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Patient knowledge and perception on laparoscopic cholecystectomy: a questionnaire based study for optimizing informed consent

Hasta gözü ile laparoskopik kolesistektomi: aydınlatılmış onamı iyileştirmeye yönelik anket çalışması

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Abstract

Aim. Laparoscopic cholecystectomy (LC) is one of the most commonly performed operations in surgical practice. Reports on surgical outcomes of this operation are in excess in the literature. However, studies designed to understand perceptions of patients, and vital points of informed consent about this operation are still lacking. We aimed to analyze the knowledge and perception of patients about LC in order to understand the topics that should be emphasized before surgery. **Methods.** Patients admitted to outpatient clinic for gallbladder disease requiring surgery were considered for enrollment. Individuals consenting to participate were given a questionnaire about demographics, and basic measures of LC. Each statement had a 4 point scale. They were also asked the source of information, type of operation they would prefer to undergo, and their reasons for that. **Results.** Our patients had adequate knowledge regarding the technical equipment, surgical education, and experience required for LC compared to open cholecystectomy (71%, 45%, and 59%, respectively). A significant number of participants had knowledge on pain, hospitalization period, and infection, (64%, 74%, 63.7%, respectively). Expense of the operation, postoperative adhesion and hernia formation were significantly unknown among participants (36.7%, 47%, and 47.7%, respectively). Eighty percent of participants preferred to undergo laparoscopic surgery. However, 17.3% percent of those had no preference on the type of surgery. The main reasons given for preferring LC were less pain and shorter incision (53.3% and 31%, respectively). Source of information was family and relatives in more than half of the cases and these sources were more common among primary educated. One fourth of our patients (24.7%) thought that LC is done only for stone removal, and almost half of participants (46%) had no idea on gallbladder or stone removal. Patients obtaining information from the Internet had a better knowledge compared to others. **Conclusion.** We conclude that, a) effects of LC on postoperative adhesion, and hernia formation are significantly unknown among patients, b) patients obtaining information from family or relatives, and those with low education level think that LC, apart from conventional OC offers the possibility of removing stones only, and leaving the gallbladder in situ, and c) informed consent for LC should be personalized, emphasizing postoperative adhesion, hernia formation, and gallbladder removal.

Keywords: Laparoscopic cholecystectomy, public knowledge, perception, informed consent.

Özet

Amaç. Laparoskopik kolesistektomi (LK) cerrahi uygulamaları içinde en sık yapılan ameliyatlardan biridir. Bu ameliyatın cerrahi sonuçları hakkında çok sayıda yayın varlığına rağmen, LK için hastaların bakış açıları ve aydınlatılmış onamın önemli noktaları ile ilgili çalışmalar halen eksiktir. Biz ameliyat öncesi aydınlatılmış onamda vurgulanması gereken noktaları anlayabilmek amacıyla, hastalarımızın bu ameliyat hakkındaki bilgilerini ve bakış açılarını incelemeyi amaçladık. **Yöntem.** Cerrahi uygulama gerektiren safra kesesi hastalığı nedeniyle başvuran ve çalışmaya katılmayı kabul eden hastalara demografik bilgileri ve LK'nin temel yönleri ile birlikte bilgi kaynağı, olmak istedikleri ameliyat tipi ve bunun için nedenlerini sorgulayan bir anket uygulandı. Her soruya ait çoktan seçmeli 4 şık sunuldu. Ayrıca, bilgi

kaynakları, olmak istedikleri ameliyat tipi ve bunun nedenleri de sorgulandı. **Bulgular.** Anlamlı sayıda hasta açık cerrahiye kıyasla LK açısından teknik donanım, cerrahi eğitim ve cerrahi deneyim (sırası ile %71, %45 ve %59) konularında bilgi sahibi idi. Anlamlı sayıda hasta ağrı, hastanede yatış süresi ve enfeksiyon hakkında bilgili idi (sırası ile %64, %74, %63,7). Ameliyat ücreti, yapışıklıklar ve fıtık gelişimi anlamlı oranlarda hastalar tarafından bilinmeyen konulardı (sırası ile %36,7, %47, %47,7). Hastaların %80'i LK ameliyatı olmayı tercih etti. Ne var ki, %17,3'ünün herhangi bir ameliyat tercihi olmadı. LK'yi tercih etmenin temel nedenleri daha az ağrı ve daha küçük kesi idi (sırası ile %53,3 ve %31). Hastaların yarısından fazlasında bilgi kaynağı aile ve akrabalar idi ve bu durum ilkokul mezunlarında daha sık idi. Hastaların dörtte biri LK ameliyatının sadece taşları çıkarmak için yapıldığını düşünürken, hastaların yaklaşık yarısı safra kesesi veya taş çıkarımı hakkında bilgi sahibi değildi. İnterneti kaynak gösteren hastaların bilgi düzeyleri diğerlerine göre daha iyi idi. **Sonuç.** LK ameliyatı için a) ameliyat sonrası yapışıklık ve fıtık gelişimi hastaların anlamlı bir bölümü tarafından bilinmemektedir, b) aile ve yakın çevresinden bilgi alanlar ve düşük eğitim seviyesine sahip olan hastalar LK'nin açık cerrahiden farklı olarak sadece taşları alıp, safra kesesini yerinde bırakma avantajına sahip olduğunu düşünmektedir ve c) alınacak aydınlatılmış onamın yapışıklık, fıtık gelişimi ve safra kesesinin çıkarılacağı vurgulanarak kişiselleştirilmesi gerektiği kanaatindeyiz.
Anahtar kelimeler: Laparoskopik kolesistektomi, toplum bilgisi, algılama, bilgi, aydınlatılmış onam.

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Introduction

Laparoscopic cholecystectomy, since its introduction in 1987 has been the most commonly performed laparoscopic operation in surgical practice [1, 2]. Current surgical knowledge claims LC as the golden standard approach for benign gallbladder disease requiring surgery. Despite the nomenclature minimally invasive surgery, LC is associated with a number of complications and dismal outcomes [3-5]. However, exaggerated advantageous aspects of LC overshadow its risks and complications in the public area [6]. Patients scheduled for LC are, to some degree aware of its benefits, but are prone to ignore its risks and complications. Complete understanding of all factors related to the procedure is essential for surgical decision making, but this process requires a base knowledge on the subject. Previously obtained information from other sources, whether true or false, can alter expectations and attitudes of patients, leading to discompatibility during surgical decision making. Well organized informed consent obtained before invasive procedures can increase patient-physician cooperation, and can help in the discussion of outcomes after the procedure [7]. With the wide spread source of data, particularly the Internet, medical care seekers now have possible access to learn more about medical problems and compare the therapy types. While most individuals lack significant knowledge regarding the operation, some patients seek for specific information for possible outcomes of the therapy. Regardless of knowledge, almost every individual has expectations about the procedure and satisfaction usually relies on the balance between expectation of patients and offerings of physicians [8]. Therefore demonstration of public knowledge on this subject can alter attitudes of physicians toward informed consent. Surgeons can arrange their approach on patient expectation in a beneficial way for patient satisfaction. Patient satisfaction following LC has been extensively investigated. Even if there are a few studies regarding patient knowledge and perception on LC [9], vital topics of informed consent for LC have not been evaluated. We felt it is necessary to document patient knowledge and perception on LC in order to obtain a well constructed informed consent. We specifically addressed the following

questions: (a): What is the basic knowledge of our patients on LC; (b): to what extent do sociodemographic characteristics and information source play a role in their perception and knowledge; (c): do sociodemographics and information source impact the choice for the type of surgery and their reasons for that; (d): which aspects of LC should be emphasized during the information process before surgery? Our study shows the patients attitudes, preferences, and knowledge before the information process. The findings from our study may extend the literature regarding the sources of differences in patient preferences, knowledge, and decision-making for LC.

Materials and methods

During the years 2007-2008, 300 patients from the outpatient clinic of the general surgery in our hospital, scheduled for LC in our service, willing to be enrolled in this study consented to participate. Patient demographics like age, gender, and education were recorded. Health care providers and patients with previous abdominal surgery were excluded. Patient eligibility criteria included the ability to read and write in their native language.

This study was based on a descriptive trial aimed to analyze knowledge and perception of patients of LC. The questionnaire and consent were written in native language of patients. Original questionnaire was pre tested in a sample of 20 patients for applicability, and was further assessed by an uninformed physician. Based on the comments, we modified our questionnaire and applied the final 12 item questionnaire with a 4-item response scale: yes; probably; no; I do not know. Since we aimed to investigate patient knowledge and perception, we used this 4-item response scale to obtain precise information and avoid further confusion. During interviews patients were asked to choose the most appropriate answer. They were specifically asked the duration, expense, and technical equipment of LC, as well as surgical experience and surgical education required for LC, compared to OC. Questions regarding outcomes after surgery included pain, duration of hospital stay, incision, infection, adhesion, and postoperative hernia formation. We also evaluated their perception on whether if there is a technical difference between open and LC by the 12th question, stating that LC offers the possibility of removing the stones only, and leaving the gallbladder in situ. The last question aimed to analyze the choice of participants for the type of surgery and their reason for that. They were asked to write their reasons in their own words (open ended format). Participants were also asked their source of information including social environment (family and relatives), newspaper, television, Internet, and another doctor (Table 1). Patients enrolled in the study were taken to a separate room and filled the questionnaire on their own. They were requested not to write their names on the questionnaire. Only the subjects completing the whole questionnaire were analyzed. All questionnaires were collected in a box to ensure anonymity. Data entry was done by a blinded staff member and patients were given the same formal oral and written informed consent. This study was conducted in a single institute and questions have been translated to English after the trial. After giving the questionnaire patients were asked to take a look at the paper to learn whether if there is anything that they do not understand. This was done for the questions regarding technical details, in order to prevent bias and misunderstanding. Statistics were performed considering the percentage of each chosen response. For the last question, reasons for choice were separately recorded and evaluated accordingly. Statistical analysis was performed by Chi-square test. P values below 0.05 were considered significant.

Table 1. The questionnaire used for this survey, and rates of answers among participants.

Laparoscopic (Closed) Gallbladder Surgery Questionnaire Form			
1) Takes longer time			
a) yes *(58 / 19.3%)*	b) no *(124 / 41.3%)*	c) probably *(49 / 16.3%)*	d) I do not know *(69 / 23%)*
2) Is more expensive			
a) yes (84 / 28%)	b) no (67 / 22.3%)	c) probably (39 / 13%)	d) I do not know (110 / 36.7%)
3) Requires different materials and technical equipment			
a) yes *(213 / 71%)*	b) no *(16 / 5.3%)*	c) probably *(34 / 11.3%)*	d) I do not know *(37 / 12.3%)*
4) Requires further surgical education			
a) yes *(135 / 45%)*	b) no *(42 / 14%)*	c) probably *(54 / 18%)*	d) I do not know *(69 / 23%)*
5) Requires more surgical experience			
a) yes *(177 / 59%)*	b) no *(31 / 10.3%)*	c) probably *(53 / 17.7%)*	d) I do not know *(39 / 13%)*
6) Is associated with less postoperative pain			
a) yes *(201 / 67%)*	b) no *(11 / 3.7%)*	c) probably *(50 / 16.7%)*	d) I do not know *(38 / 12.7%)*
7) Leads to earlier discharge from hospital			
a) yes *(222 / 74%)*	b) no *(5 / 1.7%)*	c) probably *(44 / 14.7%)*	d) I do not know *(29 / 9.7%)*
8) Is performed from smaller incisions and results in smaller scars.			
a) yes *(248 / 82.7%)*	b) no *(3 / 1%)*	c) probably *(23 / 7.7%)*	d) I do not know *(26 / 8.7%)*
9) Is associated with less wound infections			
a) yes *(191 / 63.7%)*	b) no *(7 / 2.3%)*	c) probably *(56 / 18.7%)*	d) I do not know *(46 / 15.3%)*
10) Results in less intraabdominal adhesions			
a) yes *(32 / 10.7%)*	b) no *(9 / 3%)*	c) probably *(118 / 39.3%)*	d) I do not know *(141 / 47%)*
11) Leads to less incisional hernias			
a) yes *(55 / 18.3%)*	b) no *(5 / 1.7%)*	c) probably *(97 / 32.3%)*	d) I do not know *(143 / 47.7%)*
12) In closed surgery only stones are removed, in open surgery whole gallbladder is removed			
a) yes *(74 / 24.7%)*	b) no *(54 / 18%)*	c) probably *(34 / 11.3%)*	d) I do not know *(138 / 46%)*
13) How did you obtain information on laparoscopic surgery for gallbladder removal?			
a) another physician *(37 / 12.3%)*	b) family, relatives *(127 / 42.3%)*	c) television *(61 / 20.3%)*	d) newspaper *(20 / 6.7%)*
e) Internet (32 / 10.7%)	f) I do not have information *(23 / 7.7%)*		
14) Which type of surgery would you like to undergo?			
a) open *(242 / 80.7%)*	b) closed *(6 / 2%)*	c) I do not have any idea*(52 / 17.3%)*	

Data were presented as number of patients answered as this choice / its percentage according to total number of patients answered all choices.

Results

Patient demographics

Patients consisted of 55 males and 255 females with a mean age of 41±8.3. Education level was primary in 45 (15%), secondary in 124 (41.3%), and tertiary in 131 (43.7%).

Durational and financial aspects

Questions regarding technical and financial aspects were the expense and duration of

procedure. One hundred and ten patients (36.7%) claimed that they did not know the cost of procedure compared to OC, followed by 84 patients declaring that LC was more expensive than conventional OC, and 67 (22.3%) patients stated that LC was not more expensive. Thirty-nine patients (13%) had no information on the cost of procedure.

According to 124 patients (41.3%) duration of LC is not longer than OC. However, 58 cases (19.3%) stated that LC is associated with longer time compared to OC. Forty-nine patients declared that LC probably takes more time, and 69 cases (23%) had no information regarding duration of the procedure (Figure 1A). Knowledge about technical and financial aspects of LC did not differ according to education level and gender (p=0.362 and 0.52 for education and p=0.151 and 0.902 for gender, respectively). Source of information significantly affected knowledge on duration and cost of LC compared to OC. Namely, the Internet had a better effect about knowledge on duration and newspaper had better effect about knowledge on cost of LC (p=0.014, and 0.031, respectively).

Surgical equipment, training, and experience

Surgical equipments, education, and experience were essential components of LC according to a significant number of cases. Different equipment and advanced surgical education were essential according to 213 (71%) and 135 (45%) individuals, respectively. Experience was also essential for LC according to 177 (59%) participants (Figure 1B).

Knowledge on surgical training, and experience were not affected by the education level (p=0.52, and 0.65, respectively). However, education level significantly affected knowledge on surgical equipment. Sixty percent of primary, 56.94% of secondary, and 79.4% of tertiary graduates declared that LC requires different equipment compared to OC (p=0.09). Patients obtaining information from newspaper and Internet significantly had better knowledge on surgical equipment, training and experience required for LC compared to other sources of information (p<0.001 for each). Gender did not affect knowledge about surgical education, equipment and experience (p=0.996, 0.574, and 0.861, respectively).

Outcomes of surgery

We observed that the majority of participants had adequate knowledge on postoperative pain, length of incision, earlier discharge and infectious complications (67%, 82.7%, 74%, and 63.7%, respectively). Knowledge on length of incision and infection rate after LC was significantly better in tertiary graduates (p= 0.013 and 0.029, respectively). Knowledge on effects of LC on postoperative pain was known by 67% of patients regardless of education level and source of information. However, almost half of our patients had no information regarding intraabdominal adhesion formation and incisional hernia, which significantly were the most unknown topics of our questionnaire. Education level played a marked role in defining hernia formation after LC. Rate of knowledge on hernia formation among primary, secondary and tertiary graduates were 11.1%, 12.1%, and 26.7%, respectively (p=0.002). For adhesions, the rate of correct answers was 2.2%, 7.2%, and 16.8%, respectively. Even if there was a difference according to education

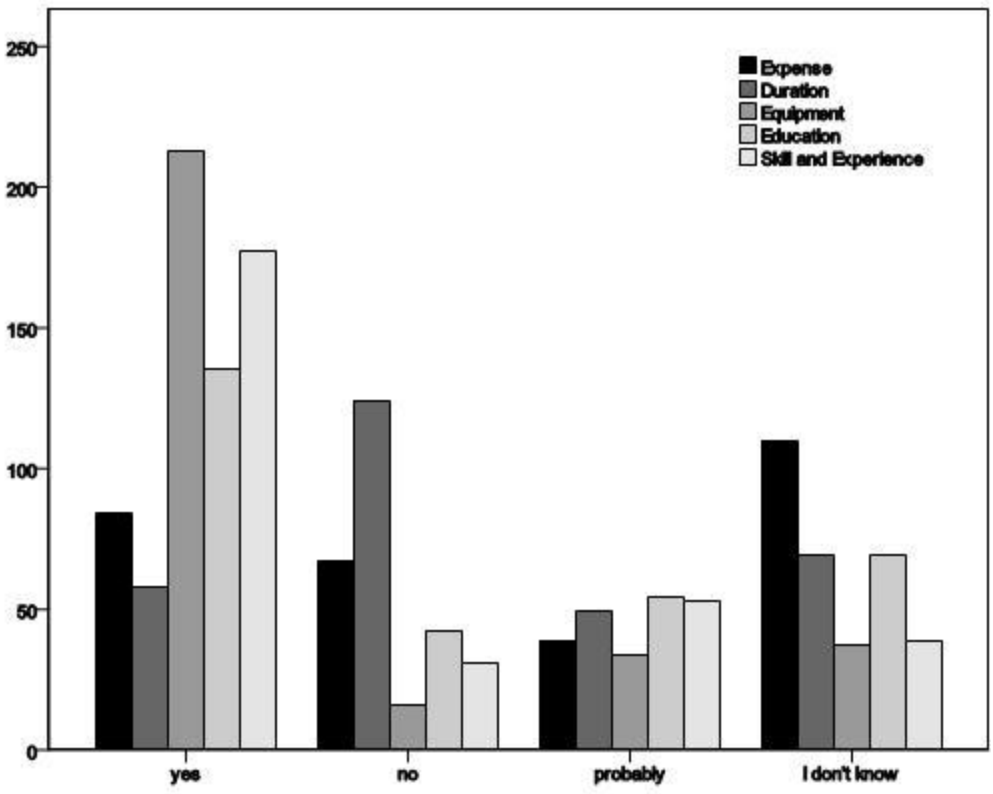

Figure 1A and B. Considerable number of patients (36.7%) had no knowledge regarding expense of the procedure. Interestingly, an important number of participants (41.3%) stated that LC does not take more time than conventional open surgery (Figure 1A). According to the majority of participants, technical equipment, surgical education and experience, indicated by 71%, 45% and 59% of patients respectively, were the mainstay of LC (Figure 1B).

level, it was not significant (p=0.098). Number and rates of answers to questions on surgical outcomes were depicted in Table 1. Answers to outcomes of surgery according to education level are shown in Table 2. Gender did not influence the answers on surgical outcomes.

Table 2. Number and percentage of correct answers according to primary, secondary, and tertiary levels of education in the study population.

	Primary	Secondary	Tertiary
Longer time	10 / 45 (22.2%)	23 / 124 (18.5%)	25 / 131 (19.1%)
More expensive	13 / 45 (28.8%)	37 / 124 (29.8%)	34 / 131 (25.9%)
More surgical education	23 / 45 (51.1%)	53 / 124 (42.7%)	59 / 131 (45.03%)
More experience	26 / 45 (57.7%)	70 / 124 (56.4%)	81 / 131 (61.8%)
Advanced equipment	27 / 45 (60%)	82 / 124 (66.1%)	104 / 131 (79.4%)
Earlier discharge	31 / 45 (68.9%)	86 / 124 (69.3%)	105 / 131 (80.1%)
Less pain	27 / 45 (60%)	85 / 124 (68.5%)	89 / 131(67.9%)
Small incision	32 / 45 (71.1%)	101 / 124 (81.4%)	115 / 131 (87.8%)
Less infection	21 / 45 (46.6%)	74 / 124 (59.6%)	96 / 131 (73.3%)
Less adhesion	1 / 45 (2.2%)	9 / 124 (7.2%)	22 / 131 (16.8%)
Less hernia	5 / 45 (11.1%)	15 / 124 (12.1%)	35 / 131 (26.7%)

Gallbladder removal

Seventy-four participants (24.7%) claimed that in LC only stones are removed, and in OC whole gallbladder is removed. Only 54 cases (18%) correctly answered that this statement

is wrong. Thirty-four patients (11.3%) found this statement probably true. However, 138 patients (46%) had no idea on this statement. In total 82% of participants failed to give a correct answer to this question. Education level had a marked effect on this question; 2.2% of primary, 6.25% of secondary and 33.6% of tertiary graduates correctly answered this question ($p<0.0001$). Gender had no significant effect on knowledge about gallbladder removal ($p=0.971$). Source of information led to marked difference about knowledge on gallbladder removal. We noticed that patients obtaining information from the Internet had significantly better knowledge, followed by those gathering information from newspaper and another doctor (84.4%, 50%, and 32.4%, respectively; $p<0.0001$). Rate of correct answers among other sources of information were less than 5%. Rates of correct answers arranged according to information source and education level are shown in Figures 2A and 2B.

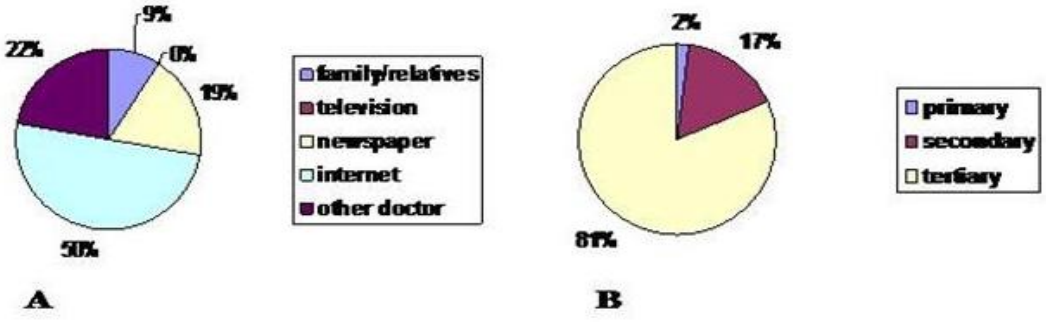

Figure 2A-B. Graphical distribution of correct answer to technical detail of LC (In closed surgery only stones are removed, in open surgery whole gallbladder is removed) according to source of information and education. In total 54 participants correctly answered this question. Majority of patients correctly answering this questions obtained knowledge from the Internet (27/54; 50%), followed by those from newspaper (10 / 54; 18.5%). Education level among these individuals were primary school in 1 (1.9%), secondary in 9 (16.7%), and tertiary school in 44 (81.5%), ($p<0.001$).

Information source

Social environment, namely family and relatives, was the most common source of information declared by 127 individuals (42.3%), followed by television (n=61, 20.3%), another physician (n=37, 12.3%), internet (n=32, 10.7%), and newspaper (n=20, 6.7%). Twenty-three patients (7.7%) stated that they have no knowledge about the procedure. Family and relatives were the source of information in 43.5% of females and 32.7% in males. Newspaper was more commonly referred among males (16.4% vs. 4.5%, $p=0.012$). Other sources were similar between both sexes. As noted, significant numbers of patients lacked information regarding adhesion and hernia formation in LC, opposed to OC. However, considering the source of information, knowledge on these topics was significantly different. Internet users, apart from other sources of information, significantly had adequate knowledge on adhesion formation (34.3% vs. less than 10% for others). Also, significant numbers of patients obtaining information from newspaper, internet, and another physician stated that hernia formation after LC was less than OC (35%, 37.5%, and 40.5%, respectively). Answers to questions modulated due to the source of information were shown in Table 3, and information source distributed according to education level in Figure 3.

Table 3. Number and percentage of "yes" answers among participants according to their source of information.

Questions	Family/relatives (n=127)	Television (n=61)	Newspaper (n=20)	Internet (n=32)	Other/doctor (n=37)
Longer time	23/127 (18.1%)	9/61 (14.7%)	6/20 (30%)	8/32 (25%)	8/37 (21.6%)
More expensive	44/127 (34.6%)	13/61 (21.3%)	7/20 (35%)	8/32 (25%)	9/37(24.3%)
More surgical education	62/127 (48.8%)	21/61 (34.4%)	14/20 (70%)	17/32 (53.1%)	16/37 (43.2%)
More experience	82/127 (64.5%)	29/61 (47.5%)	11/20 (55%)	26/32 (81.2%)	24/37 (64.8%)
Equipment	96/127 (75.6%)	36/61 (59.0%)	18/20 (90%)	30/32 (93.7%)	30/37 (81.1%)
Earlier discharge	101/127 (79.5%)	39/61 (63.9%)	17/20 (85%)	32/32 (100%)	29/37 (78.4%)
Less pain	86/127 (67.7%)	36/61 (59.0%)	16/20 (80%)	30/32 (93.7%)	29/37 (78.4%)
Small incision	112/127 (88.1%)	50/61 (81.9%)	16/20 (80%)	32/32 (100%)	34/37 (91.9%)
Less infection	83/127 (65.3%)	32/61 (52.4%)	15/20 (75%)	30/32 (93.7%)	28/37 (75.6%)
Less adhesion	11/127 (8.6%)	1/61 (1.6%)	3/20 (15%)	11/32 (34.3%)	6/37 (16.2%)
Less hernia	13/127 (10.2%)	7/61 (11.4%)	7/20 (35%)	12/32 (37.5%)	15/37 (40.5%)

Twenty three patients claimed that they did not have any information on the topic (data were not shown). The majority (127; 45.8%) of remaining 277 participants have obtained knowledge from their family or relatives.

Choice on Operation Type

In total 242 (80.7%) patients preferred to undergo LC. Fifty-two patients had no preference on the type of surgery. Only 6 patients (2%) preferred to undergo OC. Three of them obtained information from relatives and the remaining three from television. Reasons for OC were safety in one and the belief that, OC provides better vision in the remaining five. The preference on the type of operation correlated well with the degree of education. Thirty of 45 cases among primary (66.6%), 99 of 124 among secondary (79.8%), and 113 cases among 131 (86.3%) tertiary graduates preferred to undergo LC before any information was given (p=0.001). Source of information significantly altered the choice on the type of surgery. Preferring LC was the highest among patients informed by the Internet and newspaper (100% and 95%, respectively). Gender did not affect the choice on the type of operation (p=0.121).

Reasons for LC

Patients willing to undergo LC were asked to give reasons for this choice. The reasons for choosing LC were less pain, shorter incision, earlier discharge, and fewer infections. Reasons documented according to education level and information source were shown in Figures 4 and 5, respectively. Gender did not influence the reason for choosing LC (p=0.168).

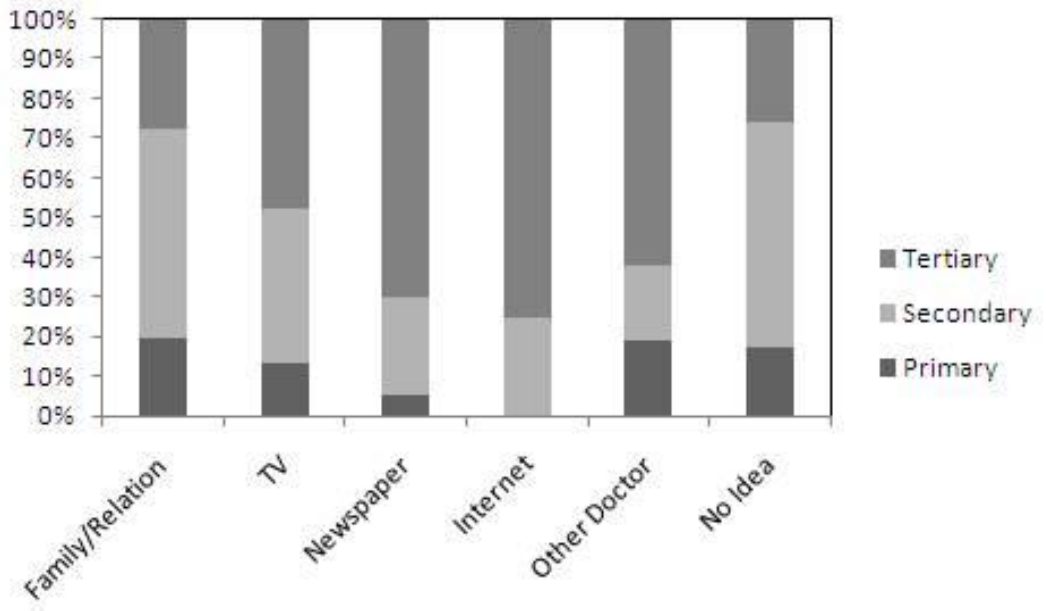

Figure 3. Graphical demonstration of information source distribution according to education level. Newspaper, Internet and another doctor were common sources of information among tertiary (70%, 75%, and 62.2%, respectively), and family or relatives were the most common source of information among primary (55.5%) and secondary (54%) school graduates (p<0.001).

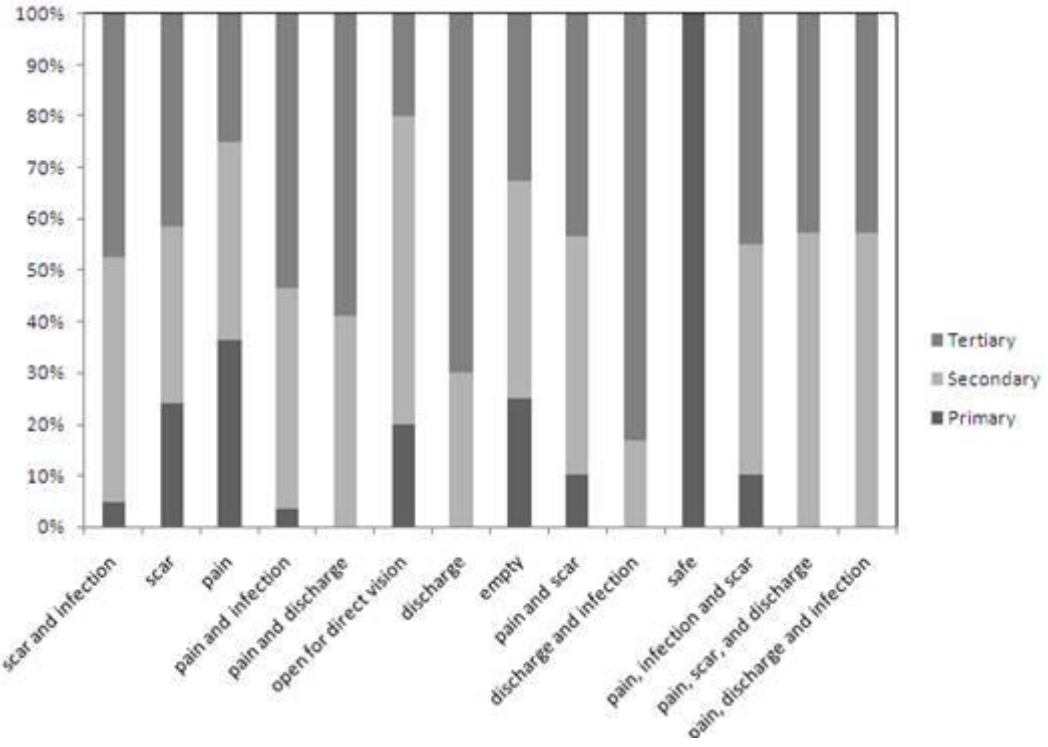

Figure 4. Reasons of participants for LC distributed according to education level showed that pain was the most common reason in primary school graduates (16 / 45, 35.5%). Pain and small incision were the most frequent reasons among secondary (41 / 124, 33.06%). However, tertiary school graduates claimed discharge as the main reason for LC (43 / 131, 32.8 %), (p<0.001).

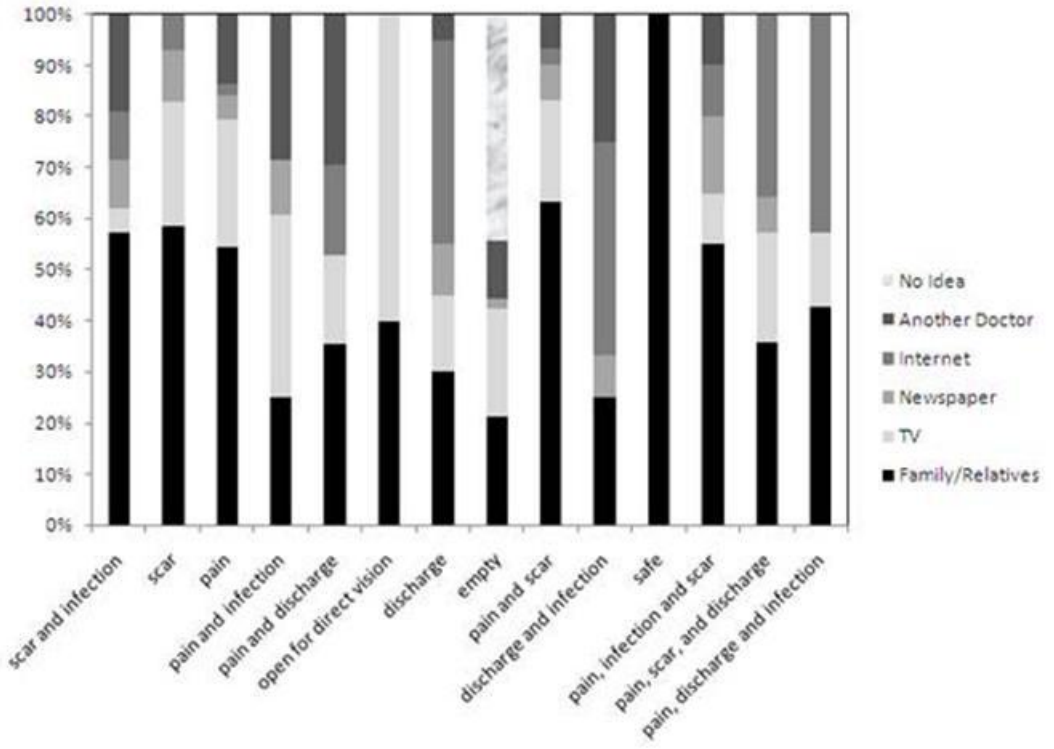

Figure 5. Influence of information source on the reason for choosing LC showed that less pain, small incision and fewer infections were the main reasons for LC in patients informed by family or relatives (90 / 127; 70.8%), television (37 / 61; 60.6%), and other physician (22/ 37; 59.5%). However, the majority of Internet informed subjects (25/32; 78.1%) claimed early discharge, less pain and fewer infections as the main reasons for choosing LC (p<0.001).

Discussion

In this study, we evaluated the knowledge and perception of LC in patients scheduled for this operation. The study design also led us to analyze preferences of participants about the type of surgery for gallbladder disease. Our patients were in similar age groups, and statistical analysis revealed no significant difference according to age and other parameters.

Reports regarding benefits of LC are abundant in available literature. There are prospective, retrospective, case selective or case-matched reports comparing LC with OC. There is worldwide consensus that LC is associated with reduced postoperative pain, early recovery and early return of bowel function, shorter hospital stay, and better cosmetics [10-16]. We discussed the perceptions of our patients based on these facts. Considering their knowledge, most of our patients had information regarding the surgical education, equipment, and benefits of LC like smaller incision, faster recovery, and less pain. Also, more than 80% of participants preferred to undergo laparoscopic surgery, before any information was given. This rate is higher than other reports on patient preferences for an active participation in decision-making that vary from 20 to 80% [17-18]. Degree of participation depends on a number of factors like age, gender, education level, cultural values, severity of the disease, and a basic knowledge of how to achieve satisfactory outcomes [19-22]. In the present study 52 patients (17.3%) had no preference on the type of surgery. But, as mentioned, more than 80% of our cases preferred to undergo LC. Willingness to undergo LC was more common among patients with higher education, younger age, and those obtaining information from newspaper or Internet. The reason for choosing LC among younger cases can be attributable to the smaller size of incisions [23]. Also, as expected, well educated patients who obtain information from public media preferred to undergo LC. The Internet has been shown to be a reliable

source of information for health care seekers [24]. Our study confirmed that the Internet provides more reliable information than other sources of information. However, the majority of our patients obtained information from easily accessible sources like family and relatives, which were not reliable sources of information.

Other well known advantages of LC like faster recovery and less postoperative pain [25-26] were well known by the majority of participants, regardless of education and source of information. These two topics were the most frequently correctly answered aspects of LC.

The training strategy, qualifications of surgeons, and utilization of a new technology in LC has been the point in many studies, all indicating the necessity of an acceptable number of operations during their learning curve [27-30]. The majority of our patients declared that different surgical equipment, as well as advanced training and experience are essential components of LC. This belief was constant among participants with different to education level and information source.

Hospital cost is a multifactorial issue covering hospital policy, type of insurance and cultural attitudes [31]. According to discharge data from the Healthcare Cost and Utilization Project-Nationwide Inpatient Sample (HCUP-NIS) database of the US [32], a matched study from Canada [33], and a prospective matched-cohort study from Europe [34], LC is associated with less hospital costs than OC, which mainly is due to reduced hospital stay. In our study, the majority of our patients (n=110, 36.7%) had no knowledge regarding the expense of LC compared to OC. According to our national insurance system, patients do not need to have a self paid coverage and it is not surprising to observe a high percentage of participants having no information about the expense of LC. It is obvious that the basic knowledge on hospital costs is highly dependent on national healthcare policy.

Duration of LC, compared to OC is mainly dependent on the experience of the surgeon. In a matched study by Sanabria et al. [33] it was stated that LC, compared to OC initially takes a longer time and the difference in the duration of the operation diminishes after 30 to 40 laparoscopic operations. In parallel to this study, Porte et al. [34] stated that LC performed by surgeons at the beginning of their learning curve is associated with a longer time. Interestingly, more than 40% of our patients claimed that LC, compared to OC does not take a longer time. Duration of LC compared to OC was unknown by 23% of patients. We think that perception of our participants towards shorter operative time for LC can be related to their opinion about advanced education, and experience required for LC, which have been constant in 48.3% and 70.1% of patients, respectively.

Shorter incisions used in LC are less susceptible to infectious problems [35]. LC is associated with a lower risk of surgical site and incisional infection [36]. Significant numbers of our participants had adequate knowledge on the benefit of LC with less wound infections compared to OC. However, knowledge on lower infection rate did not correlate with education level and source of information.

The acceptable rate of incisional hernia following LC should be less than 1% [37]. According to a retrospective report, the incidence of hernia formation after LC is lower than OC [38]. Our report is a descriptive study and we do not expect our patients to know all aspects of LC. However, almost half of our cases (47.7%) declared that they do not have any information regarding hernia formation after LC. Adhesion formation likewise, was unknown by 47% of our patients. We believe that these two topics should specifically be emphasized in obtaining informed consent for LC.

In the postoperative period LC has beneficial effects on the quality of life, and majority of our patients were conscious about these effects except for lower rates of hernia and adhesion formation. One other topic where adequate knowledge was lacking among participants was removal of the gallbladder. Almost one forth (24.7%) of patients declared that LC offers the opportunity of removing the stones only whereby leaving the

gallbladder in situ, and 46% had no information on whether or not the gallbladder will be removed. Interestingly, one of our patient favored LC, stating that the gallbladder can continue its function after the surgery. More importantly, almost one third of patients previously informed by another physician claimed that LC helps avoid gallbladder removal. This data show that almost two thirds of patients, if left uninformed, are unaware of problems related to gallbladder removal including abdominal distension, dyspepsia and bloating that can have a marked effect on their quality of life. In this study the main reason for choosing LC instead of OC has been better life quality after LC. Failure to inform patients on gallbladder removal and on gastrointestinal problems related to gallbladder removal can affect quality of life, and patient satisfaction. Patients should be informed that a dysfunctional gallbladder should be removed. They should also be informed that removal of gallbladder can lead to some gastrointestinal symptoms after the operation [39]. This kind of preoperative information can help avoid further medicolegal issues and discrepancies between patient and physician [40].

The topics used in this questionnaire were the mainstay of our preoperative written informed consent. Results of our study have shown the vital points that should be emphasized according to education level and source of information. Our results have shown that, well educated patients and Internet users are aware of almost all aspects of LC. Early discharge is the main reason for choosing LC in this group of patients. In the remaining patients less pain and smaller incision has been the mainstay of LC. Gallbladder removal, hernia and adhesion formation were the points, unknown among significant numbers of patients. Our results also showed that television, family and relatives are unreliable sources of information for LC.

The points in this questionnaire were asked in native language to avoid linguistic errors. We did not evaluate the role of psychological characteristics of patients that was beyond the scope of the present study. Our main purpose was to evaluate the baseline knowledge of our patients before surgery. We have shown that patients have different perceptions and expectations from surgery, which is beyond the reach of a standard written sheet. Written informed consent is an essential component of surgical decision-making [41-45]. However, it should be personalized, considering social and cultural issues to avoid complaints due to insufficient information. We believe that a written statement should be obtained, but remain complementary to individualized information to assure appropriate patient comprehension. Surgeons performing LC should make a special effort to understand perceptions and misleading beliefs of patients prior to an operation. Recognition of this type of misinformation can be helpful to achieve a well-constructed informed consent and improved-patient satisfaction.

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