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Thoracic Surgery and Population Health: Efficacy of a Voluntary Smoking Cessation Quit Line Intervention in the Thoracic Surgical Clinic

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Background & Purpose

Smoking Quit Line (QL) programs utilizing free education and telephone counseling services have been well demonstrated to effectively promote smoking cessation in outpatient primary care settings. Given that active smoking increases pulmonary complications after thoracic surgery,[1] we sought to evaluate the efficacy of the voluntary California Smoker's Helpline (CSH) QL program in the setting of a thoracic surgery preoperative clinic and tested the hypothesis that patients undergoing surgery would have higher durability of smoking cessation after QL intervention compared historical non-surgical figures.

Design & Methods

We identified active smoking patients referred to the voluntary QL from a thoracic surgery preoperative clinic visit. We merged demographic, clinical, and perioperative data with QL data regarding participation in the program and success and durability of smoking cessation. Primary outcome was successful participation in the QL program. Secondary outcomes included smoking cessation preoperatively, and continued cessation at 1 month or the first postoperative visit and 6 months, postoperative complications, length of stay, and 30 day mortality. Demographic and clinical variables were compared with contingency tables and t-test analysis. Predictors of participation in the QL program were assessed with logistic regression modeling.

Analysis

Contingency table and t-test analysis were used to compare demographic and clinical outcomes. Logistic regression was used to evaluate predictors of participating in the QL program.

Results

Table 1: Demographics of patients referred to Quit Line, stratified by operation status

	Non-Operation n (%)	Operation n (%)	All n (%)	p-value
Patients	53 (48.2)	58 (51.8)	111 (100)	
Male	29 (54.7)	33 (56.9)	62 (55.9)	0.85
Age at Referral Date, mean ± SD	61.0 ± 10.9	62.6 ± 11.4	61.8 ± 11.2	0.357
18-39	2 (3.8)	2 (3.4)	4 (3.6)	<0.001
40-49	8 (15.1)	5 (8.6)	13 (11.7)	
50-59	10 (18.9)	13 (22.4)	23 (20.7)	
60-69	20 (37.7)	17 (29.3)	37 (33.3)	
70+	13 (24.5)	21 (36.2)	34 (30.6)	
Race				
White	31 (58.5)	53 (91.4)	84 (75.7)	<0.001
African American or Black	5 (9.4)	1 (1.7)	6 (5.4)	
American Indian or Alaska Native	2 (3.8)	1 (1.7)	3 (2.7)	
Asian	1 (1.9)	0	1 (0.9)	
Other	2 (3.8)	3 (5.2)	5 (4.5)	
Unknown	6 (11.3)	0	6 (5.4)	
Comorbidities				
Hypertension	26 (49.0)	40 (69.0)	66 (59.5)	0.036
Congestive Heart Failure	2 (3.8)	0 (0.0)	2 (1.8)	0.226
Coronary Artery Disease	3 (5.7)	12 (20.7)	15 (13.5)	0.026
Pulmonary Hypertension	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Interstitial Fibrosis	1 (1.9)	1 (1.7)	2 (1.8)	0.949
COPD	26 (49.1)	22 (37.9)	48 (43.2)	0.156
Steroids	8 (15.1)	5 (8.6)	13 (11.7)	0.086
Peripheral Vascular Disease	4 (7.5)	6 (10.3)	10 (9.0)	0.114
Diabetes	8 (15.1)	10 (17.2)	18 (16.2)	0.802
Pack-Years Of Cigarette Use, mean (SD)	44.9 ± 29.4	46.8 ± 30.6	45.9 ± 30.0	0.742
<25	13 (24.5)	14 (24.1)	27 (24.3)	
25-49	20 (37.7)	15 (25.9)	35 (31.5)	
50-74	11 (20.8)	13 (22.4)	24 (21.6)	
76-99	4 (7.5)	5 (8.6)	9 (8.1)	
100-124	1 (1.9)	4 (6.9)	5 (4.5)	
125-149	3 (5.6)	6 (10.3)	9 (8.1)	
Zubrod/ECOG				
0	3 (5.6)	4 (6.9)	7 (6.3)	0.173
1	21 (39.6)	44 (75.9)	65 (58.6)	
2	11 (20.8)	8 (13.8)	19 (17.1)	
3	2 (3.8)	1 (1.7)	3 (2.7)	
No data	17 (32.1)	1 (1.7)	18 (16.2)	

Table 2: Diagnosis and Operation Type for Operation Cohort

Column1	Participated in QL n (%)	Did Not Participate in QL n (%)	All Patients n (%)
Total Patients	33 (56.9)	25 (43.1)	58
Lung cancer	21 (63.6)	12 (48.0)	33 (56.9)
Lung nodule	1 (3.0)	2 (8.0)	3 (5.2)
Lung mass	2 (6.1)	1 (4.0)	3 (5.2)
Lung cyst	0	1 (4.0)	1 (1.77)
Interstitial lung disease	2 (6.1)	2 (8.0)	4 (6.9)
Esophageal cancer	3 (9.1)	6 (24.0)	9 (15.5)
Myasthenia gravis, thymic hyperplasia	1 (3.0)	1 (4.0)	2 (3.4)
Mediastinal Tumor	1 (3.0)	0	1 (1.7)
Tracheal tumor	1 (3.0)	0	1 (1.7)
Hiatal Hernia	1 (3.0)	0	1 (1.7)
Type of Surgery			
Total Lung	**29 (59.2)**	**20 (40.8)**	**49**
VATS lobectomy	11 (37.9)	12 (60.0)	23 (46.9)
VATS sublobar resection	8 (27.6)	6 (3.0)	14 (28.6)
VATS lymphadenectomy	2 (6.9)	0	2 (4.1)
VATS decortication	1 (3.4)	1 (5.0)	2 (4.1)
VATS pleurectomy	1 (3.4)	0	1 (2.0)
VATS mediastinal tumor resection	1 (3.4)	0	1 (2.0)
VATS thymectomy	0	1 (5.0)	1 (2.0)
Open lobectomy	2 (6.9)	0	2 (4.1)
Open sublobar resection	1 (3.4)	0	1 (2.0)
Open thymectomy	1 (3.4)	0	1 (2.0)
Chest wall tumor excision	1 (3.4)	0	1 (2.0)
Total Esophageal	**4 (44.4)**	**5 (55.5)**	**9**
Esophagectomy	3 (75.0)	5 (100.0)	8 (88.9)
Laparoscopic fundoplication	1 (25.0)	0	1 (11.1)

Table 3: Smoking Cessation Outcomes for Non-Operation Cohort

	n (%)	Successfully Quit n (%)	Smoke Free at 1 month n (%)	Smoke Free at 6 months n (%)
Participated in Quit Line	24 (45.3)	8/24 (33.3)	7/24 (29.2)	6/23 (26.1)
Did Not Participate in Quit Line	29 (54.7)	11/29 (37.9)	8/27 (29.6)	6/25 (24.0)
All Patients	53	19/53 (35.8)	15/51 (29.4)	12/48 (25.0)

On logistic regression modelling, there were no predictors of a referred patient to choose to enroll in the QL program, however having an operation increased the odds of smoke-free durability at the postoperative visit/1month by 2.6 x (p=0.005).

Table 4: Smoking Cessation Outcomes for Procedure Cohort

	n	Days between Quit and Surgery	Quit Preoperatively n (%)	Quit Postoperatively n (%)	Smoke Free at Postop n (%)	Smoke Free at 6 months n (%)
Participated in Quit Line	32 (55.2)	31.17	21/32 (65.6)	2/32 (6.3)	23/32 (71.9)	14/28 (50.0)
Did Not Participate in Quit Line	26 (44.8)	31.29	16/26 (61.5)	0	14/25 (56.0)	6/18 (33.3)
All	58	31.22	37/58 (63.8)	2/58 (3.4)	37/57 (64.9)	20/45 (44.4)

Table 5: Postoperative Pulmonary Complications

Variable	Quit Smoking n (%)	Did Not Quit n (%)	Both n (%)	p-value
Patients	37 (54.4)	21 (36.2)	58 (100)	
Composite Major Pulmonary Complications	11 (27.5)	4 (22.2)	15 (22.1)	0.535
Air Leak Greater Than Five Days	4 (10.8)	1 (4.8)	5 (8.6)	0.723
Atelectasis Requiring Bronchoscopy	1 (2.7)	1 (4.8)	2 (3.4)	0.840
Post-op-Pleural Effusion Requiring Drainage	1 (2.7)	0 (0.0)	1 (1.7)	0.745
Pneumonia	2 (5.4)	0 (0.0)	2 (3.4)	0.554
Adult Respiratory Distress Syndrome	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Respiratory Failure	1 (2.7)	0 (0.0)	1 (1.7)	0.745
Bronchopleural Fistula	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Pulmonary Embolus	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Pneumothorax	3 (8.1)	0 (0.0)	3 (5.2)	0.391
Initial Ventilator Support >48 Hours	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Reintubation	1 (2.7)	0 (0.0)	1 (1.7)	0.125
Tracheostomy	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Tracheobronchial Injury	0 (0.0)	0 (0.0)	0 (0.0)	N/A
Other Pulmonary Event	2 (5.4)	0 (0.0)	2 (3.4)	0.554
Unexpected Admission To ICU	2 (5.4)	1 (4.8)	3 (5.2)	0.649
Unexpected Return to the OR	2 (5.4)	1 (5.5)	3 (5.2)	0.964
Length of Stay, mean ± SD	5.9 ± 5.5	4.9 ± 3.1	5.5 ± 4.8	0.420
30 Day Mortality	0 (0.0)	0 (0.0)	0 (0.0)	N/A

Discussion

- Patients undergoing thoracic surgery were nearly twice as likely to quit smoking, regardless of QL referral.
- Smoke-free durability was comparable in non-operative patients regardless of participation in the QL program
- Operative patients had comparable preoperative quit-rates regardless of QL referral, but those participating in the QL had higher smoke-free durability at the postoperative visit and at 6 months, with rates higher than with CSHQL results (24% and 13% at 1 month and 6 months, respectively) in a general healthcare setting.[2]

Conclusions

- Patients undergoing a thoracic operation are more motivated to quit smoking.
- In-office preoperative smoking cessation counseling is effective, but durability improves with an adjunct such as referral to a QL program.
- As such, subspecialty clinicians can dramatically improve smoking cessation rates even in non-operative patients with appropriate outpatient counseling, and intervention.
- These results of an optional "Opt-In" QL referral program will serve as a comparison to our recently launched "Opt-Out" QL program in the thoracic surgery clinic.

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