

# The role of flexible bronchoscopy in the evaluation of childhood respiratory tract pathologies

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## ABSTRACT

**Objective:** Flexible bronchoscopy is a versatile diagnostic and treatment method that plays a crucial role in evaluating the anatomy and functions of the upper and lower airways. It has many indications in patients with respiratory tract findings in childhood. In this study, we aim to present our experience with 164 flexible bronchoscopy procedures we performed over four years.

**Material and Methods:** We included all pediatric-aged children (under 18) who underwent flexible bronchoscopy at Kartal Dr. Lütfi Kırdar City Hospital's pediatrics clinic between March 2018 and January 2022. We reviewed the medical records and recorded their demographic characteristics, bronchoscopy indications, bronchoscopy findings, and complications, retrospectively.

**Results:** We performed 164 flexible bronchoscopy procedures on 158 patients (56.3% male). The median age of the patients was 8 (5–14) years. The most common indication for flexible bronchoscopy was suspicious foreign body aspiration (20.1%), followed by persistent radiological anomalies (19.5%). We observed normal airway anatomy in 48.8% of flexible bronchoscopy procedures. The most common bronchoscopy finding was increased pathological secretion (11%). We did not detect major vital complications, but minor complications occurred in 9.7% (n=16) of the bronchoscopy procedures. Transient hypoxia developed after 6.1% (n=10) of bronchoscopy procedures, and laryngospasm/bronchospasm occurred after 3.6% (n=6). We completed all patients' bronchoscopy processes despite complications.

**Conclusion:** The introduction of flexible bronchoscopy into practice and the increase in its use have a positive effect on providing early diagnosis and treatment of undiagnosed diseases. The reliability of the flexible bronchoscopy procedure is very high with pre-procedure preparation and vital sign monitoring during the process in an anesthesia environment, particularly with a trained team. We believe that performing flexible bronchoscopy in experienced centers under appropriate conditions will reduce the incidence of complications.

**Keywords:** Flexible bronchoscopy; child; indication; complication.

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# Çocukluk çağı solunum yolu patolojilerinin değerlendirilmesinde fleksibl bronkoskopinin rolü

## ÖZET

**Amaç:** Fleksibl bronkoskopi çocukluk çağında solunum yolu bulguları olan hastalarda birçok endikasyonla yapılabilen üst ve alt hava yolları anatomisinin ve fonksiyonlarının değerlendirilmesinde önemli bir role sahip çok yönlü bir tanı ve tedavi yöntemidir. Bu çalışmada amacımız 4 yıllık süreçte gerçekleştirdiğimiz 164 fleksibl bronkoskopi işlemi ile ilgili deneyimimizi sunmaktır.

**Gereç ve Yöntemler:** Mart 2018 ile Ocak 2022 tarihleri arasında Kartal Dr. Lütfi Kırdar Şehir Hastanesi Çocuk Sağlığı ve Hastalıkları Kliniği'nde fleksibl bronkoskopi uygulanan 18 yaş altı çocuklar çalışmaya dahil edildi. Hastaların tıbbi kayıtları incelendi ve demografik özellikleri, bronkoskopi endikasyonları, bronkoskopi bulguları ve komplikasyonları kayıt edildi.

**Bulgular:** Dört yıllık dönemde toplam 158 hasta (%56,3 erkek)'ya 164 fleksibl bronkoskopi işlemi uygulandı. Hastaların ortanca yaşı 8 yıl (5–14 yıl) idi. Fleksibl bronkoskopi'nin en sık endikasyonu şüpheli yabancı cisim aspirasyonu (%20,1), ikinci en sık nedeni persiste eden radyolojik anomaliler (%19,5) idi. Fleksibl bronkoskopi işlemlerinde %48,8 oranında normal havayolu anatomisi gözlemlendi, en sık gözlenen bronkoskopi bulgusu patolojik sekresyon artışı (%11) idi. On altı (%9,7) fleksibl bronkoskopi işleminde minör komplikasyon gözlemlendi. Bronkoskopi işlemlerinin hiçbirinde major komplikasyon gözlenmedi. On (%6,1) bronkoskopi işlemi sonrası geçici hipoksi ve 6 (%3,6) bronkoskopi işlemi sonrası laringobronkospazm gelişti. İşlemi herhangi bir komplikasyon nedeniyle tamamlanamayan hasta olmadı.

**Tartışma:** Fleksibl bronkoskopinin uygulamaya girmesi ve kullanım sıklığının artması, tanı konulamayan bazı hastalıklarda erken tanı ve tedavinin sağlanmasında olumlu yönde etki etmektedir. İşlem öncesi hazırlık, anestezi ortamında yapılan bu işlem süresince monitörizasyon ve eğitilmiş bir ekiple fleksibl bronkoskopi işleminin güvenilirliği oldukça yüksektir. Fleksibl bronkoskopi işleminin tecrübeli merkezlerde, uygun koşullar altında yapılması oluşabilecek komplikasyon sıklığını oldukça azaltacağını düşünmekteyiz.

**Anahtar Kelimeler:** Fleksibl bronkoskopi; çocuk; endikasyon; komplikasyon.

## INTRODUCTION

Respiratory diseases are one of the leading causes of mortality and morbidity in childhood, and many serological, radiological, and interventional methods are in clinical use for diagnosis and treatment. Flexible bronchoscopy (FB) is a versatile, efficacious, and indispensable diagnosis and treatment method in evaluating upper and lower airway anatomy and function for diagnosing children's respiratory tract diseases (1). Flexible bronchoscopy allows endoscopic visualization of the nose, larynx, vocal cords, and tracheobronchial tree and thorough evaluation of airway anomalies. It was first applied in adult patients in 1968 and started to be used in pediatric cases ten years later (2, 3).

FB has become essential in pediatric clinics for lung and airway disease management in children, newborns, and infants (4) regarding diagnostic or therapeutic objectives. It allows anatomical evaluation of the airway and sampling for bronchoalveolar lavage (BAL) or bronchial biopsy from the distal airways for pathological and microbiological analysis. Indications for diagnostic FB include recurrent lower respiratory tract infections (LRTI), stridor, treatment-resistant or persistent wheezing, chronic cough, suspected foreign body aspiration, hemoptysis or pulmonary hemorrhage, suspected structural anomalies or endobronchial lesions, radiological abnormalities (persistent atelectasis, consolidations, atypical infiltrates, localized aeration distinctions) and obstructive sleep apnea (5, 6). Therapeutic FB indications include restoration of airway patency in the presence of mucus plugs or hematoma, control of hemoptysis or airway bleeding, expansion of the stenotic airway, lavage for the treatment

of pulmonary alveolar proteinosis, foreign body removal, and bronchoscopic intubation (5, 6). Although there are no absolute contraindications for flexible bronchoscopy, resistant pulmonary hypertension, uncontrolled bleeding disorders, and hypoxemia can be counted among the relative contraindications (5).

In this study, we aimed to present our experience of 164 FB procedures performed in our pediatrics clinic between 2018 and 2022 and retrospectively evaluate FB indications, results, and complication rates with the demographic characteristics of patients.

## MATERIAL AND METHODS

We included all children (under 18) underwent FB at the Kartal Dr. Lütfi Kırdar City Hospital Pediatrics Clinic between March 2018 and January 2022 in this study, and reviewed the medical records of the patients regarding demographic characteristics, bronchoscopy indications, bronchoscopy findings, and complications. If patients had more than one FB, we added each bronchoscopy as a different intervention and recorded separately. The study was accomplished following the ethical principles of Helsinki.

We performed FB with the indications of persistent radiological anomaly (consolidation, atelectasis, hyperinflation), recurrent LRTI (at least two episodes of pneumonia in 1 year, at least three episodes of pneumonia throughout life), suspected foreign body aspiration, chronic cough (lasting more than four weeks), persistent wheezing (in patients unresponsive to asthma treatment), stridor, bronchiectasis, and tuberculosis diagnosis and treatment (5–7).

Before FB, we informed the families about the indications, purpose, safety, and possible complications of the procedure and obtained written consent. We fasted breastfed infants for four hours, children aged six months to three years for four to six hours, and older children for six hours before the procedure. We performed the FB intervention under general anesthesia via routine vital sign monitoring during anesthesia with pulse oximetry, capnography, body temperature measurement, three-channel electrocardiogram, and blood pressure with a team consisting of an anesthesiologist, nurse, and pediatric pulmonologist specialist who will perform bronchoscopy in the operating room. The anesthesiologist performed sedation/analgesia by administering midazolam, propofol, or ketamine intravenously, and the pediatric pulmonologist performed FB intervention with 4.9 or 3.6 mm outer diameter Fujinon Video Bronchoscopes (Fujifilm, Tokyo, Japan) with nasal oxygen support and used lidocaine as a topical anesthetic on the vocal cords or carina in all patients during the procedure.

We grouped complications related to FB as minor and major (8).

#### Minor complications of bronchoscopy

1. Slightly desaturation during the procedure ( $\text{SaO}_2 \geq 80 < 90\%$ )
2. Laryngospasm/bronchospasm without saturation  $< 90\%$
3. The temporary need for oxygen support after bronchoscopy
4. Post-procedure temporary cough/stridor/dyspnea
5. Mild systemic allergic reaction without hypoxia or arterial hypotension
6. Possibly drug-induced agitation after anesthesia
7. Post-procedure fever  $\geq 38.5^\circ\text{C}$

#### Major complications of bronchoscopy

1. Severe desaturation ( $\text{SaO}_2 < 80\%$ ) during the procedure
2. Laryngospasm/bronchospasm with saturation  $< 90\%$
3. The need for mechanical ventilation after the procedure
4. The need for unplanned intensive care observation after bronchoscopy.
5. Severe systemic allergic reaction with hypoxia or arterial hypotension
6. Pulmonary or endobronchial bleeding
7. Arterial hypotension requiring inotropic support
8. Cardiopulmonary arrest resulting in cardiopulmonary resuscitation.

We obtained the study approval from Dr. Lütfi Kırdar City Hospital Ethics Committee (date: 22.07.2022, number: 2022.514.230.14).

#### Statistics

We presented descriptive data with %, %(n) and median (interquartile range) and did the calculations with "R" based Jamovi 2.3.18 statistical package program and presented in tables.

**Table 1. Demographic characteristics of patients and indications for fiberoptic flexible bronchoscopy**

	n	%
Patients (male)	89	56.3
Under ( $\leq$ ) 1 year old	8	5.1
Older than 1 year old	150	94.9
Suspicion of foreign body aspiration	33	20.1
Persisting radiological anomaly (consolidation, atelectasis, hyperinflation)	32	19.5
Chronic cough	26	15.9
Recurrent LRTI-pneumonia	25	15.2
Hemoptysis-Bleeding	22	13.4
Persistent wheezing	18	11.0
Stridor	3	1.8
Tuberculosis diagnosis and treatment	3	1.8
Bronchiectasis	2	1.2

LRTI: Lower respiratory tract infections.

## RESULTS

We performed 164 FB interventions to 158 patients (56.3% male) from March 2018 to January 2022. The median age of the patients was 8 (5–14) years. 5.1% (n=8) of patients were under one year old, and 94.9% (n=150) were older than one year old. We performed all FB bronchoscopy procedures under sedation in the bronchoscopy unit.

The most common indication for flexible bronchoscopy was suspicious foreign body aspiration (20.1%), and the second most common cause was a persistent radiological anomaly (consolidation, atelectasis, hyperinflation) (19.5%). Regarding the distribution of bronchoscopy indications by gender, the most common cause was the foreign body (24.7%) in boys, and persistent radiological anomaly (consolidation, atelectasis, hyperinflation) (17.3%) and hemoptysis-bleeding (17.3%) in girls. Regarding the distribution of bronchoscopy indications by age, the most common FB indication under 12 months (including one year of age) was foreign body aspiration (62.5%), while the most common FB indication over 12 months was a persistent radiological anomaly (consolidation, atelectasis, hyperinflation) (20.5%).

The general characteristics of the patients and FB indications are presented in Table 1.

As we evaluated the findings in 164 FB procedures, the most common result was increased pathological secretion by 11% (n=18). We observed normal airway anatomy in 48.8% (n:80) of the patients (Table 2). We found normal bronchoscopy findings in 54.5% (n=18) of bronchoscopies performed for suspected foreign body aspiration (n=33), whereas there was a foreign body in 21.2% (n=7) patients, bronchomalacia in 9.1% (n=3), pathological secretion increase in 6.1% (n=2), granulation in 6.1% (n=2), and mucosal edema/hyperemia/fragility in 3% (n=1).

**Table 2. Findings obtained with bronchoscopy**

Bronchoscopy findings	n	% of Total
Normal findings	80	48.8
Increased pathological secretion	18	11.0
Bronchomalacia	10	6.1
Tracheomalacia	9	5.5
Laryngomalacia	8	4.9
Foreign body	8	4.9
External pressure to the airway	8	4.9
Mucosal edema/hyperemia/fragility	7	4.3
Bronchial stenosis	5	3.0
Granulation	4	2.4
Congenital respiratory anomaly	3	1.8
Airway lesion (nodular lesion, mass, endobronchial lesion, hemangioma)	3	1.8
Vocal cord paralysis	1	0.6

While there were normal endoscopy findings in 53.8% (n=14) of bronchoscopies performed in patients with chronic cough (n=26), 7.7% (n=2) showed signs of increased pathological secretion, 7.7% (n=2) tracheomalacia, 7.7% (n=2) laryngomalacia, 7.7% (n=2) external compression on the airway, 3.8% (n=1) bronchomalacia. Airway malacia (tracheomalacia, bronchomalacia and laryngomalacia) was at a rate of 26.9% of the pathological findings detected in bronchoscopy performed for chronic cough.

While 28.1% of the bronchoscopies performed due to persistent radiological abnormality (n=32) had normal findings, 21.9% (n=7) had increased pathological secretion, 15.6% (n=5) had external compression on the airway, 9.4% (n=3) tracheomalacia, 9.4% (n=3) bronchomalacia findings.

There were normal findings in 52% (n=13) of bronchoscopies performed for recurrent LRTI-pneumonia (n=25), but we detected increased pathological secretion in 16% (n=4) and laryngomalacia in 12% (n=3) patients.

While there were normal findings in 68.2% (n=15) of bronchoscopies (n=22) performed for hemoptysis/bleeding, we found laryngomalacia in 9.1% (n=2) of patients.

We found normal findings in 55.6% (n=18) of bronchoscopies performed for persistent wheezing-wheezing, where increased pathological secretion in 11.1% (n=2), mucosal edema/hyperemia/fragility in 11.1% (n=2), bronchial stenosis in 11.1% (n=2), laryngomalacia 5.6% (n=1), and external airway compression 5.6% (n=1).

We found normal findings in 54.5% of the bronchoscopies performed for stridor, where we detected a foreign body in 21.2% (n=7), bronchomalacia in 9.1% (n=3), 6.1% (n=7) increased pathological secretion and 6.1% (n=7) granulation findings.

Considering the distribution of bronchoscopy results regarding the gender, the most common finding was increased pathological secretion in 10.1% (n=9) of boys and 12% (n=9) of girls (Table 3).

**Table 3. Bronchoscopy findings of the patients by gender**

Bronchoscopy findings	Gender		
	Female	Male	Total
Normal findings			
n	39	41	80
%	52.0	46.1	48.8
Increased pathological secretion			
n	9	9	18
%	12.0	10.1	11.0
Bronchomalacia			
n	5	5	10
%	6.7	5.6	6.1
Tracheomalacia			
n	5	4	9
%	6.7	4.5	5.5
Laryngomalacia			
n	2	6	8
%	2.7	6.7	4.9
Foreign body			
n	5	3	8
%	6.7	3.4	4.9
External pressure to the airway			
n	3	5	8
%	4.0	5.6	4.9
Mucosal edema/hyperemia/fragility			
n	2	5	7
%	2.7	5.6	4.3
Bronchial stenosis			
n	3	2	5
%	4.0	2.2	3.0
Granulation			
n	1	3	4
%	1.3	3.4	2.4
Congenital respiratory anomaly			
n	1	2	3
%	1.3	2.2	1.8
Airway lesion (nodular lesion, mass, endobronchial lesion, hemangioma)			
n	0	3	3
%	0.0	3.4	1.8
Vocal cord paralysis			
n	0	1	1
%	0.0	1.1	0.6
Total			
n	75	89	164
%	100.0	100.0	100.0

**Table 4. Bronchoscopy findings detected below and above 1 year of age**

Bronchoscopy findings	≤1 year old	>1 year old	Total
Normal findings			
n	6	74	80
%	75.0	47.4	48.8
Increased pathological secretion			
n	0	18	18
%	0.0	11.5	11.0
Bronchomalacia			
n	0	10	10
%	0.0	6.4	6.1
Tracheomalacia			
n	0	9	9
%	0.0	5.8	5.5
Laryngomalacia			
n	0	8	8
%	0.0	5.1	4.9
Foreign body			
n	0	8	8
%	0.0	5.1	4.9
External pressure to the airway			
n	0	8	8
%	0.0	5.1	4.9
Mucosal edema/hyperemia/fragility			
n	0	7	7
%	0.0	4.5	4.3
Bronchial stenosis			
n	0	5	5
%	0.0	3.2	3.0
Granulation			
n	2	2	4
%	25.0	1.3	2.4
Congenital respiratory anomaly			
n	0	3	3
%	0.0	1.9	1.8
Airway lesion (nodular lesion, mass, endobronchial lesion, hemangioma)			
n	0	3	3
%	0.0	1.9	1.8
Vocal cord paralysis			
n	0	1	1
%	0.0	0.6	0.6
Total			
n	8	156	164
%	100.0	100.0	100.0

As we analyzed the distribution of bronchoscopy findings according to age, we found normal bronchoscopy findings in 75% (n=6) and granulation tissue in 25% (n=2) among under one-year-old patients.

Among patients over one year of age, the most common pathological findings were increased pathological secretion in 11.5% (n=18) and bronchomalacia in 6.4% (n=10), where 47.4% (n=74) of patients had normal bronchoscopic findings (Table 4).

Minor complications occurred in 9.7% (n=16) of FB procedures, but no major complications occurred in any of the bronchoscopy procedures. Transient hypoxia developed after 6.1% (n=10) of bronchoscopy procedures, and laryngospasm/bronchospasm developed after 3.6% (n=6) of them. There was no patient whose intervention could not be completed due to complications. While the complication rate under one year was 0%, the complication rate above 1-year-old was 10.6% (n=16).

## DISCUSSION

Flexible bronchoscopy is an invasive but generally safe procedure for the pediatric population as well as for adults. It is being used for more indications day by day. As a result, the use of FB for diagnosis and treatment in childhood has increased in recent years, including in pediatric and neonatal intensive care units. However, despite international guidelines and recommendations, clinical uses and indications of FB may differ in studies depending on the equipment in centers located in different regions (5, 6).

Bronchoscopy is a life-saving intervention for a child who develops respiratory failure due to foreign body aspiration and sometimes prevents the patient from receiving inhaler treatment for months because of a misdiagnosed foreign body aspiration, as well as reducing mortality and morbidity. In addition, imaging with FB can rule out a suspected foreign body aspiration, but if a foreign body is detected, a rigid bronchoscopy can remove foreign bodies in children (9). If clinicians can not determine the definitive diagnosis by anamnesis, physical examination, and radiological imaging, a bronchoscopy might help to exclude foreign body aspiration. In our study, the most common FB indication was suspicion of foreign body aspiration (20.1%), and the second was persistent radiological anomalies (19.5%). Other common indications were chronic cough (15.9%) and recurrent LRTI (15.2%). Pediatric Bronchology Group's study on pediatric bronchoscopy (10) reported that 198 centers performed a total of 56,145 bronchoscopies over three years, with an average of 74 FB per center per year. In this study, the most common indication for bronchoscopy procedures was suspected foreign body aspiration at a rate of 72.7%. In addition, radiological abnormalities 48.5%, infections 48.5%, and chronic cough 29.3% were other frequent indications, which was compatible with our results (10). In two studies reported from different countries, the results conflicted with ours as the most common indication for FB in children was stridor (11, 12). Also, in two other studies conducted in our country evaluating FB results in children, the most common FB indications were atelectasis (21.5%) and re-

current LRTI (29.6%) (13, 14). We think that the reason why the most common indication is the suspicion of foreign body aspiration is the high number of emergency service case applications to our hospital, which is a reference center for emergency cases. In our study, the most common bronchoscopy finding was increased pathological secretion in the airways. In the retrospective evaluation of 180 FB performed by Carroll et al. (15), increased purulent secretion was the most common pathological finding, which is consistent with the results of our study. In two studies conducted in our country, the most detected bronchoscopy finding in childhood FBs was increased secretion, and the results were consistent with ours (13, 14).

Macroscopic features of respiratory tract secretions in terms of color, viscosity, and the amount may be warning signs for recurrent respiratory tract infections. Bronchoscopy is a crucial diagnostic tool to detect the underlying cause in cases with persistent or recurrent LRTI. Detection of potentially pathogenic bacteria is vital to administrate appropriate antibiotic therapy to children with recurrent LRTI (5). In a study conducted in our country, the most common finding reported in FBs performed due to recurrent LRTI was increased secretions (14). Similarly, in our results, the most common pathological diagnosis in FB procedures performed for recurrent LRTI was increased secretion. Gökdemir et al. (16) reviewed 434 patients diagnosed with persistent LRTI and reported the most common causes as aspirated foreign bodies and structural anomalies. In the study of Ferraro et al. (17), the most common anatomical abnormalities in patients who underwent FB due to recurrent LRTI were bronchomalacia and tracheomalacia.

Wheezing is a common clinical symptom in children. FB is recommended to diagnose the underlying anatomy in children with persistent wheezing despite appropriate treatment (18). Literature data have shown that approximately one in two children with persistent wheezing have anatomical abnormalities (19, 20). In our study, the most common result in FB procedures performed for persistent wheezing was anatomical abnormalities (bronchial stenosis and laryngomalacia), in line with the literature. FB is vital for evaluating children with recurrent wheezing who do not respond to conventional treatments. Diagnosis of possible airway malaise may limit the use of drugs with potential side effects, such as inhaled steroid therapy (19).

Patients with non-pathologic radiological imaging and hematological tests, unresponsive to medical treatments given for a cough lasting longer than four weeks, should be considered a chronic cough. Chronic cough in children is another indication of FB, where clinicians should exclude foreign body aspiration and congenital malformations. In our study, we performed the FB procedure due to chronic cough in 15.9% of the patients. In the study of Ferraro et al. (17), lower airway malaise was the most common finding in children with chronic cough. Ergenekon et al. (14) reported that they detected pathological findings in 68.3%, increased pathological secretion in 45%, and airway malaise in 13.4% of 120 patients who underwent FB due to chronic cough. In our study, airway malacia (tracheomalacia, bronchomalacia and laryngomalacia) was at a rate of 26.9% of

the pathological findings detected in bronchoscopy performed for chronic cough, in line with the literature data.

In 9.7% (n=16) patients, temporary complications developed during or after the FB procedure in our study group; the most common complication was temporary hypoxemia in 6.1%, and the second was bronchospasm (3.6%). We did not observe any major complications, and none of the patients' procedure was interrupted. Mondal et al. (21) reported that minor complications developed in 14 of 100 pediatric patients who underwent FB, and the most common complication was transient hypoxemia. Also, single-center studies from our country and abroad reported that hypoxemia was the most common complication, which was compatible with our results (11–13, 22). It is thought that obstruction of the airway by the catheter during the bronchoscopy procedure, depression of the respiratory drive with sedation, and excessive coughing cause temporary hypoxemia (23).

### Limitations of the Study

This study is a cross-sectional and retrospective study. Another limitation is the small number of patients.

### CONCLUSION

In conclusion, FB is a valuable diagnosis and treatment method that clinicians can perform with many indications in children with respiratory tract diseases. Flexible bronchoscopy is vital for the early diagnosis and treatment of undiagnosed conditions and gives highly reliable results if conducted with pre-procedure preparation, monitoring during the procedure performed in the anesthesia environment, and a trained team. We think that performing flexible bronchoscopy in experienced centers under appropriate conditions will incredibly reduce the incidence of complications.

**Ethics Committee Approval:** The Dr. Lütfi Kırdar City Hospital Clinical Research Ethics Committee granted approval for this study (date: 22.07.2022, number: 2022.514.230.14).

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**Çıkar Çatışması:** Yazarlar çıkar çatışması bildirmemişlerdir.

**Mali Destek:** Yazarlar bu çalışma için mali destek almadıklarını beyan etmişlerdir.

**Yazarlık Katkıları:** Fikir – FÇ, CMB; Tasarım – MTK, KP, İK; Denetleme – FÇ, MTK, İK; Kaynaklar – CMB, BY, KP; Malzemeler – FÇ, MTK, İK, CMB; Veri Toplanması ve/veya İşlemesi – CMB, YA, FÇ; Analiz ve/veya Yorum – MTK, İK, BY; Literatür Taraması – MTK, FÇ, KP, BY; Yazıyı Yazan – FÇ, MTK, İK; Eleştirel İnceleme – FÇ, MTK, İK, YA, CMB.

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