

Impact of chronic kidney disease among Koreans adults with chronic obstructive pulmonary disease

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OBJECTIVES

Renal dysfunction is associated with an increased mortality risk in chronic obstructive pulmonary disease (COPD) patients.¹ Early identification and intervention of COPD patients with chronic kidney disease (CKD) may provide better outcomes in general population. However, there is little known about the relationship between CKD and COPD in general population. We aimed to determine the prevalence and impact of CKD in COPD patients from the fifth Korea National Health and Nutritional Examination Survey (KNHANES) 2012.

METHODS

This study utilized data from the fifth KNHANES 2012, which was a cross-sectional and nationally representative survey conducted by the Division of Chronic Disease Surveillance of the Korean Center for Disease Control and Prevention. We analyzed data of 3,393 adults ≥ 40 years old who completed pulmonary function tests. On spirometric examination, participants with $FEV_1/FVC \geq 0.70$ and $FVC \geq 80\%$ predicted were categorized as having normal lung function (NLF). COPD was defined as $FEV_1/FVC < 0.70$. Participants with restrictive lung function as $FEV_1/FVC \geq 0.70$ and $FVC < 80\%$ predicted were excluded from this study. Glomerular filtration rates (eGFRs) were evaluated using the equation described by the Chronic Kidney Disease Epidemiology Collaboration. CKD was defined as $eGFR < 60$ mL/min/1.73m². Multivariate logistic regression analysis was performed to evaluate the relationship between CKD and COPD.

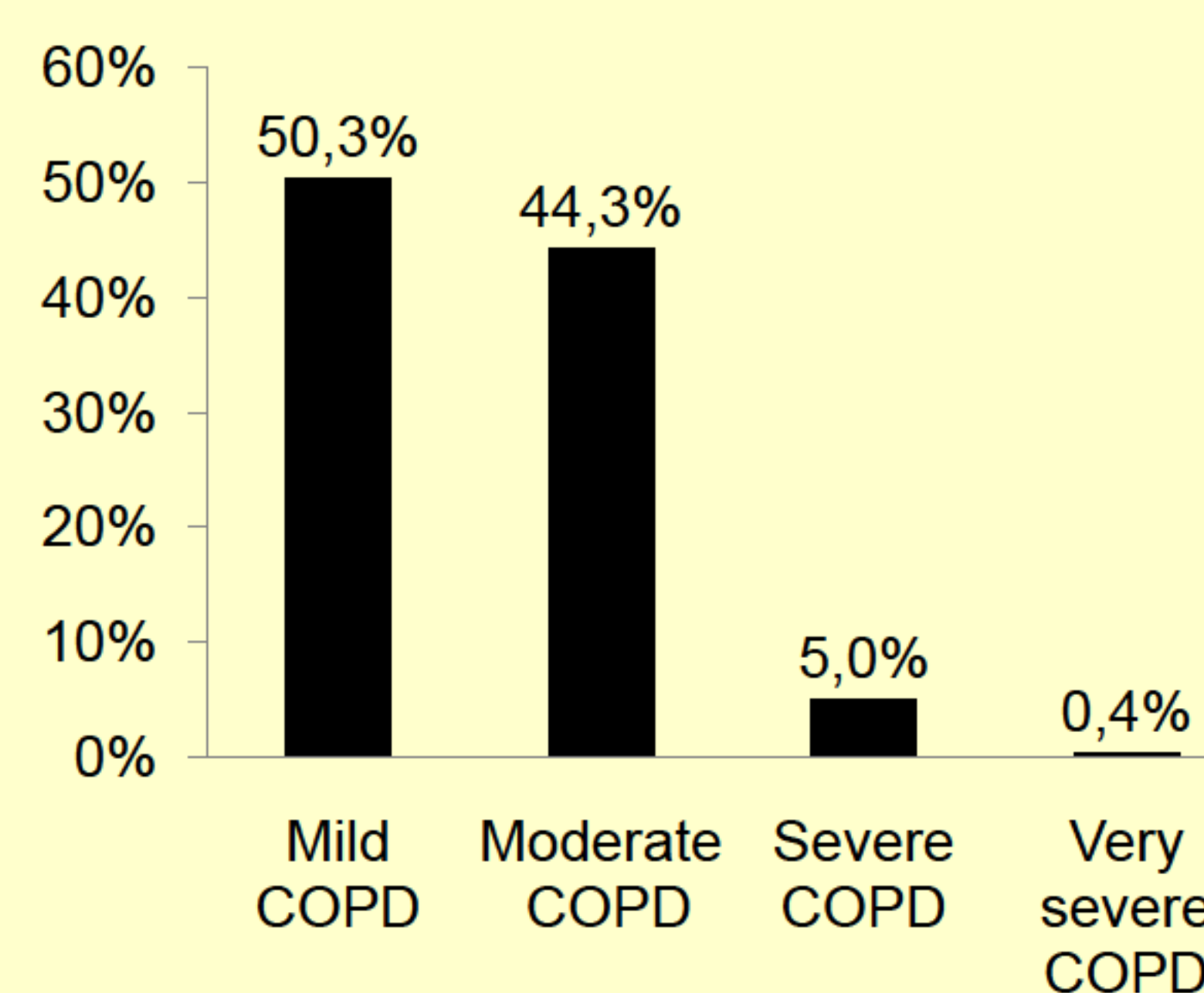
RESULTS

Of 3,393 participants performed eligible spirometry, 3,027 were included in this study. The prevalence of COPD was 15.6% in a Korean population ≥ 40 years old. Mean eGFR was 89.2 ± 13.8 mL/min/1.73m² in subjects with NLF and 81.4 ± 14.6 mL/min/1.73m² in those with COPD. In total, 16.2% of subjects were 70 years of age and older and 48.9% of subjects were male. Subjects with CKD were 3.3%.

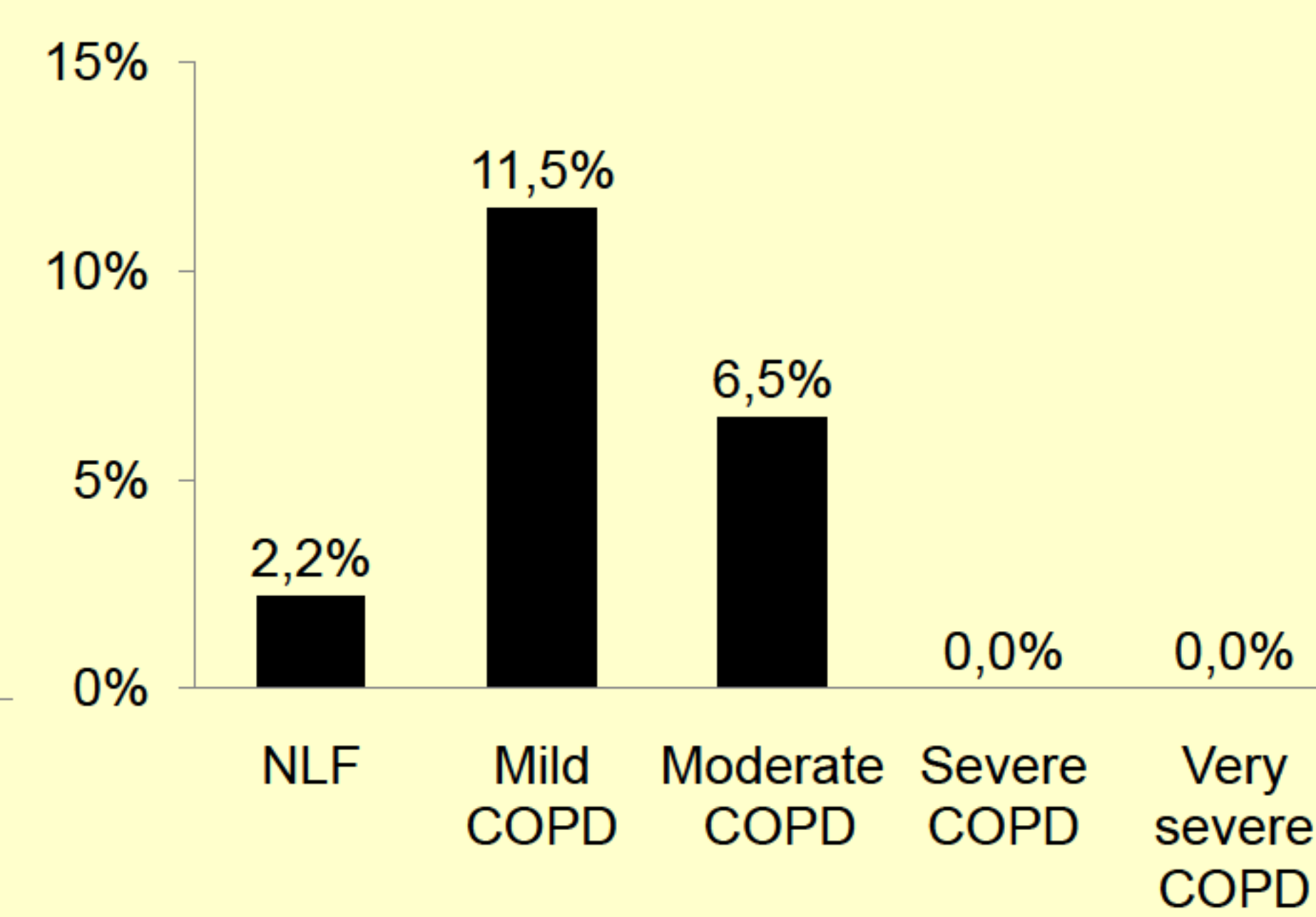
Baseline characteristics in subjects with NLF and COPD

	Total (N=3027)	NLF (N=2499)	COPD (N=528)	p-value
Age, years				0.000
≥ 40	83.8%	87.6%	64.2%	
≥ 70	16.2%	12.4%	35.8%	
Gender, male	48.9%	43.5%	76.7%	0.000
Education level				0.000
\geq University	22.3%	24.1%	13.0%	
High school	34.3%	35.8%	26.6%	
Middle school	14.7%	14.3%	16.6%	
\leq Elementary school	28.8%	25.8%	43.8%	
Body mass index, kg/m ²				0.005
≥ 25	37.3%	38.8%	29.5%	
$18.5 \leq < 25$	61.2%	60.0%	67.2%	
< 18.5	1.5%	1.2%	3.2%	
Hypertension	26.3%	23.9%	38.2%	0.000
Diabetes mellitus	8.6%	7.4%	14.7%	0.000
Dyslipidemia	13.7%	13.8%	13.3%	0.549
Cerebrovascular accident	1.7%	1.6%	2.4%	0.339
Coronary heart disease	3.3%	3.1%	4.4%	0.262
Pulmonary tuberculosis	4.8%	3.4%	12.1%	0.000
Current bronchial asthma	1.9%	1.0%	6.6%	0.000
Depression	2.4%	2.6%	1.3%	0.163
Cancer				0.058
Lung	0.1%	0.06%	0.4%	
Other	3.8%	3.5%	5.2%	
Smoking				0.000
Never	53.8%	58.7%	28.8%	
Former	24.3%	21.1%	40.1%	
Current	22.0%	20.2%	31.1%	
Physical activity				
Vigorous	12.8%	13.3%	10.2%	0.101
Moderate	6.0%	6.3%	4.1%	0.123
Walking	36.2%	35.9%	37.6%	0.551
Systolic blood pressure, mmHg				0.000
< 140	85.7%	87.0%	78.9%	
$140 \leq < 180$	13.9%	12.7%	20.1%	
≥ 180	0.4%	0.3%	1.0%	
Diastolic blood pressure, mmHg				0.837
< 90	86.1%	86.2%	85.7%	
$90 \leq < 110$	13.4%	13.4%	13.6%	
≥ 110	0.5%	0.4%	0.7%	
Hemoglobin < 12 mg/dL	6.7%	7.2%	4.1%	0.012
Total cholesterol ≥ 200 mg/dL	42.4%	43.5%	37.0%	0.033
Fasting glucose ≥ 126 mg/dL	7.2%	6.5%	10.7%	0.012
Glomerular filtration rates, mL/min/1.73m ²				0.000
≥ 90	51.8%	54.1%	39.8%	
$60 \leq < 90$	44.9%	43.6%	51.5%	
< 60	3.3%	2.2%	8.7%	
25-hydroxyvitamin D < 20 ng/mL	69.1%	71.0%	59.4%	0.000
Urine albumin-to-creatinine ratio, mg/mg				0.086
≥ 30	7.1%	6.6%	9.7%	
> 300	0.9%	0.9%	1.0%	

Proportion of subjects according to COPD severity



Proportion of subjects with CKD according to the pulmonary function



Risk factors for chronic obstructive pulmonary disease among a Korean population (obtained by multivariate logistic regression analysis*)

	Odds ratio	95% confidence interval	p-value
Age, years			0.000
≥ 40	1		
≥ 70	3.266	2.232-4.780	
Gender, male	5.014	3.158-7.961	0.000
Body mass index, kg/m ²			0.004
≥ 25	1		
$18.5 \leq < 25$	1.646	1.169-2.318	
< 18.5	2.696	0.959-7.577	
Education level			0.000
\geq University	1		
High school	1.599	1.044-2.448	
Middle school	2.155	1.373-3.381	
\leq Elementary school	3.889	2.475-6.109	
Pulmonary tuberculosis	3.515	1.735-7.122	0.001
Current bronchial asthma	8.374	3.588-19.544	0.000
Smoking			0.045
Never	1		
Former	1.643	1.087-2.484	
Current	1.605	1.058-2.436	
Glomerular filtration rate, mL/min/1.73m ²			0.016
≥ 90	1		
$60 \leq < 90$	0.889	0.637-1.240	
< 60	2.199	1.196-4.043	

*Multivariate logistic regression analysis was conducted with adjustment for hypertension, diabetes mellitus, physical activity, systolic blood pressure < 140 , $140 \leq < 180$, and ≥ 180 , hemoglobin < 12 mg/dL, fasting glucose ≥ 126 mg/dL, total cholesterol ≥ 200 mg/dL, and 25-hydroxyvitamin D < 20 ng/mL.

