ORIGINAL ARTICLE

Symptomatology and Health Status in Patients With Chronic Obstructive Pulmonary Disease

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Summary

Chronic Obstructive Pulmonary Disease (COPD) is a growing health problem worldwide and in Malaysia. Until recently, research on COPD has been slow and difficult, partly due to the huge heterogeneity of this disease, and its variable and imprecise definitions. To perform a descriptive study on a convenient sample of local patients with COPD treated in a state hospital in Malaysia. Fifty-two patients [mean (95% CI) age: 67 (63-70) years; 86% male; 38% Malays, 36% Chinese, 25% Indians; mean (95% CI) PEFR: 45 (40-51) % predicted normal] were interviewed. Clinico-demographic data was collected using a structured questionnaire and health-related quality of life was scored using St George's Respiratory Questionnaire (SGRQ). For analysis, patients were also divided into moderate (n=17) [PEFR 50% to 80%] and severe (n=35) [PEFR < 50%] disease groups. Except for education and total family income, demographic and comorbidity variables were comparable between the two groups of COPD severity. All except 9% of patients were current or ex-smokers. Breathlessness, not chronic bronchitis (i.e. cough and sputum), was the first ranking respiratory symptom in over 70% of the patients, whether currently or at early disease manifestation. Between 5 and 15% of the patients denied any symptom of chronic bronchitis as current or early stage symptoms. Duration of symptoms prior to the diagnosis varied considerably with about 9% having symptoms for over 10 years. Over 80% of the patients smoked for over 15 years before the onset of symptoms. Quality of life in patients with COPD was generally poor and similar between both COPD severity groups. About one fifth of the patients had exacerbations more than 12 times a year. While many features described in our local patients are well recognized in COPD, the finding that 'chronic bronchitis' is not a prominent symptom in the current or past history may have important implications in the diagnosis of at risk individuals and patients with early disease requiring attention. More research is required to confirm and to understand this.

Key Words: Chronic obstructive pulmonary disease, Malaysia, Chronic bronchitis, Symptoms, Health-related quality of life

Introduction

Chronic obstructive pulmonary disease (COPD) is a major and growing global health problem. In 1990, it ranked the sixth most common cause of death worldwide and is predicted to become the third most common cause of mortality and the fifth most common cause of chronic disability by 2020[1].

Accurate epidemiology on COPD prevalence, morbidity, and mortality has always been difficult to establish. Even in developed countries, the data is likely to underestimate the true prevalence largely because of the nature of the disease that does not present itself until clinically apparent and moderately advanced, the imprecise and variable definitions of COPD, and possible co-existence of asthma complicating the issue of diagnosis[2].

The WHO/World Bank Global Burden of Disease Study[3] estimated worldwide the prevalence of COPD in 1990 at 9.34/1000 in men and 7.33/1000 in women. In Asia

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countries and islands (excluding China and India), COPD is estimated to affect 2.89 and 1.79 per 1000 males and females respectively. Recently, a study on 12 Asia-Pacific countries based on a prevalence model estimated a considerably higher overall rate of 6.3%, with the prevalence in Malaysia estimated at of 4.7%[4].

To date, there is no published study on Malaysian patients with COPD. We sought to fill this void by carrying out a descriptive study on a convenient cohort of patients with physician-diagnosed COPD admitted to an urban-based state general hospital for acute exacerbation of their disease between June 2003 and March 2004.

Materials and Methods

Patients

Fifty-two patients with physician-diagnosed COPD were recruited during the period Table I. All but two who were recruited from the medical outpatient clinic, were interviewed during hospital admission in Seremban Hospital, Negeri Sembilan. Clinico-demographic data was collected using a structured questionnaire by direct personal interview with the investigators. Peak expiratory flow rate (using Wright peak flow meter) reading was recorded prior to hospital discharge or during follow-up visits in the medical outpatient clinic. Health-related quality of life measurement using St George's Respiratory Questionnaire (SGRQ) was conducted during the interview. Only verbal consent was obtained.

Ranking of respiratory symptoms

Part of the clinical data collected included the ranking of five respiratory symptoms (cough, sputum, breathlessness, wheeze and chest tightness) from 1 (most frequent) to 5 (least frequent) or none. The patient was asked regarding these symptoms in relationship to what was current (i.e. normal day-to-day activity when not in exacerbation) and then (i.e. when respiratory symptoms first experienced during early disease manifestation).

St George's Respiratory Questionnaire (SGRQ)

Previously translated Malay and Chinese versions of the SGRQ and the original English version were used. The versions were designed specifically for Malaysian patients and were previously validated for use in international drug trials where Malaysia participated (personal communication, PW Jones). The three versions were sufficient to cater for the linguistic needs of the three main ethnic groups of Malaysian patients. As per protocol, patients read and completed the questionnaire by themselves except for those who were illiterate or visually impaired. Under these circumstances, the investigator would read out the questions and assist in the recording of answers. The questionnaire scored the three components of quality of life, namely symptoms (severity and frequency), activity (causing or limiting activities) and impact (on employment, emotions, feeling of panic or control), plus a total score. Higher scores indicated greater morbidity.

Data analysis

Data was analyzed as whole patient group as well as two groups of COPD severity according to PEFR % predicted normal (50% to 80% as moderate disease) and (<50% as severe disease). The separation into moderate and severe disease using the cut-off point of 50% was arbitrarily carried out for the purpose of this study only. Clinico-demographic variables of patients were presented as percentage or mean (95% Confidence Interval). Differences in categorical and continuous data were assessed by Chi Square test and unpaired t test, respectively. All computations were made using the statistical package SPSS version 11.5 for Windows (Chicago, Illinois, USA). In all cases, the significance was defined at the 5% level and presented as two-tailed.

Results

Of 52 patients recruited, 17 had moderate COPD [mean (95% CI) PEFR predicted normal: 300 (261-338) litres/min] and 35 had severe COPD [171 (151-191)]. Nearly 90% of the patients had a clear diagnosis of COPD made by the attending specialist. The majority of the patients was elderly and male, and had other comorbidities. All three ethnic groups contributed to the studied population. Except for lower educational level and total family income in the severe COPD group, all demographic and comorbidity variables were comparable between the two groups of patient Table I.

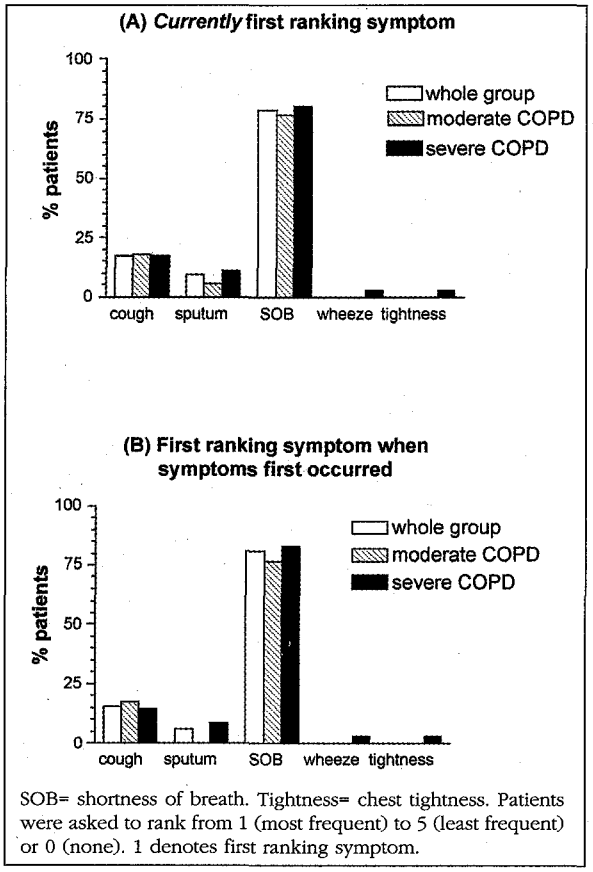
Over 70% of the patients were ex-cigarette smokers while nearly 10% never smoked. Over 90% of the patients did not report any indoor cigarette smoking by another individual. The overall cigarette pack years were 50 years. Less than 2% had ever worked in a quarry but about 17% of all patients had worked in a construction site. There were no significant differences between the two COPD severity groups Table II.

The first ranking (i.e. most frequent) symptom in over 70% of the patients was breathlessness both currently and

when it first occurred. This was similar in both moderate and severe COPD. Cough as the first ranking symptom was only reported in about 15% of the patients whether currently or then. Sputum as first ranking symptom was in about 10% of the patients while no patients reported wheeze or chest tightness as their first ranking symptoms [Figure 1]. Common symptoms that were not experienced for the current or previous state of disease were chest tightness and wheeze. Between 5 and 10% of patients had no cough or sputum production whether currently or then. The pattern was similar in patients with both moderate and severe disease [Figure 2].

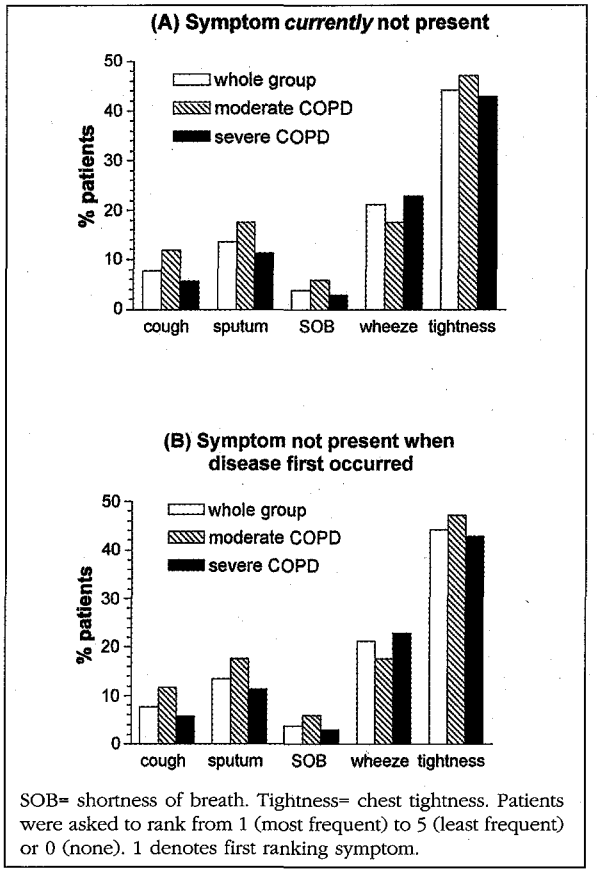
The diagnosis for most of these patients was made more than one year ago. There was a small trend towards longer interval from diagnosis in the patients with severe COPD. The duration of symptoms was less than 5 years in about 40% of the patients while it was between 5 and 10 years in 45% of the patients. Fewer than 10% had symptoms over 10 years. The large majority of patients had smoked for over 15 years before the onset of respiratory symptoms Table III.

The overall mean SGRQ scores were high in the patients studied. Despite the significant differences in airflow limitation, quality of life was equally poor in both patients with moderate and severe COPD. More than half had exacerbations of disease up to 3 times in 12 months, and about one-fifth had >12 exacerbations over the same period of interval Table IV.



SOB= shortness of breath. Tightness= chest tightness. Patients were asked to rank from 1 (most frequent) to 5 (least frequent) or 0 (none). 1 denotes first ranking symptom.

Fig. 1: First ranking respiratory symptoms in patients with Chronic Obstructive Pulmonary Disease (COPD) that are (A) current, and (B) when symptoms first occurred by patient recall.



SOB= shortness of breath. Tightness= chest tightness. Patients were asked to rank from 1 (most frequent) to 5 (least frequent) or 0 (none). 1 denotes first ranking symptom.

Fig. 2: Symptoms not present in patients with Chronic Obstructive Pulmonary Disease (COPD) (A) currently, and (B) when disease first occurred by patient recall.

Table I: Clinico-demographic features of patients

Variables	Whole group	Chronic Obstructive Pulmonary Disease		p¶
		Severity according to airflow limitation		
		Moderate (PEFR50 to 80%)	Severe (PEFR<50%)	
N	52	17	35	-
Clear diagnosis	88.5	88.2	88.6	-
Probable diagnosis§	11.5	11.8	11.4	0.972
Age, yrs	67 (63-70)	62 (56-69)	69 (65-73)	0.066
Male %	86.5	94.1	82.9	0.264
Ethnicity				
Malay	38.5	47.1	34.3	-
Chinese	36.5	23.5	42.9	-
Indian	25.0	29.4	22.9	0.396
Education				
None	28.8	11.8	37.1	-
Primary	53.8	52.9	54.3	-
Secondary	9.6	23.5	2.9	-
Tertiary	7.7	11.8	5.7	0.042
Residence				
City/capital	26.9	29.4	25.7	-
Town	51.9	47.1	54.3	-
Outside town	21.2	23.5	20.0	0.887
Income levelt				
<RM1000	71.2	52.9	80.0	-
RM1001-3000	21.2	41.2	11.4	-
RM3001-5000	5.8	0	8.6	-
>RM5000	1.9	5.9	0	0.024
PEFR, litres/min	213 (188-238)	300 (261-338)	171 (151-191)	<0.001
PEFR % predicted	45 (40-51)	64 (52-76)	36 (32-40)	<0.001
Comorbidity				
Presence	53.8	47.1	57.1	0.494
Severity scores‡				
1	46.2	52.9	42.9	-
2	50.0	47.1	51.4	-
3	3.8	0	5.7	0.531

Values are percentages except age [expressed in mean yrs (95% confidence interval]; PEFR= Peak Expiratory Flow Rate in litres/min or % predicted normal; § indicate possible overlap with asthma ; t indicate total family income per month in Malaysian Ringgit (RM); ¶ p value between moderate and severe COPD patients; ‡ Severity scoring[11]: 1= no important chronic disease; 2= moderate to severe diseases of heart, lung, gastrointestinal tract; 3= any cancer (except skin), end-stage renal disease, end-stage liver disease

Table II: History of exposure to known risk factors

Risk factors	Whole group	Chronic Obstructive Pulmonary Disease		p¶
		Severity according to airflow limitation		
		Moderate (PEFR 50 to 80%)	Severe (PEFR<50%)	
Cig smoking				
Current	17.3	17.6	17.1	-
Previous	73.1	76.5	71.4	-
Never	9.6	5.9	11.4	0.816
Total pack yrs‡	50 (41-58)	44 (31-57)	52 (42-63)	0.322
Indoor cig /day				
None	96.2	94.1	97.1	-
2-5 hrs	1.9	0	2.9	-
>5 hrs	1.9	5.9	0	0.279
Ever worked in				
Quarry	1.9	0	2.9	0.482
Construction	17.3	17.6	17.1	0.964

Values are percentages except cigarette pack years [expressed in mean years (95% confidence interval)]
Cig= cigarette
PEFR= Peak Expiratory Flow Rate % predicted normal
‡ one pack years= 20 cigarettes a day for one year
¶ p value between moderate and severe COPD patients

Table III: History in relation to symptoms and cigarette smoking

History by patient recall	Whole group	Chronic Obstructive Pulmonary Disease		p¶
		Severity according to airflow limitation		
		Moderate (PEFR 50 to 80%)	Severe (PEFR<50%)	
How long ago was the diagnosis				
< 1 yr	17.3	35.3	8.6	-
1 to 5 yrs	44.2	35.3	48.6	-
> 5 yrs	38.5	29.4	42.9	0.057
Duration of symptoms prior to diagnosis, yrs				
< 5 yr	44.2	41.2	45.7	-
5 to10 yrs	46.2	47.1	45.7	-
> 10 yrs	9.6	11.8	8.6	0.914
Duration of cigarette smoking prior to symptom onset, yrs				
< 5 yr	11.5	5.9	14.3	-
5 to15 yrs	5.8	11.8	2.9	-
> 15 yrs	82.7	82.4	82.9	0.321

Values are percentages
PEFR= Peak Expiratory Flow Rate (% predicted normal)
¶ p value between moderate and severe COPD patients

Table IV: Health status of patients

	Whole group	Chronic Obstructive Pulmonary Disease Severity according to airflow limitation		p¶
		Moderate (PEFR 50 to 80%)	Severe (PEFR<50%)	
SGRQ mean scores §(95% CI)				
Symptoms	60 (54-65)	57 (44-70)	61 (55-66)	0.519
Activity	74 (68-80)	75 (63-87)	73 (66-80)	0.760
Impact	58 (54-63)	59 (51-68)	58 (52-64)	0.799
Total	63 (59-67)	64(56-71)	63 (58-68)	0.887
Exacerbations in past 12 months				
0 to 3	55.8	47.1	60.0	-
4 to 12	23.1	23.5	22.9	-
> 12	21.2	29.4	17.1	0.560

PEFR= Peak Expiratory Flow Rate % predicted normal
§ St Georges' Respiratory Questionnaire (higher scores indicate greater morbidity)
CI= confidence interval
¶ p value between moderate and severe COPD patients

Discussion

We had described the clinico-demographic, symptomatology and health outcomes of a cohort of local Malaysian patients with physician-diagnosed COPD, all but two, recruited following hospital admission for disease exacerbation. We showed that cigarette smoking remained the principle association amidst the risk factors enquired. We also showed that it was breathlessness, not symptoms of chronic bronchitis (i.e. cough and sputum), that was the most frequent symptom experienced by the majority of the patients, whether currently or during the early stage of disease manifestation. In fact, between 5 and 15% of the patients denied ever having any symptom of chronic bronchitis. We also showed that in most patients, the duration of symptoms prior to the diagnosis of COPD/asthma varied considerably up to 10 years, reflecting the heterogeneity of disease progression, with a large majority of patients being cigarette smokers for over 15 years before the onset of symptoms. Finally, we showed that the health-related quality of life in our patients with COPD was poor and equally so regardless of airflow limitation. One fifth of all patients had exacerbations more than 12 times a year.

The mean (95% CI) of PEFR in our study population was 43 (40-51)% of predicted normal, indicating that they had moderate-to-severe disease severity of COPD according to the Global Initiative for Chronic Obstructive Lung Disease classification[2]. The health outcomes described here are mostly a reflection of such severity, for example, quality of life scores and frequency of disease exacerbations.

The prominence of the association with cigarette smoking in COPD, shown in our finding is not new[2]. This perhaps comes as little surprise since almost all diagnosis of COPD can only be made confidently with a definite history of cigarette smoking. However, we showed that passive smoking is a low occurrence among these patients, as are other occupation-related risk factors broadly enquired in our study such as having worked in construction sites and quarries. The finding that between 6 and 11% of our patients had never smoked- a figure similar to elsewhere[2] indicates that other forms of lung insult, such as biomass fuel burning in poorly ventilated homes[5,6], or individual genetic predisposition may be important. Interestingly, our findings of significantly higher frequency of severe COPD than moderate COPD in lower socio-economic groups, as reflected by lower total family income and

education level, lend support to low socio-economic status as a risk factor in COPD development[7].

Importantly, we showed that only between 5 and 15% of our patients ranked cough and sputum as presenting symptoms whether currently or when symptoms first occurred, and between 15 and 20% patients never had such symptoms. This is an important observation because 'chronic bronchitis' features prominently in identification of subjects at risk of developing COPD and is used frequently to help establish the diagnosis of COPD. In fact, Global Initiative for Chronic Obstructive Lung Disease (GOLD) specifies cough and sputum production as key chronic symptoms to identify at risk individuals (Stage Zero) in the development of COPD[2]. Furthermore, our findings also does not support the notion that symptom pattern may change from early to later disease, for example, from a 'chronic bronchitis' picture to one with 'wheezing breathlessness'. Another important observation is that, in stark contrast to patients with asthma, wheeze and chest tightness featured only weakly in patients with COPD. Taken together, the findings may have important implications for both scientists and clinicians in understanding the natural history of COPD and the possibility of different phenotypic expression in this condition.

We showed that the duration of symptoms prior to diagnosis was long and varied considerably between patients. A small proportion reported symptoms for more than 10 years prior to diagnosis. Similarly, while the majority of the patients had smoked for over 15 years before developing symptoms, 11% of the patients had only smoked for less than 5 years, with a trend toward severe group having smoked for a shorter period than those with moderate disease (14.3% vs 5.9%). This supports the present idea that the natural history of COPD is variable between individuals[2] and does not always follow a linear deteriorating course based on the Fletcher and Peto Diagram[8]. The reasons for this are not clear but variation in individual genetic predisposition and presence of other forms of lung insult may play a role.

The main weakness of our study is the small patient sample size, resulting in Type II interpretative error. Caution must therefore be exercised in the interpretation of our findings and their conclusions. It is possible that these findings cannot be generalized for all COPD patients in Malaysia. However, it has occurred at the expense of being careful in our selection of patients in order to ensure that patients had COPD, and not purely asthma. As a result, almost 90% of the recruited subjects had clear COPD and fewer than 10% might have asthma overlay. This descriptive study was carried out by direct interview of patients by investigators, in order to minimize faulty findings resulting from misinterpretation of questions. PEFR was used instead of spirometric reading of forced expiratory volume in one second (FEV_1) for sake of convenience. Although not as well validated as in FEV1, it is acceptable as a means to measure airflow limitation and appropriate for the research purpose in COPD in which airflow limitation is progressive and largely irreversible[9]. Another important consideration is the use of patient recall, not substantiated by historical medical records. Such potential bias is inherent in all questionnaire studies and we minimized this by creating relatively wide-ranging categories such as between 5 and 10 years, and not between 1 to 2 years.

Being a more heterogeneous disease than asthma and a much more difficult disease to study for obvious reasons, COPD has not been well researched and understood until recently[10]. This study represents an attempt to build information on home ground regarding patients with COPD and will support the global efforts to better characterize this condition and to better understand the implications on local healthcare cost and resource allocation[4].

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