

한국 기관지확장증 환자의 동반질환

이지호

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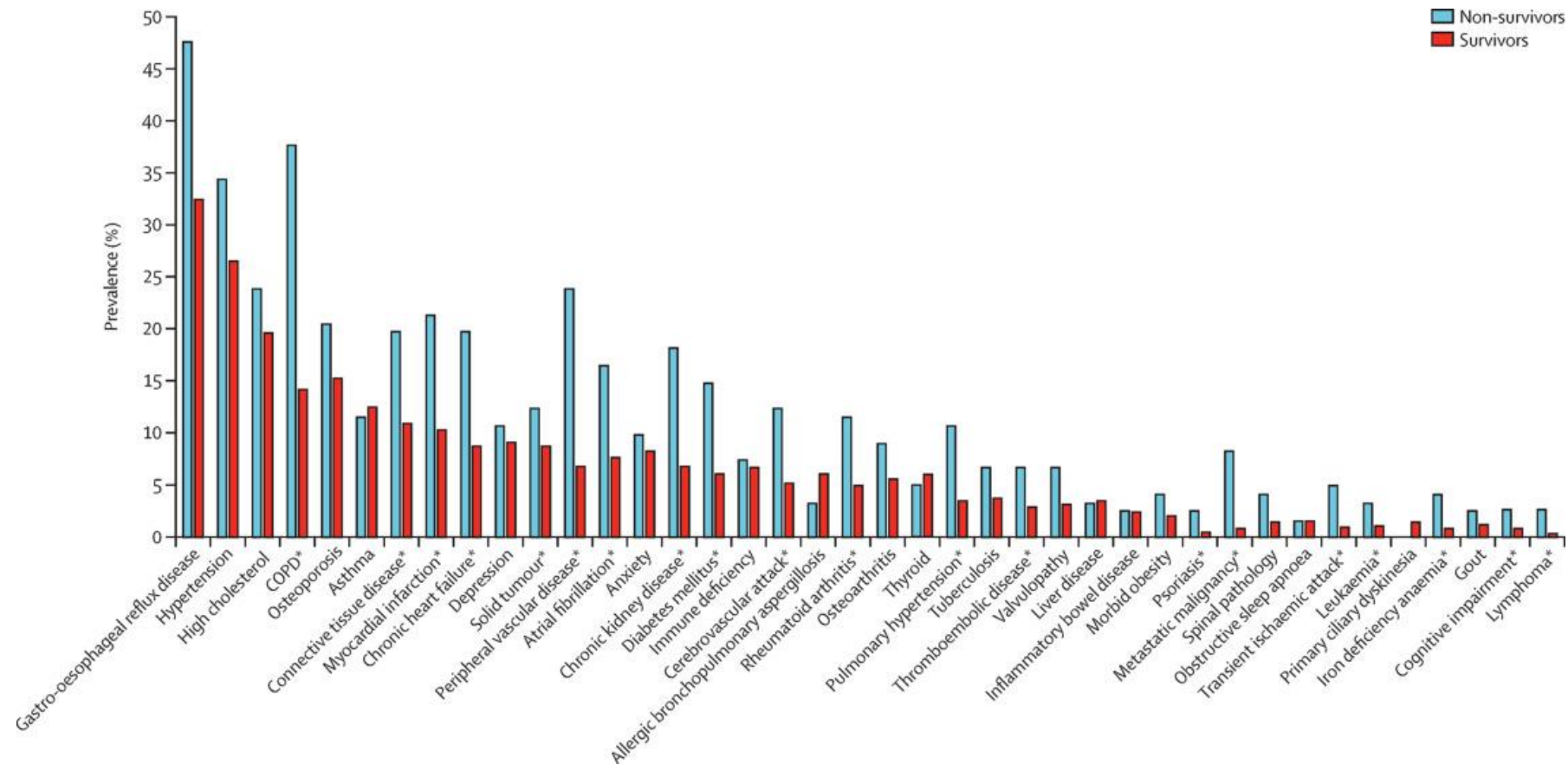
- 1) Comorbidities in bronchiectasis
- 2) Prevalence and impact of depression in bronchiectasis
- 3) Prevalence and impact of chronic rhinosinusitis in bronchiectasis

Comorbidities in bronchiectasis

- Bronchiectasis is a chronic and heterogeneous disease that can coexist with diverse pathological conditions.
- Comorbidities in bronchiectasis not only contribute to an increased healthcare and socioeconomic burden but also worsen patients' quality of life, exacerbation frequency, lung function, and mortality risk.
- Despite the high prevalence of comorbidities in bronchiectasis, their specific impact on clinical outcomes and natural history of the disease is still indeterminate.

Comorbidities and the risk of mortality: an international multicentre cohort study

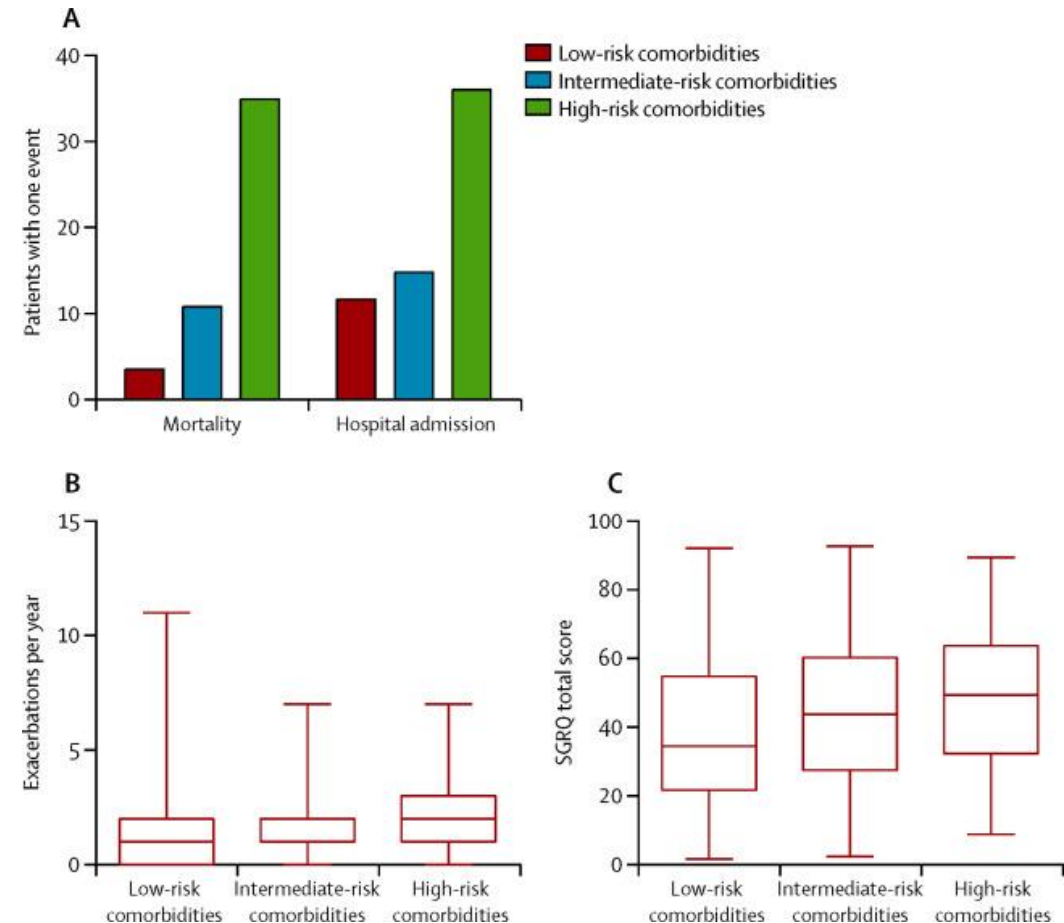
- Dundee (UK), Galway (Ireland), Leuven (Belgium), and Monza (Italy), followed up for 5 years (n = 986)



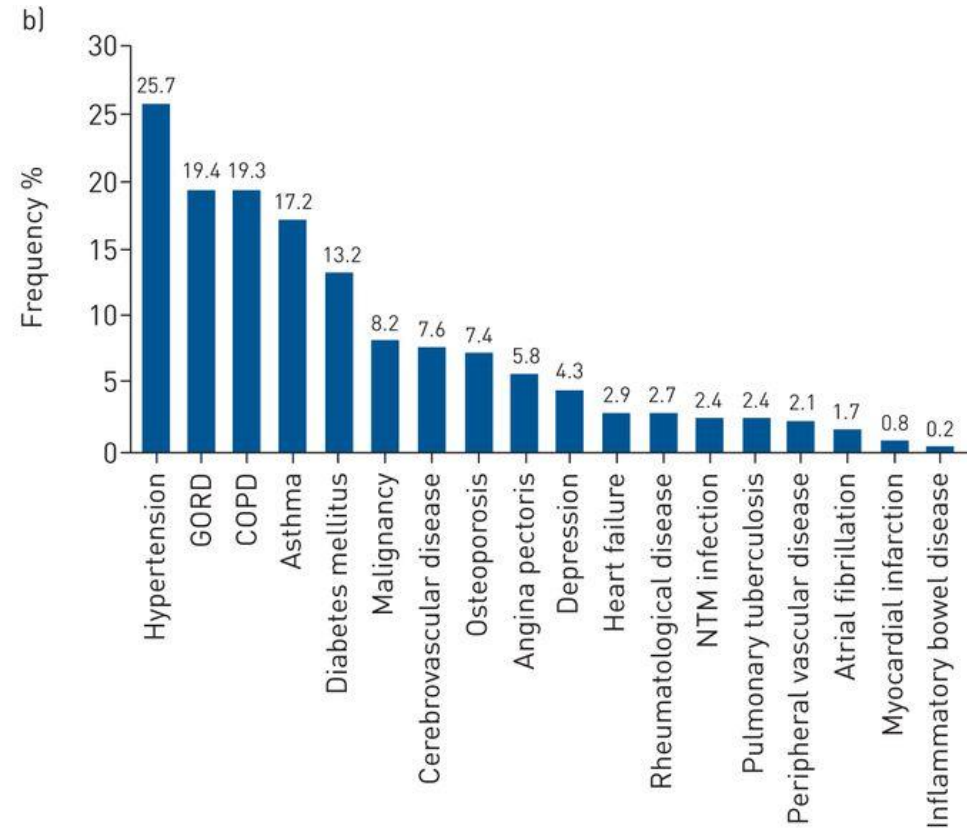
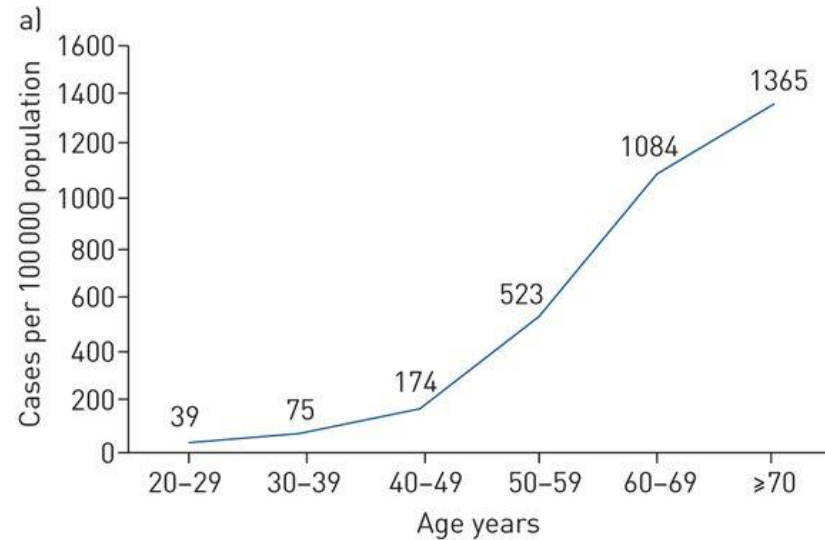
Comorbidities and the risk of mortality: an international multicentre cohort study

Derivation of the Bronchiectasis Aetiology Comorbidity Index (BACI)

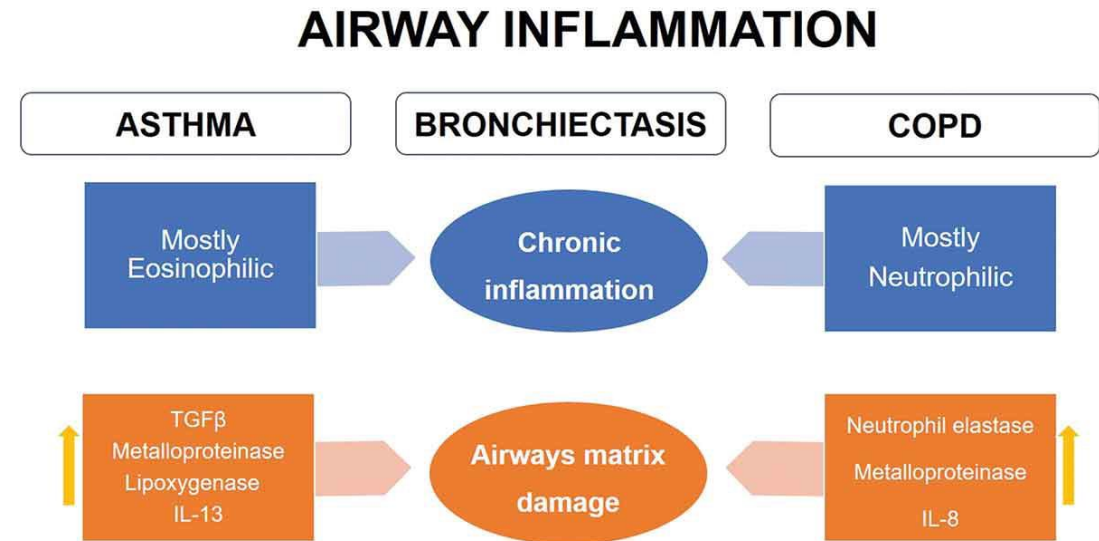
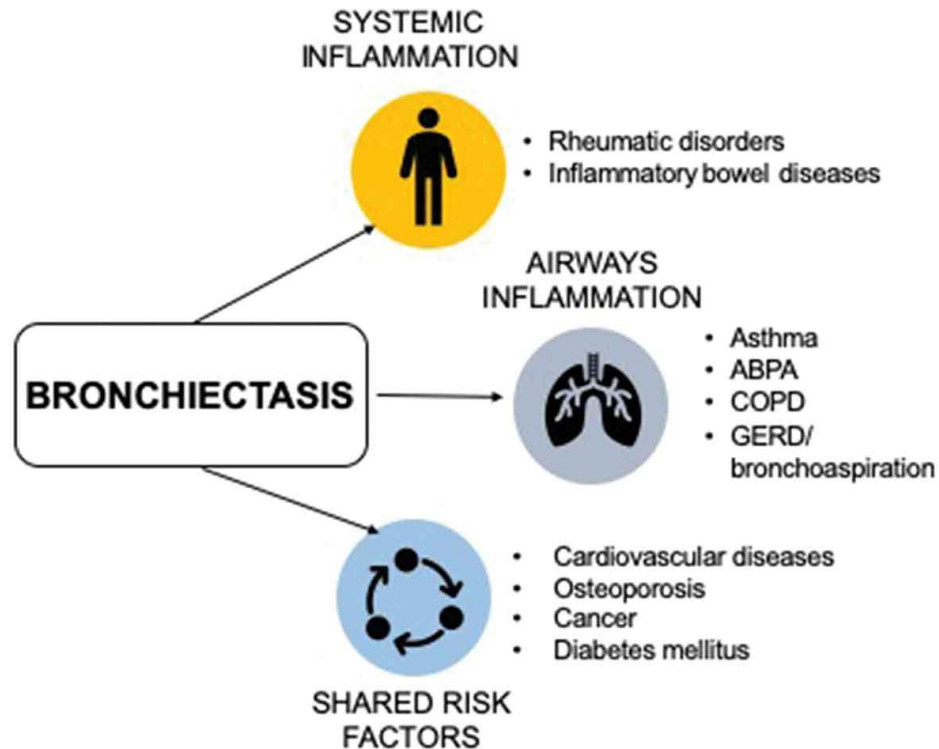
Comorbidity	Hazard Ratio	95% CI	P value	Points
Metastatic malignancy	6.69	3.53-12.68	<0.0001	12
Haematological malignancy	2.85	1.17-6.97	0.02	6
COPD	2.22	1.53-3.23	<0.0001	5
Cognitive impairment	2.21	0.82-6.01	0.12	5
Inflammatory bowel disease	2.01	0.75-5.40	0.17	4
Liver disease	1.94	0.80-4.72	0.14	4
Connective tissue disease	1.78	1.19-2.68	0.005	3
Iron deficiency anaemia	1.78	0.80-2.68	0.16	3
Diabetes	1.76	1.10-2.80	0.02	3
Asthma	1.65	1.00-2.73	0.050	3
Pulmonary hypertension	1.58	0.88-2.84	0.12	3
Peripheral vascular disease	1.50	1.00-2.25	0.052	2
Ischaemic heart disease	1.31	0.91-1.89	0.14	2



Comorbidities in Korean patients with bronchiectasis



Bronchiectasis and comorbidities: a pathogenic hypothesis



Current guidelines in bronchiectasis

Spanish Guidelines on Treatment of Bronchiectasis in Adults

A high proportion of patients with BE present comorbidities that must be identified and treated. Those with the greatest impact on BE patients are **rhinosinusitis** and/or nasal polyposis, hiatus hernia, anxiety and **depression**.

British Thoracic Society Guideline for bronchiectasis in adults

5. Consider comorbidities
 - Echocardiogram to assess LV function and for Pulmonary Hypertension
 - Assess if have sinus disease and whether treated
 - Exclude PE if suspected

Figure 1 Management of the deteriorating patient.

	Mild-disease severity	Moderate - Severe
Severity Index scoring	baseline	baseline
BMI (Body Mass Index)	annual	annual
Exacerbation History	annual	6 monthly
Sputum Culture	annual	6 monthly
MRC Dyspnoea Score	annual	6 monthly
Spirometry	annual	annual
CT (Radiological Extent)	at diagnosis*‡	at diagnosis*‡
Sputum mycobacterial culture†	baseline‡	baseline‡
Oxygen saturation monitoring (SpO2)	annual	6 monthly
Underlying cause investigations	at diagnosis‡	at diagnosis‡
Comorbidities assessment	at diagnosis‡	at diagnosis‡

Prevalence and impact of depression in bronchiectasis

Hospital anxiety and depression scale for Koreans

HADS-A (anxiety)	HADS-D (depression)
나는 긴장감 또는 정신적 고통을 느낀다. 나는 무언가 무서운 일이 일어날 것 같은 느낌이 든다. 마음속에 걱정스러운 생각이 든다. 나는 편하게 긴장을 풀 수 있다. 나는 초조하고 두렵다. 나는 가만히 있지 못하고 안절부절 한다. 나는 갑자기 당황스럽고 두려움을 느낀다.	나는 즐겨오던 것들을 현재도 즐기고 있다. 나는 사물을 긍정적으로 보고 잘 웃는다, 나는 기분이 좋다. 나는 기력이 떨어진 것 같다. (Somatic item) 나는 나의 외모에 관심을 잃었다. 나는 일들을 즐거운 마음으로 기대한다. 나는 좋은 책 또는 라디오, 텔레비전을 즐길 수 있다.

4점 척도 (0~3점): 0 ~ 21점

Relationship between depression and health status in bronchiectasis

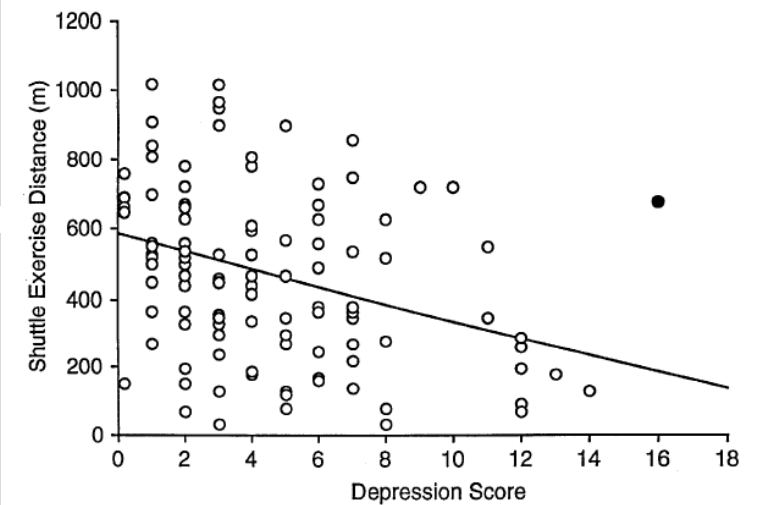
- UK, cross-sectional study (n = 111): 52 ± 13 years, male of 39.6%, FEV₁ of 66.4% ± 28.8
- Depression: ≥ 8 HADS, 9% with depression

TABLE 1. Correlation between the HADS and the SGRQ

	SGRQ Symptoms	SGRQ Activity	SGRQ Impacts	SGRQ Total
HADS Anxiety	0.20*	0.23*	0.38***	0.33***
HADS Depression	0.34***	0.44***	0.58***	0.55***
HADS Depression-D4	0.27**	0.37***	0.50***	0.41***
Item D4	0.43***	0.50***	0.60***	0.60***

TABLE 2. Correlations between the HADS and fatigue, dyspnoea, Shuttle Walk test and FEV₁ (% pred)

	HRCT score	Shuttle walk test	FEV ₁ (% pred)	PaO ₂	Physical fatigue	Mental fatigue	Total fatigue	Dyspnoea
HADS anxiety	0.05 ^{ns}	-0.02 ^{ns}	-0.06 ^{ns}	-0.08 ^{ns}	0.36*	0.56*	0.51*	0.16 ^{ns}
HADS Depression	0.05 ^{ns}	-0.33*	-0.02 ^{ns}	-0.10 ^{ns}	0.55*	0.54*	0.62*	0.40*
HADS Depression-D4	0.02 ^{ns}	-0.29*	0.02 ^{ns}	-0.09 ^{ns}	0.47*	0.52*	0.57*	0.35*
Item D4	0.13 ^{ns}	-0.39*	-0.13 ^{ns}	-0.10 ^{ns}	0.60*	0.45*	0.61*	0.51*



Prevalence of depression and anxiety in chronic airway lung disease

- Korea, cross-sectional study
- Beck Depression Inventory (BDI) and State-Trait Anxiety Inventory (STAI)

Parameters	Chronic airway lung diseases			
	Healthy control (n = 73)	COPD (n = 84)	Bronchial asthma (n = 37)	Bronchiectasis (n = 33)
Age, yr	66 (51 - 89)	67 (45 - 88)	56 (45 - 80) ^{a,b}	62 (45 - 83) ^{a,b}
Male gender	33 (45)	80 (95) ^a	16 (43) ^b	15 (46) ^b
Body mass index, kg/m ²	23.8 ± 3.2	22.6 ± 3.0	24.9 ± 3.6 ^b	21.3 ± 3.3 ^a
Smoking habits				
Ex-smoker / Current smoker	14 / 1	59 / 25	7 / 3	9 / 1
Median pack-years	20 (1 - 40)	40 (15 - 100) ^a	20 (5 - 30) ^b	18 (2 - 70) ^b
Post-bronchodilator FVC, % predicted	98.8 ± 14.2	81.9 ± 17.8 ^a	82.8 ± 18.7 ^a	62.6 ± 18.2 ^{a,b}
Post-bronchodilator FEV ₁ , % predicted	102.7 ± 16.7	59.5 ± 24.8 ^a	71.7 ± 21.1 ^{a,b}	55.0 ± 19.0 ^a
Post-bronchodilator FEV ₁ /FVC ratio	84.9 ± 10.6	51.9 ± 13.3 ^a	63.2 ± 10.2 ^{a,b}	64.3 ± 16.6 ^{a,b}
Hemoglobin, g/dL	13.1 ± 1.6	14.3 ± 1.7 ^a	13.7 ± 1.8	13.2 ± 1.4 ^b
Albumin, g/dL	4.1 ± 0.4	4.1 ± 0.5	4.3 ± 0.5	3.9 ± 0.5
PaO ₂ , mmHg (room air)	88.2 ± 3.6	79.1 ± 16.5	84.7 ± 13.2	77.9 ± 20.3
PaCO ₂ , mmHg (room air)	38.9 ± 3.5	40.8 ± 6.8	39.5 ± 4.7	42.8 ± 10.2 ^a

Prevalence of depression and anxiety in chronic airway lung disease

Table 2. Depression and anxiety status of the study population

Variables	Healthy control (n = 73)	Chronic airway lung diseases		
		COPD (n = 84)	Bronchial asthma (n = 37)	Bronchiectasis (n = 33)
BDI				
Total score	13 (0 - 31)	17 (0 - 42) ^a	14 (2 - 36)	16 (3 - 51) ^a
BDI score ≥ 16	22 (30)	46 (55) ^a	15 (41)	18 (55) ^a
STAI				
State-anxiety score	40 (23 - 67)	44 (20 - 67) ^a	44 (23 - 67) ^a	43 (23 - 72) ^a
Trait-anxiety score	44 (30 - 90)	47 (20 - 66) ^a	45 (32 - 58)	46 (28 - 64)

Table 4. Predictive factors for depression in patients with chronic airway lung diseases

Factors	Odds ratio (95% CI)	p value
Age	1.017 (0.978 - 1.059)	0.395
Female gender	1.792 (0.579 - 5.547)	0.311
Body mass index	0.974 (0.865 - 1.095)	0.656
Current or ex-smoker	3.894 (1.269 - 11.952)	0.018
Post-bronchodilator FVC, % predicted	0.990 (0.961 - 1.020)	0.522
Post-bronchodilator FEV ₁ , % predicted	0.972 (0.947 - 0.997)	0.027

Depression and anxiety symptoms in bronchiectasis: associations with health-related quality of life

Characteristics	Mean	SD	<i>n</i>	(%)
Age	32.2	14.3		
Males			41	44.1
Weight (kg)	64.0	16.8		
Height (cm)	163.8	8.3		
BMI (kg/m ²)	23.8	5.4		
Sputum production (ml/day)	26.6	28.7		
Bhalla score	17.0	4.3		
FEV ₁ (ml)	2,260.6	906.2		
FEV ₁ (%)	67.0	24.2		
FVC (ml)	3,085.4	1,036.1		
FVC (%)	73.3	19.5		
Oxygen desaturation during exercise			10	10.8
Chronic colonization				
Any bacterial colonization			74	79.6
<i>S. aureus</i> colonization			46	49.5
<i>H. influenzae</i> colonization			46	49.5
<i>Pseudomonas</i> colonization			55	59.1
<i>B. cepacea</i> colonization			2	2.2
Exacerbations in the last year	2.4	2.3		
Mild exacerbations	2.2	2.2		
Severe exacerbations	0.2	0.5		
Days of hospital admission in the last year	1.2	4.6		

- Spain, cross-sectional study (n = 93, 43 with cystic fibrosis)
- Hospital anxiety and depression scale (HADS) 8 > : considered depression
- St. George respiratory questionnaire (SGRQ)

Depression and anxiety symptoms in bronchiectasis: associations with health-related quality of life

- Depression (23%), anxiety (38%)

Results of correlation analysis

Variables	HADS-D
Clinical variables	
Age	0.38**
FEV ₁ %	0.09
Bhalla score	0.09
Daily sputum	-0.03
Exacerbation frequency ^a	0.15
Hospital admissions ^a	0.13
SGRQ scores	
Symptoms	0.50**
Activity	0.45**
Impact	0.52**
Total	0.56**

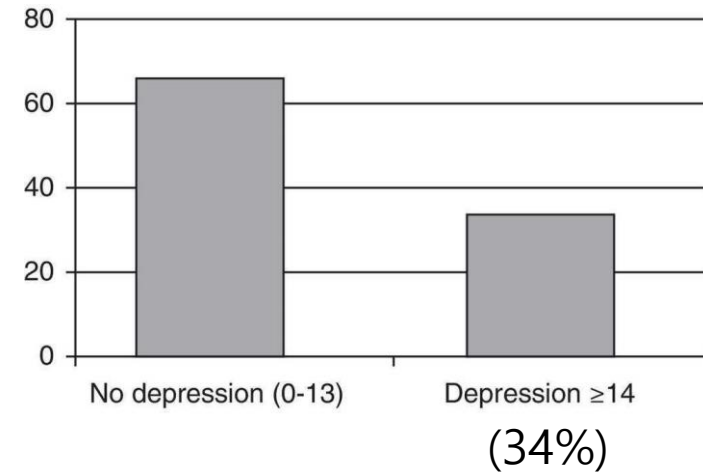
Table 4 Regression Model (total SGRQ score as the dependent variable)

Variables	B	SE B	β	t	p	r^2 corrected
Gender	5.39	2.72	0.14	1.98	0.051	0.67
Age	-0.01	0.10	-0.01	-0.08	0.934	
Diagnosis	0.67	1.24	0.05	0.55	0.588	
Exacerbations frequency	1.57	0.66	0.19	2.37	0.021	
FEV ₁ %	-0.22	0.06	-0.26	-3.59	0.001	
Daily sputum	0.10	0.05	0.15	2.16	0.034	
HADS anxiety	1.46	0.44	0.37	3.34	0.001	
HADS-depression	1.36	0.49	0.29	2.76	0.007	

Presence of depression in patients with bronchiectasis

Variables	Results
Age (years), $X \pm SD$	66.2 \pm 14.22
Sex ♀/♂, n	51/23
BMI (kg/m^2), $X \pm SD$	24.56 \pm 3.81
Smoking habit, %	
Non-smokers/ex-smokers/active smokers	64.9/25.7/9.5
Charlson Index, $X \pm SD$	0.85 \pm 1.25
MRC dyspnoea Grade 1/Grade 2, %	47.3/27
Estimated amount sputum/day, %	
<5 ml	25
5–30 ml	50
>30 ml	25
Colour, %	
Mucous	35
Mucopurulent	38
Purulent	22
Brownish	4
Haemoptysis ≥ 100 ml/day/sinusitis, n	4/5
%FVC	85.11 \pm 20
%FEV ₁	74 \pm 23
Cystic/diffuse bronchiectasis, %	20/55
Bacterial colonisation/P aeruginosa, n	21/15
Respiratory exacerbations ($X \pm SD$)	2.58 \pm 1.46
Hospitalizations, $X \pm SD$	0.29 \pm 0.54
SGRQ total	32.55 \pm 19.1
SGRQ symptoms	41.48 \pm 21.40
SGRQ activity	41.12 \pm 24.64
SGRQ impact	23.84 \pm 19.16

- Spain, cross-sectional study (n = 70)
- Beck Depression Inventory (BDI) ≥ 14 : depression



Presence of depression in patients with bronchiectasis

	Age, years Mean±SD	BMI, kg/m ² Mean±SD	Charlson Mean±SD	Amount of expectoration, ml Mean±SD	%FEV ₁ Mean±SD	Exacerbations Mean±SD	Hospitalizations Mean±SD
<i>BDI</i>							
<14 (49)	64.4±13	24.5±3.8	0.9±1.3	24.5±26.9	71.5±21.7	2.5±1.4	0.2±0.5
≥14 (25)	70±15.9	24.7±3.9	0.6±1	26.6±30.7	79.2±24.9	2.6±1.5	0.4±0.6
<i>P</i>	.110	.761	.305	.761	.179	.247	.247

	Sex		Cough		Dyspnoea, MRC			Bacterial colonisation		Bronchiectasis	
	Female	Male	Yes	No	0	1	2	No	Yes	Diffuse	Localised
<i>BDI</i>											
<14 (49)	29	20	34	15	13	24	12	36	13	25	24
≥14 (25)	22	3	21	4	6	11	8	13	8	8	17
<i>P</i>	.009		.140		.789			.408		.095	

	SGRQ total, mean±SD	SGRQ symptoms, mean±SD	SGRQ activity, mean±SD	SGRQ impact, mean±SD
<i>BDI</i>				
<14 (49)	30.9±19.1	41.7±21.9	38.9±24.3	21.5±18.3
≥14 (25)	36±19	41.±20.7	45.9±25.2	28.8±20.4
<i>P</i>	.308	.902	.268	.141

Factors related to depression in adults with bronchiectasis

- Turkey, prospective study (n = 133, non-cystic fibrosis)
- Depression: ≥ 7 HADS, 21.1% with depression

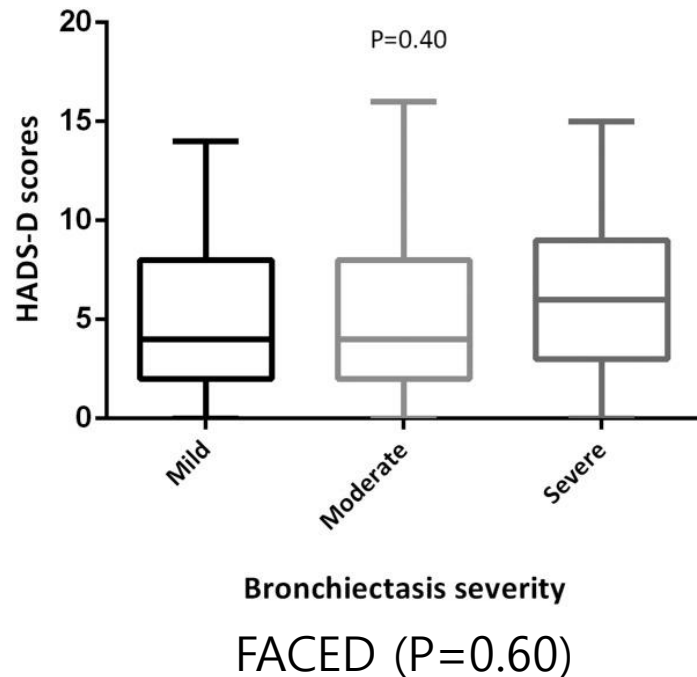
	HAD-D		P-values
	<7	≥ 7	
Number	105 (78.9)	28 (21.1)	
Age, years	49.6 \pm 14.5	48.7 \pm 14.5	>0.05
Female	61 (45.8)	20 (15)	>0.05
Male	44 (33.1)	8 (6)	
Smoking			
Never smoker	60 (45.5)	17 (12.9)	>0.05
Ever smoker	44 (33.3)	11 (8.3)	
Employment	48 (37.5)	17 (13.3)	>0.05
Nonemployment	52 (40.6)	11 (8.6)	
Family situation			
Live alone	23 (17.3)	12 (9)	<0.05
With partner/other family member	92 (69.2)	16 (12)	
No history of depression	76 (57.1)	15 (11.3)	0.05
History of depression	29 (21.8)	13 (9.8)	
PFTs			
FEV ₁ , % predicted	63.9 (24.5)	56.1 (20.6)	>0.05
FVC, % predicted	68.9 (21.1)	65.7 (21.7)	>0.05
FEV ₁ /FVC	72.3 (14.4)	69.8 (11.3)	>0.05
No admission to an emergency department	59 (44.4)	9 (6.8)	0.023
Admission to an emergency department	46 (34.6)	19 (14.3)	
No hospitalization	89 (66.9)	24 (18)	>0.05
Hospitalization	16 (12)	4 (3)	

Table 3 Predictive factors for depression in patients with bronchiectasis

Factors	OR (95% CI)	P-values
Age	1.010 (0.964–1.058)	0.654
Male gender	1.172 (0.349–3.927)	0.797
Live with a partner	0.176 (0.459–0.675)	0.011
Comorbidity	0.692 (0.201–2.382)	0.560
Depression history	2.521 (0.842–7.549)	0.098
Panic disorder history	2.372 (0.737–7.637)	0.148
Admission to an emergency department	4.236 (1.277–14.0522)	0.018
Panic disorder history	1.932 (0.433–8.627)	0.148
Hospitalization	0.426 (0.768–2.309)	0.388
Hemoptysis	0.255 (0.687–0.948)	0.041

Depression in bronchiectasis: association with disease severity and quality of life

- China, cross-sectional study (n = 163): 45.8 (13.8) years, female 62.6%, FEV₁ 67.1% (28.8)
- Depression: ≥ 8 HADS, 30.1% with depression



Factors	Depression	
	OR (95% CI)	P value
Poor sleep quality (PSQI>5)	5.89 (2.54–13.69)	<.001
Education below college graduate
Younger age, mean (SD), y
Daytime cough score, mean (SD), y

Not associated with FEV₁, HRCT scores, sputum volume, PA colonization, MRC scale, exacerbation, and hemoptysis

SGRQ	HADS-depression		
	Pathological (n = 49)	Normal (n = 114)	P
Symptom	42.0 (27.0–62.0)	33.5 (24.0–51.2)	.044
Activity	36.1 (20.8)	27.2 (21.8)	.017
Impact	45.7 (18.9)	29.9 (18.8)	<.0001
Total	42.7 (17.1)	30.4 (17.9)	<.0001

환자 건강 설문지 (PHQ)-9

문항	전혀 방해 받지 않았다	며칠 동안 방해 받았다	7일 이상 방해 받았다	거의 매일 방해 받았다
1) 일 또는 여가 활동을 하는데 흥미나 즐거움을 느끼지 못함	0	1	2	3
2) 기분이 가라앉거나, 우울하거나, 희망이 없음	0	1	2	3
3) 잠이 들거나 계속 잠을 자는 것이 어려움, 또는 잠을 너무 많이 잠	0	1	2	3
4) 피곤하다고 느끼거나 기운이 거의 없음	0	1	2	3
5) 입맛이 없거나 과식을 함	0	1	2	3
6) 자신을 부정적으로 봄. 혹은 자신이 실패자라고 느끼거나 자신 또는 가족을 실망시킴	0	1	2	3
7) 신문을 읽거나 텔레비전 보는 것과 같은 일에 집중하는 것이 어려움	0	1	2	3
8) 다른 사람들이 주목할 정도로 너무 느리게 움직이거나 말을 함. 또는 반대로 평상시보다 많이 움직여서, 너무 안절부절못하거나 들떠있음	0	1	2	3
9) 자신이 죽는 것이 더 낫다고 생각하거나 어떤 식으로든 자신을 해칠 것이라고 생각함	0	1	2	3
총점 점				

환자 건강 설문지 (PHQ)-9

Table 1. DSM-5 domains that various depression scales measure

	1	2	3	4	5	6	7	8	9	10	11
HDRS	•	•	•	•	•	•	•		•		
MADRS	•	•	•	•	•	•	•	•	•		
BDI-II	•	•	•	•	•	•	•	•	•		
CES-D	•	•	•	•		•	•	•			
PHQ-9	•	•	•	•	•	•	•	•	•	•	
SDS	•	•	•	•	•	•	•	•	•		
HADS	•	•				•	•				
MASQ	•	•			•	•	•	•			
EPDS	•	•		•			•		•		
GDS	•	•			•	•	•	•			
KDS	•				•	•	•	•			
NADS	•	•	•	•	•		•	•	•		

1 : Depressed mood, 2 : Diminished interest or pleasure, 3 : Significant weight loss or gain, 4 : Insomnia or hypersomnia, 5 : Psychomotor agitation or retardation, 6 : Fatigue or loss of energy, 7 : Worthlessness or excessive or guilt, 8 : Diminished ability to think or concentrate, or indecisive, 9 : Recurrent thoughts of death, 10 : Impairment of functioning, 11 : Manic symptoms. HDRS : Hamilton Depression Rating Scale, MADRS : Montgomery-Asberg Depression Rating Scale, BDI-II : Beck Depression Inventory-II, CES-D : Center for Epidemiologic Studies Depression Scale, PHQ-9 : The Nine-Item Patient Health Questionnaire, SDS : Zung Self-Rating Depression Scale, HADS : Hospital Anxiety and Depression Scale, MASQ : Mood and Anxiety Symptom Questionnaire, EPDS : Edinburgh Postnatal Depression Scale, GDS : Geriatric Depression Rating Scale, KDS : Korean Depression Scale, NADS : New Anxiety-Depression Scale

Sensitivity of 88%, specificity of 85%, and AUC : 92.2%

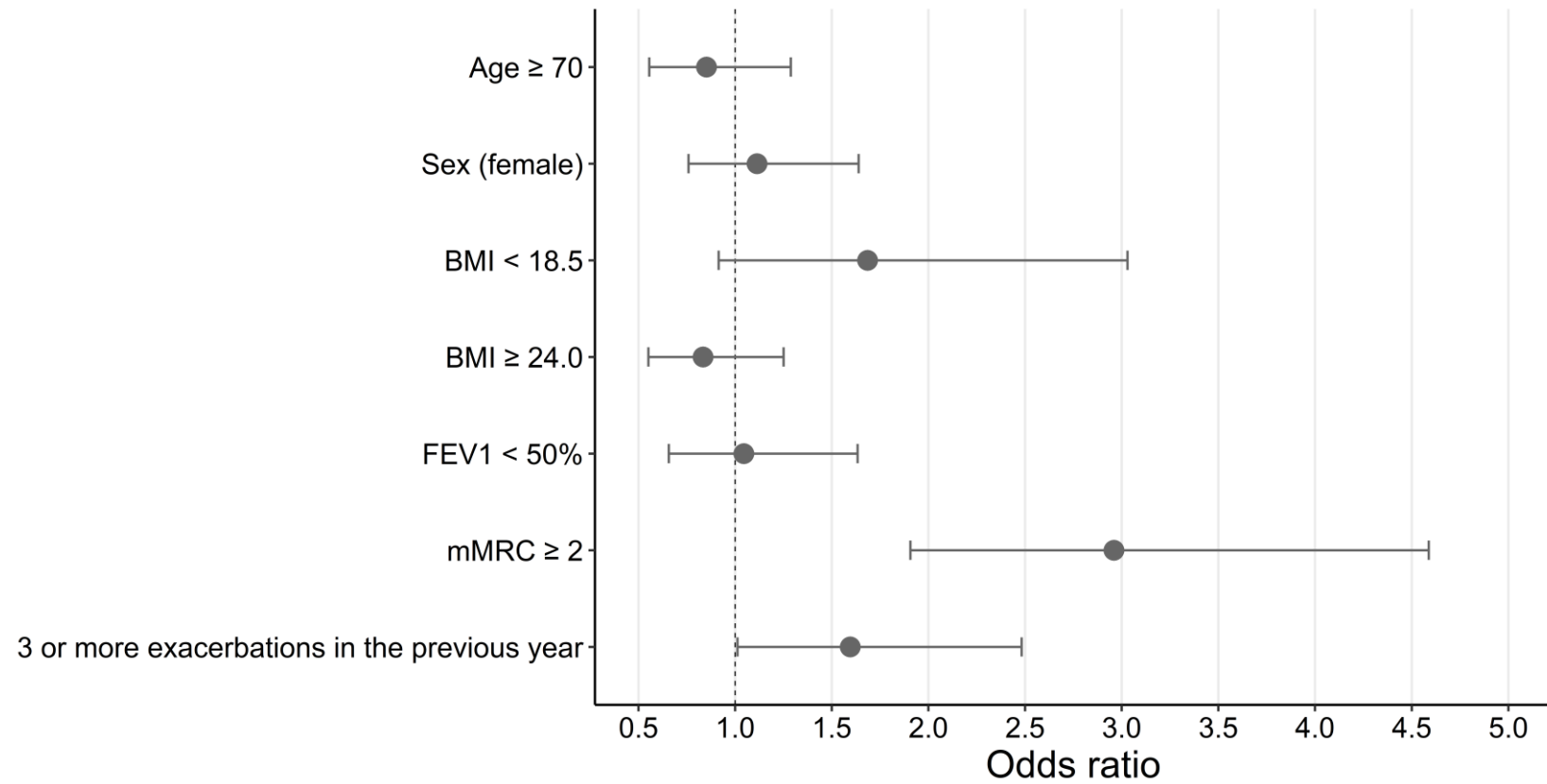
Prevalence of depression and its associated factors in bronchiectasis: findings from KMBARC registry

Variable	Nondepressed (PHQ-9 < 10) (n = 642)	Depressed (PHQ-9 ≥ 10) (n = 168) (20.7%)	p value
Age (years)	64.6 ± 9.1	63.3 ± 10.2	0.140
Sex (female)	355 (55.3)	97 (57.7)	0.631
Bronchiectasis duration (years)	3.2 ± 1.6	3.3 ± 1.7	0.432
Ever smoker	216 (33.7)	56 (33.3)	1.000
BMI	23.3 ± 6.9	22.5 ± 3.9	0.049
FEV₁ (%)	65.8 ± 20.8	60.4 ± 20.8	0.005
FVC (%)	74.1 ± 17.5	68.4 ± 17.1	0.001
Asthma or COPD	294 (45.8)	80 (47.6)	0.737
Number of exacerbation	1.2 ± 1.9	2.0 ± 3.7	<0.001
Hospitalization	99 (15.4)	42 (25.0)	0.005
Tuberculosis history	219 (35.8)	51 (31.7)	0.372
NTM history	65 (10.64)	14 (8.70)	0.564
Depression history	15 (2.3)	20 (11.9)	<0.001
LTOT or NIV	8 (1.2)	11 (6.5)	<0.001
ICU or MV	4 (0.6)	3 (1.8)	0.326
Etiology			
Post-infectious	249 (43.7)	60 (38.5)	0.281
Idiopathic	229 (40.2)	66 (42.3)	0.698
PA colonization	46 (7.3)	16 (9.6)	0.412
Sputum volume (≥ 30cc/day)	253 (39.4)	64 (38.1)	0.825
Radiological extent (≥ 3 lobes)	342(53.3)	96 (57.1)	0.418

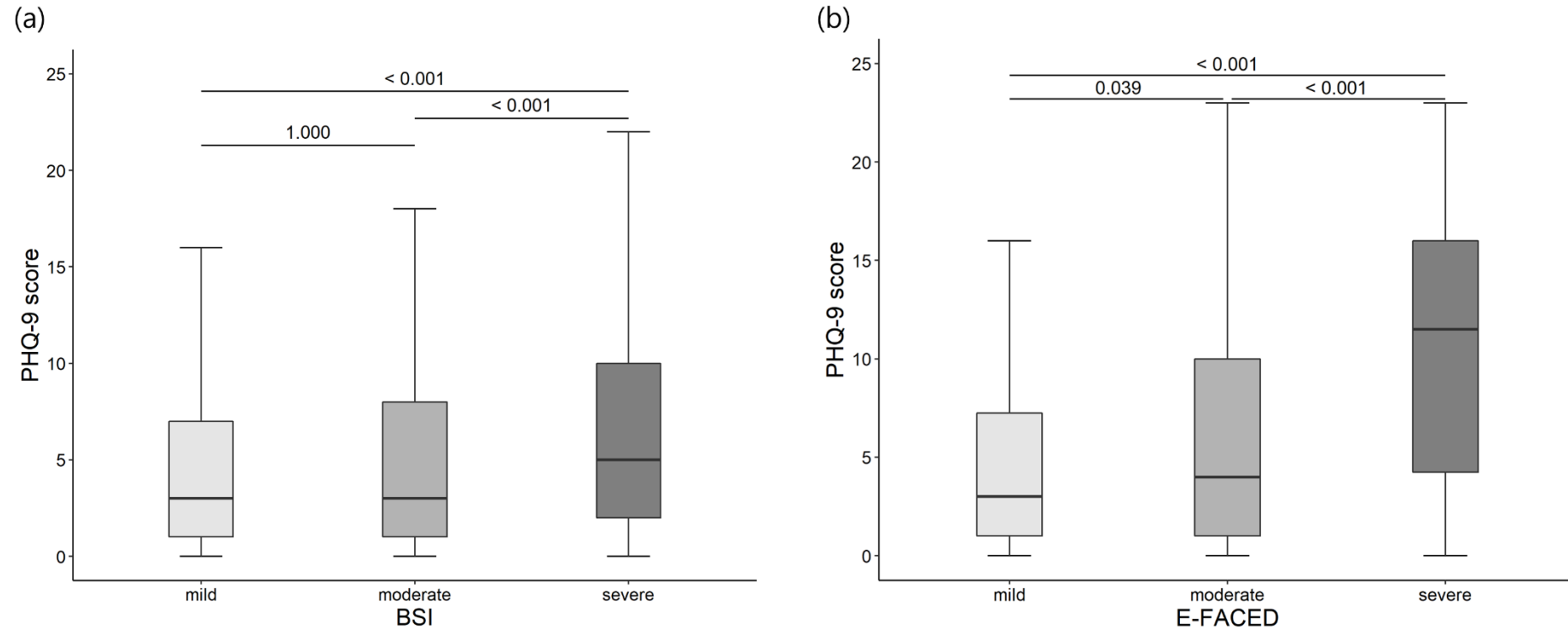
Factors associated with depression

Factors	Univariate analysis		Multivariate analysis	
	OR (95% CI)	p value	OR (95% CI)	p value
Age	0.986 (0.968 – 1.004)	0.114	0.980 (0.960 – 1.000)	0.045
Sex (female)	1.105 (0.785 – 1.561)	0.570	1.019 (0.692 – 1.506)	0.923
BMI	0.952 (0.904 – 1.002)	0.062	0.971 (0.919 – 1.024)	0.280
FEV1 (%)	0.985 (0.976 – 0.994)	0.001	1.001 (0.991 – 1.012)	0.803
mMRC	2.031 (1.659 – 2.500)	<0.001	2.137 (1.671 – 2.752)	<0.001
Number of exacerbations in the previous year	1.140 (1.064 – 1.228)	<0.001	1.085 (0.997 – 1.178)	0.052
LTOT or NIV	5.553 (2.211 – 14.562)	<0.001	1.899 (0.642 – 5.673)	0.243

Factors associated with depression

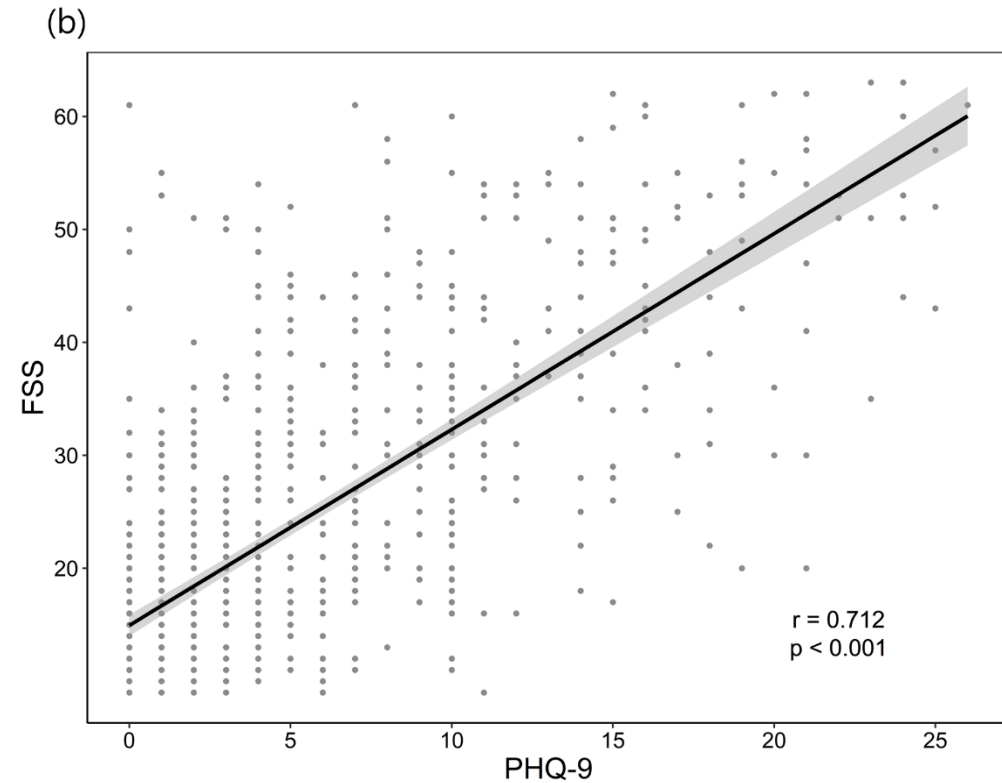
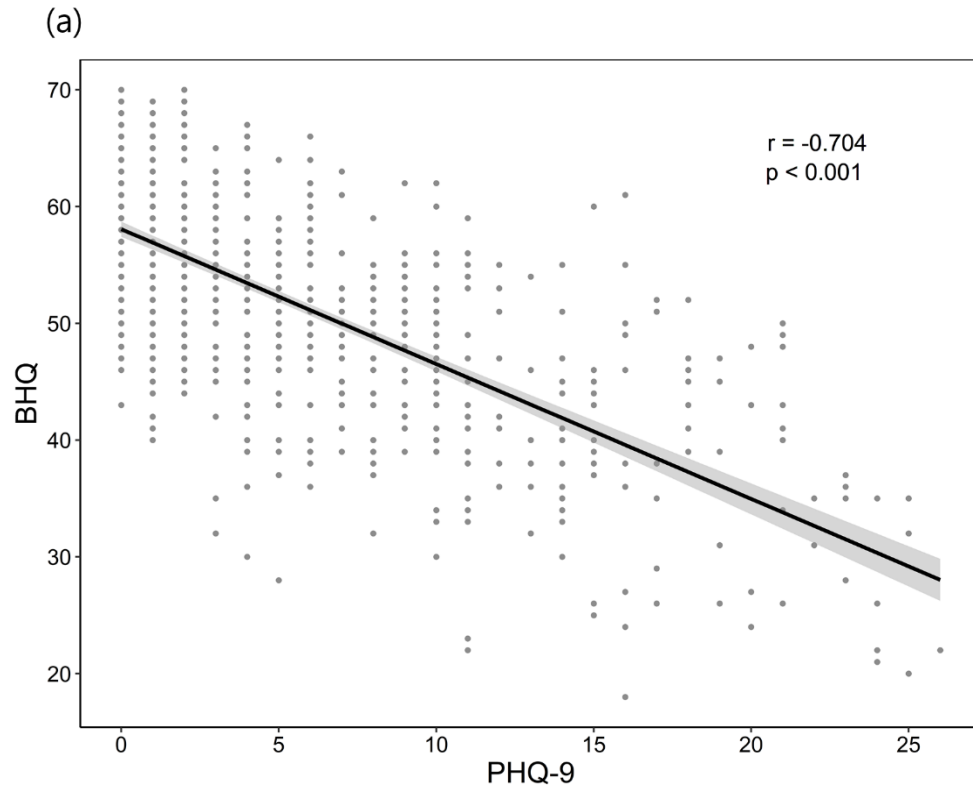


Comparison of depression across the severity of bronchiectasis



Exacerbation (**E**), FEV₁% (**F**), age (**A**), colonization with PA (**C**), extension of bronchiectasis (**E**), and dyspnea score for mMRC (**D**)

Result of correlation analysis



BHQ: Bronchiectasis Health Questionnaire
FSS: Fatigue Severity Score

Summary (1)

- Study results from KMBARC are generally consistent with previous findings.
- Prevalence of depression was approximately 20% (range 5% to 55%), but underrecognized.
- Depression correlated with quality of life and fatigue.
- Depression was associated with dyspnea and frequent exacerbation, but not associated with disease severity assessed by HRCT, FEV₁, age, sex, BMI, and etiology.
- Active screening for depression is necessary to optimize the treatment of bronchiectasis.

Prevalence and impact of chronic rhinosinusitis in bronchiectasis

Characterisation of the presenting clinical features of adult bronchiectasis

- Australia, cross-sectional study (n = 103): 56 years, female 63%, FEV₁ 76%
- CRS defined as chronic upper respiratory symptoms for more than a year.

Table 2 Clinical Findings in 103 patients with bronchiectasis at time of diagnosis.

Symptoms, n (%) or mean ± sd as appropriate

Productive cough	99 (96)
Sputum most days of week	90 (87); daily in 78 (76)
Daily sputum volume, ml	38 ± 34
Dyspnoea	62 (60)
MRC dyspnoea score	2.1 ± 1.2
Rhinosinusitis	73 (71)
Chest pain	20 (19)
Exacerbations	2.4 ± 1.6
Haemoptysis	27 (26)
Fatigue	75 (73)

- 30 patients gave a history of ENT surgery for recurrent sinusitis.
- 47 patients had radiologic abnormality of the upper airway (from mucosal thickening to severe pansinusitis).

United airways again: high prevalence of rhinosinusitis and nasal polyps in bronchiectasis

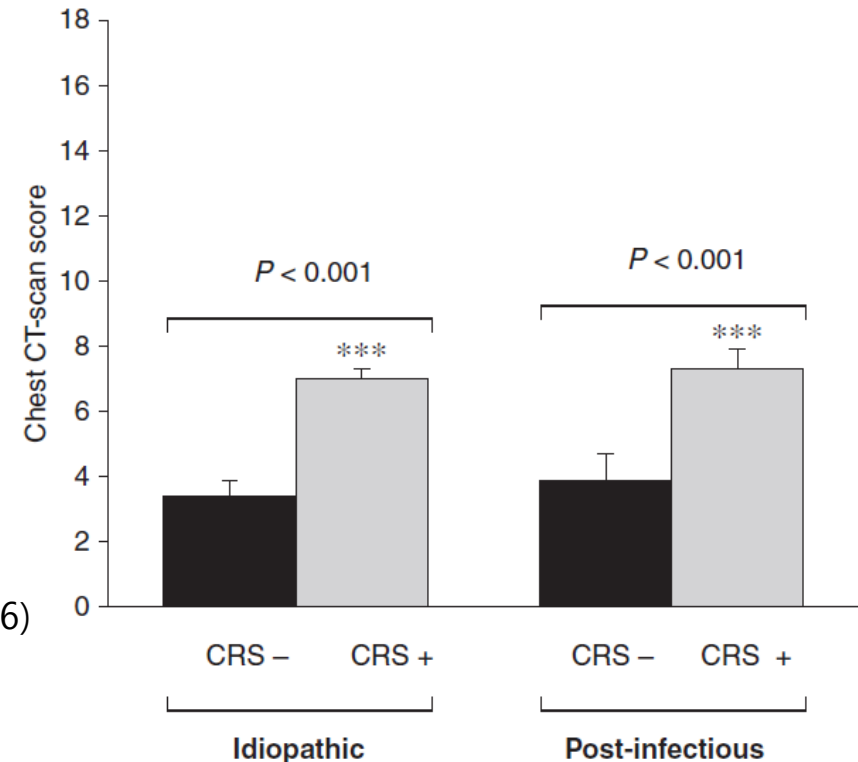
- Spain, cohort study (n = 88): 55 years, female 69%, FEV₁ 83%
- Etiology: idiopathic 37% and postinfectious 63%
- CRS defined as following EPOS criteria
- CRS (**77%**): rhinorrhea (98.5%) and nasal congestion (90%)
Nasal polyp (**25%**) in endoscopy
- The prevalence of CRS, nasal polyps and other outcomes were similar in idiopathic and postinfective bronchiectasis.

United airways again: high prevalence of rhinosinusitis and nasal polyps in bronchiectasis

Table 1. Epidemiological characteristics of BQ patients included in the study

	All BQ patients	No CRS	CRS
Patients, <i>n</i> (%)	88	20 (23)	68 (77)
Age (years)†	55 ± 2	59 ± 3	54 ± 2
BQ age diagnosis (years)†	40 ± 2	47 ± 4	38 ± 2.5
Female (%)	69	50	75*
F/M ratio	2.3 : 1	1 : 1	3 : 1
Smoking habit			
Ex-smokers (%)	24	50	16
Smokers (%)	6	0	7
Packs/year†	23 ± 3	25.5 ± 5	22 ± 4
Lung function			
FEV ₁ (%)†	83 ± 3	90 ± 4	81 ± 3
FEV ₁ /FVC (%)†	93 ± 1.5	96 ± 3	92 ± 2

(p=0.06)



C-reactive protein: 1.3 ± 0.2 mg/dl in patients with CRS compared with patients with no CRS (0.6 ± 0.2 mg/dl; p<0.05)

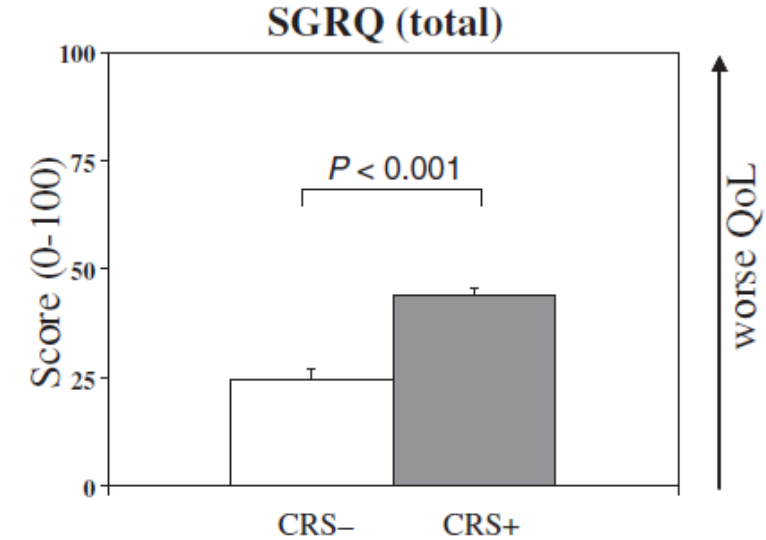
United airways: the impact of CRS in bronchiectatic patient's quality of life

- Spain, cohort study (n = 80)
- CRS defined as following EPOS criteria

	All BQ patients	Non-CRS	CRS
Patients, n (%)	80	20 (25)	60 (75)
Age (years)†	56.6 ± 1.8	58.7 ± 3.2	55.5 ± 2.1
Female subjects, % F/M ratio	71 2.4 : 1	50 1 : 1	81* 4.4 : 1
FEV ₁ , %†	80.8 ± 2.8	90 ± 4	75.8 ± 3*

*P < 0.05.

HRCT score: 6.2 ± 0.5 in patients with CRS compared with patients with no CRS (4.2 ± 0.7; p<0.001)



Total nasal symptom score correlated with SGRQ score ($r=0.67$; p<0.01)

- CRS contributed to the impairment of health status in patients with bronchiectasis.
- “United airway” concept goes beyond the scope of asthma and COPD

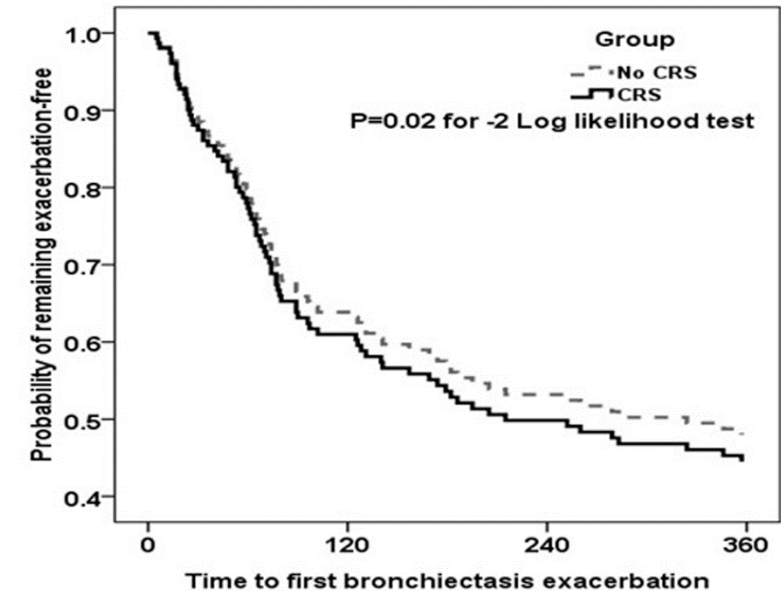
Impacts of CRS on severity and exacerbations in Chinese adults with bronchiectasis

- China, cohort study (n = 148)
- CRS defined as following EPOS criteria : 47 (31.8%)

Parameters	CRS	No CRS	P value
No. of patients	47	101	-
Age (years)	43.6±14.8	45.0±13.4	0.58
Height (cm)	160.1±8.0	161.6±7.6	0.27
Weight (kg)	50.0 (11.5)	52.0 (10.8)	0.40
Females (No., %)	33 (70.2%)	59 (58.4%)	0.17
Body mass index (kg/m ²)	20.4±2.7	20.0 (4.3)	0.80
Body mass index <18.5 (No., %)	11 (23.4%)	33 (32.7%)	0.25
Age of bronchiectasis symptom onset (years)	30.3±16.1	30.7±17.1	0.91
Symptom onset for >10 years (No., %)	19 (40.4%)	40 (39.6%)	0.92
Duration of symptom onset (years)	13.3±9.7	14.3±14.2	0.65
24-hour sputum volume (ml)	20.0 (35.0)	20.0 (25.0)	0.44
Bronchiectasis Severity Index	6.4±3.4	5.0 (6.0)	0.19
Never-smokers (No., %)	39 (83.0%)	92 (91.1%)	0.15
Underlying causes			
Post-infectious (No., %)	10 (21.3%)	30 (29.7%)	0.28
Other known causes (No., %) *	18 (38.3%)	22 (21.8%)	0.04
Idiopathic (No., %)	19 (40.4%)	49 (48.5%)	0.36

Impacts of CRS on severity and exacerbations in Chinese adults with bronchiectasis

Parameters	CRS	No CRS	P value
No. of patients	47	101	-
No. of bronchiectatic lobes	4.0 (3.0)	4.0 (3.0)	0.28
HRCT total score	7.0 (7.0)	7.0 (5.0)	0.46
Cystic bronchiectasis (No., %)	20 (42.6%)	62 (61.4%)	0.03
Lung function	-	-	-
FVC% predicted	78.2±19.8	82.2 (16.8)	0.54
FEV ₁ % predicted	68.2±24.8	74.8 (21.2)	0.29
FEV ₁ /FVC%	75.3 (19.6)	73.8±12.7	0.28
MMEF% predicted	51.2±29.3	59.2±31.0	0.14
D _L CO% predicted	89.7±14.1	89.0±19.9	0.84



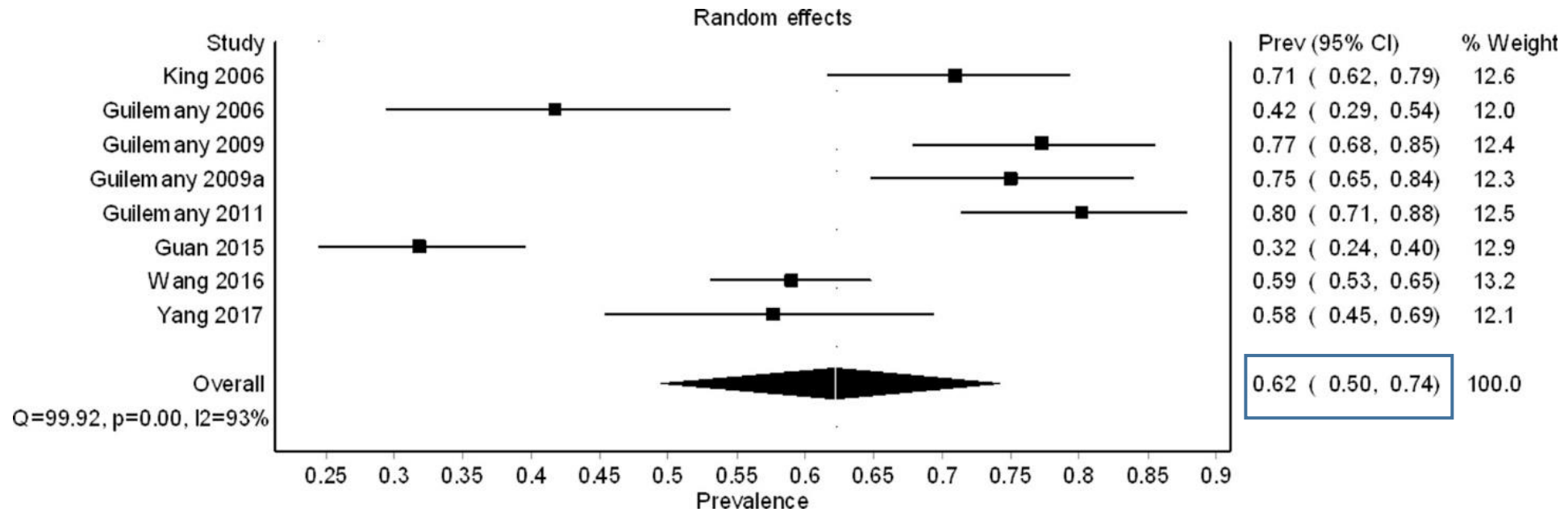
No. of patients at risk				
CRS	47	30	21	20
No CRS	101	70	54	48

- CRS is associated with higher BSI, exacerbation, and poorer lung function

European position paper on rhinosinusitis and nasal polyps: EPOS definition of CRS

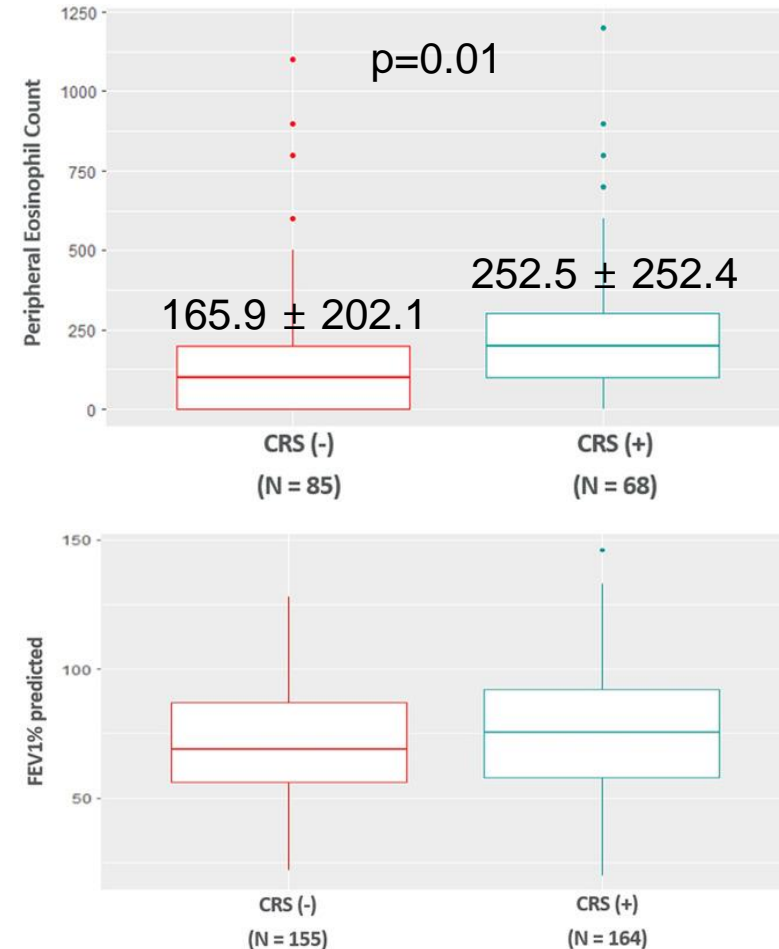
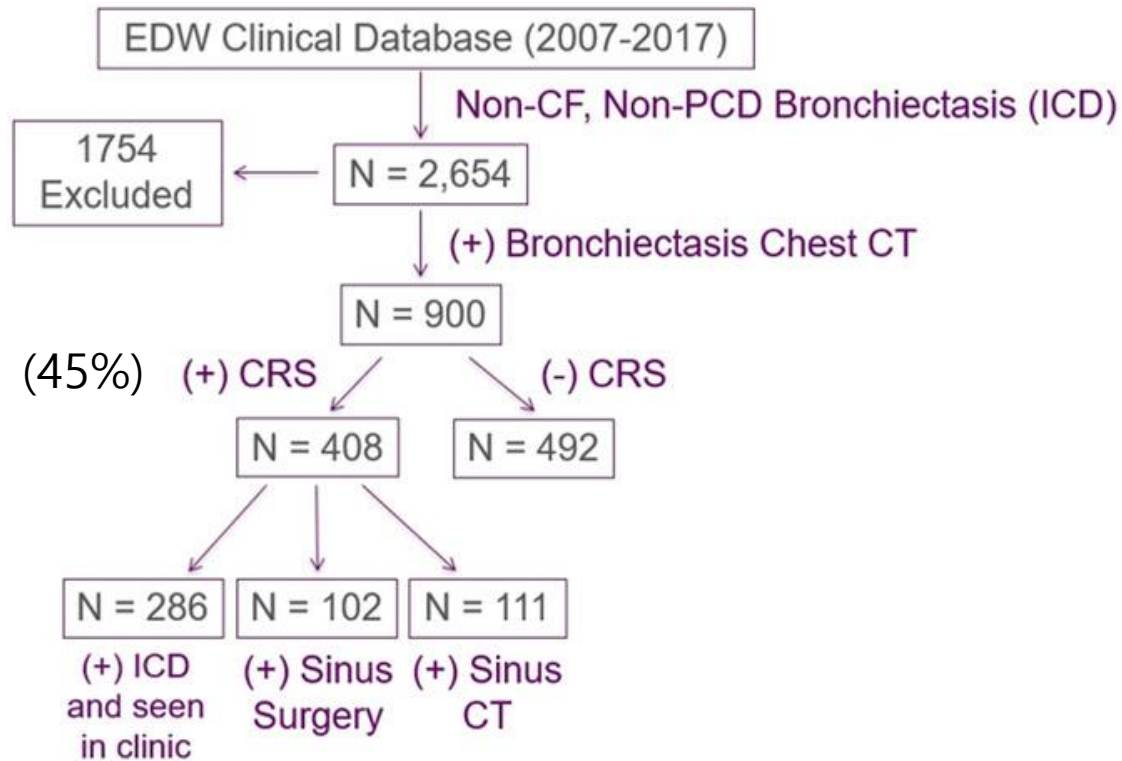
- Two or more symptoms (for ≥ 12 weeks), one of which should be either nasal blockage / obstruction / congestion or nasal discharge (anterior / posterior nasal drip):
 \pm facial pain/pressure \pm reduction or loss of smell
and either
- Endoscopic signs of: nasal polyps, and/or mucopurulent discharge primarily from middle meatus and/or edema / mucosal obstruction primarily in middle meatus
and/or
- CT changes: mucosal changes within the ostiomeatal complex and/or sinuses
- **Definition for epidemiology studies and general practice:** the definition is based on symptomatology usually without ENT examination or radiology. We are aware that this will give an over estimation of the prevalence.

Prevalence of CRS in bronchiectasis: a meta-analysis



Prevalence of CRS in patients with non-cystic fibrosis bronchiectasis at a tertiary care center in the United States

- Retrospective cohort study



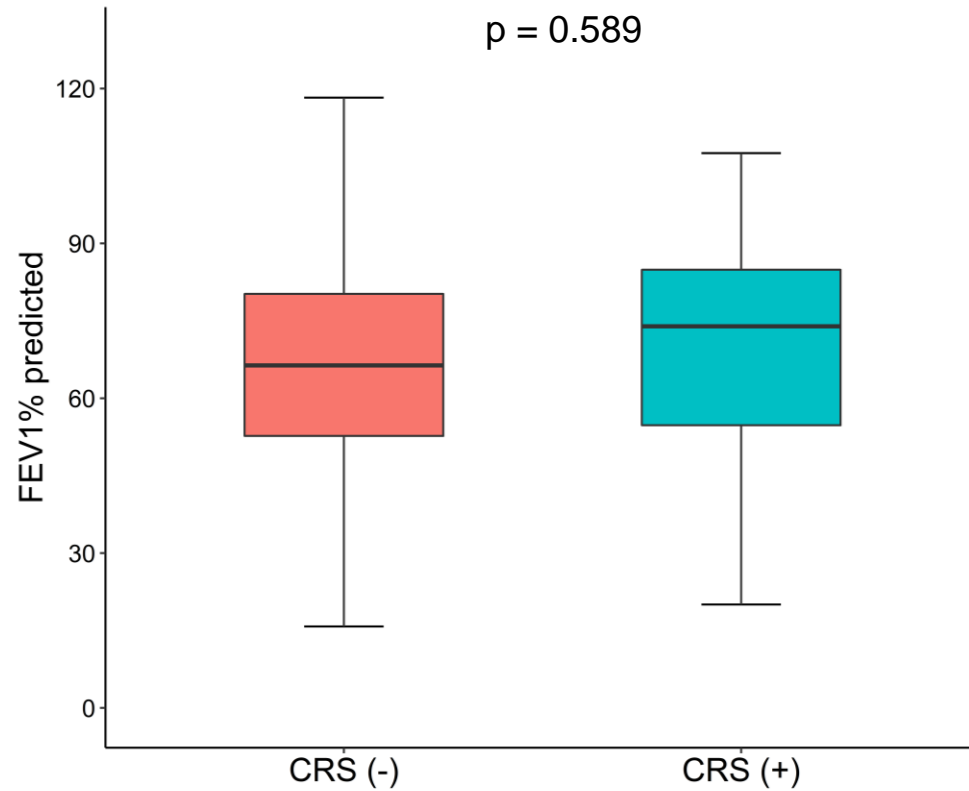
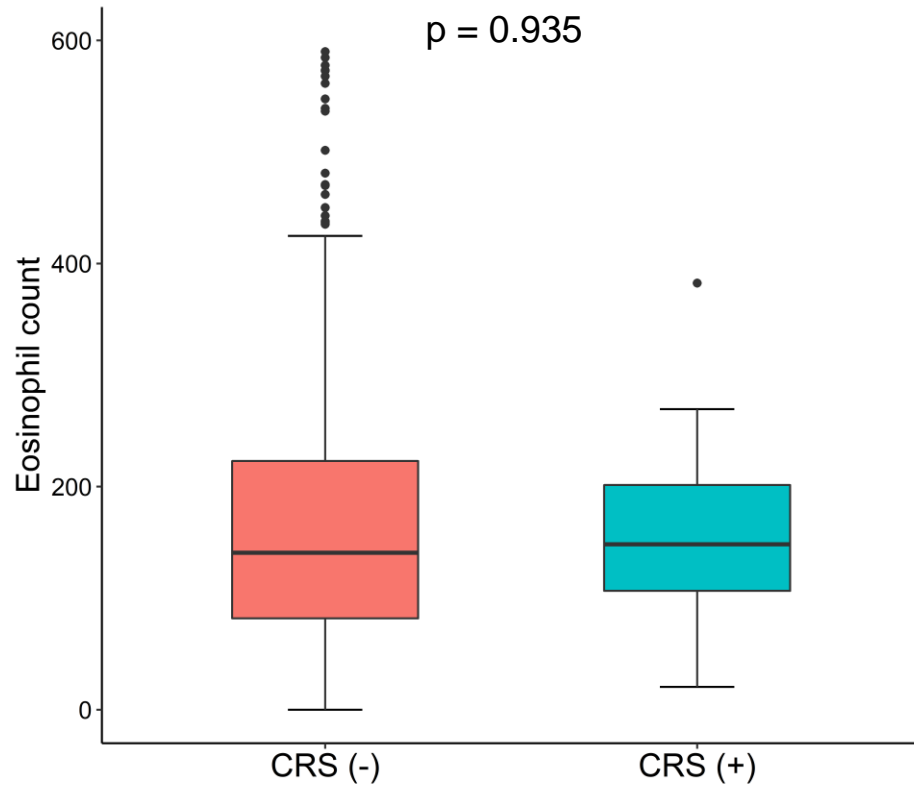
Prevalence and impact of CRS in bronchiectasis: findings from KMBARC registry

Variable	CRS (-) (n= 865)	CRS (+) (n = 66) (7.1%)	p value
Age (years)	64.6 ± 9.3	60.5 ± 10.7	0.001
Sex (female)	486 (56.3)	36 (54.5)	0.788
Bronchiectasis duration (years)	3.3 ± 1.6	2.9 ± 1.6	0.136
Ever smoker	295 (34.1)	21 (31.8)	0.701
BMI	22.9 ± 3.4	23.1 ± 3.9	0.636
Asthma	173 (20.0)	15 (22.7)	0.283
COPD	295 (34.1)	25 (37.9)	0.387
Etiology			
Post-infectious	173 (20.0)	5 (7.6)	0.013
Idiopathic	311 (36.0)	35 (53.0)	0.006
Tuberculosis	178 (20.6)	9 (13.6)	0.175
PA colonization	59 (6.8)	7 (10.6)	0.248
Sputum volume (cc/day)	26.2 ± 44.1	48.2 ± 113.3	0.130
Sputum volume (≥ 30cc/day)	215 (25.5)	19 (30.2)	0.416

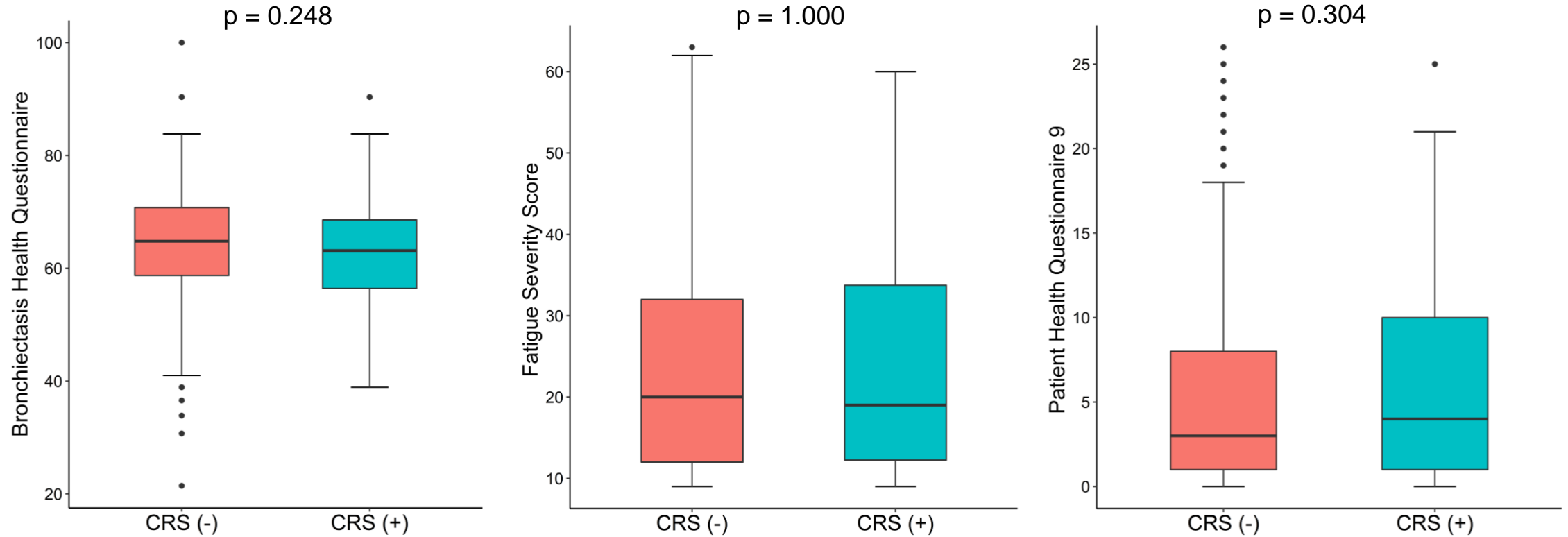
Prevalence and impact of CRS in bronchiectasis: findings from KMBARC registry

Variable	CRS (-)	CRS (+)	p value
Number of exacerbation	0.9 ± 1.7	1.0 ± 1.3	0.801
Hospitalization	151 (17.5)	7 (10.6)	0.153
LTOT or NIV	17 (2.0)	4 (6.1)	0.031
Radiological extent (lobe)	3.4 ± 1.7	3.4 ± 1.6	0.418
CT score	12.1 ± 4.1	11.4 ± 4.4	0.212
C-reactive protein	1.5 ± 2.9	1.1 ± 1.6	0.324
BSI	6.8 ± 3.7	6.3 ± 3.3	0.291
FACED	2.0 ± 1.7	1.7 ± 1.4	0.122
E-FACED	2.4 ± 1.9	1.9 ± 1.7	0.075

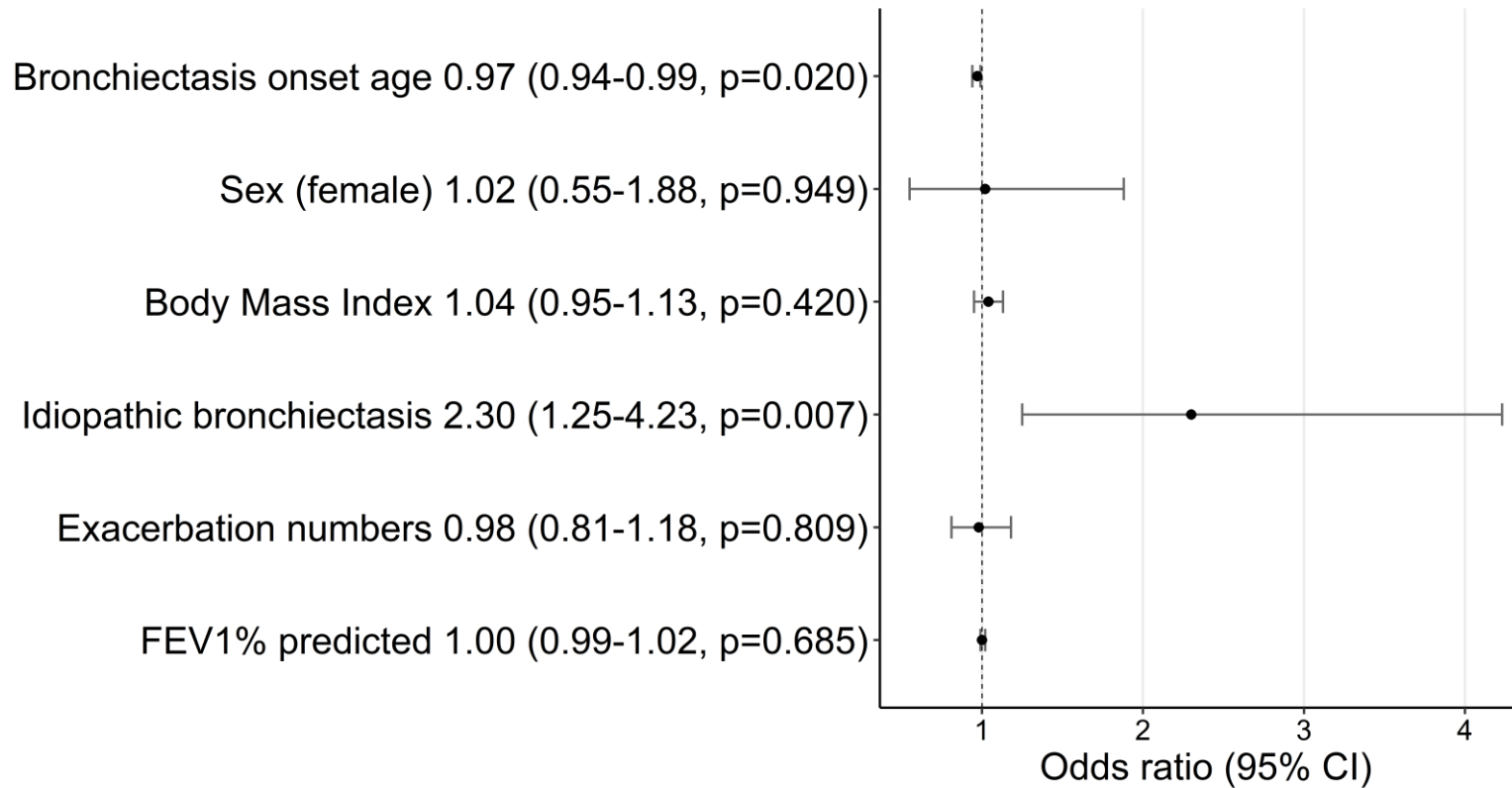
Prevalence and impact of CRS in bronchiectasis: findings from KMBARC registry



Prevalence and impact of CRS in bronchiectasis: findings from KMBARC registry



Prevalence and impact of CRS in bronchiectasis: findings from KMBARC registry



Summary (2)

- Prevalence of CRS from KMBARC was 7.1% (66/931).
- CRS was not associated with disease severity, inflammation, exacerbation, lung function, quality of life, fatigue and depressive symptom. Younger onset age and idiopathic etiology was associated with CRS.
- This low prevalence and negative results might be attributable to the absence of diagnostic criteria of CRS.
- We need to pay attention to CRS as a comorbidity and be aware of definition of CRS.
- This result warrants further research into the subject.