Respiratory Medicine (2004) **98**, 1207–1213

respiratoryMEDICINE

Gender differences in the management and experience of Chronic Obstructive Pulmonary Disease

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Received 19 September 2003; accepted 3 May 2004

KEYWORDS
COPD;
Gender;
Medical care;
Symptoms

Summary Whether women receive the same medical care for COPD as men and if they are at risk of different outcomes as a result, is not known. The Confronting COPD International Survey was performed in the USA, Canada, France, Italy, Germany, The Netherlands, Spain and the UK in 2000 with 3265 COPD participants. Forty-one per cent were women; mean age in women and men was 61.2 (SD 10.5) and 64.4 (11.0) years, mean pack-years of smoking 36 (29) and 46 (35) years, respectively. After adjusting for age, pack-years, country and severe dyspnea (MRC scores 5 and 4), women were less likely to have had spirometry (OR 0.84, 95% C.I. 0.72–0.98) but more likely to get smoking cessation advice (OR 1.57, 1.33–1.86). Despite significantly lower pack-years of smoking, women were more likely to report severe dyspnea than men (OR 1.30, 1.10–1.54), with similar cough (OR 1.08, 0.92–1.27) and less sputum (OR 0.84, 0.72–0.98). There were no differences in the risk of hospitalisation or emergency room visit. This study indicates that gender differences in COPD care and outcomes exist.

Introduction

Historically chronic obstructive lung disease (COPD) has been associated with elderly, male smokers, but recent evidence indicates that in some countries, smoking rates in women now approaches that in men, and in the USA and Denmark, the number of deaths from COPD in women has now overtaken that in men.[1] In the UK this event is forecast to occur in 2008.[2] However, due to the traditional view that COPD is a male disease, it is possible that current identification of women presenting with

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doi:10.1016/j.rmed.2004.05.004

symptoms of COPD may not be the same as that of men. Indeed, Chapman et al.[3] have shown in a random sample of 192 primary-care physicians using a hypothetical case presentation and structured interview, that there exists a bias towards a COPD diagnosis in men, particularly when spirometry is not part of the diagnosis. This may expose women to lack of appropriate diagnostic procedures and as a result less optimal care, as has been evident in cardiovascular disease.[4–6]

Once diagnosis has been made, it is not clear whether women are then managed differently to men. Women generally more frequently report severe symptoms than men, particularly dyspnea[7,8] and report a lower quality of life for the same level of lung function.[9] Whether this is due to sub-optimal management or gender differences in subjective assessment of disease is not understood. Sub-optimal management would be defined as having less or inappropriate medication and lack of advice regarding COPD, its causes and daily management. Previous literature in cardiovascular disease suggests that women may not receive such early aggressive therapy as men and other literature suggests females have less access to steroids in respiratory disease.[6,10] Thus, a bias in care provision for women could be expected to result in greater number and intensity of symptoms and hospitalisation than men.

To our knowledge it has never been reported if women receive the same care as men from the physician they see most frequently for COPD. This study reports on any differences between women and men for symptoms, prescribed medication and hospitalisation. This study also investigates patient satisfaction with care to assess any gender differences.

Methods

The design and methodology of the Confronting COPD Survey has been described elsewhere.[8] In brief, the study was carried out between August 2000 and January 2001 in the USA, Canada, France, Italy, Germany, The Netherlands, Spain and the UK. From a total of 201,921 households screened by random-digit dialling, 3265 subjects with a reported physician diagnosis of COPD, chronic bronchitis or emphysema, or with symptoms of chronic bronchitis (defined as persistent cough with sputum from the chest for the last two years or more) were identified and interviewed. All patients were at least 45 years old and had a cumulative cigarette consumption of at least 10 pack-years. The survey questionnaire was based on the American Thoracic Society questionnaire with details that have been described before.[8] Questions included symptom severity, hospitalisation, emergency room visits, activity limitations due to COPD and use of respiratory therapy. The Medical Research Council (MRC) dyspnea scale, modified according to Bestall et al.[11] was incorporated into the questionnaire and ranged in score from 5–0: 5 "too breathless to leave the house"; 4 "have to stop for breath every few minutes when walking even on level ground"; 3 "have to stop even when walking at my own pace or walk slower than most people of my age"; 2 "get breathless when hurrying on level ground or walking on a slight incline"; 1 "only get breathless after strenuous exercise"; 0 "none of these". In this study, severe dyspnea was defined by levels 5 and 4 from the scale. Cumulative cigarette consumption in pack-years was calculated on the basis of the number of cigarettes smoked per day and number of years of daily smoking. The English version of the questionnaire was translated and back translated into Dutch, French, German, Italian and Spanish with the help of translators experienced in health surveys. The interviews were conducted in the native language of the respondent by experienced interviewers.

The sample was stratified by region within each country and sampled proportionally. In these analyses an unweighted sample was used. Percentage variables were compared using χ^2 test, a *P*-value below 0.05 being considered statistically significant. Logistic regression was performed to test the association between dependent variables related to diagnostic procedures, symptoms, provision of inhaled steroid and hospitalisation, with gender as an independent variable. All models were additionally adjusted for age, pack-years of smoking, country and dyspnea severity (as a marker of disease severity). Results are given as crude odds ratios and adjusted odds ratios with 95% confidence limits.

Results

Table 1 shows that 41% of the sample were women and on average women were slightly younger than men and had significantly lower pack-years of smoking. More women than men were represented in the USA (55.3%), Canada (55.1%) and the UK (51.2%). Based on self-report, only 34% of women and 39% of men reported ever having a spirometry test and only 37% of women and 28% of men reported ever receiving anti-smoking advice. Twenty nine per cent of women and 24% of males reported

Table 1 Patient demographics, symptoms and treatment variables.

	Men		Women	
	N	%	*N*	%
Patients	1937	59	1328	41
Age—mean (*SD*)	64.4 (11.0)		61.2 (10.5)	
Pack-years-mean (*SD*)	46.6 (35.1)		36.9 (29.6)*	
Spirometry ever	747	39	453	34*
Anti-smoking advice ever	535	28	488	37*
Sputum (⩾few days per week)	1207	62	822	62
Severe dyspnea (MRC 4&5)	467	24	382	29*
Cough(⩾few days per week)	1274	66	943	71
Hospitalisation (in last year)	263	14	150	11
Emergency room visit (in last year)	235	12	152	11
ICS use (now or in last year)	409	21	315	24
Inhaler training ever	1178	61	888	67*

*$P<0.05$.

Table 2 Odds ratios for dependent variables with significantly different outcomes for women versus men.

	Crude odds ratio (95% CI)	Adjusted odds ratio (95% CI)
Spirometry ever		
Women	0.83 (0.71,0.95)	0.84 (0.72,0.98)
Anti smoking advice ever		
Women	1.52 (1.31,1.77)	1.57 (1.33,1.86)
Sputum⩾few days per week (for any 3 month period in the last year)		
Women	0.98 (0.85,1.14)	0.84 (0.72,0.98)
Severe dyspnea (MRC scale 4/5)		
Women	1.27 (1.09,1.49)	1.30 (1.10,1.54)
Cough⩾few days per week (for any 3 month period in the last year)		
Women	1.28 (1.10,1.48)	1.08 (0.92, 1.27)
Hospitalisation in the last year		
Women	0.81 (0.65,1.00)	0.81 (0.64,1.03)
Emergency Room visit in the last year		
Women	0.94 (0.75,1.16)	0.80 (0.63,1.01)
ICS use now or in past year		
Women	1.16 (0.98,1.37)	1.01 (0.84,1.21)
Inhaler training ever		
Women	1.30 (1.12,1.51)	1.03 (0.88,1.22)

Each model was adjusted for age, pack-years of smoking, country and dyspnea severity.

severe dyspnea ($P<0.05$), 71% of women and 66% of men reported symptoms of cough and 62% of both men and women reported sputum.

Table 2 shows the association between gender and the dependent variables related to diagnosis, care, symptoms and hospitalisation. It can be seen that fewer women are given spirometry than men when controlling for the independent variables of age, pack-years, MRC dyspnea severity and country (adjusted odds ratio (OR) 0.84 95% CI 0.72, 0.98).

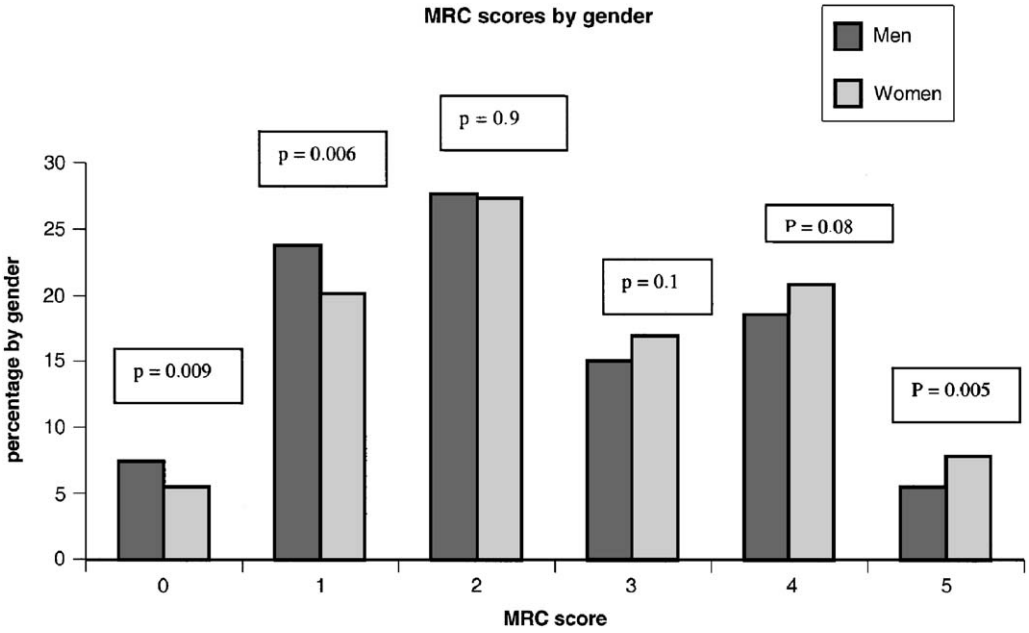

Figure 1

Table 3 Patient satisfaction with treatment by gender (patients who strongly agree/agree with the statement).

	Men %	Women %
Satisfied with doctors management and treatment	82.5	83.2
The doctor's advice helped improve ability to manage respiratory symptoms	66.3	69.3
The doctor is genuinely concerned to help me	88.8	88.0
My doctor is very knowledgable about my condition and its treatment	83.2	82.3
My doctor really involves me in decisions about my treatment	73.8	75.2
My doctor thinks my condition is my fault	42.3	41.4
My doctor does not think he/she can do anything to relieve my symptoms	30.1	27.8
Doctors do not understand what it is like to suffer from my condition	26.3	27.4

There were no significant differences between males and females (P 0.05) for any of the questions.

More women receive anti-smoking advice than men when adjusting for the same variables (OR 1.57 95% CI 1.33, 1.86). Women were less likely to have sputum (OR 0.84 95% CI 0.72, 0.98) and more likely to suffer from severe dyspnea (OR 1.30 95% CI 1.10, 1.54) than men but there was no difference in risk of cough between sexes after adjusting for the independent variables. Figure 1 illustrates the differences between men and women for subjective dyspnea assessment. Both sexes reported more frequently mild dyspnea (MRC scores 1 and 2) than severe dyspnea, but men were significantly more likely to have mild dyspnea (MRC score 1, men 23.8% vs. women 20.1%, $P = 0.006$) and women to have more severe dyspnea (MRC score 5, men 5.5% vs. women 7.8%, $P = 0.005$). Hospitalisation and emergency room visit were not significantly different between men and women nor was the likelihood of being treated with an inhaled corticosteroid or being trained with an inhaler.

Table 3 illustrates patient satisfaction with care and shows that there were no significant differences between men and women in their views of

physician care. The majority of patients were satisfied or very satisfied with their care and felt that their clinicians were doing their best to be supportive and had good knowledge of COPD. Whilst approximately 40% of men and women felt that the doctor considered their COPD to be self-inflicted, only 30% of men and 27% of women reported their clinician as being unable to help them control their symptoms.

Discussion

This study shows that, despite a higher prevalence of some reported symptoms by women, in this population with COPD spirometry was less applied in women than in men in 2000. Conversely, women receive advice on smoking cessation more frequently than men. Women were more likely to suffer from severe dyspnea and equally likely to have cough symptoms, despite being younger and having significantly less pack-years of smoking. Factors associated with disease control such as hospitalisation, emergency room visit and prescription of a steroid were not different between women and men. In three countries women in this survey were more highly represented than men, but this is more likely due to a response bias favouring women in these countries, than being actually representative of disease burden at the time of the survey.

Guidelines for COPD recommend that spirometry is used as a diagnostic tool in the evaluation of patients presenting with symptoms associated with COPD.[12] This is both to confirm obstructive airways disease and to differentiate between asthma and COPD. In this population, sampled from countries throughout Europe and North America, fewer than 40% of patients reported having had spirometry. For women this figure falls to 34%. Patients in this sample have been reported previously as receiving most of their care from either general practice (62.4%) or from other care givers (15%).[8] To date, it has been recognised that use of spirometry in general practice remains low which may hinder proper diagnostics and especially the differential diagnosis between COPD and asthma.[13–15] Why women should receive even less spirometric testing than men is difficult to evaluate but could be related to the bias that COPD is still considered a male disease, which was historically the case. This type of gender bias is well illustrated in cardiovascular disease where, in a study of patients who had suffered an acute myocardial infarction, women of all ages were less likely to be given diagnostic catheterisation, aspirin within 24 h after arrival at hospital, or thrombolytic therapy within 60 min compared to men, despite being ideal candidates for such interventions.[6] This data is supported by other studies showing that women hospitalised for coronary heart disease undergo fewer major diagnostic and therapeutic procedures than men.[4,5] The literature on under use of diagnostic procedures for women with cardiovascular disease has been attributed to the fact that the disease, like COPD, has been traditionally associated with males, particularly in the elderly, where gender bias in diagnostic and therapeutic procedures is the most pronounced.[16] Another reason for under use of spirometry in women is that clinicians may make assumptions that women presenting with symptoms primarily of cough and dyspnea, may in fact have asthma, a hypothesis supported by the study of Chapman et al.[3] They found that using spirometry as part of the diagnostic procedure removed gender bias in labelling patients as having COPD. It is therefore unfortunate that spirometry is not being more widely used to diagnose COPD.

The majority of men and women in this population had not received advice from their clinician on the most appropriate methods of smoking cessation, despite this factor constituting a cornerstone of the guidelines with regard to the treatment and care of patients with COPD.[12] Interestingly, women had a greater likelihood than men to receive this advice. This could in part be due to biased reporting by men on being advised about smoking cessation. It may also indicate that clinicians are aware of literature supporting the fact that women find it harder to give up smoking and thus encourage and support quit attempts with advice.[17,18]

Despite being younger and with significantly less pack-years of smoking, women reported more severe dyspnea than males, suggestive of more severe disease in women. This has been previously shown in other studies in COPD[7] and additionally in asthma.[19] Whether women in this population had relatively more severe airway obstruction than men, or whether their subjective view of dyspnea was actually different from men is impossible to assess in this observational study. A reason why women in this sample may have more severe dyspnea, suggestive of more severe disease, despite lower levels of smoking, could be related to the fact that the prevalence of COPD symptoms is higher in subjects with airway hyperresponsiveness (AHR) than those without AHR.[20] Women have been observed to have greater risk of AHR than men, possibly associated with smoking.[21] Alternatively it is possible that there is a selection bias in the

sample, women needing to have more severe symptoms than men, to achieve a diagnosis of COPD. Women in this study also reported the same risk of cough as men despite lower pack-years of smoking. This fact combined with greater severity of dyspnea would, however, suggest that women are more at risk from the effects of smoking. A recently published paper also supports the finding that women are likely to suffer more symptoms with a similar smoking burden.[22] Previous literature has shown that smoking has a greater impact upon the health of women as they have a higher risk of being admitted to hospital for COPD, even after adjusting for pack-years of smoking.[23] Furthermore, some literature has shown that decline in FEV_1 is steeper in women than men for the same smoking exposure[24,25] and that lung growth is reduced due to smoking exposure during adolescence.[26] It is known that the composition of lymphocyte subsets in the lower respiratory tract changes with age in women but not men and it has been suggested that this is the reason why women are more predisposed to certain symptoms such as cough.[27] This, combined with the detrimental effects of cigarette smoke, may partly explain the higher rate of severe dyspnea and cough observed in female smokers than in male smokers here and elsewhere. However, there are conflicting reports with regard to tobacco smoking and lung function in men and women, in part due to differing methodology; this area therefore warrants further investigation.[24,28]

Rates of hospitalisation and emergency room visit were relatively high in this population as compared to other epidemiological studies such as the Copenhagen City Health Study where the hospitalisation rate was only 2.4% and the Glostrup Population Study where it was 0.5%.[23] However, in the Danish studies the populations were probably milder and the hospitalisation episodes were taken from hospital records. In this study, self-reporting of hospital and emergency room visits may have been vulnerable to exaggeration, as patients may have confused visits for other co-morbidities in their estimation.

To our knowledge this is the first study to investigate a gender effect on satisfaction with medical care. The results show that women and men are generally satisfied with their care and felt that the clinician was knowledgeable about COPD. The results of this survey, however, do not necessarily support the patients' views regarding their clinicians' knowledge of COPD diagnosis and care, as they raise questions regarding knowledge and application of guideline recommendations.

Conclusion

This study shows that of the minority of patients who are given spirometric tests, women receive less than men. Advice regarding smoking cessation was only given to a minority of patients with COPD, with more given to women. For less pack-years of smoking women were at greater risk of severe dyspnea than men and at the same risk of cough. Women did not differ from males in their views of COPD care provision and satisfaction with care.

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