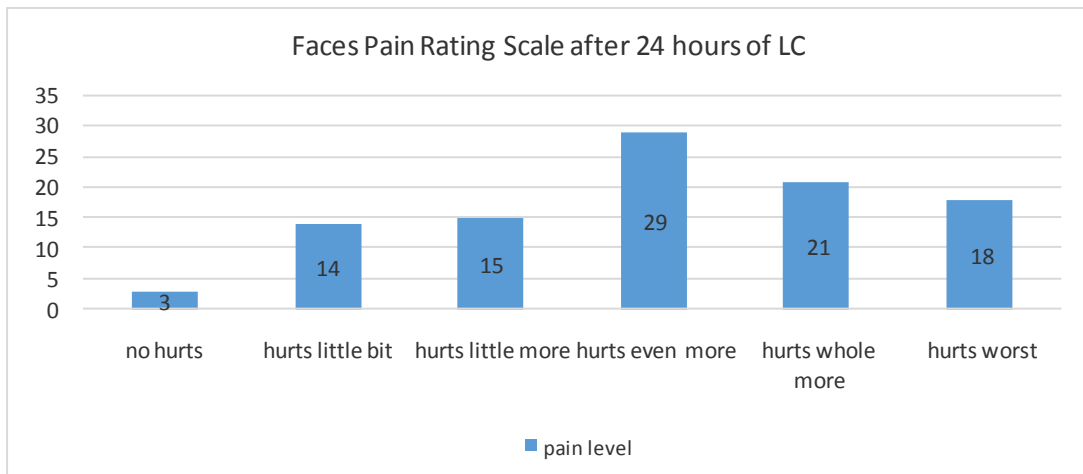

Figure (1): Faces pain rating scale after 24 hours of LC (N=100)

According to post-operative pain figure (1) showed that (29%) of patients had hurts even more pain and (18%) of them had hurts worst while the minority (3%) had no hurts in post-operative period.

Table 3: Correlation between anxiety and pain, Mean ± SD of patients

Variables	Mean ± SD		Pearson correlation	
			r	p
Anxiety	20.38	9.92	.156	.02
Pain	6.10	2.78		

* Significant at P < 0.05

Table 3 showed that statistically significant correlation was found between preoperative anxiety and post-operative pain (r =0.156 ; P< 0.05).

Table 4: Relation between age and anxiety score and pain levels

	Age	Mean ± SD		One way ANOVA	
				F	P
Anxiety	18 <30 years	23.07	10.69	1.396	.241
	30<45 years	20.88	8.75		
	45<60 years	18.35	9.14		
	60<75 years	15.50	9.00		
	75-90 years	15.00	18.51		
Pain	18 <30 years	5.54	2.73		
	30<45 years	6.42	2.71		
	45<60 years	5.70	2.92	1.103	.360
	60<75 years	6.00	3.35		
	75-90 years	8.00	2.00		

* Significant at P < 0.05

Table 4 revealed no statistically significant relation was found between age and anxiety as well as pain (F=1.068, P=.377; F=1.103, P=.360) respectively.

Table 5: Relation between gender and anxiety score and pain levels

	Gender	Mean ± SD		Independent t-test	
				t	P
Anxiety	Male	22.26	10.35	2.45	.08
	Female	17.36	8.46		
Pain	Male	6.23	2.71	.581	.03
	Female	5.89	2.90		

* Significant at P < 0.05

Table 5 showed significant differences between male and female in relation to level of pain (t=0.581; P= 0.03).

Table 6: Relation between level of education and anxiety score and pain levels

	Education	Mean ± SD		One way ANOVA	
				F	P
Anxiety	Cannot read and write	14.23	8.53	5.158	.007
	Read and write	20.56	9.40		
	University Education	23.45	10.19		
Pain	Cannot read and write	6.78	2.84		
	Read and write	5.76	2.79	.958	.387
	University Education	6.26	2.72		

* Significant at P < 0.05

Table 6 showed significant relation between level of education and anxiety (P <0.05).The same table indicated that patients with university education had higher score of anxiety (23.45±10.19) than those who cannot read and write(14.23± 8.53).

DISCUSSION

In this study there was a significant correlation between the preoperative anxiety and the post operative pain in patients with LC. The researchers found a preoperative moderate anxiety level of (37%) of patients was identified before performing LC. This finding is similar to the previous study conducted in Turkey by (Ali *et al.,*2014) to compare the effect of preoperative anxiety on postoperative pain control and recovery from anesthesia in patients undergoing LC which highlighted a significant correlation between preoperative hospitalization and BAI score. Another study conducted in UK by (Mitchell,2013) stated that the majority of patients were anxious in the preoperative period. In-addition, other authors (Matthias and Samarasekera, 2012) conducted in Sri Lankan by to assess the preoperative anxiety in surgical patients and stated that prevalence of anxiety is high among Sri Lankan Patients . The finding of the current study indicated that patients in the preoperative period may require more preoperative information and nursing consideration to relive the anxiety. Also evaluating the effects of preoperative anxiety more objectively need more attention from health care providers.

The current study found that a significant correlation between preoperative anxiety and postoperative pain. This finding is consistent with a study conducted in Brasil by (Roberto, 2017) to correlate the level of anxiety presented in the preoperative period with the intensity of pain reported by elderly in the immediate postoperative period which reported that the anxiety level occurred in the preoperative period was positively correlated with postoperative pain response. Another recent study conducted in Canada by (Yang *et al.,* 2019) reported a significant association between preoperative anxiety and postoperative pain. Furthermore, (Jackson *et al.,*2016) carried out a systematic review of longitudinal study for anxiety evaluation in the Brazilian population for identifying association between pre-surgery emotional distress and postoperative pain outcomes and reported that emotional distress such as anxiety had association with postoperative pain. Another study conducted in Belgica by (Ocalan, 2015) reported the same finding.The finding of the current study could potentially be useful if considering the anxiety assessment protocols in the preoperative period for identifying vulnerable patients who can benefit from interventions targeting anxiety reductions.

The current study highlighted insignificant relation between age and preoperative anxiety and postoperative pain. This finding is inconsistent with the study conducted by (Zheng *et al.,*2017) who reported significant differences between patients age and anxiety level. The same authors added that postoperative pain level was higher in younger patients than older and this is incongruent with our finding. Another study conducted in Croatia by (Lesin *et al.,* 2016) reported that age and preoperative anxiety are significantly associated with postoperative pain. Recent study conducted in Canada by (Yang *et al.,*2019) to identify preoperative predictors of poor postoperative pain control in adults undergoing inpatient surgery highlighted that younger age is significantly associated with postoperative pain which is inconsistent with the current study finding.

The present study showed that male is more anxious than female however no significant differences was found. This finding is incongruent with the study conducted by other investigators (Matthias and Samarasekera,2012) who highlighted that females are more anxious than males in preoperative period. On the same line another study conducted on patients under elective day surgery in the UK showed that female gender indicative of higher anxiety level more than male(Mitchell,2013). The present study reported significant relationship was found between postoperative pain and gender of patients and this finding is consistent with study conducted in Belgica by (Ocalan, 2015) who stated that men and women showed significant differences with respect to pain in the postoperative periods. Recent study carried out by (Yang *et al.,*2019) reported that female sex is a significant predictor of postoperative pain .This finding suggests that gender differences associated with waiting before surgery may need to be given greater consideration from health care providers in order to minimize postoperative pain.

Regarding level of education the current study found insignificant correlation with postoperative pain and this finding is consistent with the qualitative systemic review study conducted to determine the predictors of postoperative pain and analgesics consumption (Vivian *et al.,* 2009). Another study conducted in Croatia by (Lesin *et al.,* 2016) stated insignificant correlation between level of education and postoperative anxiety. The present study showed significant correlation between level of education and preoperative anxiety. This finding is in the same line with recent study conducted in Ethiopia by (Mulugeta*et al.,* 2018) to assess preoperative anxiety and associated factors among adult surgical patients and reported significant correlation between level of education and preoperative anxiety. In the present study, the higher anxiety score was among patients with higher education. Similar study conducted by (Nigussie, Bleachew, & Wolancho,2014) revealed that the level of preoperative anxiety appeared to increase with increasing level of education. This could be because increase level of education may lead to sufficient awareness related to complications of anesthesia and surgery.

CONCLUSION AND RECOMMENDATIONS

In this study the researchers found significant correlation between preoperative anxiety and postoperative pain. Age insignificantly associated with anxiety and pain. Significant differences were found between male and female in relation to postoperative pain. Level of education is significantly associated with anxiety. It is essential to develop standardized methods and consensus criteria for minimizing pain. The researchers of the current study recommended development of personalized discipline specific clinical pathway such as enhanced recovery programmes in postoperative period in order to reduce length of hospital stay and preoperative anxiety .In addition, there is a lack of research in managing preoperative anxiety and postoperative pain for patients with LC, which should require further investigation. Future work is needed to incorporate appropriate preoperative information and assessment into a routing preoperative nursing practice for patients with LC.

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