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Etiology and Clinical Evaluation of Patients with Bronchiectasis in a Tertiary Hospital in Nigeria

Etiologie et Évaluation Clinique des Patients Atteints de Bronchiectasie dans un Hôpital Tertiaire du Nigeria

¹*V. A. Umoh, ²D. D. Alasia, ¹E. E. Akpan, ¹U. Ekrikpo, ³E. E. Ekpe, ⁴M. E. Ekwere, ¹E. Peters

ABSTRACT

BACKGROUND: Bronchiectasis is often considered an orphan disease in developed societies. This may not be the case with low-income countries. Currently there is a paucity of data on the pattern and presentation of this condition in Nigeria.

OBJECTIVE: This study was undertaken to determine the frequency and pattern of presentation of bronchiectasis in a tertiary healthcare facility in Uyo, South-South, Nigeria.

METHODS: We carried out a three-year prospective study of adult patients aged between 15–85 years diagnosed with bronchiectasis in the University of Uyo Teaching Hospital in Uyo, Nigeria between 2016 and 2019.

RESULTS: Eighty-two patients were identified from the clinic register. Out of these, 76 were recruited into the study; made up of 44(57.9%) males and 32 (42.1%) females. The average age of the patients was 49.7 ± 14.1 years. Sixteen (21.1%) of the patients were HIV positive. Forty-four (57.9%) patients had previously been treated for pulmonary tuberculosis. Majority of the patients; 72 (94.7%) had chronic productive cough. Sixty-four (84.2%) had at least one episode of exacerbation within the last 12 months while 36(47.4%) had a severe exacerbation requiring hospitalisation. Hospitalisation was associated with several factors with the strongest contributor being the presence of respiratory distress on physical examination (OR 15.4 $p=0.002$).

CONCLUSION: Bronchiectasis is not an uncommon disease amongst our patients. A previous history of pulmonary tuberculosis is the commonest associated predisposing medical condition. There is a high rate of exacerbation among these patients with respiratory distress as the strongest predictor of hospitalisation. *WAJM 2022; 39(1): 52–58.*

Keywords: Etiology, Clinical features, Bronchiectasis, Exacerbation, Hospitalisation.

RÉSUMÉ

CONTEXTE: La bronchiectasie est souvent considérée comme une maladie orpheline dans les sociétés développées. Ce n'est peut-être pas le cas dans pays à faible revenu. Actuellement, il y a une pénurie de données sur les caractéristiques et la présentation de cette maladie au Nigeria.

OBJECTIF: Cette étude a été entreprise pour déterminer la fréquence et le mode de présentation de la bronchiectasie dans un établissement de soins tertiaires à Uyo, dans le sud-sud du Nigeria.

MÉTHODES: Nous avons mené une étude prospective sur trois ans auprès de patients adultes âgés de 15 à 85 ans chez qui on a diagnostiqué une bronchiectasie dans l'hôpital universitaire d'Uyo, à Uyo, entre 2016 et 2019. Uyo, au Nigeria, entre 2016 et 2019.

RÉSULTATS: Quarante-deux patients ont été identifiés à partir du registre de la clinique registre. Parmi ceux-ci, 76 ont été recrutés dans l'étude ; composés de 44 (57,9 %) hommes et 32 (42,1 %) femmes. L'âge moyen des patients était de $49,7 \pm 14,1$ ans. Seize (21,1 %) des patients étaient séropositifs. Quarante-quatre (57,9 %) patients avaient déjà été traités pour une tuberculose pulmonaire. La majorité des patients ; 72 (94,7%) avaient une toux productive chronique. Soixante-quatre (84,2 %) ont eu au moins un épisode d'exacerbation au cours des 12 derniers mois, tandis que 36 (47,4 %) ont eu une exacerbation sévère nécessitant une hospitalisation. L'hospitalisation était associée à plusieurs facteurs, le facteur le plus important étant la présence d'une détresse respiratoire à l'examen physique (OR 15.4 $p=0.002$).

CONCLUSION: La bronchiectasie n'est pas une maladie rare parmi nos patients. Un antécédent de tuberculose pulmonaire est l'état médical prédisposant le plus fréquent. Il existe un taux élevé d'exacerbation chez ces patients, la détresse respiratoire étant le facteur prédictif le plus fort d'hospitalisation. *WAJM 2022; 39(1): 52–58.*

Mots clés: Étiologie, Caractéristiques cliniques, Bronchiectasie, Exacerbation, Hospitalisation.

¹Department of Internal Medicine, University of Uyo, Uyo, Nigeria. ²Department of Internal Medicine, University of Port Harcourt, Port Harcourt, Nigeria. ³Department of Surgery, University of Uyo, Uyo, Nigeria. ⁴Department of Internal Medicine, University of Uyo Teaching Hospital, Uyo, Nigeria.

*Correspondence: Dr. Victor A. Umoh, Department of Internal Medicine, University of Uyo, Uyo, Nigeria. Phone numbers: 08055026582
Facsimile numbers E-mail: aaumoh@yahoo.com

INTRODUCTION

Bronchiectasis is a pathological description of the airway which is characterized by permanent thickening and dilatation. It is the result of a vicious cycle of inflammation and infection arising from a variety of etiologic factors both inherited and acquired.¹ This condition was first described in medical literature by Laennec in 1819 using case reports and clinical examination in correlation with autopsy findings.^{2,3} Bronchiectasis was previously quite common in the Western world as documented in a lecture by Jex-Blake in 1919 at the hospital for consumption in London UK. Using case records over a 20-year period. He estimated that bronchiectasis could be responsible for as high as 5% of hospital admissions.⁴ The prevalence of bronchiectasis has since declined significantly in the developed world owing to early immunisation, widespread use of antibiotics and improved living conditions. However these days bronchiectasis is being recognized more due to the increasing use of high-resolution computerized tomography (HRCT) of the chest to evaluate respiratory complaints in high income countries.⁵ The prevalence of bronchiectasis is thought to be higher in the low-income societies compared with their higher-income counterparts probable due to poorer living conditions and reduced access to healthcare.⁶ The etiologic factors responsible for bronchiectasis differ from population to population. Congenital immune deficiency syndromes, metabolic and congenital ultrastructural defects are the major etiologic factors in the Western world, while infections: bacterial and fungal, continue to be major causes of the disease in the developing world.⁷

Bronchiectasis can be considered to be a common, yet undiagnosed condition, especially in Sub-Saharan Africa. Umoh, *et al* in a retrospective survey of patients admitted for respiratory diseases over five years in Calabar, South-eastern Nigeria did not report any case of bronchiectasis⁸ while Desalu, *et al* reported four cases out of 183 respiratory diseases admissions in a two year period in Ilorin, North-central Nigeria.⁹ There is a paucity of data on

the clinical correlates of this condition in our environment. This study was undertaken to evaluate the etiology and clinical correlates of bronchiectasis in a developing country like Nigeria.

METHODS

Study Area

This study was conducted in the respiratory diseases clinic of the University of Uyo Teaching Hospital (UUTH). This is a public hospital located in the capital of Akwa Ibom State, South South Nigeria. This hospital provides secondary and tertiary health-care services for the people of Akwa-Ibom and the neighbouring states. The clinic receives referrals from the Hospital's general out-patient clinics, the general medical out-patient clinic, and other primary and secondary health-care facilities within and around the state.

This was a prospective cross-sectional study. Patients who presented to the clinic with chronic productive cough lasting more than 4 weeks and or recurrent episode of cough with two or more episodes occurring over two months, with radiological evidence i.e. HRCT or chest radiography, suggestive of bronchiectasis were recruited for this study.¹⁰ Patients with diagnosis of other chronic respiratory diseases such as active tuberculosis, interstitial lung disease, etc. were excluded from the study. The subjects were recruited over three years; August 2016 to July 2019. Selected subjects had a comprehensive interview and clinical assessment done during their clinic visits with the use of a proforma to document the findings. Demographic data, predisposing factors for bronchiectasis such as previous history of pulmonary tuberculosis and severe childhood respiratory infection, the presenting symptoms and duration of such symptoms, smoking history and alcohol use were documented as well as physical examination findings during the clinical assessment. Daily sputum volume was estimated using a teaspoon (5mls), tablespoon (15mls), egg cup (50mls) and teacup (150mls). Daily sputum production was classified as scanty if ≤ 10 mls, moderate 15mls to ≤ 50 mls and copious ≥ 50 mls. Shortness of breath was evaluated using the Medical Research

Council (MRC) dyspnoea scale. A history of exacerbation and hospitalisation was obtained by the interviewer; exacerbation was defined as the worsening of symptoms of cough, chest pain, sputum production and shortness of breath necessitating the use of medications or a change in medications. Hospitalisation was defined as the admission into a healthcare facility overnight for worsening clinical state. Smoking status was determined using the Center for Disease Control (CDC) definitions for cigarette smoking.¹¹ A comprehensive physical examination was carried out on each subject by pulmonologists. Weight, height and body mass index (BMI) were measured and calculated. BMI was categorized into underweight (< 18.5 Kg/M²), normal weight (18.5 Kg/M²–25 Kg/M²), overweight (25.1 Kg/M²–30 Kg/M²) and obese > 30 Kg/M². Respiratory distress and chest wall asymmetry and other abnormalities were noted. General physical examination findings such as digital clubbing was also documented. All the subjects were screened for active pulmonary tuberculosis using gene amplification technique for Mycobacterium tuberculosis in sputum (XpertMTB) as well as for HIV infection using double ELISA for anti-HIV antibodies in serum.

Data was analysed using a statistical software package (IBM SPSS statistics for windows version 22) categorical data was presented as frequency and percentages while continuous data was presented as means with standard deviation. The univariate relationship between parameters was explored using the chi-square test for categorical variables and student's T-test for continuous variables. A binary logistic regression model was constructed to determine factors that contribute to an unfavourable clinical outcome (previous hospitalisation for exacerbation) amongst the subjects. A p value of less than 0.05 was taken to signify significant association between parameters.

RESULTS

Demographics

Eighty-two patients were identified from the clinic register. Out of these, 76 were recruited into the study; made up

of 44(57.9%) males and 32 (42.1%) females. Six patients were excluded from the study for not meeting the criteria for the diagnosis of bronchiectasis. Sixty-three of the diagnosis were confirmed by thoracic CT scans while thirteen were “highly suggestive of bronchiectasis” on chest X-ray along with chronic productive cough. The average age of the patients was 49.7 ± 14.1 years. The males were significantly older than the females (54.27 ± 14.3 years vs. 43.5 ± 11.3 years, $P=0.001$). Most of the patients had either a secondary 36(47.4%) or tertiary 20(26.3%), while eight patients had no formal education. The males were significantly better educated than the females ($p<0.001$). Majority of the patients were semi-skilled 44(57.9%) while 12(15.8%) were unemployed (Table 1).

Risk Factors

Twenty patients (26.3%) used alcohol with no significant difference across gender ($p=0.82$) while 12(15.8%) patients had ever smoked tobacco but none of them was a current smoker. All the smokers were males. Sixteen (21.1%) of the patients were HIV positive; 12(37.5%) females and 4(9.1%) males $p=0.003$. Forty-four (57.9%) patients had previously been treated for pulmonary tuberculosis; 28(63.6%) males and 16(50.0%) females $p=0.23$ (Table 1).

Clinical Presentation

In terms of the clinical presentation, 48(63.2%) had a cough in the mornings while 56(73.7%) had cough every day. Majority of the patients; 72 (94.7%) had a productive cough which was mostly of moderate 36(47.3%) and copious 24(31.6%) in quantity. Majority of the patients were underweight; 36(47.4%) with none being obese. Sixty-four (84.2%) had at least one episode of exacerbation within the last 12 months while 36(47.4%) having a severe exacerbation requiring hospitalisation (Table 2).

Clinical Correlates Assessment

There were more females than males hospitalised for disease exacerbation (50% vs 45%) but this was not statistically significant. Shortness of breath was significantly associated with hospitalisation while the relationships

Table 1: General Characteristics of Study Participants

Parameter	All(n=76)	Male(n=44)	Female(n=32)	P
Age, years (mean \pm SD)	49.7 \pm 14.1	54.27 \pm 14.3	43.5 \pm 11.4	0.001
Education				
None, N (%)	8(10.5)	0(0)	8(25.0)	<0.001
Primary, N (%)	12(15.8)	4(9.1)	8(25.0)	
Secondary, N (%)	36(47.4)	24(54.5)	12(37.5)	
Tertiary, N (%)	20(26.3)	16(36.4)	4(12.5)	
Occupation				
Unemployed, N (%)	12(15.8)	4(9.1)	8(25.0)	0.001
Semiskilled, N (%)	44(57.9)	24(54.5)	20(62.5)	
Public service, N (%)	12(15.8)	12(27.3)	0(0)	
Business, N (%)	8(10.5)	4(9.1)	4(12.5)	
Alcohol use, n (%)	20(26.3)	12(27.3)	8(25.0)	0.82
Smoking History				
Ever smoked, N (%)	12(15.8)	12(27.3)	0(0)	0.001
Pack-years, years (mean \pm SD)	20.2 \pm 14.5	20.2 \pm 14.5	0(0)	
Indoor air pollution, N (%)	24(31.6)	8(18.2)	16(50.0)	0.003
Severe childhood chest infection N (%)	8(10.5)	8(18.2)	0(0)	0.011
Previous PTB, N (%)	44(57.9)	28(63.6)	16(50.0)	0.23
HIV positive, N (%)	16(21.1)	4(9.1)	12(37.5)	0.003

Table 2: Clinical Features of Study Participants

Clinical Feature	N=76(%)
Morning cough N (%)	48(63.2)
Daily cough N (%)	56(73.7)
Productive cough N (%)	72(94.7)
Sputum Quantity	
Scanty N (%)	16(21.1)
Moderate N (%)	36(47.3)
Copious N (%)	24(31.6)
Nature of Sputum	
Mucoid N (%)	20(27.8)
Purulent N (%)	24(33.3)
Bloody N (%)	20(27.8)
Black N (%)	8(11.1)
Dyspnoea	64(84.2)
MRC Dyspnoea Grade	
Grade 1 N (%)	24(31.6)
Grade 2 N (%)	12(15.8)
Grade 3 N (%)	16(21.1)
Grade 4 N (%)	12(15.8)
Respiratory distress N (%)	16(21.1)
Finger clubbing N (%)	40(52.6)
BMI, Kg/M ² (mean \pm SD)	20.4 \pm 4.1
Underweight, N (%)	36(47.4)
Normal, N (%)	23(30.3)
Overweight, N (%)	17(22.4)
Exacerbations N (%)	64(84.2)
Hospitalization N (%)	36(47.4)

between previous TB as well as HIV infection and hospitalisation were not statistically significant. Alcohol consumption and cigarette smoking were significantly associated with hospitalisation. Respiratory distress was significantly associated with hospitalisation while digital clubbing was not significantly associated with hospitalisation (Table 3).

Binary logistic regression was performed to assess the impact of some patient characteristics on the likelihood that a patient would be hospitalised. The model contained five variables known to be associated with disease severity from previous studies;⁵ age, HIV infection status, frequent daily cough, BMI and having respiratory distress on physical examination. The full model containing all the predictors was statistically significant $\chi^2(5, N=76) = 25.33, p<0.001$. The model explained 37.8% of the variance in hospitalisation status (Nagelkerke R square) of the patients and correctly classified 68.4% of the patients. As shown in Table 4, three of the five predictors made significant unique contributions. The strongest contributor being the presence of respiratory distress: OR 15.4 $p=0.002$.

Table 3: Demographic and Clinical Correlates of Hospitalisation

Parameter	Hospitalisation N (%)	P
Gender		
Male	20(45)	0.7
Female	16(50.0)	
Education		
None	0(0.0)	<0.001
Primary	4(33.3)	
Secondary	12(33.3)	
Tertiary	20(100.0)	
Employment		
Unemployed	8(66.7)	<0.001
Unskilled	8(18.2)	
Public servants	12(100.0)	0.3
Businessmen	8(100.0)	
Exacerbations	32(50.0)	
Productive cough	36(50.0)	
Quantity of Sputum		
Scanty	8(66.7)	0.065
Moderate	20(55.6)	
Copious	8(33.3)	
Nature of Sputum		
Mucoid	16(80.0)	<0.001
Purulent	4(16.7)	
Bloody	12(60.0)	<0.001
Black	4(50.0)	
Shortness of breath	36(56.2)	
Prior TB infection	24(54.5)	
HIV infection	8(50.0)	0.14
Alcohol consumption	4(20.0)	0.81
Smoking history	12(100.0)	0.004
Exposure to IAP	8(33.3)	<0.001
Respiratory distress	12(75.0)	0.096
Digital clubbing	16(40.0)	0.013
		0.17

DISCUSSION

A total of seventy-six patients with bronchiectasis were identified in this study over three years. This is in contrast with some previous surveys from Nigeria. In a previous review of medical records of patients in a tertiary hospital in South-West Nigeria by Desalu, *et al*⁹ the authors reported only four patients with bronchiectasis out of 183 patients with respiratory diseases giving a disease frequency of 2.2% in two years between 2006 and 2008. Similarly, Adeniyi, *et al*¹² and Umoh, *et al*⁸ recorded no case of bronchiectasis in Owo, South-western Nigeria and Calabar, South-Eastern Nigeria over five years between 2007 and 2012, and 2008 to 2013 respectively. This seems to portray bronchiectasis as a rare condition in these parts of the world. On the other hand, Adebajo, *et al*¹³ in an earlier review of the medical records of the cardio-thoracic Unit of the University College Hospital, Ibadan, over 3 years from 1975 to 1978 reported 54 cases of bronchiectasis. These cases were confirmed by bronchography in most cases or histology. This goes to show that bronchiectasis may not have been such a rare condition but due to limited diagnostic facilities, the identification of this condition has been challenging in resource poor environments. Furthermore, bronchiectasis is a known sequelae of pulmonary tuberculosis and the presentation is similar to pulmonary tuberculosis. It is possible that in the absence of more specific diagnostic tools such as real time PCR, tuberculosis culture or appropriate imaging modalities, cases of bronchiectasis can be misdiagnosed as smear negative tuberculosis especially in patients previously diagnosed and treated for pulmonary tuberculosis.^{14,15}

Table 4: Predictors of Hospitalization

Parameter	Univariate					Multivariate				
	B	Sig	OR	95% CI for OR		B	Sig	OR	95% CI for OR	
				Lower	Upper				Lower	Upper
Age, years	0.062	0.002	1.064	1.023	1.106	0.085	0.001	1.088	1.035	1.144
HIV infection	0.00	1.0	1.0	0.33	3.03	0.052	0.95	1.05	0.195	5.69
Frequent daily cough	0.56	0.29	1.75	0.614	4.989	1.88	0.024	6.59	1.28	33.55
BMI	-0.016	0.8	0.984	0.876	1.106	-0.032	0.66	0.97	0.83	1.12
Respiratory distress	1.38	0.03	4.0	1.147	13.95	2.73	0.002	15.4	2.7	87.7

OR, Odds Ratio; CI, Confidence Interval.

The average age in this study (49.7 years) is similar to the average age of 48 years from a retrospective study conducted in Casablanca, Morocco by Bopaka, *et al.*¹⁶ This is higher than what was observed in the pre-antibiotic era where bronchiectasis was commoner among young people.¹⁷ However, the average age in this study, it is lower than reports from previous studies from the West where the average age ranged between 56 to 64 years.^{18–20} This differences in age may be due to the possible etiological risk factors. Where infections are implicated in developing countries while immunosuppression due to advancing age is implicated in countries with more developed healthcare systems.²¹

There were more males than females in this study with a male to female ratio of 1.4:1. This is different from reports from previous studies where the majority of the subjects were females.^{5,14,22–24} The higher prevalence of bronchiectasis amongst males in this study may be due to the higher prevalence of tuberculosis among male in Nigeria,²⁵ which is the most common etiological factor associated with bronchiectasis in this study. Bronchiectasis is not a primary disease but an anatomical and functional abnormality resulting from a variety of factors. A previous history of tuberculosis diagnosis and treatment was the commonest predisposing condition among the study population (57.9%). This finding is similar to reports from an earlier Nigerian study by Adebajo, *et al.*¹³ the authors documented that 27(50%) of their patients with bronchiectasis had previous tuberculosis infections. Similarly, Palwatwichai, *et al.*²⁴ in a two-year study of patients with bronchiectasis in Bangkok, Thailand observed that the commonest identifiable cause of bronchiectasis was tuberculosis in 32% of the patients. Pulmonary tuberculosis is prevalent in developing countries and is a known risk factor for bronchiectasis.⁵ Effective treatment for pulmonary tuberculosis is widely available but delays in commencement of treatment may lead to the long term complications such as bronchiectasis.^{26,27} This observation is at variance with other studies in the developed countries where

cystic fibrosis is the commonest cause especially in childhood.²⁸ The assessment of studies conducted in Western countries with the exclusion of cystic fibrosis, reveals that the etiological factors are a mix of several conditions. Steinfert, *et al.*²⁹ documented recurrent childhood respiratory infections among 70% of their patients with bronchiectasis. Post-infective conditions were also common among patients studied in Cambridge, United Kingdom by Pasteur, *et al.*²³ where the authors observed that 43% of the patients had a previous history of a severe chest infection though only about 29% were thought to have occurred in early childhood. Shoemark, *et al.*²² reported that 26% of the patients in their study had no known associations (idiopathic). This difference in etiological conditions between these studies can be explained by the fact that tuberculosis is endemic in Africa and South-East Asia while that is not the case in Western countries.

Sixteen (21.1%) of the patients in this study were diagnosed with HIV infection. While the incidence of acute pulmonary infections in HIV is declining due to the widespread use of cotrimoxazole prophylaxis and the increasing adoption of anti-retroviral therapy.³⁰ Chronic lung disease, on the other hand, is emerging as an essential complication among people living with HIV/AIDS.³¹ HIV is associated with an increased risk of tuberculosis and recurrent viral and bacterial pulmonary infections. However, data from a previous study suggest that HIV predisposes to bronchiectasis independently of respiratory diseases, likely due to HIV-mediated defects in immunity and inflammation.³²

Severe childhood infections were associated with bronchiectasis in 10.5% of the patients in this study. Previous reports from other studies have shown a higher proportion of their patients with associated childhood infections; Pasteur, *et al.*²³ in a study to determine the etiology of bronchiectasis in Papworth, Cambridge reported early childhood infections as a possible cause of bronchiectasis in 29% of the patients studied. Similarly, Habesoglu, *et al.*⁵ in a study conducted in Baskent University Hospital, Adana, Turkey reported a prevalence of child-

hood diseases among 22.7% of their adult patients with bronchiectasis. On the other hand, Bopaka *et al.*¹⁶ reported repeated childhood infections amongst 58% of their patients in Morocco. The low prevalence of childhood infections amongst our patients may be due to poor record-keeping as well as poor recall bias among the subjects.

The hallmark of bronchiectasis is chronic cough productive of purulent or mucopurulent sputum. All our patients presented with chronic cough. Almost all of them had bronchorrhoea (94.7%) while 73% of them complained of daily cough. Other studies have reported chronic productive cough among their subjects ranging from 74% to as high as 98% of the patients.^{5,19,24} The production of purulent sputum in bronchiectasis is due to persistent infection and inflammation of the airways^{33,34} as well as the permanent structural changes to the airways and impaired mucociliary clearance.³⁵

Bronchiectasis is a chronic suppurative condition and may require extensive medical care including hospitalisation. Based on health-care claims data from outpatient and inpatient settings, the total medical care expenditures for patients with bronchiectasis is on the average \$5,681 which is more than those for non-bronchiectasis patients.³⁶ There was a high rate of disease exacerbations and hospitalisation among our subjects 84.2% and 47.4% respectively. Exacerbations lead to an increased rate of lung function decline, poorer prognosis, and increased mortality.³⁷ Previous studies have documented a high rate of hospitalisation among patients with bronchiectasis. Ringshausen, *et al.* reported the average annual age-adjusted hospitalisation rate of around 9.4 hospitalisations per 100,000 population in Germany,³⁸ while Seitz, *et al.* reported a rate of 16.5 per 100,000 in the United States.³⁹

Age, frequent productive cough on most days and the presence of respiratory distress were factors that were independently associated with hospitalisation among the subjects. Increasing age is recognized as a risk factor for chest infections,⁴⁰ and exacerbation of bronchiectasis. This can be attributed to the fact that older patients

have a longer duration of the disease, poorer immune function and cumulatively have had more exacerbations.

Frequent cough with sputum production is associated with recurrent chest infections and increased morbidity in patients with bronchiectasis. This is due to the pathological changes that occur in the bronchiectatic airway which impairs the airway's ability to prevent, control and resolve respiratory tract disease (increased mucosal secretion, impaired clearance of foreign particles and a failure to resolve airway inflammation). This results in a recurrent and persistent inflammation and infection.⁴¹ Daily cough with sputum production is more associated with cystic bronchiectasis and this pattern usually presents with higher morbidity and worse prognosis.⁵

Respiratory distress is a physical sign of compromised pulmonary function and as expected, is associated with disease severity. Respiratory distress is usually more common in patients with a cystic form of the disease where they present with poorer ventilatory function.⁷ Cystic type of bronchiectasis is usually associated with more severe pulmonary function impairment and worse CT scoring.^{42,43} It also is the most frequently associated with comorbid pulmonary hypertension.⁴⁴

Study Limitations

Some of the patients did not have HRCT confirmation of the diagnosis of bronchiectasis due to the high cost of this service.

CONCLUSION

Bronchiectasis is not as uncommon as previously thought. Almost all the patient presented with chronic productive cough. Bronchiectasis presents with a high degree of morbidity among patients with frequent exacerbations and need for hospitalisation among our patients. This study has highlighted that a previous history of pulmonary tuberculosis is the commonest etiological risk factor associated with the development of bronchiectasis. Older patients with frequent symptoms and respiratory difficulties are more likely to have frequent exacerbations and severe disease requiring hospitalisation.

We would like to make the following recommendations

1. Early detection and initiation of treatment for patient with pulmonary tuberculosis in the community to minimize the damage to the lungs and airway occasioned by the disease.
2. Follow-up for patients released from pulmonary tuberculosis treatment to ensure early identification of patients who may develop bronchiectasis
3. Reducing the cost of HRCT services to increase its accessibility for the evaluation of patients with chronic cough.
4. Ensure close monitoring of bronchiectasis patients to detect patients who are at risk for frequent exacerbations and severe disease.

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