Chronic Obstructive Pulmonary Disease (COPD): Comorbidity and Quality of Life — North Carolina 2011

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Background

Chronic Obstructive Pulmonary Disease (COPD) is a lung disease characterized by progressive chronic inflammation of the airways in response to environmental irritants. The most common risk factor for COPD is exposure to tobacco smoke, either directly or secondhand. Other COPD risk factors include long term exposure to air pollution, chemical fumes and dust from the workplace. COPD is known to be associated with multiple comorbidities. The reasons for this are complex and not entirely known. However, there is growing evidence to suggest that systemic inflammation, that occurs with cigarette smoking, might be a common pathway for multiple chronic conditions found among adults with COPD.[1]

A review of the COPD literature indicates that chronic disease comorbidities, such as heart disease, diabetes, kidney disease, hypertension, osteoporosis, arthritis and various types of cancer are part of the common non-pulmonary sequelae of COPD.[2] A large-scale study, using electronic primary care records of more than 1.2 million patients, found that COPD was associated with increased risks of cardiovascular disease (OR=4.98; $p < 0.001$), stroke (OR=3.34; $p < 0.001$), and diabetes mellitus (OR=2.04; $p < 0.001$).[3] Similarly, a large population study published in 2008 found that the adjusted odds of chronic disease among those with COPD were two times higher for diabetes, 1.6 times higher for hypertension, and 2.4 times higher for cardiovascular disease, compared to the odds among those without COPD.[4]

COPD can also adversely affect quality of life. Depression has often been associated with COPD.[5] Using 2001–2008 NHANES data, researchers found that as the number of comorbid conditions (i.e., congestive heart failure, diabetes, arthritis, prostate cancer) increased, those with COPD were 43 percent more likely to report poor self-rated health.[6] Physical inactivity due to breathing limitation is also prevalent among those with COPD.[7]

This report examines the prevalence and risk of secondary chronic conditions and poor quality of life among North Carolina adults with COPD.

Methods

The study results were derived from the 2011 BRFSS (Behavioral Risk Factor Surveillance System) survey of North Carolina

**Table 1.
Prevalence and Age-adjusted Relative Risk of Chronic Conditions Among North Carolina Adults by COPD Status: 2011 NC BRFSS Survey**

Chronic Conditions	Prevalence		Relative Risk	
	COPD Wt%	No COPD Wt%	aRR	95% C.I.
Arthritis	56.6	22.8	1.73*	1.58–1.90
Diabetes	25.6	9.7	1.80*	1.50–2.16
History of heart attack	15.2	3.6	2.59*	2.03–3.31
History of coronary heart disease	17.3	3.5	3.05*	2.40–3.88
High blood pressure	59.7	30.3	1.43*	1.32–1.56
Kidney disease	6.9	1.8	2.77*	1.74–4.41
Current asthma	39.6	6.6	6.78*	5.74–8.02
3+ chronic diseases	40.0	7.5	3.38*	2.91–3.93

Abbreviations: COPD – chronic obstructive pulmonary disease; aRR – age-adjusted relative risk (Mantel–Haenszel); C.I. – confidence interval.

* Statistically significant $p < 0.05$

adults. The BRFSS is a random-digit-dial telephone survey of noninstitutionalized adults, ages 18 and older. The survey is conducted annually by state health departments in collaboration with the Centers for Disease Control and Prevention (CDC). The BRFSS collects information on health behaviors, chronic conditions and use of preventive care.

Two study groups were derived from the screener question on COPD: "Have you ever been told by a doctor or health professional that you have COPD, emphysema or chronic bronchitis?" Those who responded "yes" to the question defined the COPD study group; those who responded "no" comprised the non-COPD group. There were 1,030 respondents who met the definition for COPD and 10,469 respondents who did not have COPD.

Seven chronic conditions were defined from the 2011 survey: arthritis, diabetes, heart attack, coronary heart disease, high blood pressure, kidney disease and current asthma (Table 1). In addition, we created a multiple chronic conditions indicator, delineating two groups: 1) those who reported having three or more chronic conditions and 2) those having fewer or no chronic conditions.

Poor quality of life (QoL) consisted of four indicators derived from the survey: 1) self-perceived fair or poor health, 2) doctor-diagnosed depression, 3) no exercise or physical activity in the past month and 4) frequent poor physical health days. Indicator #4 included those who reported 14 or more days in the past 30 days when their physical health was not good (Table 2).

For each chronic condition and QoL indicator, we computed the weighted prevalence and age-adjusted relative risk of having the chronic condition or QoL indicator for those with COPD compared to the risk found among those without COPD. Age-adjustment was needed to account for the higher proportion of older adults in the COPD group, predisposing the group to worse health status. Age-adjustment was calculated using the Mantel-Haenszel method and test statistic.

Results

For each of the chronic conditions that we examined in Table 1, both the prevalence estimates and the age-adjusted relative risks were statistically significantly higher for respondents with COPD. The largest difference in prevalence was found with the multiple chronic conditions indicator. Forty percent of those with COPD reported having three or more chronic conditions compared to 7.5 percent of their counterparts — a difference of 32.5 percentage points. After adjusting for age, the relative risk of coronary heart disease was 3.1 times higher in the COPD group; similarly, the risk of a heart attack was 2.6 times higher. The risk of kidney disease was also noticeably higher in the COPD group (RR=2.77 [95% C.I. 1.74–4.41]). In addition, we found that 40 percent of those with COPD also reported having current asthma, which share similar symptoms.

The results in Table 2 show that the age-adjusted relative risk of poor physical health days was 3.4 times higher in the COPD group— the highest risk of any of the four indicators. Nearly 60 percent of respondents with COPD reported being in fair or poor health, as compared to 16.6 percent of respondents without the disease. Furthermore, about 41 percent of the COPD group reported being diagnosed with depression versus about 16 percent of the non-COPD group. The results also show that nearly half of COPD respondents (48.4%) versus a quarter of non-COPD respondents (25.1%) did not participate in any exercise or physical activity in the past month.

Results from this study confirm that North Carolina residents with self-reported COPD have a significantly higher risk of worse physical health, poor mental health and a substantially higher prevalence of other chronic health conditions than those without COPD.

Discussion

This report was based on self-reported prevalence of doctor-diagnosed COPD. However, many North Carolina residents with respiratory symptoms may not be aware that they have COPD.

Accurate and early diagnosis of COPD and effective clinical management of the disease are keys to reducing the burden and cost of the disease. According to the GOLD (**G**lobal Initiative for Chronic **O**bstructive **L**ung **D**isease) standard, a clinical diagnosis of

Table 2.
Prevalence and Age-adjusted Relative Risk for Quality of Life Indicators Among North Carolina Adults by COPD Status: 2011 NC BRFSS Survey

Chronic Conditions	Prevalence		Relative Risk	
	COPD Wt%	No COPD Wt%	aRR	95% C.I.
Perceived fair or poor health	59.8	16.6	2.92*	2.64–3.24
Frequent poor physical health days[1]	42.9	10.0	3.44*	2.97–3.98
Doctor-diagnosed depression	40.9	15.7	2.57*	2.25–2.94
No exercise in past month	48.4	25.1	1.77*	1.57–1.98

Abbreviations: COPD – chronic obstructive pulmonary disease; aRR — age-adjusted relative risk (Mantel–Haenszel); C.I. — confidence interval.
* Statistically significant $p < 0.05$
[1]Self-reported 14+ days out of past 30 days when physical health was not good.

COPD should be considered for those who have shortness of breath, chronic cough or sputum production, and a history of exposure to risk factors. Some experts recommend that any adult smoker who complains of a daily cough should be screened for COPD. Spirometry, which measures lung function, is the most common test and usually the first-step in diagnosing COPD. Training physicians to improve diagnosis of COPD in primary care settings is likewise an important issue. A study of general practice physicians has shown that 15.7 percent of their patients with moderate COPD and 39.6 percent with severe CODP were undiagnosed.[8] Management of the disease requires that the disease be viewed as a multi-systemic condition. It is recommended that practice guidelines for COPD patients address the effects of multiple comorbidities on screening, diagnosis, prevention and management of the disease.

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