Burden of Smoking on Productivity in Chronic Obstructive Pulmonary Disease (COPD)

Aaron Galaznik, MD, MBA,1 Geoffrey Makinson, PhD,1 Shivani Tripathi, MPH,1 Kelly H. Zou, PhD,1 Jonathan Chapnick,2 Jeffrey Vietri, PhD2

1Pfizer Inc, New York, NY, USA; 2Kantar Health, Princeton, NJ, USA

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a disease of impaired lung function, and includes the diagnosis of chronic bronchitis and emphysema. The primary cause of COPD is smoking.1 It is well established that individuals who smoke have greater losses in work productivity compared with former and non-smokers.2

It also well-known the COPD has a considerable impact on work productivity, the proportion of which is related to disease severity.3 This study investigated the impact of smoking on productivity in subjects with COPD.

METHODS

Study design

• This study used data from the 2009 and 2010 waves (n=71,000 each) of the National Health and Wellness Survey, which is a self-administered, Internet-based questionnaire from a sample of adults (aged 18 years or older) in the United States.

• Respondents with a history of cigarette smoking, who were at least 40 years of age at the time of survey (2009–2010), and who reported diagnoses with COPD (chronic bronchitis, or emphysema) were included in this analysis. For individuals who completed the survey in both years, data from 2010 were used.

• Subjects who were quitting smoking at the time of the survey were excluded.

• Groups were split according to smoking status –

  Group 1: Current smokers

  Group 2: Reported quitting smoking 0–5 years prior to completing the survey

  Group 3: Reported quitting smoking 6–10 years prior to completing the survey

  Group 4: Reported quitting smoking 11 or more years prior to completing the survey

Work productivity was assessed using the Work Productivity and Activity Impairment scale, in which six subscales (absenteeism, presenteeism, overall work impairment, and non-work activity impairment) are assessed on a scale of 0 to 100, with higher values indicating greater impairment.

• Indirect costs were calculated using the United States Department of Labor’s 2009 Bureau of Labor Statistics average wages, stratified by gender and age and applied to smoking status.

Statistical analysis

• Multivariate generalized linear models were used to predict productivity impairment with adjusted associations of interest and a log-β-transform function. Covariates included age, sex, race, insurance status, marital status, smoking status, BMI, smoking duration, number of tobacco use, exercise and asthma diagnosis.

• Comparisons between current and former smokers were made using one-way analysis of variance (ANOVA) for continuous variables and chi-square for categorical variables.

• For comparisons where the ANOVA detected a significant difference, unadjusted pairwise comparisons were conducted using t-tests to determine statistical significance between groups.

• All analyses were conducted in SPSS Version 19.0. Alpha error levels of 5% were specified for all statistical comparisons (two-sided P=0.05).

RESULTS

Subject characteristics

A total of 1685 subjects were current smokers. The groups who had reported quitting smoking 0–5, 6–10, and 11 or more years prior to completing the survey comprised 923, 649, and 1932 subjects, respectively.

Overall, subjects who were current smokers were slightly younger than those in any of the former smoking groups. Current smokers had increased impairment at work (presenteeism: 23% vs 18%, P=0.010; overall work impairment: 25% vs 21%, P=0.043).

Incom e

Mean total cost, $ (95% CI) 29,203 (27,255, 31,151) 37,871 (33,643, 42,099) 36,223 (32,984, 39,462) 35,019 (33,237, 36,801) < 0.001

Mean indirect costs, $ (95% CI) 10,905 (9,753, 12,056) 9,630 (7,985, 11,275) 9,403 (7,427, 11,379) 7,819 (6,753, 8,884) 0.002

Mean direct costs, $ (95% CI) 18,298 (16,002, 20,594) 28,242 (25,366, 31,118) 22,819 (20,723, 25,015) 17,202 (15,485, 19,019) 0.002

Table 1. Demographic characteristics of subjects with COPD by smoking status

Table 2. Health-related productivity and activity impairment among subjects with COPD by smoking status

Table 3. Indirect costs among subjects with COPD by smoking status

CONCLUSIONS

• The results of this study provide evidence that smoking is associated with significant decrements in work productivity.

• Compared with former smokers who had quit at least 11 years prior to completing the survey, the subjects with COPD who were current smokers had similar absenteeism, greater presenteeism, greater overall work impairment, and more impairment in non-work activities.

• The estimated incremental cost of productivity decrease is $3086 per year for current smokers with COPD.

REFERENCES


ACKNOWLEDGMENTS

This study was funded by Pfizer Inc. Editorial assistance for the production of this material was provided by Helen Jones, PhD, Pfizer, Inc. Scientific Editing and Publishing funded by Pfizer Inc.

CONFLICT OF INTEREST

Mark E. Galaznik, PhD, Jonathan Chapnick, and Jeffrey Vietri are employees of Pfizer Inc. Jonathan Chapnick and Jeffrey Vietri are employees of Pfizer Inc., who were paid consultants to Pfizer for the conduct of this study.

Pfizer presented the 15th Annual International Meeting of the International Society for Pharmacoeconomics and Outcomes Research, June 2–6, 2012, Washington Hilton, Washington, DC, USA.