

Predictors of Length of Stay, Complications and Patient's Satisfaction after Appendectomy

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ABSTRACT

Background: appendicitis is the inflammation of appendix which requires appendectomy for treatment. Appendectomy involves the surgical removal of the appendix. Early diagnosis and early appendectomy performing results in a good outcome of the surgery. The traditional strategy was an open surgery, while the modern one is laparoscopic appendectomy. However both have complications. **Aim of the work:** this study aimed to investigate the predictors of length stay, complications and patient satisfaction after performing an appendectomy. **Methods:** this study based on a simple online survey which composed of 2 parts. The data were collected using an excel sheet and analyzing data were performed using SPSS. **Results:** complication after surgery included presence of abscess which represented 88.7%, suffering from complications which represented 69.3% and wound infection which represented 5.7%. The range of hospital stay was 1 to 10 days with a mean± SD of 3.9± 2.4 days. 39.6% of participants had good satisfaction, 35.8% had very good satisfaction, 15.1% and 9.4% had a fair and bad level of satisfaction. Males had mean± SD of hospital stay = 4.69 days, while females had mean± SD 2.9 days. Mean ± SD of hospital stay for patients with chronic diseases was 5.14±2.34, while for those without chronic diseases it was 3.56±2.31. **Conclusion:** the most common complication for appendectomy was abscess after the operation, individuals reported good level of satisfaction. Male gender had chronic disease were associated with longer hospital stay.

Keywords: appendectomy, complications of appendectomy, survey about appendectomy.

INTRODUCTION

Appendicitis is the inflammation of vermiform appendix^[2], it is considered as one of the most frequent surgical emergencies which require appendectomy^[2] with a lifetime risk estimated to be 5 and 20%^[3]. Appendectomy is the treatment for appendicitis by surgical removal of the appendix^[4]; it is non elective operation which performed by general surgeons^[5-7].

Studies reported a constant level of the incidence of both acute appendicitis and appendectomy^[8,9], while other studies from western countries^[10-12] showed that there was a decrease in the incidence. Open appendectomy was introduced in 1887 by George Thomas Martin and in 1889 by Charles McBurney. Laparoscopic appendectomy was described in 1983 by Kurt Semm and it is now performed for the majority of cases^[13]. Laparoscopic appendectomy is over the traditional open surgery^[14]. Open appendectomy has several complications including; adhesions, bowel obstruction, wound infection, intra-abdominal abscess and pulmonary complications from general anesthesia^[15]. The mortality and morbidity rates of open appendectomy were 0.3% and 11% respectively^[16]. Advantages of laparoscopic appendectomy such as rapid postoperative recovery, shorter hospital stay and better pain control were reported by several

studies^[17-19]. However, the risk for development of intra-abdominal abscess and superficial wound infection cannot be neglected^[20]. The period after appendectomy is a social problem, where hospitalization process may involve physical injury and emotional stress, also for the surgical recovery of patients it is important to interpret daily activities^[21]. The early diagnosis of patients with appendicitis and early performing appendectomy before perforation lead to good outcome^[22,23]. A study^[24] revealed that appendectomy for cases with perforated appendicitis had a higher risk of death (4% vs. 0.7%) and higher complications (24.9% vs. 12.7%) than those who performed appendectomy for appendicitis without peritonitis. A multi-professional approach is necessary for patients after performing the appendectomy^[21], where patients may complain pain after surgery. Hence, health professionals should intervene to prevent pain-induced noxious effects^[25]. There was a study^[21] reported that all patients performed appendectomy suffered from post-operative pain and 21.9% of cases suffered from moderate pain. Emergency surgery represented a challenge to the patient, where the admission of the patient was unplanned and the journey of the patient in the hospital can be complicated^[25], appendectomy is an emergency surgery, so patient faces this challenge in this operation. Improving patient

experience is very important, there are several studies which reported an association between patient experience and improved clinical outcomes [27]. The patients who felt that they well informed about their treatment and condition had higher satisfaction level pre-operatively and post-operatively [26]. The present study aimed to investigate the predictors of length stay, complications and patient satisfaction after performing appendectomy by using a simple survey, as far as we know that there was no study on this subject before.

MATERIALS AND METHODS

Study design

The present study was performed by using an online survey; this study was performed in the period from September 2017 to October 2017. This study included 108 participants who performed an appendectomy. The survey of this study included two sections; the first investigated the demographics of participants and the second investigated the information about the appendectomy.

Statistical analysis

Data were analyzed using SPSS software version 16, the simple descriptive analysis in the form of means and standard deviations were calculated for numerical data. Qualitative data were described using numbers and percent distribution. Comparing hospital stay according to the studied variables was done using mann-whitney and kruskal –wallis tests with a significant level of less than 0.05. The study was done after approval of ethical board of Imam Muhammad ibn Saud Islamic university.

RESULTS

This study included 108 participants, whose mean± SD age was 30.26±17.77 years old and the range of age was 19 to 76 years old. 44(40.7%) of participants were males and 64(59.3%) were females. The large majority of participants 70(64.8%) had a university education, 3(2.8%) had intermediate education, 23(21.3%) and 4(3.7%) had secondary and primary education respectively. There were 36(33.3%) had income of 1000-3000 SR, 16(14.8%) had 3001-5000 SR, 29 (26.9%) had 5001-10000 and 27(25%) had more than 10000 SR. 53(49.1%) of participants performed appendectomy, while 55 (50.9%) didn't included the calculation for individuals who performed the appendectomy. The characteristics of individuals who performed appendectomy were summarized in **table1**. The large majority of participants did not suffer chronic disease (73.6%), 81.1% did not need a blood transfusion and 88.7%

their wounds were not polluted after the operation. The most common problem reported by individuals had abscess after operation (88.7%) and there were 69.8% suffered complications after surgery. The mean± SD hospital stay was 3.9±2.4 days with a range of 1 to10 days. Most of the individuals (43.4%) needed two weeks to 1 month for getting improved, while 26.4% needed one week to 2 weeks, 22.6% need 1-2 months and the least percent 7.5% needed more than 2 months.

Table1: characteristics of participants who performed appendectomy

Characteristics		N (53)	%
Having chronic disease	No	39	73.6
	Yes	14	26.4
Needing blood transfusion	Yes	4	7.5
	No	43	81.1
	Don't know	6	11.3
Polluted wound after operation	Yes	3	5.7
	No	47	88.7
	Don't know	3	5.7
Having abscess after operation	Yes	47	88.7
	No	2	3.8
	Don't know	4	7.5
Suffering complication after surgery	Yes	37	69.8
	No	3	5.7
	Don't know	13	24.5
Period of improvement	1week-2week	14	26.4
	2week to 2 months	23	43.4
	1-2 months	12	22.6
	>2 months	4	7.5
	Mean hospital stay on days	Mean±SD range	3.9±2.4 1-10

The satisfaction of individuals about the surgery was shown in **figure1**. Most of the participants (39.6%) stated that the operation was good and 35.8% said that it was good, while 15.1% and 9.4% reported that it was fair and bad respectively.

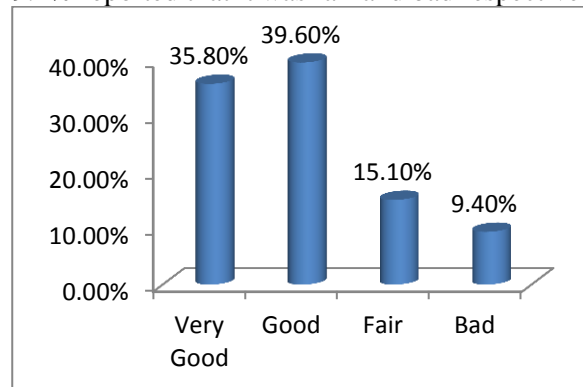


Fig1: satisfaction of participants about the operation

In this study, the gender affected significantly (P-value=0.01) the hospital stay, where males tended to spent more days than females, while age was not a significant factor (P-value=0.4). However those with age less than 30 years spent fewer days than those older than 30 years old. Suffering from chronic disease was a significant factor (P-value=0.3) that was associated with longer hospital stay (mean=5.14 days), while suffering from complication or presence of abscess after surgery were not significant factors (Table 2).

Table 2: the correlation between hospital stay and different variables

Variables		Mean	SD	P value
Sex	Male	4.69	2.520	0.011 *
	Female	2.90	1.786	
Age	< 30	3.83	2.508	0.496
	>30 y	4.22	2.354	
Having chronic disease	No	3.56	2.315	0.034 *
	yes	5.14	2.349	
Suffering complication	No	4.09	2.457	0.587
	yes	4.67	1.528	
Having abscess	No	4.00	2.345	0.712
	yes	4.38	2.694	

*P-value; significant

DISCUSSION

This study aimed to find out the predictors of length stay and complications of appendectomy as well as the satisfaction of patients. This is the first study that used a survey to investigate the previous factors by patient's report. In the present study, there were 53 (49.1%) who performed an appendectomy. A high percent of participants (73.6%) didn't suffer from any chronic diseases, while only low percent had chronic diseases 26.4%. The large majority of individuals did not need blood transfusion (81.1%), only 7.5% needed blood transfusion, while in a previous study it was found that 0.4% was suffered from bleeding, and they needed transfusion [24]. It was reported that wound infection was the most common complication of appendectomy [28-30]. In this study, there were 5.7% who had polluted wound after the operation, while higher percent (88.7%) had an abscess after the surgery. In one study performed on adults after an appendectomy, it was found that there were 4% suffered from superficial wound infection and 3.6% suffered from deep wound infection [24]. Study of Khan *et al.* [20] showed that wound infection was observed in 1 vs 5 patients who performed laparoscopic and open

appendectomy respectively, while intra-abdominal abscess was present in equal frequency in both types of surgery (1 patient regarding each type). Study of Tate [31] showed that the incidence of an intra-abdominal abscess after appendectomy was 1.4%. Another study showed that the prevalence of intra-abdominal abscess was 4.2% and 1.9% for laparoscopic and open appendectomy respectively [2]. Also, this study showed that there was a high percent of individuals (69.8%) suffered from complications after surgery. Lower percent of complications (27%) was reported in one study on children who performed appendectomy [32]. 43.4% of participants needed two weeks to 1 month for improvement and 26.4% needed 1 to 2 weeks only, however, 7.5% needed more than two months, this may depend on the general health of the individual. The range of hospital stay was from 1 to 10 days with a mean of 3.9 days. While, in another study [2] the mean of hospital stay was 1.4 and 3.4 days for patients who performed a laparoscopic and open appendectomy. It was reported that patients who early diagnosed and performed appendectomy before perforation had good outcomes and hence good satisfaction [22,23]. A high proportion of individuals in this study reported either good level (39.6%) or very good level (35.8%) of satisfaction, while only 9.4% said that it was bad and 15.1% was fair. The reason for bad outcome may be attributed to late diagnosis or late performing of an appendectomy. In contrast to our results, a study on children showed that non-satisfactory outcome after appendectomy was high; 1/5 of children [32]. By assessing the factor that influenced the hospital stay, we found that gender who had chronic diseases were significantly affected the hospital stay and male tended to stay in the hospital longer than female and those with chronic diseases had more length stay than healthy persons. The present study revealed that age was not significantly affected the hospital stay, however patients with age less than 30 years spent fewer days in the hospital than older ones. Suffering from complications and presence of abscess wasn't associated factors to the hospital stay. It can be concluded that this study is the first study depend on questioning of patients, the study highlighted points that weren't discussed before such as the factors associated to length stay in hospitals, however, this study had some limitation such as the small sample size of the study, we didn't compare or define the type of appendectomy.

CONCLUSION

The most common complication of appendectomy was presence of abscess and

suffering from complications after surgery. There was a good level of satisfaction of patients. Gender and suffering from chronic diseases were the associated factors for length stay in the hospital.

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