

SHORT COMMUNICATION

Quantifying patient-reported outcomes following subtotal cholecystectomy: A pilot cross-sectional study using a concise composite questionnaire

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Abstract

Background: Little is known about patient-reported outcomes and health-related quality of life (QoL) following subtotal cholecystectomy (STC) for benign gallbladder disease. **Aim:** To conduct a cross-sectional, survey-based pilot study assessing patient-reported outcomes and health-related QoL among patients who underwent STC for complicated cholecystolithiasis. **Methods:** Forty-four eligible patients were randomly selected from a prospectively maintained list of STCs performed at a university hospital between 2011 and 2021. They were invited to participate in interviews using a five-section, composite, semi-structured questionnaire, which included the Gastrointestinal Quality of Life Index-10 (GIQLI-10), a modified version of the Short-Form Survey 36, and a subjective health self-assessment. **Results:** Nineteen patients (response rate: 43.2%) participated in the survey. STC was performed laparoscopically in 14 patients (73.7%). One patient (5.3%) required readmission. At the time of the interview, the mean age was 66.2 years (standard deviation [SD]: 16.95). Sixteen patients (84.2%) reported other medical conditions. The most common long-term symptoms were fatigue ($n = 12$; 63.2%), bloating ($n = 10$; 52.6%), and excessive flatulence ($n = 10$; 52.6%). The mean GIQLI-10 score was 32.5 out of 40 (SD: 6.0; 95% confidence interval [CI]: 29.6–35.4), with a median score of 35 (interquartile range [IQR]: 9; 95% CI: 28–37), accounting for 87.5% of the maximum score. Fifteen patients (78.9%) reported their general health as good or very good. In 13 patients (68.4%), health remained unchanged or improved compared to one year earlier. The mean self-assessed health score was 74.1 (SD: 13.7; 95% CI: 67.5–80.7), with a median of 75 (IQR: 15; 95% CI: 65–80). **Conclusion:** These findings align with existing literature, showing generally positive patient-reported outcomes following STC. However, this study provides new quantitative details with greater granularity on overall health-related QoL and individual postoperative symptoms. **Relevance for patients:** The Short-Form Health Survey indicates that 8 out of 10 patients who underwent subtotal cholecystectomy reported their overall health as good or very good, despite experiencing some gastrointestinal symptoms. The information provided in this study can aid preoperative discussions and shared decision-making before cholecystectomy.

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Keywords: Benign gallbladder disease; Subtotal cholecystectomy; Patient-reported symptoms; Patient-reported outcome measures; Quality of life

1. Introduction

Laparoscopic cholecystectomy is the standard treatment for benign symptomatic and complicated gallbladder disease, with well-documented short- and long-term postoperative clinical and patient-reported outcomes.^{1–4} However, in exceptional surgical situations in which complete gallbladder removal is considered unsafe, subtotal cholecystectomy (STC) can be performed as an alternative to prevent injury to the bile ducts, major vessels, or gastrointestinal tract.⁵ A review of 10 English studies published between 2006 and 2023 reported STC rates ranging from 1.15% to 11.6%.⁶ STC rates also increased significantly in England between 2000 and 2019.⁷

Although debate continues regarding the rationale and usefulness of laparoscopic STC,⁸ evidence suggests that its clinical outcomes are comparable to those of open total cholecystectomy.^{5,9} However, little is known about patient-reported quality of life (QoL) and symptoms following STC. To date, only two studies have reported results on this topic.^{10,11} By contrast, much larger bodies of literature exist for total cholecystectomy. Three recently published systematic reviews identified up to 281 studies assessing patient-reported outcomes after total cholecystectomy.^{12–14}

The two studies on QoL after STC found no significant difference in QoL between the fenestrating and reconstituting STC subgroups, despite differences in study methodologies and reporting styles.^{10,11} Van Dijk *et al.*¹⁰ described patterns of general health-related QoL and gastrointestinal health in patients who underwent fenestrating or reconstituting STC or total cholecystectomy following conversion from a laparoscopic procedure to laparotomy. Conversely, Gross *et al.*¹¹ calculated the frequency of two symptoms (pain and nausea or vomiting) and their characteristics in the STC cohort and its corresponding subgroups, based on responses to questions adapted from the Gastrointestinal Quality of Life Index (GIQLI) questionnaire. Owing to very limited data on long-term outcomes after STC, a recent call for new studies and extended follow-ups has been ongoing to better understand the long-term consequences of surgical practice related to STC.¹⁵

Quantifiable, data-driven knowledge on general health-related QoL and postoperative symptoms in cases

of predicted or unplanned STC is crucial for improving preoperative patient counselling, informed consent, and shared decision-making. Given this background, this study aims to address a notable gap in the STC profile by providing data on patient-reported outcomes across STC types. In 2022, an institutional, cross-sectional, survey-based study was conducted to assess patient-reported outcomes and health-related QoL among patients who underwent STC for complicated cholecystolithiasis, regardless of STC type. In this pilot study, we describe the methodology, present initial results and findings, and highlight considerations for designing and conducting larger-scale investigations.

2. Methods

For this pilot study, 48 patients were randomly selected, using a reproducible random sampling method, from a list of STCs^{16,17} performed at a university hospital in the United Kingdom between 2011 and 2021. Their survival status was confirmed through the hospital's electronic information system. One researcher (ICN) conducted semi-structured telephone interviews following a strict, predesigned protocol that included self-introductions, explanations of the study aims, verbal consent, and administration of the questionnaire.¹⁸ Patients were classified as non-responders after three unsuccessful contact attempts. Data collection took place over three weeks in May 2023. The second researcher (RL) did not conduct interviews to avoid bias, as he had previously treated and observed some of the patients.

The questionnaire consisted of five sections ([Table 1](#)). Section 1 collected demographic information, comorbidities, surgical details (urgent or elective), and operative approach (laparoscopic or open). Section 2 included five questions about specific postoperative events following STC.

Section 3 addressed long-term gastrointestinal symptoms and calculated gastrointestinal health scores using the GIQLI-10.^{19–21} This instrument includes 10 questions, each with five response options scored from 0 to 4, where 4 represents the best outcome (absence of gastrointestinal symptoms). The total GIQLI-10 score ranges from 0 to 40, with higher scores indicating better gastrointestinal health-related QoL. A score of 40 represents optimal gastrointestinal health-related QoL.

Table 1. Composite questionnaire for the semi-structured telephone interviews with patients who underwent subtotal cholecystectomy

Section 1: Basic demographic information				
1.	Date of birth and age:			
2.	Height and weight:			
3.	Ethnicity:			
4.	Date of primary gallbladder operation:			
5.	Urgent or elective surgery:			
6.	Open or keyhole (laparoscopic) surgery:			
7.	Patient-reported co-morbidities:			
Section 2: Gallbladder surgery-related questions: postoperative events				
1.	Since you had your gallbladder surgery, have you been admitted to the hospital ward with any issues concerning the gallbladder or bile duct?			
	No	Yes, once	Yes, once	Yes, multiple times
	Cannot remember			
	If ‘Yes’ when was the last time when you were admitted to the hospital with those symptoms			
2.	Since you had your gallbladder surgery, have you had an ERCP (a camera test to investigate the bile duct)? (at any time point after gallbladder surgery?)			
	No	Yes, once	Yes, twice or more	Cannot remember
3.	Have you had a second operation for the complete removal of the gallbladder that was left behind during the initial gallbladder surgery? And if so, keyhole or open.			
	No	Yes (when/year)	I do not know	
4.	Do you have a hernia at the site of the gallbladder surgery?			
	No	Yes	I do not know	
5.	If you had a hernia at the site of the gallbladder operation, have you had a surgery to repair that hernia?			
	No	Yes	I do not know	
Section 3: Gastrointestinal Quality of Life Index – 10 (GIQLI-10)				
1.	How often during the past 2 weeks have you had pain in the abdomen?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
2.	How often during the past 2 weeks have you had bloating (sensation of too much gas in the abdomen)?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
3.	How often during the past 2 weeks have you been troubled by excessive passage of gas through the anus?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
4.	How often during the past 2 weeks have you been troubled by strong burping or belching?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
5.	How often during the past 2 weeks have you been tired or fatigued?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
6.	How often during the past 2 weeks have you been troubled by diarrhoea?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
7.	How often during the past 2 weeks have you been troubled by constipation?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			
8.	How often during the past 2 weeks have you been troubled by nausea?			
	All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)
	Never (4)			

(Cont'd...)

Table 1.(Continued)

Section 3: Gastrointestinal Quality of Life Index – 10 (GIQLI-10)				
9.	How often during the past 2 weeks have you been troubled by blood in the stool?			
All of the time (0)	Most of the time (1)	Some of the time (2)	Seldom (3)	Never (4)
10.	Because of your illness, to what extent have you restricted the kinds of food you eat?			
Very much (0)	Much (1)	Somewhat (2)	A little (3)	Not at all (4)
Section 4: Selected questions from Short-Form-36 (SF-36)				
1.	In general, would you say your health is:			
Excellent	Very good	Good	Fair	Poor
2.	Compared to one year ago, how would you rate your health in general now?			
Much better now than one year ago	Somewhat better now than one year ago	About the same	Somewhat worse now than one year ago	Much worse now than one year ago
How true or false is each of the following statements for you?				
3.	I seem to get sick a little easier than other people			
Definitely true	Mostly true	Don't know	Mostly false	Definitely false
4.	I am as healthy as anybody I know			
Definitely true	Mostly true	Don't know	Mostly false	Definitely false
5.	I expect my health to get worse			
Definitely true	Mostly true	Don't know	Mostly false	Definitely false
6.	My health is excellent			
Definitely true	Mostly true	Don't know	Mostly false	Definitely false
Section 5: Health self-assessment (HSA)				
1.	How would you score your health between 0 and 100?			
0 = no health (death). 100 = a perfect health which is a state of complete physical, mental, and social wellbeing, and not merely the absence of disease or infirmity.				

Abbreviation: ERCP: Endoscopic retrograde cholangiopancreatography.

Section 4 focused on general health perception. It included the general health and change-in-health domains of the 36-item Short-Form Survey (SF-36).^{22,23} Participants first rated their overall health and then indicated how it had changed over the past year. This was followed by four statements from the SF-36 concerning general health, with five response options for each.

Section 5 asked participants to rate their health on a scale from 0 to 100, after being informed of the World Health Organization's definition of health: a state of complete physical, mental, and social well-being, not merely the absence of disease or infirmity.²⁴ A score of 0 indicated no health (equivalent to death), while 100 indicated perfect health.

This brief questionnaire was designed to streamline the interview process and reduce the likelihood of early discontinuation compared to administering the full 36-item GIQLI and SF-36.

Data were entered into Microsoft Excel for Mac version 16.77.1 (Microsoft Corporation, United States), validated, and formatted before analysis in GraphPad Prism version 10.2.3 (GraphPad Software LLC, United States). Conventional and advanced statistical methods were applied. Where appropriate, measures of central tendency (mean with standard deviation [SD], median with interquartile range [IQR]) and 95% confidence intervals (CI) were reported.

3. Results

3.1. Sample size and baseline characteristics

Of the 48 patients, four (8.3%) had died, and 24 (50.0%) were non-responders. Of the 20 patients who answered the phone, one declined to be interviewed, and 19 verbally agreed to participate in the survey (response rate: 43.2%). Ten patients (52.6%) were male.

At the time of the interview, the mean age of these 19

patients was 66.2 years (SD: 16.95; 95% CI: 58.0–74.3), with a median age of 68 years (IQR: 24; 95% CI: 57–81). The mean body mass index was 30.2 kg/m² (SD: 6.5; 95% CI: 26.7–33.6), with a median of 29.7 (IQR: 8, 95% CI: 25.25–33.25).

Sixteen patients (84.2%) reported concomitant medical conditions. As shown in Table 2, the Charlson Comorbidity Index (CCI) ranged from 0 to 7, with a mean of 2.7 (SD: 1.9; 95% CI: 1.7–3.6) and a median of 3 (IQR: 3; 95% CI: 1–4). Eight patients (42.1%) had a CCI of 0–2, while 11 (57.9%) had a CCI of 3–7. Three patients (15.8%) had a CCI of 5–7. Table 2 also presents other preoperative patient characteristics, surgical details, and postoperative clinical outcomes specific to STC. The mean time between STC and interview date was 62.2 months (SD: 35.7, range: 17–128), with a median of 56 months (IQR: 72).

3.2. Patient-reported gallbladder surgery-specific outcomes

Since the initial gallbladder operation, one patient (5.3%) was readmitted and underwent endoscopic retrograde cholangiopancreatography. None of the patients subsequently had a complete cholecystectomy. Two patients (10.5%) reported an incisional hernia, one of whom (5.3%) underwent hernia repair.

3.3. Gastrointestinal Quality of Life Index

As shown in Figure 1, all 19 patients reported gastrointestinal symptoms. Fatigue was the most frequent long-term symptom, reported by 12 patients (63.2%), including four with persistent fatigue. Ten patients (52.6%) reported bloating and excessive flatulence. Eight patients (42.1%) restricted their diets because of their illness. Seven patients (36.8%) reported constipation. Five patients (26.3%) reported abdominal pain. Other symptoms included excessive belching ($n = 4$; 21.1%), diarrhoea ($n = 3$; 15.8%), nausea ($n = 3$; 15.8%), and blood in stools ($n = 2$; 10.5%). Table 3 shows the central tendency and range values of GIQLI-10 scores for the 19 patients. The median score was 35 (IQR: 9), representing 87.5% of the maximum score.

3.4. Short-Form Health Survey

No patient reported excellent health. Fifteen patients (78.9%) described their health as very good ($n = 4$) or good ($n = 11$). Four patients (21.1%) reported their general health as fair ($n = 2$) or poor ($n = 2$). Compared with one year earlier, health remained unchanged ($n = 8$), improved somewhat (“better”: $n = 2$), or improved significantly (“much better”: $n = 3$) in 13 patients (68.4%).

Responses to statements evaluating general health

were diverse (Figure 2). Seventeen patients (89.5%) stated that it was definitely false ($n = 12$) or mostly false ($n = 5$) that they became sick more easily than others. Twelve patients (63.2%) generally agreed that they were as healthy as anyone they knew and did not expect their health to worsen. Although none stated that the phrase “health is excellent” was definitely true, seven patients (36.8%) reported it was mostly true. Slightly more than half ($n = 10$; 52.6%) reported that this statement was mostly ($n = 4$) or definitely ($n = 6$) false.

A distinct pattern emerged when responses linked to “true” and “false” were combined (Figure 3). More patients selected “false” than “true” for the statements, “I get sick more easily than others” (17 false vs. 1 true) and “I expect my health to worsen” (12 false vs. 3 true). Conversely, twice as many patients (12 vs. 6) selected “true” for the statement indicating they were as healthy as others. However, the statement regarding excellent health was less convincing, with seven positive versus ten negative responses.

3.5. Health self-assessment

The most common rating was 80, reported by five patients. The mean self-assessed health score was 74.1 (SD: 13.7; 95% CI: 67.5–80.7), with a median of 75 (IQR: 15; 95% CI: 65–80). One patient rated their health at 100, while two rated it at 50, the lowest reported score (Table 3).

4. Discussion

A concise questionnaire, combining basic questions with three QoL assessment tools, was used in this study, as no biliary surgery-specific patient-reported QoL evaluation tools are currently available. The GIQLI-10 was employed in its original form.¹⁹ Notably, the GIQLI-10 is a validated, shortened version of the original instrument, designed to reduce respondent burden while accurately assessing gastrointestinal QoL. It was specifically developed for situations where brevity is important and has demonstrated strong psychometric properties by retaining the most informative items from the full tool. Given its concise format and preserved validity, we considered it an appropriate and efficient choice for this study.

This study shows a low rate of post-STC biliary event-related readmissions and endoscopic retrograde cholangiopancreatography procedures (5%). Conversely, the GIQLI-10 indicated a high prevalence of some symptoms (Figure 1 and Table 4). Fatigue (63.2%), bloating (52.6%), and excessive flatulence (52.6%) were the most frequently reported symptoms.

Notably, 84% of patients surveyed had underlying conditions, including gastrointestinal, endocrine, and

Table 2. Patient demographics, clinical characteristics, and clinical outcomes of subtotal cholecystectomy

Characteristics	Cases	Percentage or values of central tendency
Gender		
Male	10	52.6
Female	9	47.4
Race		
Whites, British	18	94.7
Black, African	1	5.3
Age, years, by surgery date		
Mean (standard deviation)	NA	60.7 (16.0)
Median (interquartile range)	NA	66 (24)
Age, years, by interview date		
Mean (standard deviation)	NA	66.2 (16.95)
Median (interquartile range)	NA	68 (24)
BMI, by surgery date, kg/m ²		
Mean (standard deviation)	NA	30.6 (6.8)
Median (interquartile range)	NA	29.2 (8.5)
BMI, by interview date, kg/m ²		
Mean (standard deviation)	NA	30.2 (6.5)
Median (interquartile range)	NA	29.7 (8)
CCI, by surgery date		
Mean (standard deviation)	NA	2 (1.7)
Median (interquartile range)	NA	2 (3)
Index 0–2	11	57.9
Index 3	6	31.6
Index 5–6	2	10.5

(Cont'd...)

Table 2.(Continued)

Characteristics	Cases	Percentage or values of central tendency
CCI, by interview date ^a		
Mean (standard deviation)	NA	2.7 (1.9)
Median (interquartile range)	NA	3 (3)
Index 0–2	8	42.1
Index 3–4	8	42.1
Index 5–7	3	15.8
Indication for gallbladder surgery		
Complicated cholecystolithiasis	19	100
Chronic cholecystitis	10	52.6
Acute cholecystitis (including acute-on-chronic)	9	47.4
ASA		
1	2	10.5
2	16	84.2
3	1	5.3
STC, by setting		
Non-elective (emergency)	14	73.7
Elective	5	26.3
STC, by mode		
Laparoscopic	14	73.7
Open	5	26.3
Conversion from laparoscopic surgery	1	5.3
Primary	4	21.1
STC, by completion type		
Reconstituting (closed-tract)	13	68.4
Fenestrating (open-tract)	6	31.6

(Cont'd...)

Table 2. (Continued)

Characteristics	Cases	Percentage or values of central tendency
Bile duct injury	0	0
Postoperative bile leakage	7	36.8
Surgical site infection	1	5.3
Postoperative ERCP, patients	5	26.3
Postoperative ITU, re-laparoscopy, PC, laparotomy	0	0
Length of hospital stay		
Mean (standard deviation)	NA	4.8 (4.1)
Median (interquartile range)	NA	4 (2–7)
Range, days	NA	18 (0–18)
Unplanned 30-day readmission	1	5.3
Histology		
Acute cholecystitis (including acute-on-chronic)	9	47.4
Suppurative/gangrenous	8	42.1
Chronic cholecystitis	10	52.6
Xanthogranulomatous	3	15.8
Complete cholecystectomy	0	0

Notes: The values in the third column are percentages unless otherwise specified in the first column. *Following comorbidities reported: hypertension ($n = 7$; 36.8%), ischaemic heart disease ($n = 4$; 21.1%), diabetes mellitus type 2 ($n = 3$; 15.8%), gastroesophageal reflux ($n = 3$; 15.8%), musculoskeletal conditions ($n = 3$; 15.8%), hypercholesterolaemia ($n = 3$; 15.8%), coeliac disease ($n = 1$; 5.3%), chronic obstructive pulmonary disease ($n = 1$; 5.3%), prostate cancer ($n = 1$; 5.3%), haemorrhoids ($n = 1$; 5.3%), vaginal prolapse ($n = 1$; 5.3%), coagulation disorder ($n = 1$; 5.3%), and anxiety ($n = 1$; 5.3%). Abbreviations: ASA: American Society of Anesthesiologists physical status classification; BMI: Body mass index; CCI: Charlson Comorbidity Index; ERCP: Endoscopic retrograde cholangiopancreatography; ITU: Intensive therapy unit; NA: Not applicable; PC: Percutaneous cholecystostomy; STC: Subtotal cholecystectomy.

musculoskeletal diseases, which most likely contributed to chronic symptoms.^{25,26}

Although patients reported a range of long-term GIQLI-10-specific symptoms, results from other sections of the questionnaire suggest that these did not have a clinically meaningful effect on overall QoL. For example, the SF-36-based health assessment indicated that most patients perceived their overall health as good and, if

not improved, at least stable compared with the previous year. One patient who reported worse health attributed this to a recent myocardial infarction rather than a biliary event. Importantly, most patients denied becoming more susceptible to illness than others or expecting their health to decline, and the majority believed they were as healthy as anyone they knew. Nonetheless, this study was not designed or powered to determine whether these symptoms significantly affect QoL; therefore, our findings should be interpreted descriptively rather than inferentially.

This study has some notable strengths: the utilisation of a brief composite questionnaire in semi-structured telephone interviews with patients who underwent STC, and the comprehensive reporting of results, with positive implications for patient counselling, informed consent, and shared decision-making before gallbladder surgery. The contents of summarative Table 4 are advantageous in this regard, and the results of the included studies complement each other. However, Table 4 also highlights considerable variations in some reported outcomes (e.g., post-STC pain and dietary restrictions). Further studies from other institutions are necessary. Only a systematic review of multiple studies will enable more definitive conclusions regarding patient-reported outcomes following STC and more reliable recommendations for practice.

Several limitations of this study should be acknowledged, particularly in light of data from the aforementioned studies on health-related QoL and postoperative symptoms following STC.^{10,11} The data were collected from a single hospital. The study relied solely on a telephone questionnaire (neither mail nor email options were available) and involved patients who had undergone surgery up to a decade earlier, which may have introduced recall bias. The sample size was small, as 25 (56.8%) of the 44 eligible patients either did not respond or declined to be interviewed. The GIQLI²⁰ is not specifically designed to assess gastrointestinal health after gallbladder surgery.²⁷ Since this was a pilot study, using the GIQLI-10¹⁹ was practical and feasible, although it might cause ceiling effects and reduce sensitivity to mild or isolated symptoms. Nevertheless, widely accepted normative GIQLI-10 values are limited in the literature, which restricts external comparisons. These factors should be considered when interpreting the relatively high global QoL scores observed in our patient cohort. Furthermore, clinician-reported long-term outcomes following STC, except for a completed cholecystectomy (Table 2), were not included in this pilot study. Recent data from the same institution are already available,^{16,17} and the design and methodology of this study specifically focused on patient-reported outcomes.

This study highlights several considerations for

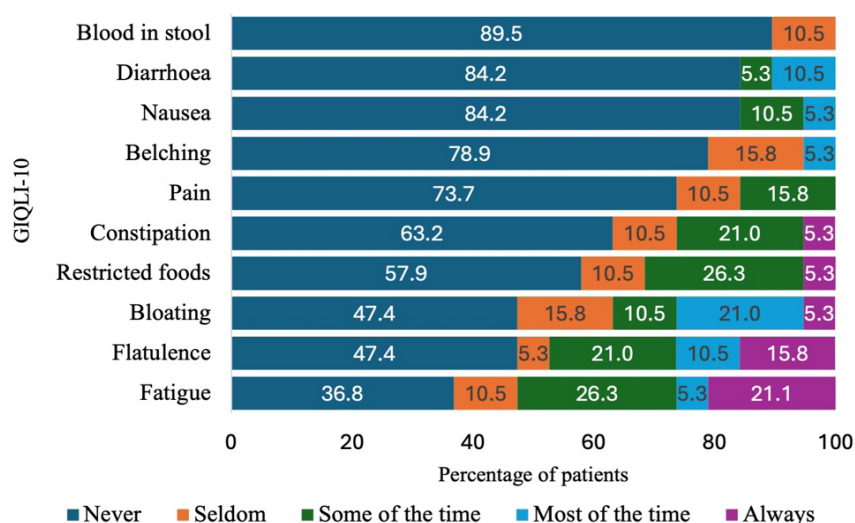


Figure 1. Breakdown and distribution of the Gastrointestinal Quality of Life Index-10-item (GIQLI-10) scores by percentage of patients. The absolute numbers of patients for each symptom category (arranged in five categories: “never,” “seldom,” “some of the time,” “most of the time,” and “always”): (i) blood in stool: 17, 2, 0, 0, 0; (ii) diarrhoea: 16, 0, 1, 2, 0; (iii) nausea: 16, 0, 2, 1, 0; (iv) belching: 15, 3, 0, 1, 0; (v) pain: 14, 2, 3, 0, 0; (vi) constipation: 12, 2, 4, 0, 1; (vii) restricted foods: 11, 2, 5, 0, 1; (viii) bloating: 9, 3, 2, 4, 1; (ix) flatulence: 9, 1, 4, 2, 3; and (x) fatigue: 7, 2, 5, 1, 4.

Table 3. Characterisation of gastrointestinal and global health in the study cohort

Descriptors	GIQLI-10 (Range 0–40)	Health self-assessment (Range 0–100)
Mean	32.5	74.1
Standard deviation	6.0	13.7
Standard error of the mean	1.4	3.1
95% confidence interval	29.6–35.4	67.5–80.7
Median	35.0	75.0
Interquartile range	9.0	15.0
95% confidence interval	28.0–37.0	65.0–80.0
Minimal value	20	50
Maximal value	39	100

Abbreviation: GIQLI: Gastrointestinal Quality of Life Index-10.

future research. Future studies should include a longer data collection period to obtain responses from $\geq 60\%$ of the identified patient population and characterise non-responders, ensuring that non-response bias does not compromise validity. Despite multiple attempts in this pilot, only 43.2% of patients were interviewed, resulting in non-response and selection bias. Future sample sizes should be sufficient to allow subgroup analyses, particularly examining the effect of the surgical setting (emergency versus elective), surgical approach (open versus laparoscopic), type of STC (fenestrating/open-tract versus reconstituting/closed-tract STC),^{28–30} and time

since surgery on patient-reported outcomes and health-related QoL. Furthermore, including a control group of patients who underwent total cholecystectomy during the same study period, as Van Dijk *et al.*¹⁰, would add value by enabling comparison of patient-reported outcomes and QoL following STC with those of standard total cholecystectomy.

Maintaining a prospective database that records patient-reported QoL measures before biliary surgery is crucial for enabling comparisons with postoperative measurements and identifying the minimal clinically important difference between preoperative and postoperative QoL scores. This

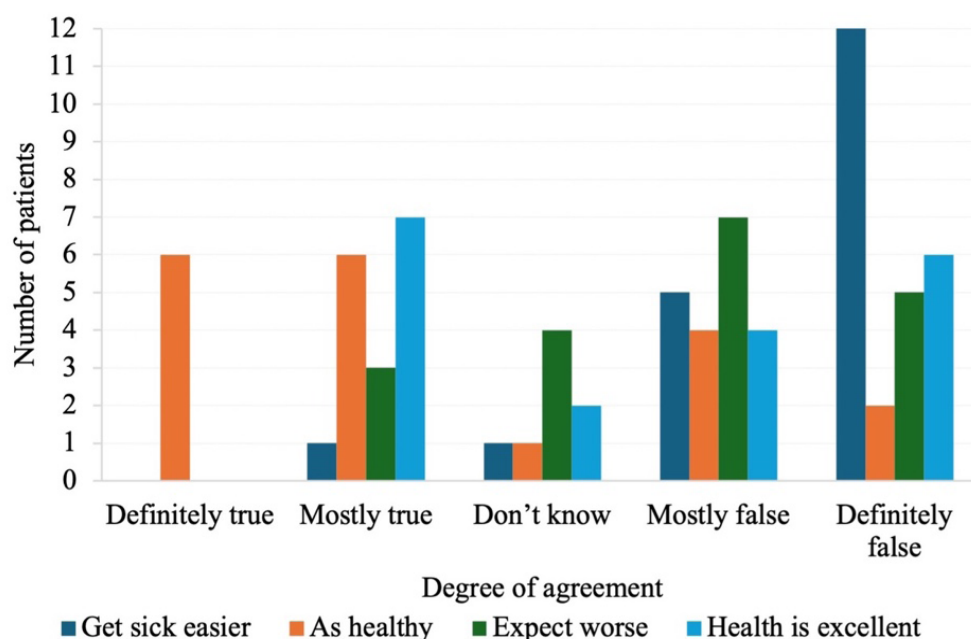


Figure 2. Patient agreement, based on a 5-point scale from the modified Short-Form Survey (SF-36) questionnaire, shown as the number of patients (y-axis). The phrases correspond to the following full statements: "Get sick easier" refers to "I seem to get sick a little easier than other people"; "As healthy" refers to "I am as healthy as anybody I know"; "Expect worse" refers to "I expect my health to get worse"; and "Health is excellent" refers to "My health is excellent."

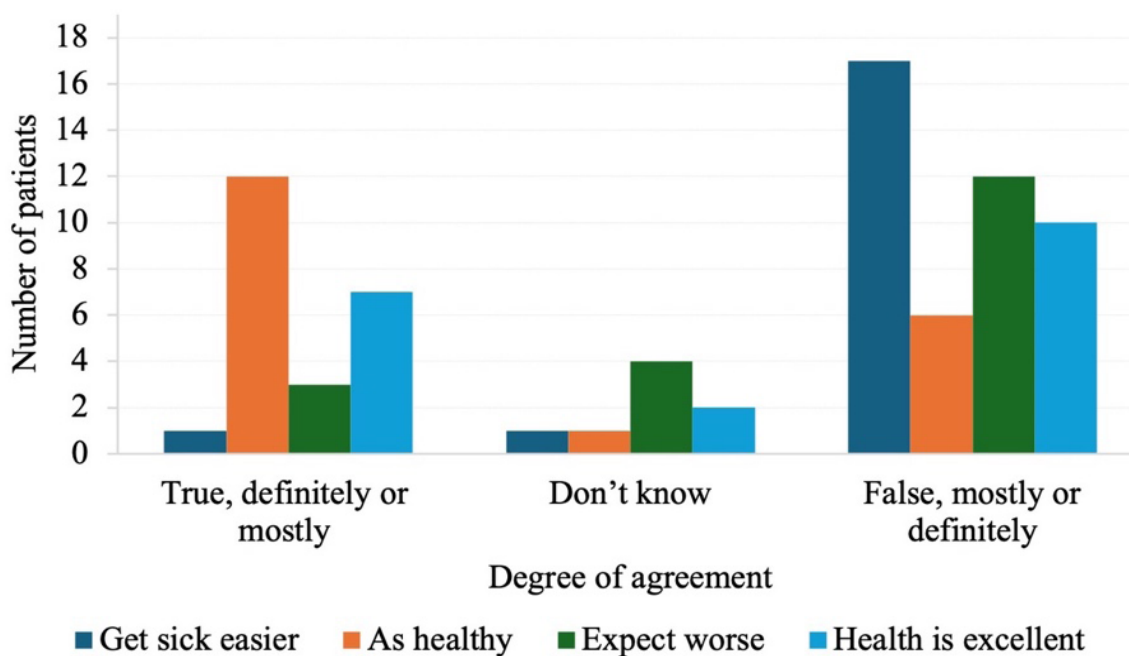


Figure 3. Patient agreement based on a 3-point scale from the modified Short-Form Survey (SF-36) questionnaire, shown as the number of patients (y-axis). The phrases correspond to the following full statements: "Get sick easier" refers to "I seem to get sick a little easier than other people"; "As healthy" refers to "I am as healthy as anybody I know"; "Expect worse" refers to "I expect my health to get worse"; and "Health is excellent" refers to "My health is excellent."

Table 4. Studies and their data on health-related quality of life and postoperative symptoms following subtotal cholecystectomy

Metrics	Studies						
	Van Dijk AH, 2017 ¹⁰				Gross A, 2025 ¹¹		Our study
	STC	STC completion type		TC	STC	STC completion type	
		Fenestrating	Reconstituting			Fenestrating	Reconstituting
Study characteristics:							
Hospitals		Four				Single	
Observational		Completed				Completed	
Cross-sectional		Yes				Yes	
Clinical outcomes		Short- and long-term				Short- and long-term	
Survey		Paper questionnaire sent by mail, with additional requests to complete it				Phone call/interview	
Median, at interview		6 years				5.25 years	
Patients for survey	175	102	73	152		131	44
Responders	105	–	–	61		51	19
Response rate	60%	–	–	40%		38.9%	43.2%
Quality of life:							
GIQLI	–	Pattern for 3 subgroups: no difference ^a		–	–	–	–
GIQLI-10, median	–	–	–	–	–	–	35.0
EQ5D	–	Pattern for 3 subgroups: no difference		–	–	–	–
EQ5D VAS	–	Pattern for 3 subgroups: no difference		–	–	–	–
SF-36, PCS	–	Pattern for 3 subgroups: no difference		–	–	–	Analysed
SF-36, MCS	–	Pattern for 3 subgroups: no difference		–	–	–	–
HSA, median	–	–	–	–	–	–	75
Postoperative symptoms:							
Pain, persistent, all or most of the time	16%	–	–	–	0	0	0
Pain, seldom or some of the time	–	–	–	–	10%	12%	8%
Nausea/vomiting, all or most of the time	–	–	–	–	2%	4%	0
Nausea/vomiting, seldom or some of the time	–	–	–	–	4%	4%	4%
Restricted foods, very much or much	–	–	–	–	14%	15%	12%
Restricted foods, somewhat of a little	–	–	–	–	24%	19%	28%
Diarrhoea ^b	9%	–	–	–	–	–	–
Constipation ^b	–	–	–	–	–	–	–
Belching ^b	–	–	–	–	–	–	–
Bloating ^b	–	–	–	–	–	–	–
Fatigue ^b	–	–	–	–	–	–	–
Flatulence ^b	–	–	–	–	–	–	–
Blood in stool ^b	–	–	–	–	–	–	–
Acid reflux	7%	–	–	–	–	–	–

(Cont'd...)

Table 4. (Continued)

Metrics	Studies								
	Van Dijk AH, 2017 ¹⁰					Gross A, 2025 ¹¹		Our study	
	STC	STC completion type		TC	STC	STC completion type			STC
		Fenestrating	Reconstituting			Fenestrating	Reconstituting		
No postoperative symptoms:									
No pain	–	–	–	–	91%	88%	92%	73.7%	
No nausea/vomiting	–	–	–	–	94%	92%	96%	84.2%	
No restricted foods	–	–	–	–	63%	65%	60%	57.9%	
Other items:									
Pain similarity	–	–	–	–	6%	4%	8%	–	
Readmission/surgery	–	–	–	–	16%	12%	20%	–	
Post-STC ERCP, confirmed	–	–	–	–	–	–	–	26.3%	
Hernia repair	–	–	–	–	–	–	–	5%	
TC, completed	–	–	–	–	–	–	–	0	

Note: ^aPattern, denoted by bar plots with error bars; ^bAll or most of the time.

Abbreviations: EQ5D: EuroQoL 5 Dimensions; GIQLI: Gastrointestinal Quality of Life Index; HSA: Health self-assessment; MCS: Mental health component summary; PCS: Physical health component summary; SF-36: Short-Form 36 Questionnaire; STC: Subtotal cholecystectomy; TC: Total cholecystectomy following conversion from a laparoscopic to an open procedure; VAS: Visual analogue score.

approach is valuable in specific clinical settings, such as gallbladder surgery.^{21,31} However, it is only feasible in departments with sufficient resources and approved long-term research and audit policies.

5. Conclusion

In this study, eight out of ten patients reported very good or good health after STC. Although some gastrointestinal symptoms persisted, the average gastrointestinal health score was 87.5% of the maximum. While these findings align with existing literature, showing generally positive patient-reported outcomes following STC, this study provides new quantitative details with greater granularity on overall health-related QoL and individual postoperative symptoms. This information can guide preoperative discussions and shared decision-making before cholecystectomy.

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Conflict of interest

Raimundas Lunevicius is an Editorial Board Member of this journal, but was not in any way involved in the editorial and peer-review process conducted for this paper, directly

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Author contributions

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Ethics approval and consent to participate

This study was conducted in line with the Declaration of Helsinki. Approval was granted by the Institutional Clinical Audit Management Board of NHS University Hospitals Liverpool Group (registration number 10816). Verbal informed consent was obtained from all patients prior to the interviews.

Consent for publication

No identifying information about the patients is provided. Consent for publication from each patient was not required.

Availability of data

Additional data are available from the corresponding author upon reasonable request.

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