The Burden of Cough and Phlegm in People with COPD: A COPD PPRN Study

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BACKGROUND

Chronic obstructive pulmonary disease (COPD) affects 15-25 million individuals in the US and is the 4th leading cause of death and 2nd leading cause of disability-adjusted life years (DALYs) of disease burden in the US. 1

In the US, COPD is a direct cause of >140,000 deaths annually with costs $850 billion, >700,000 hospitalizations and 1.5 million emergency room visits. 1

Cough and phlegm are common symptoms reported by the majority of people with COPD.2-4 Mobility for cough and phlegm are directed at bronchodilation and inflammation with few treatments addressing directly either cough or phlegm.5

Limited information has been published addressing the patient reported burden of cough or phlegm on functional status, role fulfillment abilities, and social role functioning.6

We used patient self-reported data the COPD Foundation’s Patient-Powered Research Network (COPD PPRN) to highlight the frequency, severity and life factors associated with cough and phlegm in a large group of individuals reporting phlegm or diagnosis of COPD.

OBJECTIVE

To present the patient perspective on the burden of cough and phlegm occurring in COPD.

METHODS

Data were patient reported using the online COPD Foundation’s Patient-Powered Research Network (COPD PPRN). For individuals with self-reported COPD demographic, COPD disease related (COPD: Assessment Test [CAT], exacerbations and FEV1), and functional status and quality of life data were collected following completion of eConsent. 

The frequency of cough and phlegm were assessed among current cough (1) and (2) (phlegm) of the COPD Assessment Test (CAT).7,8 Figure 1 Frequency/ severity were summarized as low (scores of <2); moderate (scores of 2-3) and high (scores >3) based on the 5 level CAT responses.

Levels of cough and phlegm frequency were compared by gender, age groups, and self-reported exacerbation rates in the previous 12 months.

Further analyses compared levels of cough and phlegm with the 7 domains of the PROMIS-29 including symptom burden, depression, fatigue, sleep, pain, social role functioning and physical role functioning.9

The COPD-29 domain scores were weighted and standardized to place the average person’s score at 50 (scale 0 to 100) with deviations from 50 suggesting burden or improvement compared to the “average” US person.10

Descriptive statistics are reported as mean (SD) for continuous variables, and frequencies (%) for categorical variables (gender, BMI, and clinical characteristics, and total CAT scores) and then stratified by levels of cough and phlegm. Values between the groups were compared using chi- squared test (for categorical variables) and t-test/ ANOVA for (continuous variables) respectively. The weighted standardized PROMIS-29 scores were stratified by room department visits and phlegm.

RESULTS

Overall, 5,314 individuals with self-reported physician diagnosed COPD were included in the analyses. 60.4% were women with an average age of 64 years (SD-11.5). 51.2% were married and 42.2% had caregivers. Both men and women were very likely to have ever smoked and many were current smokers; 88.2% ever smokers, 17.8% of these were current smokers.

Table 1. Demographic characteristics of group (N=5,314)

Table 2. Frequency of cough and phlegm levels by disease characteristics (N=5,314)

Figure 1. Cough and Phlegm as measure by cat level

Cough

Phlegm

Table 3. Cross tabulation of levels of cough and phlegm frequencies (N=5,314)

DISCUSSION

The burden of cough and phlegm may be seen in the association of the levels of cough and phlegm frequency and the standardized scores on the domains of the PROMIS-29/Figure 2-3 further demonstrates the increase in the burden of depression, anxiety, fatigue and pain as both cough and phlegm frequency increases. Depression scores increase from low (60.6%) to high (65.6%) with increasing frequency of cough. Interestingly, increasing cough and phlegm frequency but no affect of levels was seen on reported sleep disturbance.

Figure 2. Impact of Cough and Phlegm on Mood, Fatigue and Pain

For social and physical role functioning, lower scores — above the average score of “50” for age matched individuals show decline in ability to meet the patient’s expectation of these role functions. However, the impact of increasing frequency of both cough and phlegm appear to have a paradoxical impact. (Figure 3) Further exploration is warranted.

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The statements presented in this poster are solely the responsibility of the authors and do not necessarily represent the views of the funding agency. Patient-Centered Outcomes Research Institute (PCORI) funded this project.

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Figure 3. Impact of Cough and Phlegm on Social and Physical Role Functioning

CONCLUSIONS

There are other published data on the frequency and potential impact of cough and phlegm as a marker of COPD phenotypes, especially chronic bronchitis.9-10 and role factors for exacerbations and death.11 Miravitlles and Ribas2 outlined the impact of COPD on many symptoms but did not look at the specific impact of cough or phlegm frequency. The focus to cough and phlegm specifically is important since currently few pharmacotherapies directly address either cough or phlegm.6 The results of our study confirms that about two thirds of COPD patients have moderate to high cough and phlegm burden. Increasing levels of cough and phlegm are associated with increasing levels of adverse impact on rates of exacerbations, mood, pain, and fatigue. The association with levels of physical and social role function require further study.

The observed high impact of increasing levels of cough and phlegm highlights the need to increase the search for therapies designed specifically to directly reduce cough or phlegm burden in people with COPD.

Our work is limited by the potential selection bias of our online registry and the self-reported nature of the information including self-reported COPD diagnoses. However, using self-reported data regarding seldom addressed outcomes such as patient perceived impact on anxiety depression, pain, fatigue and role functioning as well as frequency of cough and phlegm production is also the strength of this work.

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Figure 2. Impact of Cough and Phlegm on Mood, Fatigue and Pain

Figure 3. Impact of Cough and Phlegm on Social and Physical Role Functioning

The distribution of both cough and phlegm are similar with about two thirds of those with low levels of cough or phlegm compared to those with high levels.

The CAT score is > 10 for about two third of those with low levels of cough and phlegm but > 94% of those with moderate to high levels. The levels of cough and phlegm and total CAT score are co-linear and highly associated. (Table 3)

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CONCLUSIONS

In people with COPD, cough and phlegm are associated with greater likelihood of having frequent exacerbations, higher hospitalization rates, increased mortality, and decreased quality of life due to increased symptoms of depression, anxiety, fatigue and pain but not sleep disturbances. While these may be direct effects of cough and phlegm, burden of symptoms may also be a marker of increasing COPD severity.

Further work in this area is required with exploration of treatment specifically aimed at cough and phlegm.

For social and physical role functioning, lower scores — above the average score of “50” for age matched individuals show decline in ability to meet the patient’s expectation of these role functions. However, the impact of increasing frequency of both cough and phlegm appear to have a paradoxical impact. (Figure 3) Further exploration is warranted.