Original Article

Patient perspectives on open *vs.* minimally invasive thoracic surgery (PPOMITS): survey and experience from a single academic institution

Daniel Jones[1,2,3], Urmila Bhattacharyya[1,3], Ching Yeung[1,2], Andre Martel[1,2,3], Mary Hanna[1,2], Ameera Moledina[1,3], Andrew J. E. Seely[1,2,3], Donna E. Maziak[1,2,3], Sudhir R. Sundaresan[1,2,3], Patrick J. Villeneuve[1,2,3], Sebastien Gilbert[1,2,3]

[1]Thoracic Surgery, The Ottawa Hospital, Ottawa, Ontario, Canada; [2]Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada; [3]The Ottawa Hospital Research Institute, Ottawa, Ontario, Canada

Contributions: (I) Conception and design: D Jones, S Gilbert, C Yeung; (II) Administrative support: D Jones, S Gilbert; (III) Provision of study materials or patients: S Gilbert, PJ Villeneuve, AJE Seely, DE Maziak, SR Sundaresan; (IV) Collection and assembly of data: C Yeung, U Bhattacharyya, A Martel, M Hanna, A Moledina; (V) Data analysis and interpretation: C Yeung, D Jones, U Bhattacharyya; (VI) Manuscript writing: All authors; (VII) Final approval of manuscript: All authors.

Correspondence to: Daniel Jones, MD, MPH. Thoracic Surgery, The Ottawa Hospital, General Campus Ste 6363, 501 Smyth Rd, Ottawa, Ontario, K1H 8L6, Canada; Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada; The Ottawa Hospital Research Institute, Ottawa, Ontario, Canada. Email: danijones@toh.ca.

Background: Despite the widespread acceptance of safety and oncologic equivalence of minimally invasive thoracic surgery, adoption by thoracic surgeons is lagging. Patient perspectives on minimally invasive thoracic surgery versus open surgical approaches has not been well studied. The aim of this survey was to document patient perspective on pain, complication risks, cosmesis, travel burden, and functional outcomes and their relationship to surgical approach.

Methods: From 2012–2017, 201 thoracic surgical patients were prospectively enrolled in this observational cohort study. Participants completed a RAND36 short form health survey and a PPOMITS (patient perspectives on open *vs.* minimally invasive thoracic surgery) questionnaire. Variables of interest were measured on a continuous visual analog scale. PPOMITS questions were classified into three anatomic regions (neck, chest, and abdomen). Surveys were completed preoperatively, then at 1 and 6 months postoperatively. Chi-squared, Fisher's, and independent *t*-test were used as appropriate.

Results: A total of 201 patients were surveyed. Recovery of indices was similar in both minimally invasive surgery (MIS) and open surgery patients. On average, patients placed greater importance on postoperative pain (6.93; 95% CI: 6.69–7.17) than incision size (4.31; 95% CI: 4.0–4.63, P<0.001) and travel burden (4.35; 95% CI: 4.04–4.66, P<0.001). Risk of complications (7.36; 95% CI: 7.14–7.58) was also given more importance than incision size (P<0.001) and travel burden (P<0.001). Findings were similar at each time point and across body regions. Importance of postoperative pain was similar between both groups regardless of surgical site and timing. RAND SF-36 results indicated a significant decline in physical functioning, role limitations due to physical health, energy level, pain, and social functioning at 1 month. All indices recovered to baseline at 6 months.

Conclusions: Early deterioration with recovery of functional outcomes at 6 months were similar regardless of surgical approach. Risk of complications was more important to patients than incision size, pain, and distance traveled for treatment. Our results suggest that patients may be willing to enter randomized trials comparing minimally invasive and open approaches, in regionalized cancer care models.

Keywords: Patient perspective; open *vs.* minimally invasive surgery (MIS); outcomes

Received: 13 October 2022; Accepted: 06 May 2023; Published online: 26 May 2023.
doi: 10.21037/ccts-22-10
View this article at: https://dx.doi.org/10.21037/ccts-22-10

Introduction

Minimally invasive surgery (MIS) is a surgical technique involving reduced trauma to skin and soft tissue due to smaller incision size. This technique is increasingly being used as the alternative to open surgery for patients eligible for thoracic surgery and includes laparoscopy and video-assisted thoracoscopic surgery (VATS). Once believed to be technically and oncologically superior, open surgery has increasingly fallen out of favour, for both benign and malignant diseases. Two randomized controlled trials (RCTs) have demonstrated a reduction in lung cancer-related morbidity in the first year following VATS compared to a thoracotomy (1,2). Another study found that after 1-year follow-up, patients who received VATS had significantly lower moderate-severe levels of pain and higher self-reported quality of life (QoL) scores relative to those who underwent anterolateral thoracotomy (3). Similar benefits of MIS approaches are seen with esophageal cancer (4). Furthermore, RCTs have demonstrated similar long-term oncological outcomes (5,6), while other evidence supports a shorter length of stay (LOS), less postoperative pain and improved QoL (7-12).

Despite sound evidence supporting minimally invasive approaches in thoracic surgery, acceptance within the surgical community has not been universal (13). Adoption and implementation of minimally invasive thoracic surgery continues to be low with wide variations across countries. MIS accounts for 30–40% of surgeries in North American context (14,15), while in Europe, the rates vary from 29–65% (16-18). Practice variability and a relative lack of uniform approach may in part explain this low uptake. In addition, little is known about patient perspectives regarding the use of MIS compared to open surgical approaches. The challenges of recruiting patients for randomization in surgical trials further adds to the complexity of understanding patient perspectives on surgical procedures (19).

Surgeons may presume a patient-preference for MIS, although to our knowledge this has not been substantiated. The aim of our study was to objectively document patients' viewpoints on pain, functional outcomes, and treatment expectations following MIS or open surgery, throughout the course of treatment. Involving thoracic surgery patients in RCT-based on patient preferences will elucidate much uncertainty within the field and allow to better address concerns in the thoracic surgery decision-making process. We also examined responses classified by surgical site (neck, chest or abdomen) and geographical distance to treatment centres. We present this article in accordance with the SURGE reporting checklist (available at https://ccts.amegroups.com/article/view/10.21037/ccts-22-10/rc).

Highlight box

Key findings

- Regardless of surgical approach, patients experienced a decline in functional outcomes at 1 month, followed by recovery to baseline at 6 months. Patients placed greater importance on risk of complications following surgery than post-operative pain, incision size, and distance to treatment centre.

What is known and what is new?

- Despite the widespread acceptance of safety and oncologic equivalence of minimally invasive thoracic surgery, adoption by thoracic surgeons is lagging.
- There is limited literature on patient perspectives on minimally invasive thoracic surgery versus open surgical approaches.

What is the implication, and what should change now?

- Patients undergoing cancer resection surgeries may be willing to participate in randomized trials that compare minimally invasive and open surgical approaches.

Methods

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Research Ethics Board at the Ottawa Hospital and registered with clinicaltrials.gov (NCT01807390), and informed consent was obtained from all individual participants. Procedures were conducted at a tertiary care academic center consisting of 6 board certified thoracic surgeons. The catchment area extends over 18,000 square kilometers. When patients consent for surgery, they consent to be operated on by any of the six surgeons within the group practice. Patients scheduled for either MIS or open surgeries were approached for participation in the survey. Procedures were determined according to appropriate physician assessment and recommendations. Perioperative work-up, educational material, and postoperative care are standardized through care maps. Patients with pulmonary, mediastinal or esophageal diseases were eligible for the study if they were surgical candidates and over 18 years of age.

Patient demographics, procedural details, and survey-response results were collected prospectively in an encrypted, de-identified database. Participants completed

two questionnaires: A pre- and post-operative questionnaire on patient perspectives of open versus minimally invasive thoracic surgery (PPOMITS) (Appendix 1, Appendix 2) and a quality-of-life survey; the RAND 36-item Short Form Health Survey version 1.0 (RAND SF-36) (Appendix 3). Both questionnaires were administered at three time points (preoperatively, 1 month postoperatively, and 6 months postoperatively). Envelopes were provided to patients in order to facilitate returned responses in the postoperative setting.

The PPOMITS questionnaire uses visual analog scales [VAS; 1 (unimportant)–10 (important)] to quantify the relationship between surgical approach (open *vs.* MIS) and anatomic region of surgery (neck, chest, and abdomen) attempting to understand a patient's expectations and experiences regarding travel burden, postoperative pain, risk of postoperative complications, cosmesis, and recovery time following the surgical intervention. Questions regarding patient expectations were asked during the pre-operative period, whereas those regarding experienced pain and complications were asked during the post-operative periods. The questions were asked of each anatomic region (neck, chest, and abdomen). The RAND SF-36 comprises 8 domains, aimed at measuring functional outcomes, including: (I) physical functioning; (II) physical pain; (III) role limitations due to physical health problems; (IV) role limitations due to personal or emotional problems; (V) emotional well-being; (VI) social functioning; (VII) energy/fatigue; and (VIII) general health perceptions. Chi-square and Fisher's exact tests were used for comparison of frequencies between categorical variables of the MIS and open surgery groups in the baseline characteristics table. Independent *t*-tests were used to assess the difference between the means of continuous variables. These were used to test for statistically significant differences wherever appropriate.

Results

Patient enrollment took place from February 2012 to March 2017. A total of 201 patients participated, with 163 patients in the MIS group and 38 in the open surgery group (*Table 1*). Patient characteristics within each surgery group are outlined in *Table 1*. Survey completion rates for the PPOMITS and SF-36 questionnaires are outlined in *Table 2*. 459 SF-36 and 480 PPOMITS surveys were completed throughout the study. The SF-36 questionnaires included: 180 during the preoperative period, 142 in the 1-month follow up, and 137 during the 6-month follow up period (*Table 2*).

PPOMITS questionnaire

Experienced pain

The average score for experienced neck pain did not differ between the three selected time points (preoperative, 1 month postoperative, and 6 months postoperative), however, for both chest and abdominal pain, preoperative pain was lowest followed by a significant increase at 1-month. Although decreased average scores were observed from 1 month postoperatively to 6 months postoperatively, the difference in scores was only significant for chest pain (*Figure 1*). Mean preoperative pain (0.68; 95% CI: 0.52–0.84) was significantly less than pain experienced postoperatively at 1 month (1.73; 95% CI: 1.41–2.05; P<0.0001) and 6 months (1.16; 95% CI: 0.90–1.42; P=0.002) (*Figure 1*). Pain experienced after surgery in the chest also significantly decreased going from 1 to 6 months post-operation (P=0.0007). Pain experienced after abdominal surgery was only significantly different between the preoperative time and 1 month post-operation (P=0.002), with lower pain experienced preoperatively (0.41; 95% CI: 0.29–0.52) than postoperatively at 1 month (0.74; 95% CI: 0.48–0.99) (*Figure 1*).

Following stratification, no difference in pain perception was experienced by patients undergoing MIS *vs.* open surgery, except for those undergoing neck surgery (preoperatively period only) (MIS =0.52; 95% CI: 0.37–0.67; open =0.20; 95% CI: 0.08–0.31; P=0.0009) (*Figure 2*). No significant difference (P>0.05) in experienced pain was observed in the chest or abdomen at any of the measured times, nor were there are difference in neck pain postoperatively between surgical approaches.

Expectations and perceived concerns regarding pain

When asked to quantify the intensity of post-surgical pain in relationship to incisions in the aforementioned bodily regions, patients had similar expectations whether surgery would be performed in the neck, chest or abdomen (P>0.05). Further, expectations for pain were found to be statistically non-significant between MIS and open approaches regardless of the region of surgical incision or post-op follow-up time (P>0.05) (*Figure 3*). In addition, concern regarding postoperative pain at both 1 and 6 months was non-significant between MIS and open surgical approaches. Concerns regarding pain were not significantly different

Table 1 Patient characteristics (N=201)

Baseline characteristics	Incision type		P value
	MIS (n=163)	Open (n=38)	
Age (years), median (SE)	66 (0.05)	64 (1.27)	
Female sex, n (%)	103 (63.2)	16 (42.1)	<0.0001*
Diagnosis, n (%)	n=162		
Esophageal cancer	6 (3.7)	3 (7.9)	
Lung cancer	121 (74.2)	28 (73.7)	
Metastasis	20 (12.3)	4 (10.5)	
Other	15 (9.2)	3 (7.9)	
Procedure, n (%)			<0.0001*
Pulmonary wedge	47 (28.8)	5 (13.6)	
Lobectomy	95 (58.3)	21 (55.3)	
Pneumonectomy	n/a	5 (13.2)	
Esophagectomy	6 (3.7)	4 (10.5)	
Other	15 (9.2)	3 (7.9)	
Post-operative complications, n (%)	n=149	n=35	0.046*
Air leaks	24 (16.1)	3 (8.6)	
Anastomotic leaks	1 (0.7)	n/a	
Cardiac	10 (6.7)	5 (14.3)	
Pulmonary	4 (2.7)	5 (14.3)	
Other	10 (6.7)	2 (5.7)	
None	100 (67.1)	20 (57.1)	
Epidural use, n (%)	20 (12.3)	31 (81.6)	<0.0001*

*, statistically significant P value, P<0.05. SE, standard error; MIS, minimally invasive surgery; n/a, not applicable.

Table 2 RAND SF-36 survey completion rates

Questionnaire type	n (%)
SF-36 survey (N=201)	
Preoperative survey	180 (89.6)
1-month postoperative survey	142 (70.6)
6-month postoperative survey	137 (68.2)
PPOMITS questionnaire (N=200)	
Preoperative survey	194 (97.0)
1-month postoperative survey	147 (73.5)
6-month postoperative survey	139 (69.5)

SF-36, 36-item Short Form Health Survey; PPOMITS, patient perspectives on open *vs.* minimally invasive thoracic surgery.

between MIS and open approach groups at any point of time for any surgical incision site (P>0.05). Patients in both surgical approach groups had expectations of a high level of pain control at 1-month after the operation regardless of the incision site with values ranging from approximately 7.8–8.5 on the VAS. Similar values were seen for pain control expectations at 6 months following surgery (VAS range, ~7.7–9.0). In the sub-group analysis, there was no significant difference between pain control expectations at 1-month between MIS and open approaches in all three surgical sites (P>0.05). Statistically significant differences between approaches were, however, found for expectations of pain control at 6 months following surgeries to the chest (mean $_{MIS}$ VAS =8.02; 95% CI: 7.69–8.35; mean $_{OPEN}$ VAS =8.75; 95% CI: 8.28–9.22; $P_{MIS\ vs.\ open}$ =0.01) and abdominal

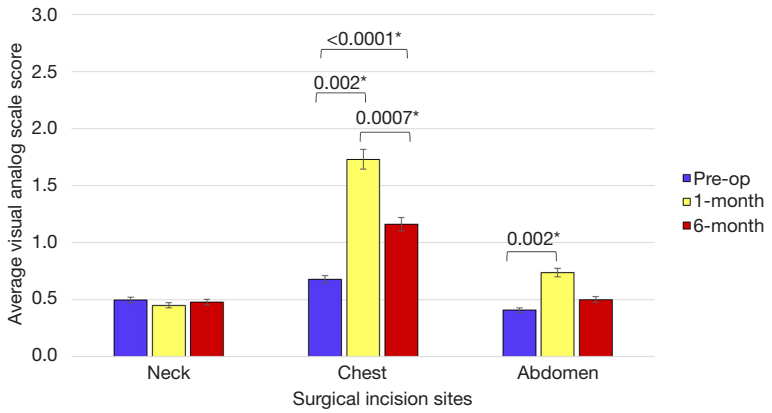

Figure 1 Mean pain level by surgical incision sites (neck, chest, and/or abdomen) at preoperative baseline, and postoperatively at 1- and 6-month intervals. *, statistically significant P value, P<0.05.

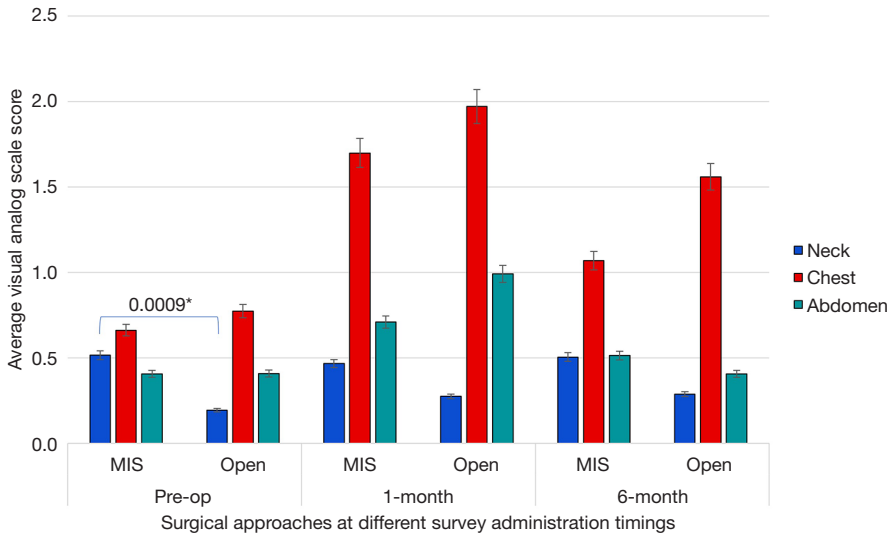

Figure 2 Comparison of mean pain level by surgical incision site (neck, chest, and/or abdomen) between MIS and open approaches at preoperative baseline, and postoperatively at 1- and 6-month intervals. *, statistically significant P value, P<0.05. MIS, minimally invasive surgery.

regions (mean $_{MIS}$ VAS =7.83; 95% CI: 7.41–8.25; mean $_{OPEN}$ VAS =8.96; 95% CI: 8.51–9.41; $P_{MIS\ vs.\ OPEN}$ >0.0001).

Expectations regarding risk of complications and daily activities

Expectations for risk of postoperative complications were found to be significantly greater for the open surgical approach (mean VAS =5.73; 95% CI: 4.67–6.78) than MIS (mean VAS =4.53; 95% CI: 4.1–5.0) for chest surgeries, preoperatively (P=0.04). All other evaluated anatomic regions and follow-up times did not significantly differ in patients' perspectives on expected risk of complications (P>0.05). In both surgical approach groups, across all three time points and all anatomic regions for surgery, patients perceived a moderate risk of complications after surgery, with VAS scores ranging from 4.0 to 5.9.

Both groups felt they would have a moderate-high level of independence with activities of daily living following surgery, with no difference between MIS or an open approach at the 1- or 6-month intervals (P>0.05), ranging from an approximate score of 5.1 to 7.3 on the VAS.

Importance

Overall, patients placed greatest importance on the risk of

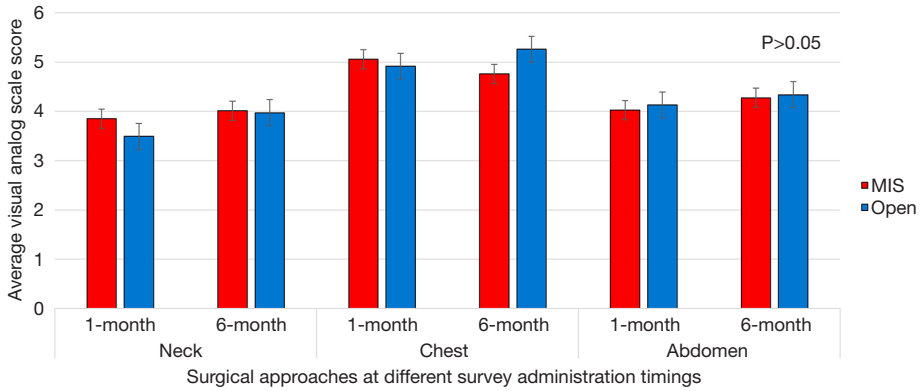

Figure 3 Comparison of patients' expected pain level by surgical incision site (neck, chest, and/or abdomen) between MIS and open approaches at 1- and 6-month intervals (P>0.05). MIS, minimally invasive surgery.

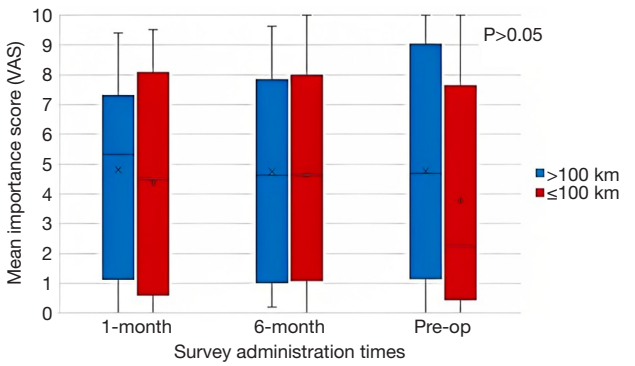

Figure 4 Comparison of importance placed by patients on the distance needed to travel for surgical care at preoperative baseline, and postoperatively at 1- and 6-month intervals (P>0.05). VAS, visual analog scale.

postoperative complications (mean VAS =7.36; 95% CI: 7.1–7.6) and postoperative pain (mean VAS =6.93; 95% CI: 6.7–7.2). Risk of complications was considered significantly more important than pain (mean difference =0.44; 95% CI: 0.22–0.65; P<0.001) and all other variables, including incision size (mean difference =3.0; 95% CI: 2.69–3.32; P<0.001) and travel burden (mean difference =2.96; 95% CI: 2.6–3.3; P<0.001). Distance to tertiary care centres (mean VAS =4.35; 95% CI: 4.0–4.7) and incision size (mean VAS =4.31; 95% CI: 4.0–4.6) were perceived as less important, respectively, although the difference in importance was not statistically significant (mean difference =0.30; 95% CI: −0.34 to 0.4; P=0.874). Findings for perceived importance, when stratified by time of survey administration relative to the date of surgery, were similar to the overall importance values and across all points of time for most of the pairwise comparisons. Postoperative pain and procedural risk were significantly more concerning to patients than surgical incision size and the distance travelled to obtain the procedure across all three evaluated time points. Comparing the risk of complications and postoperative pain, patients found the former to be of significantly greater importance overall (mean difference =0.44; 95% CI: 0.22–0.65; P<0.001) and at 6 months postoperatively (mean difference =0.76; 95% CI: 0.37–1.14; P<0.001), whereas the difference in mean importance score was not statistically significant when patients were asked preoperatively or at 1-month postoperatively (P>0.05).

In a subgroup analysis, we investigated whether the perceived level of importance differed between patients undergoing MIS *vs.* open surgery. Findings indicated that the level of importance of any of the evaluated factors (i.e., incision size, distance, postoperative pain, and risk of complications) between groups undergoing either surgical approach did not differ significantly, regardless of surgical incision site and time of survey administration (P>0.05).

Travel burden

An additional subgroup analysis was conducted classifying patients based on distance from the treating centre (≤100 km from treating centre; >100 km from treating centre), illustrating a wide variability in responses regarding importance of the distance, as an indicator of travel burden at all three points of time (*Figure 4*). The overall importance of distance to the treatment centres did not differ significantly based on the patients' actual distance to these centres (P>0.05) at any of the evaluated points of time. The data was then further stratified by anatomic region of

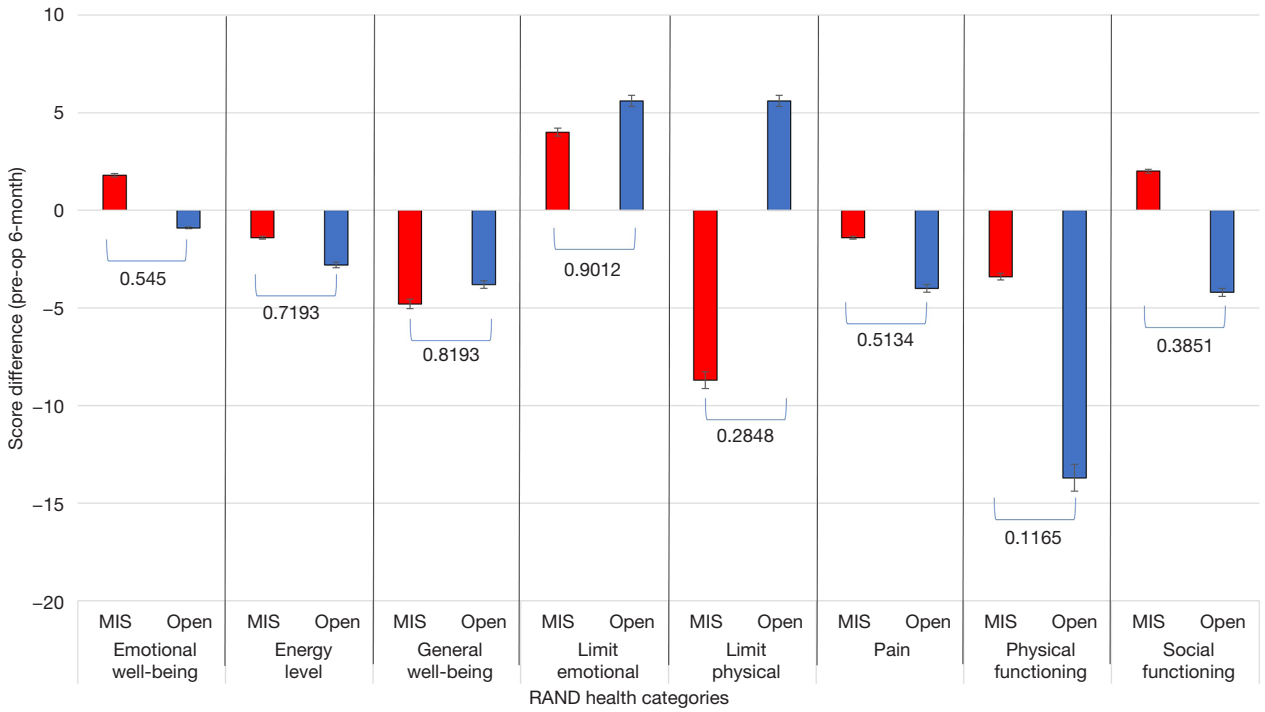

Figure 5 Change in quality of life scores across various dimensions of health (RAND questionnaire) from preoperative baseline to 6 months postoperatively, between MIS and open approaches (P>0.05). MIS, minimally invasive surgery.

surgery. Whether the distance to the treatment centre was >100 or ≤100 km, no significant difference in importance of the distance was observed between MIS and Open groups regardless of anatomic surgical site (P>0.05).

QoL questionnaire

The RAND SF-36 survey completion rates are demonstrated in *Table 2*. In the 1-month postoperative RAND SF-36 survey, patients perceived the following domains to decrease significantly: physical functioning (P<0.0001), role limitation due to physical health (P<0.0001), social functioning (P<0.0001), energy/fatigue (P<0.0001), and bodily pain (P<0.0001). At the 6-month follow up survey, these five domains of the RAND SF-36 had returned to baseline levels. There was no significant difference in the patient's perception of emotional well-being, role limitation due to personal or emotional problems, and general health perceptions either at the 1- or 6-month follow up survey [non-significant (NS) result]. The comparison of the change in RAND patient perspective scores from preoperative to 1-month postoperative survey times in MIS *vs.* open surgical approaches showed no significant differences for all health categories (P>0.05). Similar results were observed between preoperative and 6-month postoperative survey times (*Figure 5*). We performed a sub-group analysis investigating the effect of open and MIS techniques on the 8 domains of the RAND SF-36 questionnaire. There was no significant difference in the patient's perception of all 8 QoL domains following either open surgery or MIS, assessed at the 1-month follow-up and at the 6-month follow-up (P>0.05).

Discussion

Our study demonstrates that, regardless of surgical approach, patients regain baseline QoL scores in all domains assessed by the RAND SF-36 at 6 months following their surgery, despite an initial decline in QoL at 1 month. Both MIS and open procedures were well tolerated in terms of physical, emotional, and social domains. Furthermore, results from the PPOMITS questionnaire revealed that patients placed greater importance on postoperative pain and complication risks associated with surgery than on incision size or location (neck, chest, or abdomen), and or travel distance to obtain surgical care. The results of this

longitudinal survey challenge the commonly held belief that patients would not accept to be randomized between MIS or open surgery.

Despite RCTs representing the gold standard of clinical research, there is a paucity of well-conducted RCTs comparing MIS to open surgical procedures (20). Some potential reasons include ethical concerns, surgeon attitude, lack of equipoise, low recruitment rates, and patient preference (21). The latter refers to beliefs, expectations, and personal goals, as well as, to the process with which patients balance benefits, harms and inconveniences (22). Patients may be willing to be randomized if their preferences are aligned with the study goals. As an example, from the present study, if patients' perception of postoperative pain and risk of complications were felt to be identical between surgical approaches, then randomization would likely not be seen as a potential safety concern or a major deviation from standard care.

Our results highlight that patient preferences regarding incision size and travel distance are less important than their concerns about postoperative pain and risk of complications. Due to the invasive nature of surgery and its associated risks, outcomes must be measured to the highest standards of care and best-evidence guidelines. However, guidelines do not always incorporate patient's input and hence may underestimate/underreport the full range of valued patient outcomes (23). Without identifying patient preferences in RCTs, a source of uncontrolled bias may arise, as the preferences are not dealt with in the randomization process, thus threatening the validity of the outcome (24). As such, patient input should represent an integral aspect of potential surgical RCTs. Despite these drawbacks, patient-oriented, high quality surgical research must remain a priority for our surgical community. Ethical considerations may arise with respect to randomization between MIS and open surgical approaches with mounting non-randomized and randomized evidence suggesting the superiority of minimally invasive surgery for many resectable cancers. If no true clinical equipoise exists, then we would expect a higher dissemination of apparently superior surgical approaches across clinical practice. According to data from major thoracic societies [e.g., Society of Thoracic Surgeons (STS), European Society of Thoracic Surgeons (ESTS)], the percentage of major thoracic surgical procedures being performed using MIS approaches remains limited and largely confined to academic institutions. The lack of randomized data can be a significant obstacle to the development of strong guidelines and to the widespread adoption of newer therapies and procedures. A good example of this would be surgery for colorectal cancer. The MIS approach did not become widely disseminated until a landmark randomized trial showed result in equivalent oncologic outcomes, reduced LOS, improved QoL scores and patient satisfaction (25-28). To our knowledge, there is limited high-level evidence to support MIS over Open surgical treatment of lung or esophageal cancer for example (29,30). The lack of RCTs in surgical research can be partly attributed to surgeon preferences of surgical approach, thereby limiting willingness to participate in this type of study. However, some studies have suggested the possibility of expertise-based RCTs, where surgeons are assigned to a surgical approach for the study period based on their preference and expertise, thus alleviating such concerns (31,32). This represents an opportunity to conduct well-organized studies comparing MIS and open thoracic surgery, helping elucidate whether minimally invasive thoracic surgery can become the new *gold standard*. Our institutional practice model is that of a single-entry model. Here, single-entry models consist of a centralized intake and coordinated triage approach, assembling patients into a single-queue within a given jurisdiction, allowing more timely and equitable access to care (33).

We acknowledge that our results must be interpreted in light of some limitations. The relatively small sample size in the open surgery group with large range in the confidence intervals lends itself to a type I error, without appropriate power to detect a true difference. More patients undergoing pulmonary resection compared to esophageal resection made up the cohort of respondents. In addition, participants providing their expectations and concerns for MIS were independent of those answering for open surgeries, therefore relative comparisons are subject to bias in the interpretation of the results. Data regarding postoperative pain control was not collected for this study. This is a potential confounding variable for experienced pain at both post-surgical time points. Additionally, we acknowledge that there is no real benefit from an MIS approach in the neck, these cases were included to provide an overall sense of patient perception across all body regions considered in thoracic surgeries. However, it should be noted that this is a potential limitation as no meaningful interventions can be implemented in these cases. Generalizability of the results is also impacted by the fact that this is a single-institution experience. Lastly, the study was subject to selection bias because practices changed over time, including procedure preference. While surgeons who started their career more

recently have training in MIS approaches, more senior surgeons tend to have a preference towards open surgeries. Despite these limitations, our primary goal of assessing patient perspectives and subjective responses to a given surgical technique, as well as patient preferences, was still achieved.

Conclusions

Our results demonstrate an initial deterioration in functional outcome, followed by a full recovery by 6 months, regardless of the surgical approach (MIS *vs.* open) selected. In addition, patients expressed their perception that surgical safety, or the risk of postoperative complications, is a more important concern than incision size, pain, and distance traveled for care when deciding to proceed with surgical therapy for diseases of the chest and upper gastrointestinal tract. Our results suggest that patients may be open-minded to enroll in randomization between open and MIS surgical procedures as long as expectations in regards to postoperative complications and pain management are clearly defined.

Acknowledgments

This research was presented at the IASLC 2018 World Lung Conference in Toronto, Canada (*Journal of Thoracic Oncology*. 13. S851. 10.1016/j.jtho.2018.08.1525).
Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Guest Editors (Jean Bussieres and George Rakovich) for the series "Recent Advances in Perioperative Care in Thoracic Surgery and Anesthesia" published in *Current Challenges in Thoracic Surgery*. The article has undergone external peer review.

Reporting Checklist: The authors have completed the SURGE reporting checklist. Available at https://ccts.amegroups.com/article/view/10.21037/ccts-22-10/rc

Data Sharing Statement: Available at https://ccts.amegroups.com/article/view/10.21037/ccts-22-10/dss

Peer Review File: Available at https://ccts.amegroups.com/article/view/10.21037/ccts-22-10/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at: https://ccts.amegroups.com/article/view/10.21037/ccts-22-10/coif). The series "Recent Advances in Perioperative Care in Thoracic Surgery and Anesthesia" was commissioned by the editorial office without any funding or sponsorship. DEM serves as an unpaid editorial board member of *Current Challenges in Thoracic Surgery* from December 2021 to November 2023. The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Research Ethics Board at the Ottawa Hospital and registered with clinicaltrials.gov (*NCT01807390*), and informed consent was obtained from all individual participants.

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Cite this article as: Jones D, Bhattacharyya U, Yeung C, Martel A, Hanna M, Moledina A, Seely AJE, Maziak DE, Sundaresan SR, Villeneuve PJ, Gilbert S. Patient perspectives on open *vs.* minimally invasive thoracic surgery (PPOMITS): survey and experience from a single academic institution. Curr Chall Thorac Surg 2023;5:34.

Supplementary

Appendix 1: Preoperative PPOMITS survey

Study ID _____
Survey ID _____

Study time point- Date (DD/MM/YYYY)_____

Survey I: Patient Perceptions of Surgery to the Lungs and Esophagus (Preoperative)

Since you are being seen in the Cancer Assessment Center of the Ottawa Hospital, it is possible that surgery may be a treatment option for your condition. We are conducting simple surveys as part of our efforts to better understand your views on major surgery to the lungs or esophagus. It is our goal to be able to use the information you are kindly providing us to further advance cancer research. We hope that your contribution will serve to improve the care of all of our cancer patients. This survey will not affect the type of surgery you may be a candidate for.

1. What is your postal code? (This helps us estimate how far you live).
   Please include the first 3 numbers and letters of your postal code in the following boxes.

☐ ☐ ☐

2. Have you ever had surgery to your: Please add a check mark to the box that applies to you. You can select more than one (1) answer. Example: ☑

- ☐ Neck
- ☐ Chest
- ☐ Belly
- ☐ None of the above

3. Do you currently feel pain in your: Please mark your answer with an X on the line.

a. Neck?	No pain	———	The worst possible pain
b. Chest?	No pain	———	The worst possible pain
c. Belly?	No pain	———	The worst possible pain

The next few questions are designed to understand your perception and opinion regarding surgery to the neck, chest and belly. Even if you will not undergo each type of surgery, we are still interested in your opinion. Please answer EACH question (NECK, CHEST, and BELLY), even though you may not undergo each type of surgery.

4. In your opinion, how much pain do you think you would feel from having surgery to your :

a. Neck?	No pain	———	The worst possible pain
b. Chest?	No pain	———	The worst possible pain
c. Belly?	No pain	———	The worst possible pain

https://dx.doi.org/10.21037/ccts-22-10

5. If you expect surgery to be painful, how long would you expect the pain to last following surgery to the: Please add one (1) check mark to the box that applies to you. Example: ☑

a. Neck?	b. Chest?	c. Belly?
☐ Less than 6 weeks	☐ Less than 6 weeks	☐ Less than 6 weeks
☐ More than 6 weeks	☐ More than 6 weeks	☐ More than 6 weeks

6. In your opinion, how concerned are you about feeling pain following surgery to the:

a. Neck?	Not concerned	Very concerned
b. Chest?	Not concerned	Very concerned
c. Belly?	Not concerned	Very concerned

7. Please indicate how well you expect post-operative pain to the following areas to be controlled by your health care team:

a. Neck	Very poorly controlled pain	Very well controlled pain
b. Chest	Very poorly controlled pain	Very well controlled pain
c. Belly	Very poorly controlled pain	Very well controlled pain

8. In your opinion, what do you think the risk of complications is following surgery to the:

a. Neck?	No risk of complications	Very high risk of complications
b. Chest?	No risk of complications	Very high risk of complications
c. Belly?	No risk of complications	Very high risk of complications

https://dx.doi.org/10.21037/ccts-22-10

9. In your opinion, what do you think is the risk of dying because of post-operative complications following surgery to the:

a. Neck?	No risk of dying	High risk of dying
b. Chest?	No risk of dying	High risk of dying
c. Belly?	No risk of dying	High risk of dying

10. In your opinion, how many activities of your daily life do you expect to be able to independently do following surgery to the:

a. Neck?	No activities of my daily living	All activities of my daily living
b. Chest?	No activities of my daily living	All activities of my daily living
c. Belly?	No activities of my daily living	All activities of my daily living

11. In your opinion, how long do you think it will take for you to fully recover following surgery to the:
Please add one (1) check mark to the box that applies to you. Example: ☑

a. Neck?	b. Chest?	c. Belly?
☐ Less than 6 weeks	☐ Less than 6 weeks	☐ Less than 6 weeks
☐ More than 6 weeks	☐ More than 6 weeks	☐ More than 6 weeks

12. In your opinion, how much anxiety or stress do you expect to feel following surgery to the:

a. Neck?	No stress or anxiety	The most stress or anxiety possible
b. Chest?	No stress or anxiety	The most stress or anxiety possible
c. Belly?	No stress or anxiety	The most stress or anxiety possible

13. In your opinion, how important is the size of incision(s) following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

https://dx.doi.org/10.21037/ccts-22-10

14. In your opinion, how important is the pain following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

15. In your opinion, how important is the risk of complication(s) following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

16. In your opinion, how important is the distance that you would need to travel to get surgery for the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

17. If you were to complete a survey for a research study again, would you prefer to take the survey on paper or as an electronic version (ex: iPad, e-mail)?
Please add only one (1) check mark to the box that applies to you. Example: ☑

☐ Paper version

☐ Electronic version

☐ No preference

THANK YOU VERY MUCH FOR TAKING THE TIME TO ANSWER THIS SURVEY!

https://dx.doi.org/10.21037/ccts-22-10

Appendix 2: Postoperative PPOMITS survey

Study ID _____
Survey ID _____

Study time point- Date (DD/MM/YYYY)_____

Survey II: Patient Perceptions of Surgery to the Lungs and Esophagus (Postoperative)

You have agreed to help us understand your view points on surgery to the lungs and esophagus and, by now, you should have had your surgery. These simple surveys are designed as part of our efforts to better understand your views on major surgery to the lungs or esophagus. It is our goal to be able to use the information you are kindly providing us to further advance cancer research. We hope that your contribution will serve to improve the care of all of our cancer patients.

1. What is your postal code? (This helps us estimate how far you live).
Please include the first 3 numbers and letters of your postal code in the following boxes.

☐ ☐ ☐

2. Did you feel pain following your surgery? Please mark your answer with an X on the line.

No pain ——— The worst possible pain

3. Do you currently feel pain in your: Please mark your answer with an X on the line.

a. Neck? No pain ——— The worst possible pain
b. Chest? No pain ——— The worst possible pain
c. Belly? No pain ——— The worst possible pain

The next few questions are designed to understand your perception and opinion regarding surgery to the neck, chest and belly. Even if you will not undergo each type of surgery, we are still interested in your opinion. <u>Please answer EACH question (NECK, CHEST, and BELLY), even though you may not undergo each type of surgery.</u>

4. In your opinion, how much pain do you think you would feel from having surgery to your :

a. Neck? No pain ——— The worst possible pain
b. Chest? No pain ——— The worst possible pain
c. Belly? No pain ——— The worst possible pain

https://dx.doi.org/10.21037/ccts-22-10

5. If you expect surgery to be painful, how long would you expect the pain to last following surgery to the: Please add one (1) check mark to the box that applies to you. Example: ☑

a. Neck?	b. Chest?	c. Belly?
☐ Less than 6 weeks	☐ Less than 6 weeks	☐ Less than 6 weeks
☐ More than 6 weeks	☐ More than 6 weeks	☐ More than 6 weeks

6. In your opinion, how concerned are you about feeling pain following surgery to the:

a. Neck?	Not concerned	Very concerned
b. Chest?	Not concerned	Very concerned
c. Belly?	Not concerned	Very concerned

7. Please indicate how well you expect post-operative pain to the following areas to be controlled by your health care team:

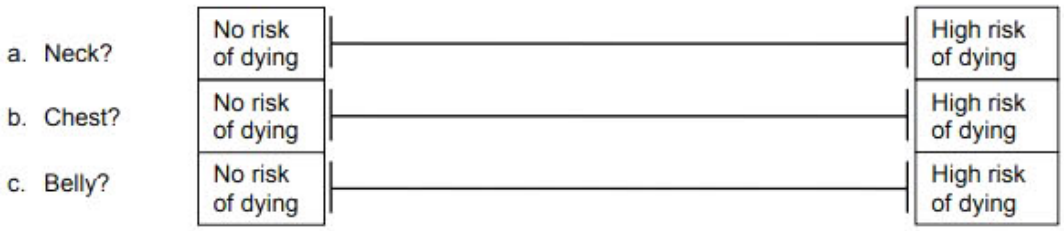
a. Neck	Very poorly controlled pain	Very well controlled pain
b. Chest	Very poorly controlled pain	Very well controlled pain
c. Belly	Very poorly controlled pain	Very well controlled pain

8. In your opinion, what do you think the risk of complications is following surgery to the:

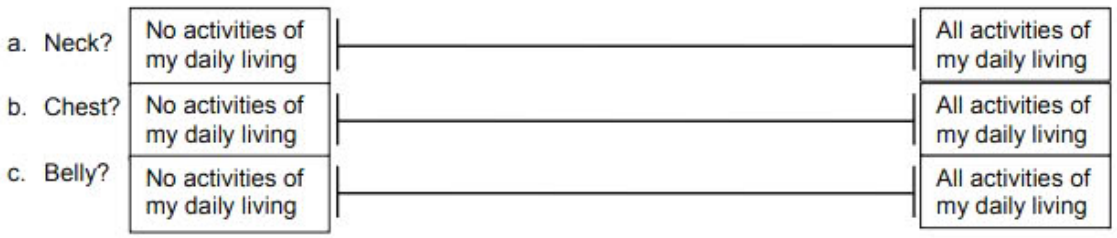
a. Neck?	No risk of complications	Very high risk of complications
b. Chest?	No risk of complications	Very high risk of complications
c. Belly?	No risk of complications	Very high risk of complications

https://dx.doi.org/10.21037/ccts-22-10

9. In your opinion, what do you think is the risk of dying because of post-operative complications following surgery to the:



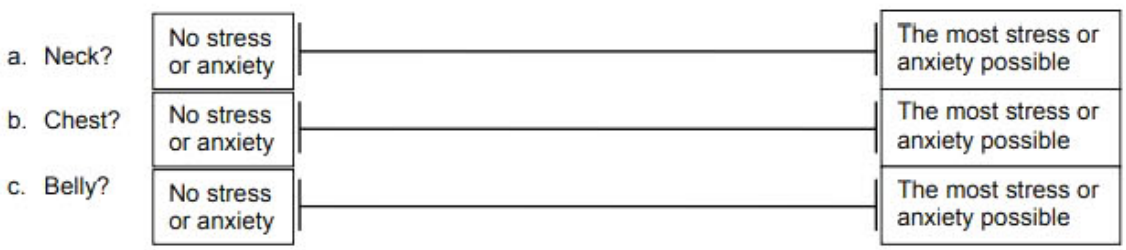
10. In your opinion, how many activities of your daily life do you expect to be able to independently do following surgery to the:



11. In your opinion, how long do you think it will take for you to fully recover following surgery to the:
Please add one (1) check mark to the box that applies to you. Example: ☑

a. Neck?	b. Chest?	c. Belly?
☐ Less than 6 weeks	☐ Less than 6 weeks	☐ Less than 6 weeks
☐ More than 6 weeks	☐ More than 6 weeks	☐ More than 6 weeks

12. In your opinion, how much anxiety or stress do you expect to feel following surgery to the:



https://dx.doi.org/10.21037/ccts-22-10

13. In your opinion, how important is the size of incision(s) following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

14. In your opinion, how important is the pain following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

15. In your opinion, how important is the risk of complication(s) following surgery to the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

16. In your opinion, how important is the distance that you would need to travel to get surgery for the:

a. Neck?	Not important	Very important
b. Chest?	Not important	Very important
c. Belly?	Not important	Very important

THANK YOU VERY MUCH FOR TAKING THE TIME TO ANSWER THIS SURVEY!

https://dx.doi.org/10.21037/ccts-22-10

Appendix 3: RAND 36-item Short Form Health Survey (RAND SF-36)-Version 1.0

The RAND 36-Item Health Survey

The RAND 36-Item Health Survey is designed to explore and understand eight key concepts that are important to our functioning:

1. Physical functioning,
2. Bodily pain,
3. Role limitations due to physical health problems,
4. Role limitations due to personal or emotional problems,
5. Emotional well-being,
6. Social functioning,
7. Energy/fatigue, and
8. General health perceptions.

Please answer every question to further understand your perception regarding your health and well-being.

1. In general, would you say your health is:	
Excellent	1
Very good	2
Good	3
Fair	4
Poor	5

2. Compared to one year ago, how would your rate your health in general now?	
Much better now than one year ago	1
Somewhat better now than one year ago	2
About the same	3
Somewhat worse now than one year ago	4
Much worse now than one year ago	5

The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?
(Circle One Number on Each Line)

	Yes, Limited a Lot	Yes, Limited a Little	No, Not limited at All
3. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports	[1]	[2]	[3]
4. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	[1]	[2]	[3]
5. Lifting or carrying groceries	[1]	[2]	[3]
6. Climbing several flights of stairs	[1]	[2]	[3]
7. Climbing one flight of stairs	[1]	[2]	[3]
8. Bending, kneeling, or stooping	[1]	[2]	[3]
9. Walking more than a mile	[1]	[2]	[3]
10. Walking several blocks	[1]	[2]	[3]
11. Walking one block	[1]	[2]	[3]
12. Bathing or dressing yourself	[1]	[2]	[3]

https://dx.doi.org/10.21037/ccts-22-10

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?
(Circle One Number on Each Line)

	Yes	No
13. Cut down the amount of time you spent on work or other activities	1	2
14. Accomplished less than you would like	1	2
15. Were limited in the kind of work or other activities	1	2
16. Had difficulty performing the work or other activities (for example, it took extra effort)	1	2

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?
(Circle One Number on Each Line)

	Yes	No
17. Cut down the amount of time you spent on work or other activities	1	2
18. Accomplished less than you would like	1	2
19. Didn't do work or other activities as carefully as usual	1	2

20. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
(Circle One Number)
Not at all 1
Slightly 2
Moderately 3
Quite a bit 4
Extremely 5
21. How much bodily pain have you had during the past 4 weeks?
(Circle One Number)
None 1
Very mild 2
Mild 3
Moderate 4
Severe 5
Very severe 6
22. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?
(Circle One Number)
Not at all 1
A little bit 2
Moderately 3
Quite a bit 4
Extremely 5

These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

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How much of the time during the past 4 weeks. . .
(Circle One Number on Each Line)

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
23. Did you feel full of pep?	1	2	3	4	5	6
24. Have you been a very nervous person?	1	2	3	4	5	6
25. Have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6
26. Have you felt calm and peaceful?	1	2	3	4	5	6
27. Did you have a lot of energy?	1	2	3	4	5	6
28. Have you felt downhearted and blue?	1	2	3	4	5	6
29. Did you feel worn out?	1	2	3	4	5	6
30. Have you been a happy person?	1	2	3	4	5	6
31. Did you feel tired?	1	2	3	4	5	6

32. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?
(Circle One Number)
All of the time 1
Most of the time 2
Some of the time 3
A little of the time 4
None of the time 5

How TRUE or FALSE is each of the following statements for you.
(Circle One Number on Each Line)

	Definitely True	Mostly True	Don't Know	Mostly False	Definitely False
33. I seem to get sick a little easier than other people	1	2	3	4	5
34. I am as healthy as anybody I know	1	2	3	4	5
35. I expect my health to get worse	1	2	3	4	5
36. My health is excellent	1	2	3	4	5

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