

# Assessment of patients' satisfaction with flexible bronchoscopy: Initial Egyptian experience

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**Introduction** Data regarding the patients' satisfaction with flexible bronchoscopy (FB) in our country, which is the major driving force in defining our practice, are lacking and have not been studied. We aimed to assess our patients' satisfaction with FB.

**Materials and methods** Prospective administration of a questionnaire assessing patients' evaluations of various aspects of their bronchoscopy experience, overall satisfaction, tolerance and willingness to return for another FB was carried out with inclusion of 115 patients in the analysis.

**Results** The pre-FB and final post-FB information were positively rated in 93.9 and 89.6% of patients, respectively. The nursing attitudes towards patients before, during and after FB were positive in 98, 98 and 95% of patients, respectively, whereas the doctors' attitude before, during and after FB was positive in 99, 100 and 98% of patients, respectively. Patients' tolerance to examination on a 10-cm visual analogue scale was 7.22. The overall positive patient satisfaction with FB was 89.6%, but only 25.2% of patients would (definitely or probably) return for repeat FB. Stepwise logistic multiregression analysis showed that both (very

good) final information and (very good) doctor's attitude after the procedure are the most sensitive discriminators for prediction of a patient with maximum satisfaction ( $P < 0.0001$ ). Scope insertion through tracheostomy and tolerance to the examination by visual analogue scale were significant predictors associated with a likelihood of definitely returning for a repeat FB if needed.

**Conclusion** Our results show that, although the majority of studied patients were satisfied with different aspects of their FB examination, only a minority would repeat this experience if needed. *Egypt J Broncho* 2013 7:71–77  
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**Keywords:** flexible bronchoscopy, patient satisfaction, willingness to repeat

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## Introduction

Since its development nearly 40 years ago [1], flexible bronchoscopy (FB) became widely available armamentarium commonly used by pulmonologists around the world. FB is an extremely safe procedure as long as basic precautions are taken [2]. A recent survey on FB practice in Cairo [3] reported a mortality rate of 0.01%, which was similar to other multicentre studies [4,5]. In contrast, the overall complication rates (3%) were extremely higher in this survey compared with that in the previously mentioned multicentre studies (0.08–0.3%) [4,5]. These higher adverse event rates in our country may be reflected on the patient experience with FB procedure.

Current FB literature reflects an emphasis on the technologic aspects, diagnostic yield and adverse events of FB rather than the patient-centred outcomes [6–8]. Despite the direct relevance to patients, there has been a dearth of international research directed towards the patient experience and satisfaction with FB [9]. In the increasingly competitive healthcare environment, consumers and healthcare administrators have realized that patient satisfaction is an important goal [10]. However, no universal method of testing patient satisfaction is approved in the literature [11–13].

Controlled comparisons of patient satisfaction between settings have rarely been conducted. In addition, no precise knowledge exists about the association between demographic variables, diagnosis and patient satisfaction [11,13,14]. Few studies have examined patient satisfaction with FB and found that favourable patient satisfaction during bronchoscopy is related to better health status, less discomfort from scope insertion, shorter examination time, better patient ratings on the information quality, better patient ratings for bronchoscopists and being less bothered by coughing, pharyngeal pain or swallowing pain [15–17].

In developing countries such as Egypt, weakened and overloaded health systems threaten the quality of care and patient satisfaction levels, which can, in turn, affect the bronchoscopy practice. To our knowledge, there are no data on patients' satisfaction with FB undergoing the procedure in our country. The aim of this study was to assess the patients' satisfaction with FB.

## Materials and methods

All adult ( $\geq 18$  years old) patients undergoing FB in Ain Shams University Hospitals, Cairo, Egypt during the period from March 2011 to March 2012 were included

in a prospective longitudinal cohort study to assess the patients' satisfaction with FB. All patients completed a standardized questionnaire form 1–48 h after FB. Exclusion criteria included previous undergoing FB, endotracheal intubation, mechanical ventilation and inability to answer or to complete the questionnaire. FB was performed in all patients under topical lidocaine anaesthesia, supplemental oxygen and pulse oximetry monitoring, according to the national and international standards of practice [3,18]. Conscious sedation was administered when needed as judged by the bronchoscopist. Approval was obtained from the local institutional board (Research Ethics Committee at the Faculty of Medicine, Ain Shams University, FWA 00017858, FMASU1262/2012).

All patients completed an Arabic questionnaire adapted from previous study on patients' satisfaction with FB (15,16) aided by an independent physician not related to the study when needed by the patients. The questionnaire included one question about patients' self-impression on his current state of health (Table 1) and 10 questions about patients' evaluations of various aspects of their bronchoscopy experience (Table 3). Each question was answered with a satisfaction scale including very good, good, fair and poor, corresponding to a point scale from 0 to 3, respectively. In addition, the questionnaire included the post-FB procedure symptom (frequencies and whether they bothered the patient or not) inquiry (Table 4) and patient-reported willingness to return for another FB. This willingness was measured using a five-point scale (definitely not, probably not, unsure, probably would and definitely would return). Visual analogue scale (VAS) was used to test tolerance to the examination on a 10 cm horizontal straight line. The end anchors of the scale were labelled as extreme boundaries of the sensation being evaluated. The tolerance to the examination on VAS (10 = very satisfactory; 0=totally unsatisfactory) as well as recall of the procedure on VAS (0 = do not recall any part of the procedure completely; 10=recall all parts of the procedure completely) were scored independently by the patients.

The following data were collected: sex, age, weight, height, level of education, smoking habits, comorbid illness, admission status (inpatient or outpatient), duration of the procedure, route of insertion, doses of midazolam and lidocaine, the different procedures performed during bronchoscopy and years of experience of the bronchoscopists. In addition, the exact time of performing the questionnaire after the FB procedure was recorded.

#### Statistical analysis

Standard statistical methods were applied. IBM SPSS statistics (V. 21, 2012; IBM Corp., Chicago, USA) was used for data analysis. Data were expressed as mean±SD

**Table 1 Patients' baseline characteristics**

|  |               |
|--|---------------|
| Age (mean ± SD)  | 49.22 ± 13.74 |
| Sex [n (%)]  |               |
| Male   | 91 (79.1)     |
| Female   | 24 (20.9)     |
| Body weight (kg) (mean±SD)                                   | 77.4 ± 13.37  |
| BMI (mean±SD)  | 27.69 ± 4.47  |
| Smoking habits [n (%)]                                       |               |
| Nonsmoker  | 32 (27.83)    |
| Current smoker   | 46 (40)       |
| Ex-smoker  | 37 (32.17)    |
| Comorbidities [n (%)]  |               |
| DM   | 12 (10.43)    |
| HTN  | 14 (12.17)    |
| DM and HTN   | 9 (7.83)      |
| Others   | 4 (3.48)      |
| No   | 77 (66.96)    |
| Level of education [n (%)]                                   |               |
| Illiterate   | 20 (17.39)    |
| Primary school   | 10 (8.70)     |
| Preparatory school   | 21 (18.26)    |
| Secondary school   | 16 (13.91)    |
| Institute  | 29 (25.27)    |
| Bachelors  | 19 (16.52)    |
| Admission status [n (%)]                                     |               |
| Inpatient  | 35 (30.43)    |
| Outpatient   | 80 (69.57)    |
| Patients' self-impression on current state of health [n (%)] |               |
| Very good  | 15 (13.04)    |
| Good   | 58 (50.43)    |
| Fair   | 35 (30.43)    |
| Poor   | 7 (6.09)      |

Data are presented as number and percentage unless otherwise indicated. DM, diabetes mellitus; HTN, hypertension.

for quantitative parametric measures in addition to both number and percentage for categorized data. Stepwise logistic multiregression analysis was used to search for a panel (independent parameters) that can predict the target parameter (dependent variable). Using logistic stepwise multiregression analysis, we can obtain the most sensitive panels that can predict the dependent variable. They were sorted according to their sensitivity to discriminate on the basis of their *P* values.

We hypothesized that there were a number of factors that could potentially affect patient decisions to return for bronchoscopy. To understand what contributed to the willingness to return for a repeat FB, we developed the regression models. These examined patient factors and care factors and their relationship to returning, and they also examined the association of other patient-reported outcomes with willingness to return.

## Result

### Study population characteristics and flexible bronchoscopy procedure

During the study period from March 2011 to March 2012,

117 eligible patients were identified. In all, 115 patients completed the questionnaire and were considered the study population, whereas two patients refused to share their views. Patient's detailed baseline characteristics and self-impression on his current state of health are shown in Table 1. The FB procedure data details are highlighted in Table 2.

**Patients' evaluations of their experience with flexible bronchoscopy procedure**

Patients' evaluations of various aspects of the bronchoscopy experience are shown in Table 3. The overall positive satisfaction with FB (98.6%) was very good, good and fair in 6.96, 46.96 and 35.65% of patients, respectively, and it was poor in only 10.43% of patients. Final information given about how to obtain test results (Table 3, question 9) was very good, good and fair in 6.09, 44.35 and 39.13% of patients, respectively.

Patients positively rated the doctor's attitude after FB as very good, good and fair (21.74, 51.30 and 25.22%, respectively). The median timing of performing the questionnaire was 2.68 ± 1.001 h (range 1.0–6.0 h) after FB.

The median patient tolerance score to the examination was 7.22 using VAS (the tolerance score to the examination on VAS was 10 for very satisfactory and 0 for totally unsatisfactory), whereas the median score for patient recall of FB procedure was 8.35 using VAS (score for recall of the procedure on VAS was 0 if patient does not recall any part of the procedure completely and 10 if patient recalls all parts of the procedure completely).

**Patients' reported symptoms**

Post-FB procedure symptom frequencies are shown in Table 4, whether or not they bothered the patient. The most frequently reported symptoms were taste of anaesthesia (100%), coughing (73.04%), haemoptysis (57.39%) and throat pain (49.57%).

**Measures of patient satisfaction**

The overall satisfaction with FB was related to the

doctor's attitude after the procedure (Table 3, question 7) and the final information given (Table 3, question 9) as shown in Tables 5 and 6, respectively. Stepwise logistic multiregression analysis showed that both (very good) final information and (very good) doctor's attitude after the procedure are the most sensitive discriminators for prediction of a patient with maximum satisfaction ( $P < 0.0001$ ) as shown in Table 7.

**Willingness to return for repeat bronchoscopy**

The percentage of patients who reported that they would definitely return if they needed to repeat FB was 1.74% (2/115), whereas 23.48% (27/115) of patients would probably return, 35.65% (41/115) were unsure, 25.22% (29/115) would probably not and 13.91% (16/115) would definitely not return, if they needed to repeat FB (Fig. 1).

**Table 2 Flexible bronchoscopy procedures data**

| Indications for FB [n (%)]                      |                 |
|---|-----------------|
| Suspected cancer                                | 58 (50.43)      |
| Infiltrates                                     | 23 (20)         |
| Haemoptysis                                     | 21 (18.26)      |
| Others  | 16 (13.91)      |
| Scope insertion [n (%)]                         |                 |
| Nasal   | 106 (92.17)     |
| Oral  | 6 (5.22)        |
| Tracheostomy                                    | 3 (2.61)        |
| Sampling method [n (%)]                         |                 |
| BAL   | 15 (13.04)      |
| Brush   | 9 (7.83)        |
| BW  | 88 (76.52)      |
| TBx   | 4 (3.48)        |
| TBNA  | 15 (13.04)      |
| Bx  | 54 (46.95)      |
| Mean volume of lidocaine (mg)                   | 224.26 ± 11.399 |
| Mean midazolam dose (mg) when used <sup>a</sup> | 3.18 ± 1.42     |
| Duration of bronchoscopy (min)                  | 20.31 ± 8.79    |
| Years of experiences of bronchoscopist          | 7.75 ± 4.80     |

Data are presented as number and percentage unless otherwise indicated. BAL, bronchoalveolar lavage; BW, bronchial wash; Bx, bronchial biopsy; FB, flexible bronchoscopy; TBNA, transbronchial needle aspiration biopsy; TBx, transbronchial lung biopsy. <sup>a</sup>Midazolam was used only in 28 patients [28/115=24.35%].

**Table 3 Patients' evaluations of various aspects of the bronchoscopy experience**

| Questions  | Very good [n (%)] | Good [n (%)] | Fair [n (%)] | Poor [n (%)] |
|--|-------------------|--------------|--------------|--------------|
| How was preinformation before FB?                    | 19 (16.52)        | 50 (43.48)   | 39 (33.91)   | 7 (6.09)     |
| How was nursing before FB?                           | 15 (13.04)        | 69 (60)      | 29 (25.22)   | 2 (1.74)     |
| How was nursing during FB?                           | 23 (20)           | 61 (53.04)   | 29 (25.22)   | 2 (1.74)     |
| How was nursing after FB?                            | 10 (8.70)         | 57 (49.57)   | 43 (37.39)   | 5 (4.35)     |
| How was doctor's attitude before FB?                 | 36 (31.30)        | 51 (44.35)   | 27 (23.48)   | 1 (0.87)     |
| How was doctor's attitude during FB?                 | 34 (29.57)        | 63 (54.78)   | 18 (15.65)   | 0 (0)        |
| How was doctor's attitude after FB?                  | 25 (21.74)        | 59 (51.30)   | 29 (25.22)   | 2 (1.74)     |
| How did you tolerate the scope insertion?            | 5 (4.35)          | 36 (31.30)   | 55 (47.82)   | 19 (16.52)   |
| How was the final information after FB? <sup>a</sup> | 7 (6.09)          | 51 (44.35)   | 45 (39.13)   | 12 (10.43)   |
| What is your overall satisfaction with FB?           | 8 (6.96)          | 54 (46.96)   | 41 (35.65)   | 12 (10.43)   |

FB, flexible bronchoscopy. <sup>a</sup>Final information was given about what was found during the procedure, what to expect after the procedure and how to obtain the test results.

**Table 4 Patient's reported symptoms**

| Symptoms                 | Number and frequencies<br>[n (%)] | Bothered<br>[n (%)] | Not bothered<br>[n (%)] |
|--------------------------|-----------------------------------|---------------------|-------------------------|
| Taste of anaesthesia     | 115 (100)                         | 83 (72.17)          | 32 (27.83)              |
| Cough                    | 84 (73.04)                        | 40 (47.62)          | 44 (52.38)              |
| Haemoptysis              | 66 (57.39)                        | 16 (24.24)          | 50 (75.76)              |
| Throat pain              | 57 (49.57)                        | 21 (36.84)          | 36 (63.16)              |
| Swallowing pain          | 56 (48.70)                        | 19 (33.93)          | 37 (66.07)              |
| Numbing/pain in nose     | 42 (36.52)                        | 21 (50)             | 21 (50)                 |
| Difficulty in swallowing | 40 (34.78)                        | 13 (32.50)          | 27 (67.50)              |
| Wheezes                  | 32 (27.83)                        | 28 (87.50)          | 4 (12.50)               |
| Cough phlegm             | 27 (23.48)                        | 10 (37.04)          | 17 (62.96)              |
| Shortness of breath      | 23 (20)                           | 21 (91.31)          | 2 (8.69)                |
| Chest pain               | 21 (18.26)                        | 10 (47.62)          | 11 (52.38)              |
| Choking sensation        | 18 (15.65)                        | 15 (83.33)          | 3 (16.67)               |
| Nose bleeding            | 18 (15.65)                        | 14 (77.78)          | 4 (22.22)               |
| Fever                    | 13 (11.30)                        | 6 (46.15)           | 7 (53.85)               |
| Chills                   | 9 (7.83)                          | 3 (33.33)           | 6 (66.67)               |
| Vomiting                 | 6 (5.22)                          | 5 (83.33)           | 1 (16.67)               |

**Table 5 Relationship between the overall satisfaction with flexible bronchoscopy and the final information given**

|                               | Overall satisfaction |       |       |       |       |
|-------------------------------|----------------------|-------|-------|-------|-------|
|                               | Very good            | Good  | Fair  | Poor  | Total |
| Final information             |                      |       |       |       |       |
| Very good                     |                      |       |       |       |       |
| Count                         | 1                    | 6     | 0     | 0     | 7     |
| % within overall satisfaction | 12.5                 | 11.1  | 0.0   | 0.0   | 6.1   |
| Good                          |                      |       |       |       |       |
| Count                         | 7                    | 32    | 11    | 1     | 51    |
| % within overall satisfaction | 87.5                 | 59.3  | 26.8  | 8.3   | 44.3  |
| Fair                          |                      |       |       |       |       |
| Count                         | 0                    | 12    | 28    | 5     | 45    |
| % within overall satisfaction | 0.0                  | 22.2  | 68.3  | 41.7  | 39.1  |
| Poor                          |                      |       |       |       |       |
| Count                         | 0                    | 4     | 2     | 6     | 12    |
| % within overall satisfaction | 0.0                  | 7.4   | 4.9   | 50.0  | 10.4  |
| Total                         |                      |       |       |       |       |
| Count                         | 8                    | 54    | 41    | 12    | 115   |
| % within overall satisfaction | 100.0                | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>P</i> *                    |                      |       | 0.000 |       |       |

\*Using the Pearson  $\chi^2$ -test, there was highly significant positive statistical correlation [ $P = 0.000$ ].

#### Factors associated with willingness to return for repeat flexible bronchoscopy

Stepwise logistic multiregression analysis showed that the most sensitive discriminators for prediction of a patient who would definitely return for a repeat FB are site of scope insertion (tracheostomy vs. mouth or nose) and tolerance to the examination assessed by the VAS score (Table 8). The likelihood of definitely returning was higher when the bronchoscope was inserted through tracheostomy rather than when it was inserted through the mouth or nares.

These results are significant predictors of patient

**Table 6 Relationship between the overall satisfaction with flexible bronchoscopy and the doctor's attitude after the procedure**

|                                       | Overall satisfaction |       |       |       |       |
|---------------------------------------|----------------------|-------|-------|-------|-------|
|                                       | Very good            | Good  | Fair  | Poor  | Total |
| Doctor's attitude after the procedure |                      |       |       |       |       |
| Very good                             |                      |       |       |       |       |
| Count                                 | 5                    | 16    | 3     | 1     | 25    |
| % within overall satisfaction         | 62.5                 | 29.6  | 7.3   | 8.3   | 21.7  |
| Good                                  |                      |       |       |       |       |
| Count                                 | 2                    | 29    | 23    | 5     | 59    |
| % within overall satisfaction         | 25.0                 | 53.7  | 56.1  | 41.7  | 51.3  |
| Fair                                  |                      |       |       |       |       |
| Count                                 | 1                    | 9     | 15    | 4     | 29    |
| % within overall satisfaction         | 12.5                 | 16.7  | 36.6  | 33.3  | 25.2  |
| Poor                                  |                      |       |       |       |       |
| Count                                 | 0                    | 0     | 0     | 2     | 2     |
| % within overall satisfaction         | 0.0                  | 0.0   | 0.0   | 16.7  | 1.7   |
| Total                                 |                      |       |       |       |       |
| Count                                 | 8                    | 54    | 41    | 12    | 115   |
| % within overall satisfaction         | 100.0                | 100.0 | 100.0 | 100.0 | 100.0 |
| <i>P</i> *                            |                      |       | 0.000 |       |       |

\*Using the Pearson  $\chi^2$ -test, there was highly significant positive statistical correlation [ $P = 0.000$ ].

**Table 7 Stepwise logistic multiregression analysis between both final information given and the doctor's attitude after the procedure with maximum satisfaction**

| Parameters                            | Regression coefficient | <i>P</i> | Significance |
|---------------------------------------|------------------------|----------|--------------|
| Final information                     | +0.4614                | 0.00000  | HS           |
| Doctor's attitude after the procedure | +0.2684                | 0.00216  |              |

HS, highly significant.

**Table 8 Multivariable analyses to predict the likelihood of returning for repeat flexible bronchoscopy**

| Parameters   | Regression coefficient | <i>P</i> | Significance |
|--|------------------------|----------|--------------|
| Scope insertion through tracheostomy (as against mouth or nares) | +0.6344                | 0.00435  | HS           |
| Tolerance to FB <sup>a</sup>                                     | +0.2665                | 0.00000  |              |

FB, flexible bronchoscopy; HS, highly significant. <sup>a</sup>Assessed by visual analogue scale.

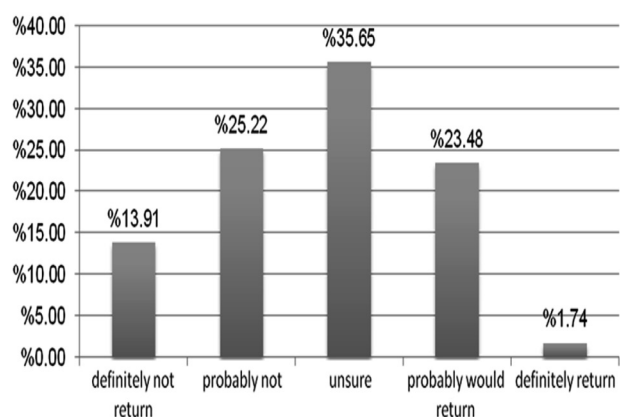
satisfaction after adjusting for other factors, including medication use, age, sex, weight, height, education, health status, indication of FB and bronchoscopy sampling methods. The presence of pain, coughing phlegm, haemoptysis, nasal bleeding and chills was negatively associated with a willingness to return for repeat FB, although the association was not statistically significant ( $P > 0.05$ ).

#### Discussion

This is the first prospective study to assess patients' satisfaction with FB in Egypt. The results of this study showed that the overall positive patient satisfaction with



Fig. 1



Patients' reports of willingness to return for repeat bronchoscopy.

FB was 89.6%. In contrast, only 25.2% of patients would (definitely or probably) return for repeat FB if needed. Scope insertion through tracheostomy and tolerance to the examination by VAS were significant predictors associated with a likelihood of definitely returning for a repeat FB if needed.

Patient tolerance to invasive procedures is emphasized more nowadays, as it is an important aspect of service quality [10,12,19]. However, no universal method for measuring patient satisfaction exists, which limits the possibility of comparing studies [11–13].

In the present study, quantification of patient satisfaction with FB utilizing direct question – ‘What is your overall satisfaction with FB?’ – showed that the overall positive patient satisfaction with FB was 89.6%. Comparable overall patient satisfaction with FB (98%) was obtained by Bernasconi *et al.* [16] utilizing the same direct question. However, quantification of patient satisfaction through indirect question ‘willingness to return for repeated FB’ showed that only 25% of our studied patients would return for repeat FB. It has been previously emphasized that patient satisfaction is closely associated with willingness to return for the procedure if needed again [20]. However, asking that question to the patient seems hypothetical, as the indications for repeat bronchoscopy is rare and the bronchoscopist always concentrates on fulfilling the goals of the procedure rather than improving patient satisfaction [21]. In addition, the willingness to repeat FB cannot be taken solely as an indicator of patient satisfaction, as other factors may influence the decision to repeat, such as the cost of the procedure, insurance coverage and the proximity of service. Compromising any aspect of diagnostic or therapeutic manoeuvres solely for enhanced patient satisfaction would be impractical [21].

There are wide variations in the level of overall willingness to return for a FB in the literature (13–98%) [15,16,22–25].

This might be attributed, in part, to the cultural and geographical factors. Lower range of results (13 and 25%) was observed in a Korean study [22] and current Egyptian study, respectively, whereas higher range of results (41, 65, 72, 93 and 98%) was observed in Spanish, Japanese, Indian, North American and Swiss studies, respectively [15,16,24,25]. In addition, no or seldom use of sedative and/or analgesic in some studies may explain these wide variations [22–24]. In the current study, several explanations are possible for low (25%) overall willingness to return for a FB. First, a sedative premedication for FB was used only in 24% of studied patients. In fact, the use of sedation is associated with improved overall tolerance, patient perception and willingness to return for a FB [26,27]. Second, our question about willingness to return did not include the clause, ‘if necessary’, which might have reflected the patient responses that were more emotional than rational [22].

This study showed that both (very good) final information given and (very good) doctor's attitude after FB are predictors for the patients with maximum satisfaction. Similar association between the information provided to patients and patient satisfaction has been found in bronchoscopy and other settings such as gastrointestinal procedures [15,28]. Not only the prebronchoscopy and immediate postbronchoscopy information provided increased patient satisfaction [15,18], but also a postbronchoscopy visit 24 h after the FB significantly improved patient tolerance to FB without changing the procedure technique [22]. In addition, the doctor's attitude towards his patient has led to better patient ratings of the physician quality and hence the patients may be more satisfied with the procedure [15,22]. Thus, clinicians should attempt to provide more attentive patient care and information and should have positive attitudes to improve patient satisfaction with FB.

In our study, there were two factors that were significantly associated with a likelihood of definitely returning for a repeat FB: scope insertion through tracheostomy and tolerance to the examination assessed by VAS. Less discomfort from scope insertion has been previously associated with willingness to return for repeat FB [15]. Thus, the finding of definitely returning was higher when the bronchoscope was inserted through tracheostomy. Insertion of bronchoscope through nose or mouth is associated with pain, trauma and gag reflex. Whether FB is best performed through the transnasal or transoral approach has been debated by the experienced bronchoscopists [29,30].

Previous studies have utilized patient VAS score of tolerance to specific symptomatology as a measurement for satisfaction with FB [17,26]. Hadzri *et al.* [17] reported that VAS score for cough perception is the most reliable

subjective measurement of patient satisfaction level. In addition, other studies have correlated the degree of FB tolerance with patient satisfaction with or without sedation use [23,27]. Thus, previous findings could enlighten the higher VAS score to tolerance as predictor of willingness to return for repeat FB in the current study. Many other factors such as age, male sex, disease districts, diagnostic procedures, bronchoscope sizes, procedure durations, preprocedure anxiety and health status are all reportedly associated with patient tolerance and satisfaction and sometimes independently predict the decision to return for repeat FB if necessary [15,16,24,25].

This study has several limitations. First, the questionnaire approach used has in general its inherent drawbacks, as answers to some questions rely on memory of the participants. In addition, wording and formatting of questions may be confusing to some participants. Second, the ideal time to administer the questionnaire has not been established and may influence decision-making of willingness to return for FB [15,17]. In our study, median timing of performing the questionnaire was  $2.68 \pm 1.00$  h after FB. Thus, in sedated patients, the lingering effects of sedatives may influence the results [17]. Third, the sedative premedication used in 24% of studied patients may affect the tolerance of these patients compared with nonsedated patients. Fourth, other factors such as waiting time for FB, the FB environment, patient characteristics (e.g. personality or racial) or outcome of the procedure were not evaluated in the present study and may affect the results, creating a need to be studied further.

## Conclusion

Our results show that, although the majority of studied patients were satisfied with different aspects of their FB examination, only a minority would repeat this experience if necessary. Efforts toward improving patient satisfaction should be concerned about alleviating patient discomfort while avoiding nondiagnostic study, which may necessitate bronchoscopy repetition.

## Acknowledgements

### Conflicts of interest

None declared.

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