Respiratory Medicine (2007) **101**, 661–669

ELSEVIER

respiratoryMEDICINE

Implications of chronic obstructive pulmonary disease (COPD) on patients' health status: A western view

Yogesh Suresh Punekar[a,*], Roberto Rodriguez-Roisin[b], Mark Sculpher[c], Paul Jones[d], Michael Spencer[a]

[a]*Global Health Outcomes, GlaxoSmithKline Research and Development, Greenford Road, Greenford, Middlesex UB6 0HE, UK*
[b]*Servei de Pneumologia, IDIBAPS, Hospital Clínic, Departament de Medicina, Universitat de Barcelona, 08036-Barcelona, Spain*
[c]*Centre for Health Economics, University of York, Heslington, York YO10 5DD, UK*
[d]*Respiratory Medicine, St. George's, University of London, Cranmer Terrace, Tooting, London SW17 0RE, UK*

Received 16 March 2006; accepted 1 June 2006

KEYWORDS
Comparison;
COPD;
Country;
Health status;
Treatment

Summary
Aim: To assess and compare health status among chronic obstructive pulmonary disease (COPD) patients presenting for treatment in six countries and in two healthcare settings using a generic health status instrument.
Methods: A population based cross-sectional survey was conducted among 2703 patients and their physicians (1381 in primary and 1322 in specialty care) in five EU countries and the USA. Information was collected on demographic and clinical characteristics, exacerbations and health status estimated using EQ-5D.
Results: The mean EQ-5D score for COPD patients was similar between primary and specialty settings in all countries except Italy. Approximately, half of the patients indicated some impairment in health status on mobility, usual activities, pain/discomfort and anxiety/depression domains of EQ-5D. Approximately, 5% of patients in EU countries except UK had health status valued as worse than death based on valuations of the general population. Patients suffering from severe breathlessness, experiencing $\geqslant 3$ exacerbations in the previous year, categorised as severe according to GOLD criteria, and experiencing day-time and night-time symptoms had significantly impaired health status.
Conclusion: COPD patients classified as moderate/severe in clinical practice have worse health status compared to mild patients. This impairment is similar in primary and specialty setting across western countries.

---

*Corresponding author. Tel.: +44 7810 657214; fax: +44 1707 363645.
E-mail address: yogesh.punekar@spcorp.com (Y.S. Punekar).

0954-6111/$ - see front matter © 2006 Elsevier Ltd. All rights reserved.
doi:10.1016/j.rmed.2006.06.001

Introduction

Chronic obstructive pulmonary disease (COPD) is characterised by a progressive airflow limitation that is not completely reversible.[1] The Global Burden of Disease studies predicted COPD to become the third most common cause of mortality and the fourth most common morbidity producing illness by 2020.[2] By the year 2000, COPD became the fourth leading cause of death which, therefore, indicates that these projections are likely to be correct.[3] Mortality due to COPD continues to rise in contrast to other chronic diseases such as coronary artery disease and cerebrovascular disease where mortality is on the decline.[4,5]

Although COPD has a considerable burden the disease appears often to be underdiagnosed and undertreated.[1] Traditionally, COPD has not received the same level of attention as other chronic conditions of similar mortality and morbidity from decision makers in many countries. The burden of COPD therefore needs to be highlighted among patients, physicians and decision makers.[6]

The burden can be estimated in clinical, humanistic or economic parameters but COPD being a disease with multisystemic involvement, humanistic assessment in the form of health status estimation seems the most appropriate.[7] Health status can be assessed using either a generic or a disease specific health status instrument. A number of generic and disease specific instruments have been used in COPD, although use of a respiratory specific instrument has been more common. A generic measure helps healthcare payers and decision makers to compare health status across different therapeutic areas to ensure an efficient allocation of resources between (as well as within) clinical areas. The EQ-5D is one such generic preference based health status instrument developed by EuroQol group.[8,9] Despite its wide use in a variety of clinical areas, so far it has been used sparingly in COPD.[10]

Several studies have attempted to quantify burden of COPD in individual countries but no study so far has compared the health status burden on patients diagnosed as COPD sufferers across different countries and across various treatment settings. Comparisons across countries with different healthcare systems offering varied access to patients will not only contribute to global assessment of COPD but may also help in identification of cost effective forms of COPD management.

The primary objective of this study was to assess and compare health status using a generic preference-based instrument in patients diagnosed with COPD presenting for treatment in six western countries and in two healthcare settings.

Methods

Study sample and data collection

The Respiratory Disease Specific Programme III (Adelphi Group Products) was designed to provide key health outcomes information on an ongoing regular basis. It included a survey of 328 primary care physicians (PCP) and 335 respiratory specialists (RS) in the USA and five European countries including France, Germany, Italy, Spain and UK. The study was conducted in the second half of 2003. The physicians were randomly selected by members of local research agency in each country from public lists of healthcare professionals practicing in primary care or COPD speciality as appropriate. These physicians were representative of the national population of physicians in terms of physician's age, gender and volume of activity, and were chosen based on the quotas set by speciality type, geographical location and number of COPD patients currently being treated by them. The initial stage of recruitment from the randomly selected list of physicians was through a telephone call to assess their willingness and eligibility to participate in the study. In the current study 80% of approached candidates agreed to participate. Physicians who were recruited but who subsequently dropped out at any stage for any reason before completion of the study were replaced by randomly selecting physicians from the initial public lists with similar eligibility to those who dropped out. In the current study less than 5% of recruited physicians dropped out and were replaced.

Patient record (PR) forms were placed with the recruited physicians and the physicians were asked to complete one PR form per patient on the next six patients diagnosed and treated for COPD presenting for consultation during the next 10 working days. The identification and selection of patients was made solely by the physician using following criteria and was based primarily on the diagnostic judgement and clinical impression that the physician would use in a normal clinical practice setting based on signs and symptoms of COPD. Patients more than 40 years of age with history of smoking and diagnosis of airflow obstruction (COPD, emphysema and/or chronic bronchitis) were selected irrespective of their reason for physician visit such as repeat prescription, routine review, or an unscheduled consultation. The PR forms were completed only for the patients personally seen by the physician either during or immediately after the consultation by referring to PRs if needed.

Physicians were asked to report the diagnosis given to the patient and patient's clinical history in the previous year including the most recent forced spirometric measurements. In addition, physicians were asked to record the number of exacerbations suffered by patients in the previous year. An exacerbation was referred to as an acute episode where patients received some form of treatment from the physician but no formal definition for COPD exacerbation was used. Information was also collected on patient demographics such as age, gender, body mass index (BMI), and whether patient lived alone or with someone as well as comorbidities.

Patients for whom a PR form had been completed were then asked to complete a separate patient self-completion (PSC) form by their physicians in clinic immediately after the physician visit. Representatives of the data collection agency ensured that patients completed PSC form without consulting the doctor, nursing staff or any other individual. PSC form completion by the patient was not obligatory. Patients who did not complete PSC form (non-responders) were compared with respondents on demographic and clinical variables using PRFs filled by their physicians to eliminate any non-responder bias. This form collected information on presence of daytime and/or night-time respiratory symptoms such as cough, wheezing, shortness of breath and chest tightness. The PSC form also collected information on breathlessness assessed using Medical Research Council (MRC) dyspnea scale modified by Bestall et al.,[11] current health status assessed using the EQ-5D,[8,9] and demographic information such as smoking status and need for a caregiver to cope with their medical condition. The information collected using the PSC form was subsequently verified by matching with the information obtained on corresponding PR form wherever possible.

Health status assessment

Health Status was assessed using the EQ-5D self-administered questionnaire.[8,9] The EQ-5D is a generic, preference-based measure that provides a single index that represents overall health status at a point in time. This EQ-5D index reflects the general public's valuation (or preference) for an individual's health state. The instrument consists of a descriptive system with five domains which include mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each domain is divided into three levels which include no impairment, some or moderate impairment and extreme impairment. These domains and their levels together define a total of 245 health states (including unconsciousness and death).

Each of these health states can then be converted into a single summary index by using the EQ-5D scoring algorithm.[12] The scoring algorithm is based on the preferences of 3395 members of the UK public on a scale where 0 is equivalent to death and 1.0 is good health. The summary index referred to as 'the EQ-5D score' ranges from -0.594 to 1.0 where negative scores are health states valued as worse than death by the public. The score of -0.594 represents extreme problems on all the five dimensions and a score of one represents no impairment on any of the five dimensions.

Disease severity was estimated for a subset of patients with spirometric measurements available using GOLD criteria.[1] Patients were classified into GOLD categories based on post bronchodilator forced expiratory volume in 1 s (FEV_1). The survey did not collect information on chronic respiratory insufficiency (Stages III and IV) as defined by GOLD guidelines. Therefore the 'severe' (GOLD—stage III) and 'very severe' (GOLD—stage IV) subsets were merged to form a single 'severe' subset. Comorbidities were converted into Charlson index[13] and the resultant index was used as an estimate of the impact of comorbidities on health status.

Statistical analysis

Data from both the PR and PSC forms were extracted and analysed in the statistical package SPSS (SPSS for Windows, Rel. 12.0.3. 2003. Chicago: SPSS Inc.). A prior significance level of 0.05 was used for all statistical tests. Descriptive analysis was performed on patient demographics, diagnostic history and health status assessed using the EQ-5D questionnaire on the entire sample, and then subgroups based on country and treatment setting. Multivariate analysis was used to determine the impact of exacerbation frequency, disease severity, breathlessness and symptoms on health status after controlling for age, comorbidities, country and treatment setting using the entire sample. The impact of above clinical variables on health status was also assessed separately for either treatment setting after controlling for age, comorbidities and country. Fischer's exact and chi-square tests and, Bonferroni's correction were used when necessary.

Results

Three thousand five hundred and eighty three physician responses out of a possible 3978 patient profiles were received. The number of profiles reduced to 2933 after matching physician responses (PR forms) with patient responses (PSC forms). More than 75% of patients in all the five countries completed PSC forms and were not significantly different than patients who did not complete PSC form on demographic and clinical variables. Among these profiles, 230 patients had missing data on EQ-5D and hence were omitted from the final analysis. This resulted in 2703 usable patient profiles with 1381 patients treated by PCPs and 1322 patients treated by RSs. The actual numbers of usable patient profiles are listed in Table 1.

Demographic and clinical characteristics

A comparison of the demographic and clinical characteristics of patients visiting PCPs and RSs in each country is summarised in Table 1. When compared across countries, after controlling for the treatment setting, patients showed significant differences on all the demographic and clinical characteristics with the exception of age. When compared across treatment settings (PCPs vs RSs), after controlling for the country effect, patients were not significantly different for obesity based on BMI and the diagnosis of COPD. Overall, a significantly higher proportion of PCP patients were females, were current smokers and had received the diagnosis of chronic bronchitis or emphysema; whereas significantly higher proportion of RS patients felt the need for a carer to cope with their condition and were categorised as moderate or severe according to GOLD ($P<0.05$ each). Twenty-nine per cent of patients visiting PCPs and 32% of patients visiting RSs received the diagnosis of more than one condition among chronic bronchitis, emphysema and COPD.

Health status utilities on EQ-5D

The mean EQ-5D scores among respondents in six countries ranged from 0.62 (France) to 0.71 (USA). Figure 1 displays the mean EQ-5D scores split between treatment settings in each country. The scores ranged from 0.65 (France) to 0.73 (Italy) for PCP patients and from 0.60 (France) to 0.71 (Spain) for RS patients. The mean EQ-5D scores for patients visiting PCPs and RSs were similar in all countries with the exception of Italy where the PCP scores were significantly higher (0.73 PCP; 0.62 RS; $P<0.01$).

Four European countries with the exception of UK had at least 5% patients (range 5–7%) with an EQ-5D score less than zero indicating that these patients' health status was worse than death as valued by general population on EQ-5D. Less than 1% patients in UK and 2% patients in the USA had EQ-5D

Table 1 Patient demographics, clinical characteristics and diagnostic history.

	Overall		France		Germany		Italy		Spain		UK		USA	
Healthcare setting[*]	PCP	RS	PCP	RS	PCP	RS	PCP	RS	PCP	RS	PCP	RS	PCP	RS
N	1381	1322	190	183	274	258	181	167	264	275	98	64	374	375
Mean age in years (SE)	66 (0.29)	66 (0.31)	66 (0.86)	64 (0.88)	62 (0.67)	62 (0.75)	64 (0.81)	66 (0.76)	68 (0.59)	67 (0.66)	67 (1.1)	67 (1.1)	68 (0.53)	68 (0.54)
Females %	34[†]	29[†]	25	20	33	37	22	22	22[‡]	10[‡]	51	38	49	43
Need carer %	8[‡]	13[‡]	8[‡]	32[‡]	3	5	8	15	13	18	12	16	8	6
Current smokers %	34[‡]	27[‡]	30	33	42	35	26	26	26[§]	17[§]	34	26	40[‡]	26[‡]
Clinically obese % (BMI$\geqslant$30)	20	20	15	14	20	17	14	18	18	20	25	16	26	26
Primary diagnosis														
Chronic bronchitis %	30[†]	24[†]	30	25	42[‡]	22[‡]	28	21	38[§]	28[§]	15	19	20	26
Emphysema %	34[‡]	23[‡]	18[‡]	35[‡]	33	31	15	20	14[†]	25[†]	19	33	31[‡]	47[‡]
COPD %	84	84	97[†]	89[†]	93	90	75[†]	87[†]	81	85	74[†]	92[†]	78	74
Forced spirometry (*N*)[¶]	248	872	32	144	68	211	9	41	36	193	22	45	81	238
Mild %	37	25	44	31	34	29	0	42	36	26	50	7	37	18
Moderate %	31	36	31	35	35	37	11	24	31	41	27	29	32	34
Severe %	32	39	25	34	31	34	89	34	33	33	23	64	31	48

[*] PCP denotes primary care physician and RS denotes respiratory specialist.

[†] PCPs and RSs are significantly different ($P<0.01$) using Fisher's exact test.

[‡] PCPs and RSs are significantly different ($P<0.001$) using Fisher's exact test.

[§] PCPs and RSs are significantly different ($P<0.05$) using Fisher's exact test.

[¶] There are significant differences in forced spirometric measurement between PCPs & RSs in Italy ($P<0.01$), UK ($P<0.001$) & USA ($P<0.01$) and overall ($P<0.01$) using χ^2 test.

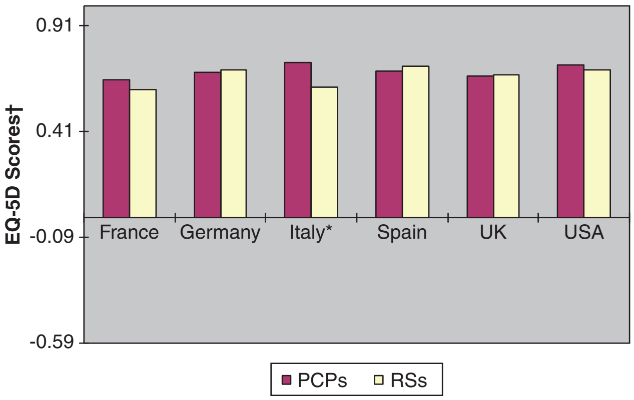

Figure 1 Mean EQ-5D scores in Primary Care (PCPs) and respiratory specialist (RSs) settings. *$P<0.01$ for PCPs vs RSs. †High scores mean better health.

scores less than zero. The proportion of patients with health status valued worse than death was similar in both treatment settings with no significant difference in all countries except Italy (11% RS vs 3% PCP; $P<0.01$).

Table 2 summarises the health status scores of patients at the time of the survey. The overall mean EQ-5D score was similar in both treatment settings. Females had worse EQ-5D score than males in RS setting ($P<0.05$) but were comparable to males in PCP setting. Patients aged 65 and above had significantly lower EQ-5D score compared to patients younger than 65 year in both treatment settings ($P<0.001$).

Multivariate analysis showed significant impact of clinical variables such as exacerbation frequency, spirometry, breathlessness and presence of day-time and/or night-time symptoms on health status after controlling for age, comorbidities, country and treatment setting. When the

Table 2 Patient's health status.

Healthcare setting*	PCPs† EQ-5D‡	RSs† EQ-5D‡
Overall mean (95% CI)	0.70 (0.68–0.71)	0.68 (0.66–0.69)
Males	0.70 (0.68–0.72)	0.69§ (0.67–0.71)
Females	0.69 (0.66–0.71)	0.65§ (0.62–0.68)
Patients <65 years	0.77¶ (0.75–0.79)	0.72¶ (0.70–0.75)
Patients $\geqslant 65$ years	0.65¶ (0.62–0.67)	0.64¶ (0.62–0.67)
Exacerbations (95% CI)		
No exacerbations	0.78 (0.75–0.80)	0.75 (0.72–0.77)
1–2 exacerbations	0.74 (0.72–0.77)	0.73 (0.71–076)
3 or more exacerbations	0.61** (0.59–0.64)	0.57** (0.54–0.60)
Forced spirometry (95% CI)		
Mild	0.77** (0.73–0.81)	0.68 (0.64–0.72)
Moderate	0.68 (0.62–0.74)	0.72†† (0.69–0.75)
Severe	0.62 (0.56–0.68)	0.64†† (0.61–0.67)
MRC dyspnea‡‡ (95% CI)		
Breathlessness after exercising heavily	0.88 (0.86–0.90)	0.88 (0.85–0.90)
Breathlessness when hurrying on level ground	0.79 (0.77–0.81)	0.79 (0.77–0.81)
Walk slower than most people of same age	0.71 (0.68–0.74)	0.73 (0.70–0.76)
Have to stop for breath even when walking on level ground	0.59 (0.57–0.62)	0.60 (0.58–0.63)
Too breathless to leave house	0.17 (0.11–0.24)	0.29 (0.22–0.35)
Symptoms§§ (95% CI)		
No symptoms	0.85 (0.83–0.86)	0.81 (0.79–0.84)
Day-time symptoms only	0.69 (0.68–0.72)	0.72 (0.69–0.74)
Night-time symptoms only	0.73 (0.65–0.81)	0.69 (0.58–0.80)
Daytime and night time symptoms	0.59 (0.56–0.61)	0.56 (0.53–0.59)

*PCP denotes primary care physician and RS denotes respiratory specialist.

†Statistical significance denotes comparison between different categories within the same treatment setting after controlling for age, comorbidities and country.

‡Rabin and de Charro[10] and Bestall et al.[11].

§Significantly different from other category ($P<0.05$).

¶Significantly different from other category ($P<0.001$).

**Significantly different from both other categories (using Bonferroni's multiple comparison test).

††Severe category significantly different from moderate.

‡‡The only non-significant difference is for RSs, between categories "breathlessness when hurrying on level ground" and "walk slower than most people of same age".

§§For both PCPs and RSs, the only non-significant differences are between night-time only and day-time only.

impact of these clinical variables on health status was analysed separately for PCPs and RSs controlling for age, comorbidities and country, patients with three or more exacerbations had significantly lower EQ-5D scores compared with patients with less than three exacerbations in both treatment settings ($P<0.05$). Mild PCP patients, classified according to GOLD's spirometric criteria, had significantly higher EQ-5D score than moderate and severe patients ($P<0.05$) whereas moderate patients visiting RSs had significantly higher EQ-5D score than severe patients ($P<0.05$). Patients' health status was also associated with breathlessness (MRC dyspnea scale). As for patients with increasing levels of breathlessness, the EQ-5D scores ranged from 0.88 to 0.17 in PCP cohort and 0.88 to 0.29 in RS cohort. Patients with higher degree of breathlessness had lower health status with the exception of one category being significantly different than another as shown in Table 2 ($P<0.05$ each). In either health-care setting, patients with both day-time and night-time symptoms had lower health status than patients with day-time only symptoms or patients with night-time only symptoms, both of whom in turn had lower health status than patients with no symptoms ($P<0.05$ each).

Health states on EQ-5D

Figures 2 and 3 summarise the descriptive analysis of the distribution of EQ-5D health states across treatment settings in different countries. The results suggest that, within each EQ-5D domain, the distribution of problem levels across the two settings was similar in each country and was largely consistent across different countries with few differences. However, when the responses from all the countries in each domain were pooled and compared across treatment settings, it resulted in small yet significant differences. Compared to the PCP setting, a higher proportion of RS patients had moderate or extreme mobility problems (58% vs 52%), problems with self-care (29% vs 24%) and usual activities (56% vs 49%) ($P<0.01$ each). In contrast, the distribution of health states between the two settings was similar for pain/discomfort (56% vs 53%) and anxiety/depression (43% vs 41%).

Table 3 presents a comparison of EQ-5D health states between COPD patients and the general population in the USA, UK and Spain, the only countries where general population estimates on EQ-5D were available. COPD patients in all the three countries and both the treatment settings

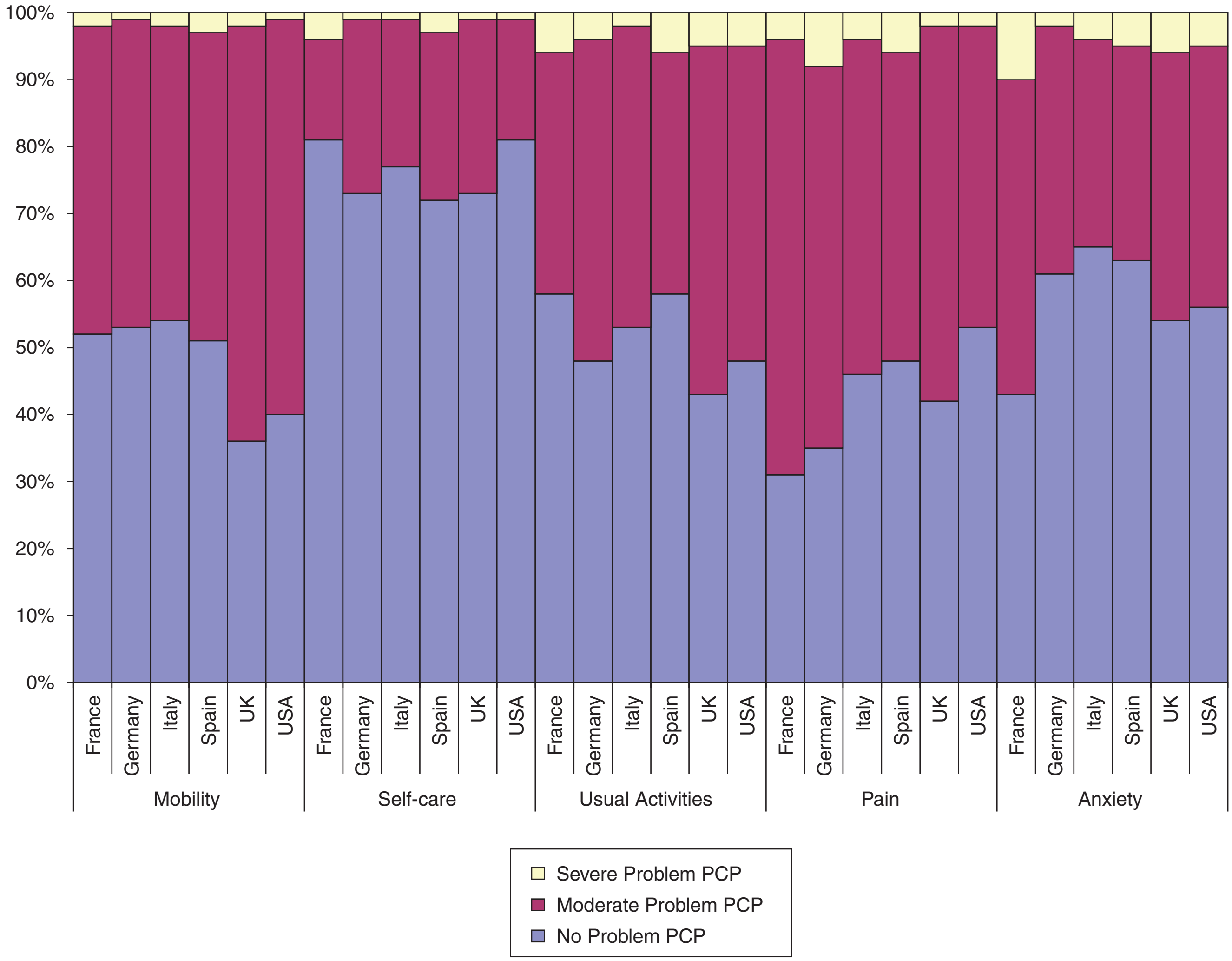

Figure 2 Frequency counts of patients visiting PCPs* on EQ-5D questionnaire. *Primary care physicians.

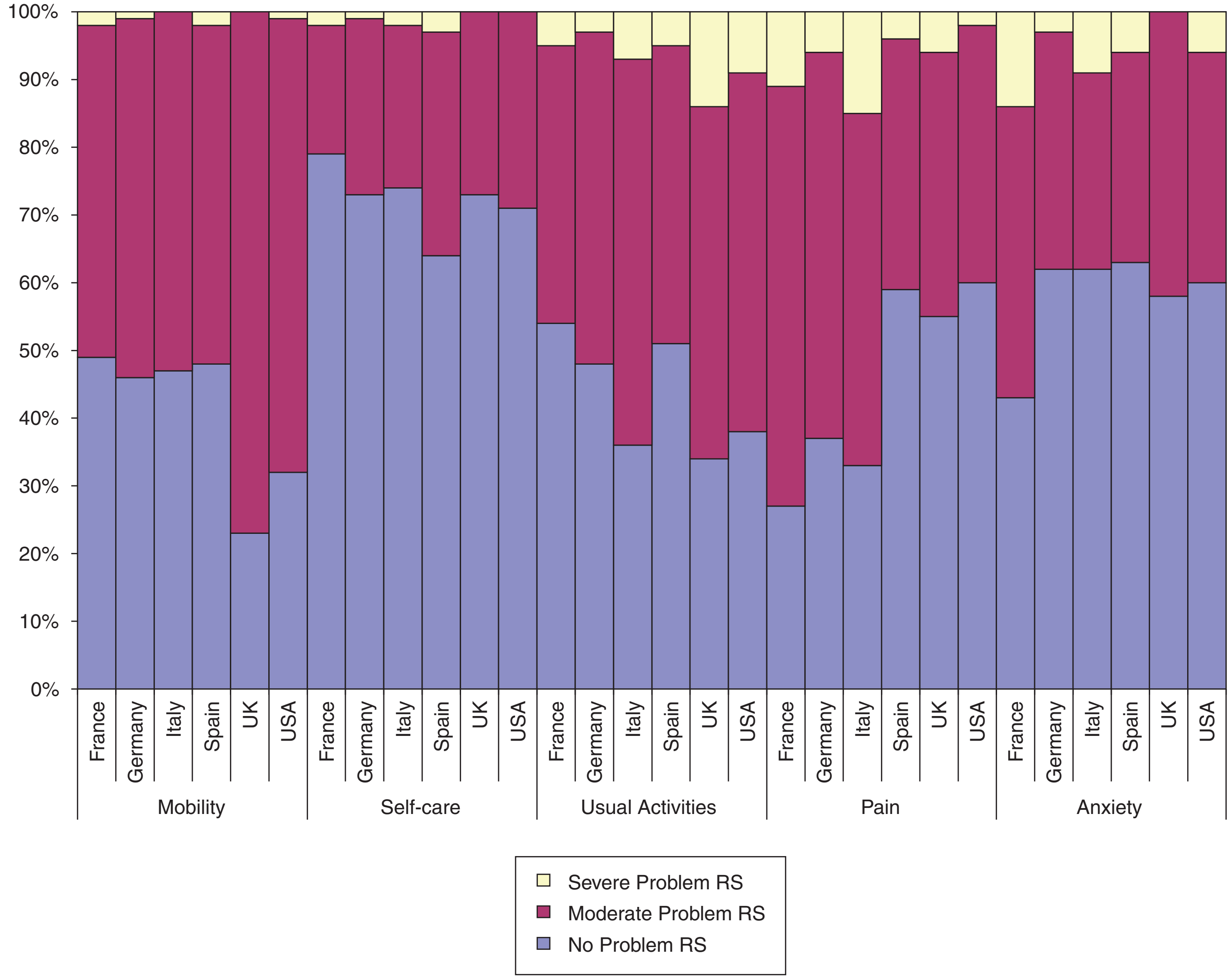

Figure 3 Frequency counts of patients visiting RSs* on EQ-5D questionnaire. *Respiratory specialists.

Table 3 Comparison of health states between COPD patients and general population (GnP).

	USA[14]			UK[15]			Spain[15]		
EQ-5D Domains	PCPs*	RSs†	GnP‡	PCPs*	RSs†	GnP‡	PCPs*	RSs†	GnP‡
Mobility (%)§	60	68	19	64	77	18	49	52	15
Self-care (%)§	19	29	4	27	27	4	28	36	2
Usual activities (%)§	52	62	15	57	66	16	42	49	14
Pain/discomfort (%)¶	47	40	41	58	45	33	52	40	45
Anxiety/depression (%)§	44	39	26	46	42	21	37	37	25

*Percent of patients with moderate or severe problems visiting PCPs.

†Percent of patients with moderate or severe problems visiting RSs.

‡Percent of general population with moderate or severe problems. Values not adjusted for age of the study sample.

§Significant differences between PCP patients and general population and RS patients and general population in all three countries ($P<0.001$ each).

¶Significant difference between PCP patients and general population in USA ($P<0.01$), UK ($P<0.001$) and Spain ($P<0.05$), and between RS patients and general population in UK ($P<0.05$).

showed substantial impairment in mobility, self-care, usual activities and anxiety/depression compared to the general population ($P<0.001$ each). A significant impairment on pain/discomfort domain of EQ-5D was also shown by patients visiting PCPs in the USA ($P<0.01$), UK ($P<0.001$) and Spain ($P<0.05$), and by patients visiting RSs in UK ($P<0.05$).

Discussion

The EQ-5D was used to assess the health status among COPD patients in this study. EQ-5D is a generic quality of life instrument with good validity and reliability but has so far been rarely used to assess quality of life in COPD patients.[16] One of the important findings of this study was that the health status among COPD patients was largely similar in primary care and specialty treatment settings with few exceptions. In both treatment settings, the mean EQ-5D score was similar and the proportion of patients having health status valued worse than death was comparable in all countries except Italy. The impact of clinical characteristics was also similar across treatment settings after controlling for country effect.

These findings seem largely consistent with the COPD severity of the patients in these treatment settings. Results from a small subset of population where spirometric values were available suggested that patients visiting PCPs and RSs in France, Germany and Spain were similar on disease severity. Similar pattern of results were not observed for the remaining countries. However, availability of spirometric results for a small proportion of patients and large differences between numbers of patients with spirometry results in two treatment settings could be some of the reasons for this discrepancy.

This however does not undermine the health status burden on COPD patients. At least 5% of patients in four European countries except UK had EQ-5D values less than zero. These patients had a health status valued worse than death by the general population and the results were consistent across all four countries and both treatment settings. Similarly, comparison of EQ-5D health states of these patients with general population in the USA, UK and Spain suggested significant impairment in their ability to walk, take care of themselves and perform routine activities. Once again, the results were consistent across all the three countries and both treatment settings. This not only highlights the detrimental impact of COPD on their health status but also suggests a need for better COPD management.

In the present study, parameters used to assess the severity of COPD patients in clinical practice showed significant associations with EQ-5D score. These parameters included objective assessment such as spirometry and symptomatic assessments such as exacerbation frequency, breathlessness and presence of respiratory symptoms. COPD patients who could be classified as moderate to severe based on these parameters had worse health status than mild patients in both treatment settings. This highlights the significant decrease in health status from mild patients to moderate or severe patients detected even by a generic health status instrument such as EQ-5D.

Few other studies have previously estimated the impact of COPD on patients' health status using EQ-5D.[17,18] Stavem and Jodalen estimated EQ-5D health states of COPD patients in their study aimed to test and validate a health status measure in COPD population.[17] Out of 52 patients assessed in their study, none had extreme impairment on mobility and personal care, 8% patients had extreme impairment in their usual activities, 4% were suffering from extreme pain/discomfort and 6% had extreme anxiety/depression. Our results are therefore similar with the proportion of patients having extreme problems on EQ-5D domains being 2% on mobility and personal care, 6% on usual activities, 5% on pain/discomfort and 6% on anxiety/depression. In another study Brazier and others assessed health status of 255 COPD patients in a teaching hospital in Sheffield, UK.[18] The overall EQ-5D score was 0.54 (standard deviation = 0.309) with a minimum score of −0.349. In our study the mean EQ-5D score was 0.67 and the minimum EQ-5D score was −0.07 among 162 UK respondents. COPD patient in our sample tended towards having better EQ-5D mean and higher EQ-5D minimum score. However, this was expected considering that our study was conducted in an outpatient setting with approximately half of the patients in primary care. Therefore, our sample may consist of higher proportion of mild patients compared to the population assessed by Brazier and others.[18]

The present study had several limitations. The objective of the study was to assess health status among COPD patients visiting PCPs and RSs. However, the study sample consisted of 18% patients in primary care and 66% patients in specialty setting with any traceable history of spirometric measurements and therefore could truly be considered as patients suffering from COPD. Yet, all the patients included in the sample received the diagnosis of COPD, chronic bronchitis or emphysema and were being treated accordingly by their physicians in both treatment settings. Hence although the results reflect a true practice setting they may be restricted to the patients diagnosed and treated as COPD sufferers in the countries and treatment settings included in the study. Any generalisation of the results beyond the countries and treatment settings studied would therefore warrant caution. The study was conducted in several western European countries and the USA having fairly advanced health-care systems and access to better COPD management and treatment. Accordingly, extrapolation of our results to other countries needs to be tempered. Although the survey was an enhanced version of the previous Disease Specific Program surveys (DSP I and DSP II), no pre-test was conducted. The sample comprised of patients in physician's offices and therefore restricts the generalisability of the study findings to COPD patients presenting for treatment. The present study used a cross-sectional study design. The health status assessment therefore represents the health status of patients at the time of a physician visit. However, the clinical parameters with the exception of breathlessness were recorded at some time during the previous year and therefore may have varying impact on patients' health status.

In conclusion, the current analysis of general health in COPD patients showed clear similarities of impairment across health care settings. In both treatment settings moderate to severe patients classified based on various clinical parameters showed worse health status burden compared with mild patients. Treatment settings had minimal impact on health status with patients in primary care and specialty settings sharing similar health status burden in most of the countries. Patients with COPD have significant health status burden especially in their mobility and their ability to conduct daily activities compared to the general public. This health status burden is significant even when valued using societal preferences.

Sponsors/Acknowledgements

The survey was conducted by Adelphi Group Products, Macclesfield, UK. The study was funded by GlaxoSmithKline R&D, Greenford, UK. Roberto Rodriguez-Roisin is supported by Red Respira-ISCIII-RTIC-03/11 and the Comissionat-Universitats i Recerca-Generalitat de Catalunya (2005 SGR00822).

References

1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global Strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. NHLBI/WHO Workshop Report April 2001(Updated 2005).
2. Murray CJ, Lopez AD. Alternative projections of mortality and disability by cause 1990–2020: Global Burden of Disease Study. *Lancet* 1997;**349**(9064):1498–504.
3. Murray CJ, Lopez AD, Mathers CD, Stein C. The Global Burden of Disease 2000 Project: global program on evidence for health policy discussion, paper number 36. Geneva: WHO; 2001.
4. Department of Commerce. Statistical abstract of the United States, 1997. US Department of Commerce, Bureau of the Census. Washington, DC, 1997.
5. Mannino DM, Brown C, Giovino GA. Obstructive lung disease deaths in the United States from 1979 through 1993. An analysis using multiple-cause mortality data. *Am J Respir Crit Care Med* 1997;**156**(3 Part 1):814–8.
6. Wouters E. Economic analysis of the confronting COPD survey: an overview of results. *Respir Med* 2003;**97**(Suppl C):S3–S14.
7. Jones P. Issues concerning health-related quality of life in COPD. *Chest* 1995;**107**(Suppl 5):187S–93S.
8. EuroQoL Group. EuroQoL—a new facility for the measurement of health-related quality of life. *Health Policy* 1990;**16**(3): 199–208.
9. Brooks R, EuroQol group. EuroQol: the current state of play. *Health Policy* 1996;**37**(1):53–72.
10. Rabin R, de Charro F. EQ-5D: a measure of health status from the EuroQol Group. *Ann Med* 2001;**33**(5):337–43.
11. Bestall J, Paul E, Garrod R, Garnham R, Jones P, Wedzicha J. Usefulness of the Medical Research Council (MRC) dyspnea scale as a measure of disability in patients with chronic obstructive pulmonary disease. *Thorax* 1999;**54**(7):581–6.
12. Dolan P. Modelling valuations for EuroQol health status. *Med Care* 1997;**35**(11):1095–108.
13. Charlson M, Pompei P, Ales K, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. *J Chron Dis* 1987;**40**(5): 373–83.
14. Shaw J, Johnson J, Coons S. US valuation of the EQ-5D health states: development and testing of the D1 valuation model. *Med Care* 2005;**43**(3):203–20.
15. Badia X, Roset M, Herdman M, Kind P. A comparison of United Kingdom and Spanish general population time trade-off values for EQ-5D health states. *Med Decis Making* 2001;**21**(1): 7–16.
16. Curtis J, Patrick D. The assessment of health status among patients with COPD. *Eur Respir J* 2003(Suppl. 41):36s–45s.
17. Stavem K, Jodalen H. Reliability and validity of the COOP/WONCA health status measure in patients with chronic obstructive pulmonary disease. *Qual Life Res* 2002;**11**(6): 527–33.
18. Brazier J, Roberts J, Tsuchiya A, et al. A comparison of the EQ-5D and SF-6D across seven patient groups. *Health Econ* 2004;**13**(9):873–84.