Effect of Verbal Empathy and Touch on Anxiety Relief in Patients Undergoing Flexible Bronchoscopy: Can Empathy Reduce Patients' Anxiety?

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Key Words

Bronchoscopy · Anxiety · Empathy · Touch

Abstract

Background: Patients undergoing flexible bronchoscopy usually experience anxiety before and during the procedure. **Objectives:** We performed this study to investigate whether verbal empathy and intentional touch from a bronchoscopist could reduce anxiety in patients undergoing flexible bronchoscopy. **Methods:** We conducted a prospective randomized trial in a university-affiliated hospital. Participants were randomly assigned to one of the following groups: a control group, a verbal empathy group, or a verbal empathy and touch group. The staff pulmonologist performing bronchoscopy expressed verbal empathy and used touch by speaking to the patient (using predefined short statements) and making eye contact, and by laying his/her left hand on the patient's right shoulder. We assessed the level of patient anxiety with a visual analog scale before and after the intervention. **Results:** Participants were 267 patients with a median age of 65 years; 62.2% were men. Although there were no differences in changes in anxiety between the three groups, subgroup analysis of the visual an-

alog scale including participants with higher baseline anxiety (empathy and touch group participants with anxiety ≥ 60 mm; empathy group and empathy and touch group participants with anxiety ≥ 70 mm) showed a larger reduction in anxiety than the control group. **Conclusions:** Verbal empathy and touch given by a bronchoscopist before bronchoscopy reduced anxiety in patients with high baseline anxiety levels.

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Introduction

Patients undergoing medical tests or procedures usually experience anxiety caused by both the tests themselves and fear of the test results [1]. For patients, anxiety associated with procedures may constitute an obstacle to the seeking of proper medical care. For physicians, patient anxiety could form a barrier to the performance of successful medical examinations [2, 3].

Flexible bronchoscopy (FB) is an essential tool for the diagnosis and treatment of various pulmonary conditions [4] and is one of the most common procedures performed by pulmonologists. With the induction of sedatives and

Fig. 1. Flow diagram of the study. * Endo-bronchial biopsy, bronchial washing, brushing, bronchoalveolar lavage, or trans-bronchial lung biopsy.

local anesthetics, FB is generally tolerable for patients under conscious sedation [3, 5, 6]. However, like other invasive procedures, bronchoscopy makes patients anxious [7].

Previous attempts to relieve patients' anxiety and improve their satisfaction by the use of music/sound or art during the procedure have been ineffective [8, 9]. A systematic review reported that music reduced anxiety in patients during normal care delivery, but it had no impact on the anxiety in patients undergoing procedures or surgery [10]. One study reported that distraction therapy with nature sights and sounds provided before, during, and after FB did not reduce anxiety in patients undergoing the procedure, while it significantly reduced pain in the same population [8]. Another study also described that music during FB did not decrease procedure-related anxiety in the patients [9].

Many literatures described that empathy and physical contacts such as hand-holding or touch can enhance the satisfaction of patients, physician-patient communica-

tion, quality of care, and even health outcomes [11–13]. There is evidence that these interventions can reduce anxiety in patients undergoing procedures or surgery [14–16]. However, there is no study evaluating the effectiveness of empathy and touch on the level of anxiety in patients undergoing FB.

In this context, we performed this study to investigate whether bronchoscopists' verbal empathy and intentional touch could reduce anxiety in patients undergoing FB.

Materials and Methods

Participants

Patients aged 19 years or more undergoing FB in a university-affiliated hospital in South Korea between November 19, 2013 and September 12, 2014 were eligible for this study. Patients were excluded if they were undergoing endobronchial ultrasound or interventional bronchoscopy, admitted to the intensive care unit, or unable to communicate. Patients for whom bronchoscopy was performed in an outpatient setting and patients who had experi-

Fig. 2. Phases of the study.

enced bronchoscopy were previously also excluded from the study. All patients provided informed written consent, and the protocol was approved by the Institutional Review Board of Seoul National University Hospital (IRB No. H-1307-042-504) for the study period between September 25, 2013 and September 24, 2014. This trial was registered with clinicaltrials.gov (No. NCT02000245).

Study Design

The flow diagram and the phases of this study are shown schematically in figures 1 and 2, respectively. A prospective randomized trial including 3 arms was performed. Randomization sequence was created using SAS 9.1 software (SAS Institute, Inc., Cary, N.C., USA) and was stratified based on sex, on whether an additional diagnostic procedure during bronchoscopy (such as bronchoscopic biopsy) was expected to be performed or not, and on the bronchoscopy rooms (we have two bronchoscopy rooms in which different personnel work) by Medical Research Collaborating Center of Seoul National University Hospital with a 1:1:1 allocation using random block sizes of 3 and 6. The allocations were contained in opaque, sequentially numbered sealed envelopes. Participants were randomly assigned to one of the following groups: a control group, a verbal empathy group, or a verbal empathy and touch group by a nurse who was not involved in the study.

To express verbal empathy, all staff pulmonologists used the following memorized script to communicate (in Korean) with the patient, making eye contact, after patients had checked the baseline level of anxiety. We used a visual analog scale (VAS) to measure the level of patients' anxiety based on the previous studies evaluating anxiety of patients [9, 15, 17]. The results of the VAS were assessed by a technician who was blinded to group assignment.

'Hello, I am Dr. Jane Doe, a staff pulmonologist performing bronchoscopy today. You may feel anxious now. You might feel uncomfortable during the exam, but we are here with you, keeping an eye on you the whole time. Don't worry and relax please.'

(1) Control group: the staff pulmonologist did not say anything to the patient and did not touch him/her before the performance of bronchoscopy.

(2) Verbal empathy group: the staff pulmonologist used the script to express empathy with the patient, making eye contact but avoiding touch.

(3) Verbal empathy and touch group: the staff pulmonologist used the script to express empathy with the patient, simultaneously laying his/her left hand on the patient's right shoulder.

Bronchoscopy Procedure

Bronchoscopy was performed by a staff pulmonologist or by a pulmonary fellow under the close supervision of a staff pulmonologist in one of the two bronchoscopy rooms.

At least two well-trained nurses or technicians assisted the bronchoscopist during each procedure. The depth of sedation was assessed with the Modified Observer's Assessment of Alertness/Sedation Scale during the procedure [18]. For local anesthesia, aerosolized lidocaine (2%, 20 ml) was sprayed into the oropharynx before insertion of the bronchoscope, and lidocaine solution (1%, 5–10 ml) was instilled through the bronchoscope after advancing the bronchoscope through the vocal cords. Conscious sedation was induced using midazolam for patients who wanted to be sedated during bronchoscopy. Vital signs were monitored and procedure time, additional procedures, and drugs used during the bronchoscopy were all recorded.

Outcomes

The primary outcome was the difference in the extent of anxiety change (as measured by the VAS) between the control and verbal empathy groups, and between the control group and the verbal empathy and touch group. The VAS consisted of a 10-cm horizontal line with 0 at the left end (representing no anxiety) and 10 at the right end (representing extreme anxiety). Patients were asked to indicate their current level of anxiety by marking the line. Baseline anxiety was assessed when patients arrived in the bronchoscopy room by a technician blinded to the randomized allocation. The second anxiety assessment took place immediately before the bronchoscopy and was performed by the same personnel. The technician assessing anxiety was not involved in the study and the minimum time interval between the two VAS assessments was 10 min (fig. 2). Post hoc subgroup analysis including patients with higher baseline anxiety (≥ 50 , ≥ 60 , and ≥ 70 mm) was performed.

The secondary outcome was patients' satisfaction after the bronchoscopy. This was evaluated with a questionnaire that participants were asked to complete within 6 h of the bronchoscopy by a nurse blinded to the randomized allocation. The questionnaire evaluated patients' religion, level of education, comorbidities, and satisfaction (e.g., if the patient was willing to repeat the bronchoscopy if necessary). Patients' discomfort, such as pain, cough, and difficulty breathing during the bronchoscopy, was evaluated. A 5-point scale (definitely not, probably not, unsure, probably would, and definitely would) was used for most of the questions.

Table 1. Baseline characteristics of patients

	Control group (n = 90)	Verbal empathy group (n = 89)	Verbal empathy and touch group (n = 88)	p value
Median age, years (IQR)	65 (55–72)	65 (58–72)	66 (57–72)	0.962
Male	56 (62.2)	56 (62.9)	54 (61.4)	0.977
Body mass index	22.7±3.1	22.2±3.4	22.4±3.2	0.498
Religion				0.425
Christianity	23 (26.1)	21 (25.6)	22 (27.5)	
Catholicism	7 (8.0)	12 (14.6)	9 (11.3)	
Buddhism	12 (13.6)	17 (20.7)	16 (20.0)	
None	42 (47.7)	32 (39.0)	32 (40.0)	
Others	4 (4.5)	0 (0.0)	1 (1.3)	
Education				0.714
College	26 (29.5)	22 (26.8)	28 (35.0)	
High school	29 (33.0)	29 (35.4)	26 (32.5)	
Middle school	11 (12.5)	12 (14.6)	5 (6.3)	
Elementary school	5 (5.7)	2 (2.4)	5 (6.3)	
Others	17 (19.3)	17 (20.7)	16 (20.0)	
Comorbidity				
Hypertension	30 (34.1)	18 (22.0)	14 (17.5)	0.035
Diabetes mellitus	14 (16.1)	16 (19.5)	13 (16.3)	0.806
Liver disease	0 (0.0)	1 (1.2)	3 (3.8)	0.078
Stroke	0 (0.0)	3 (3.7)	0 (0.0)	0.066
Depression	1 (1.1)	0 (0.0)	0 (0.0)	1.000
Insomnia	0 (0.0)	3 (3.7)	1 (1.3)	0.123
Tumor	14 (15.9)	14 (17.1)	17 (21.3)	0.644
Asthma	3 (3.5)	0 (0.0)	4 (5.0)	0.116
Chronic obstructive lung disease	2 (2.3)	2 (2.4)	2 (2.5)	1.000
Bronchiectasis	3 (3.4)	1 (1.2)	2 (2.5)	0.783
Tuberculosis	9 (10.2)	3 (3.7)	10 (12.5)	0.117
Respiratory symptom				
Cough	36 (40.9)	32 (39.0)	34 (42.5)	0.903
Sputum	32 (36.4)	25 (30.5)	30 (37.5)	0.599
Dyspnea	23 (26.1)	20 (24.4)	21 (26.3)	0.954
Hemoptysis	17 (19.3)	7 (8.5)	11 (13.8)	0.128
Indication of FB				0.633
Suspicion of lung cancer	25 (27.8)	32 (36.0)	29 (33.0)	
Preoperative evaluation	19 (21.1)	17 (19.1)	18 (20.5)	
To identify infectious organisms	35 (38.9)	27 (30.3)	27 (30.7)	
Hemoptysis	6 (6.7)	5 (5.6)	4 (4.5)	
Interstitial lung disease	2 (2.2)	2 (2.2)	7 (8.0)	
Others ¹	3 (3.3)	6 (6.7)	3 (3.4)	
Median level of anxiety on the VAS (IQR)	37 (20–59)	30 (10–55)	30 (10–60)	0.682

Data are presented as n (%) or mean ± standard deviation unless otherwise indicated. IQR = Interquartile range. ¹ Atelectasis and chronic cough.

Sample Size Determination

A previous study assessing peribronchoscopy anxiety and satisfaction defined a change of 8 mm on the VAS as clinically significant, assuming that a clinically significant change in a health-related quality of life tool is equivalent to 8% of the theoretical range of the tool [17]. Sample size calculations were based on the primary outcome, the difference in the VAS change, which should

be 8 mm between the intervention and control groups. The pooled standard deviation was defined as 16.77 based on a previous study assessing changes in pain VAS [19]. A power calculation suggested that a total sample size of 267 patients would have 80% power to detect an 8-mm difference in VAS score change between the intervention groups and the control group at a significance level of $p < 0.025$ ($= 0.05/2$).

Table 2. Procedure-related variables

	Control group (n = 90)	Verbal empathy group (n = 89)	Verbal empathy and touch group (n = 88)	p value
Male bronchoscopist	57 (63.3)	55 (61.8)	52 (59.1)	0.841
Procedure				
Washing	54 (61.4)	54 (60.7)	54 (62.8)	0.958
Biopsy	23 (25.6)	22 (24.7)	17 (19.5)	0.593
Bronchoalveolar lavage	18 (20.0)	12 (13.5)	17 (19.5)	0.445
Transbronchial lung biopsy	1 (1.1)	2 (2.2)	0 (0.0)	0.660
Brushing	3 (3.3)	1 (1.1)	0 (0.0)	0.328
Oral insertion	88 (97.8)	87 (97.8)	85 (98.8)	>0.999
Procedure duration, min	10.8±5.9	11.1±7.7	10.1±6.3	0.573
Vital signs (before FB)				
Systolic blood pressure	127.2±20.5	131.4±22.2	128.6±19.0	0.385
Diastolic blood pressure	72.7±10.1	75.7±11.7	74.5±10.8	0.196
Heart rate	76.8±14.0	77.6±14.8	78.4±18.0	0.783
Respiratory rate	17.7±2.7	17.5±2.1	17.3±2.5	0.496
Oxygen saturation	97.2±2.5	97.5±2.3	97.5±2.2	0.523
Vital signs (after FB)				
Systolic blood pressure	135.7±24.5	142.2±23.6	141.1±22.6	0.151
Diastolic blood pressure	77.8±11.2	82.2±12.9	82.3±12.5	0.023
Heart rate	91.1±14.7	89.4±17.1	90.5±18.1	0.787
Respiratory rate	20.8±3.1	20.4±2.7	20.0±3.3	0.302
Oxygen saturation	96.5±2.4	96.9±2.3	97.0±2.4	0.306
Drugs				
Midazolam, mg	4.4±2.2	4.3±1.8	4.5±1.8	0.833
Lidocaine ¹ , mg	273±152	251±125	238±105	0.183
Flumazenil	43 (64.2)	34 (57.6)	42 (61.8)	0.750
Median MOAA/S score (IQR)	4 (1–5)	3 (1–5)	3 (1–5)	0.332

Data are presented as n (%) or mean ± standard deviation unless otherwise indicated. IQR = Interquartile range. ¹ Intrabronchial.

Statistical Analysis

The χ^2 test or Fisher's exact test were used to compare categorical variables and the Mann-Whitney U test for continuous variables. A p value of <0.05 was considered statistically significant. SPSS 19.0 statistical software (IBM Corp., Armonk, N.Y., USA) was used for analysis. Subgroup analysis was performed to evaluate the effect of baseline level of anxiety of the participants on the outcome.

Results

Baseline Characteristics of the Participants

A total of 267 patients were enrolled in this study. The median age was 65 years and 62.2% were men. There were no statistically significant differences in age, sex, body mass index, religion, level of education, and comorbidities between the three groups, except that hypertension was more common in the control group. The

most common respiratory symptoms were cough (40.8%) and sputum (34.8%). The main indications of bronchoscopy were to identify infectious organisms (33.3%) and suspicion of lung cancer (31.8%) (table 1). The baseline levels of anxiety before bronchoscopy were not different between groups of patients with different indications.

Procedure-Related Variables

A total of 209 (78.3%) patients underwent at least one bronchoscopic procedure including bronchial washing, endobronchial biopsy, bronchoalveolar lavage, transbronchial lung biopsy, and brushing. There were no differences in the type of procedure, insertion route (nose vs. mouth), and procedure duration. The amounts of instilled lidocaine and intravenously injected midazolam were also similar. The median sedation score on the Modified Observer's Assessment of Alertness/Sedation Scale

Table 3. Changes in anxiety VAS assessment

	Control group (n = 90)	Verbal empathy group (n = 89)	Verbal empathy and touch group (n = 88)	p value	
				control vs. empathy	control vs. empathy and touch
Change in VAS level					
Total	-0.31 (-2.9, 2.3)	-1.17 (-4.1, 1.8)	-1.89 (-5.7, 1.9)	0.285	0.431
Patients with baseline VAS ≥ 50 mm*	-5.29 (-9.5, -1.1)	-6.10 (-12.0, -0.2)	-12.05 (-19.0, -5.1)	0.526	0.153
Patients with baseline VAS ≥ 60 mm [†]	-4.95 (-10.8, 0.9)	-10.05 (-17.0, -3.1)	-16.20 (-24.8, -7.6)	0.157	0.039
Patients with baseline VAS ≥ 70 mm [‡]	-1.33 (-7.1, 4.4)	-14.08 (-22.1, -6.0)	-18.53 (-28.1, -8.9)	0.011	0.003
Patients with decreased VAS level					
Total	34 (37.8)	47 (52.8)	38 (43.2)	0.043	0.463
Baseline VAS ≥ 50 mm*	18 (52.9)	20 (66.7)	19 (63.3)	0.265	0.401
Baseline VAS ≥ 60 mm [†]	9 (40.9)	15 (75.0)	16 (72.7)	0.026	0.033
Baseline VAS ≥ 70 mm [‡]	4 (26.7)	11 (84.6)	14 (77.8)	0.002	0.003
Patients with decreased VAS level $\geq$ MCID					
Total	22 (24.4)	25 (28.1)	24 (27.3)	0.579	0.667
Baseline VAS ≥ 50 mm*	13 (38.2)	14 (46.7)	15 (50.0)	0.496	0.344
Baseline VAS ≥ 60 mm [†]	8 (36.4)	11 (55.0)	13 (59.1)	0.226	0.131
Baseline VAS ≥ 70 mm [‡]	4 (26.7)	9 (69.2)	11 (61.1)	0.024	0.048

Data are presented by n (%) or mean (95% confidence intervals) unless otherwise indicated. MCID = Minimal clinically important difference (= 8 mm). * n = 94 (control group = 34, verbal empathy group = 30, verbal empathy and touch group = 30); [†] n = 64 (control group = 22, verbal empathy group = 20, verbal empathy and touch group = 22); [‡] n = 46 (control group = 15, verbal empathy group = 13, verbal empathy and touch group = 18).

was similar for the control, empathy, and empathy and touch groups (4, 3, and 3, respectively, $p = 0.332$). Pre- and post-FB vital signs were similar, but the control group showed lower post-FB diastolic blood pressure ($p = 0.023$) (table 2).

Anxiety Change Measured with the VAS

There was no difference in anxiety VAS change (the primary outcome) between the control group and the verbal empathy group (-0.31 vs. -1.17, $p = 0.285$), and between the control group and the verbal empathy and touch group (-0.31 vs. -1.89, $p = 0.431$). Subgroup analysis including patients with baseline anxiety VAS ≥ 60 mm showed a greater decrease in anxiety in the empathy and touch group compared with the control group (-16.20 vs. -4.95, $p = 0.039$), although no statistical difference was found between the empathy group and the control group (-10.05 vs. -4.95, $p = 0.157$). Among those with baseline anxiety VAS ≥ 70 mm, the empathy and touch group (-18.53) and the empathy group (-14.08) showed a significant decrease in anxiety compared with the control group (-1.33, $p = 0.003$ and $p = 0.011$, respectively) (table 3).

Satisfaction and Symptoms Related to Bronchoscopy

Overall participant satisfaction was good and not significantly different between the three groups. Of those patients who indicated that they would be willing to return if necessary (including *definitely yes* and *probably yes* responses), 73 (83%) were in the control group, 71 (86.5%) in the empathy group, and 65 (81.3%) in the empathy and touch group ($p = 0.196$). There was no difference in satisfaction with prebronchoscopy information, feeling uncomfortable, pain, and cough during bronchoscopy between the three groups (table 4).

Discussion

FB is one of the most important procedures to identify various pathologic conditions in respiratory medicine. However, the procedure can cause patients' anxiety [7] because it is performed through the airway and may be accompanied by invasive procedures such as transbronchial lung biopsy. Addressing patients' anxiety is important because anxiety affects the tolerability and performance of the procedure, influences patients' satisfaction

Table 4. Patient satisfaction

	Control group (n = 90)	Verbal empathy group (n = 89)	Verbal empathy and touch group (n = 88)	p value
Willing to return				0.196
Definitely yes	68 (77.3)	64 (78.0)	55 (68.8)	
Probably yes	5 (5.7)	7 (8.5)	10 (12.5)	
Not sure	5 (5.7)	4 (4.9)	5 (6.3)	
Probably no	8 (9.1)	1 (1.2)	4 (5.0)	
Definitely no	2 (2.3)	6 (7.3)	6 (7.5)	
Satisfaction with prebronchoscopy information				0.386
Definitely yes	75 (85.2)	75 (91.5)	65 (81.3)	
Probably yes	6 (6.8)	3 (3.7)	4 (5.0)	
Not sure	4 (4.5)	1 (1.2)	3 (3.8)	
Probably no	3 (3.4)	3 (3.7)	5 (6.3)	
Definitely no	0 (0.0)	0 (0.0)	3 (3.8)	
Feeling uncomfortable upon insertion				0.213
Very uncomfortable	8 (9.1)	9 (11.0)	6 (7.5)	
Somewhat uncomfortable	9 (10.2)	9 (11.0)	9 (11.3)	
Not so uncomfortable	0 (0.0)	2 (2.4)	2 (2.5)	
Not uncomfortable at all	36 (40.9)	21 (25.6)	36 (45.0)	
I don't know	35 (39.8)	41 (50.0)	27 (33.8)	
Feeling uncomfortable (nose or mouth) now				0.732
Very uncomfortable	1 (1.1)	3 (3.7)	4 (5.0)	
Somewhat uncomfortable	19 (21.8)	13 (15.9)	17 (21.3)	
Not so uncomfortable	1 (1.1)	2 (2.4)	3 (3.8)	
Not uncomfortable at all	59 (67.8)	54 (65.9)	48 (60.0)	
I don't know	7 (8.0)	10 (12.2)	8 (10.0)	
Feeling pain during FB				0.393
Very painful	5 (5.7)	5 (6.2)	4 (5.0)	
Somewhat painful	6 (6.9)	3 (3.7)	4 (5.0)	
Not so painful	1 (1.1)	6 (7.4)	2 (2.5)	
Not painful at all	33 (37.9)	20 (24.7)	26 (32.5)	
I don't know	42 (48.3)	47 (58.0)	44 (55.0)	
Cough during FB				0.459
Very severe	2 (2.3)	2 (2.5)	5 (6.3)	
Intermittent	7 (8.0)	11 (13.6)	3 (3.8)	
Not much	3 (3.4)	3 (3.7)	4 (5.0)	
Rarely	12 (13.8)	9 (11.1)	13 (16.3)	
I don't know	63 (72.4)	56 (69.1)	55 (68.8)	
Breathing during FB				0.623
Very difficult	3 (3.5)	5 (6.2)	5 (6.3)	
Somewhat difficult	7 (8.1)	4 (4.9)	2 (2.5)	
Not so difficult	4 (4.7)	1 (1.2)	4 (5.0)	
Not difficult at all	9 (10.5)	11 (13.6)	7 (8.8)	
I don't know	63 (73.3)	60 (74.1)	62 (77.5)	

Data are presented as n (%).

in the quality of care, and might result in reduced compliance with medical treatment [20–22]. Previous studies using natural sights and sounds [8] or music [9] have failed to reduce the anxiety in patients undergoing FB.

Our findings here indicate that a verbal expression of empathy accompanied by the bronchoscopist's touch decreased anxiety among those patients undergoing bronchoscopy with higher baseline anxiety VAS scores.

Patients regard empathy as a key component of the therapeutic relationship and quality of care [23]. Empathy is also a basic constituent of a good doctor-patient relationship, which improves the quality of care and treatment outcomes [12, 13] and helps relieve patient anxiety. One previous study reported that patients who perceived their physician as empathic reported lower levels of anxiety [24]. In another randomized controlled trial, a standardized videotape intervention featuring enhanced physician compassion significantly decreased viewers' anxiety [14].

Physical contact is also effective in reducing patients' anxiety and improving their emotional state. In one previous study, hand-holding during cataract surgery under local anesthesia was found to reduce patients' anxiety [15], and several nursing studies have reported that provision of intentional touch empowered patients and had positive effects on their emotions and feelings [25, 26].

In this study, the anxiety-relieving effects of verbal empathy and touch were observed only in participants with higher baseline anxiety levels. There was an effect of verbal empathy accompanied by intentional touch in participants with baseline anxiety on the VAS of ≥ 60 mm, and verbal empathy with touch as well as verbal empathy without touch reduced anxiety in participants with baseline anxiety on the VAS of ≥ 70 mm. This observation can be understood in the context of previous studies suggesting that patients with higher preintervention anxiety lev-

els are more vulnerable to the aggravation of anxiety, or more susceptible to anxiety relief by intervention [17, 27, 28].

The lack of an effect for verbal empathy and touch among all the participants may be explained by the study's limitations. First, the form of verbal expression we used, lasting about 25 s, may have been too short to reveal physicians' empathy. In a previous study that reported positive results of verbal empathy, the duration of expression of enhanced compassion was approximately 40 s [14]. In addition, our verbal empathy was a one-way expression rather than interaction with participants. The intensity and duration of touch may also not have been sufficient to indicate physicians' empathy. Physicians simply placed a hand on the patient's shoulder while expressing verbal empathy, which took approximately 25 s. In one previous study that reported a positive effect of hand-holding on patients' anxiety, the nurse practitioner held the patient's hand throughout the surgery [15]. Second, the bronchoscopist providing verbal empathy and touch was not the participants' duty physician in the majority of the cases. In those cases, participants had met the bronchoscopist for the first time; this could have been a barrier to showing empathy.

In conclusion, verbal empathy and touch provided before bronchoscopy reduced anxiety in patients with high baseline anxiety levels. Further research is needed to test other interventions to relieve patients' anxiety while undergoing bronchoscopy or other medical procedures.

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