Research Square

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National trend in the prevalence and mortality of young COPD in South Korea from 2008 to 2017

Sun-Hyung Kim
Chungbuk National University Hospital, Chungbuk National University College of Medicine
Jong Eun Park
Chungbuk National University
So Young Kim
Chungbuk National University
Yeon-Yong Kim
National Health Insurance Service
Jong Hyock Park
jonghyock@gmail.com

Chungbuk National University
Bumhee Yang
Chungbuk National University Hospital, Chungbuk National University College of Medicine

Research Article

Keywords: Mortality, Nationwide population-based study, Prevalence, Young chronic obstructive pulmonary disease

Posted Date: February 27th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8821882/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Chronic obstructive pulmonary disease (COPD) has traditionally been regarded as a disease of older adults; however, impaired lung development and early-life exposures may predispose younger individuals to COPD. Data on the prevalence and mortality of young COPD in Asian populations remain limited. We aimed to investigate temporal trends in prevalence and mortality among young adults with COPD in South Korea.

Methods

We conducted a nationwide serial cross-sectional study using the National Health Information Database linked to national cause-of-death data from 2008 to 2017. Adults aged 20–50 years were included. COPD was identified using ICD-10 codes (J41–J44), defined as ≥ 2 outpatient diagnoses or ≥ 1 hospitalization for COPD. Crude and age- and sex-standardized prevalence and mortality rates were calculated. Mortality risks were assessed using Poisson regression models adjusting for age, sex, income level, residence, and Charlson comorbidity index.

Results

The crude prevalence of young COPD increased steadily from 2.4% in 2008 to 7.8% in 2017, with similar trends observed after age standardization and across both sexes. In 2017, COPD prevalence increased with age, reaching 9.6% among individuals aged 40–50 years. Young adults with COPD had a higher burden of comorbidities than those without COPD. Although overall mortality declined over time, individuals with COPD consistently exhibited higher mortality rates. COPD was associated with increased all-cause mortality (adjusted incidence rate ratio [IRR] 1.18, 95% CI 1.14–1.23). Cause-specific mortality risks were significantly higher for lung cancer (adjusted IRR 3.16, 95% CI 2.62–3.83), as well as for diseases of the nervous, respiratory, and musculoskeletal systems.

Conclusions

Young COPD is relatively common in South Korea and its prevalence has increased substantially over the past decade. Despite their young age, individuals with COPD experience a significant burden of comorbidities and increased mortality. These findings highlight the need for greater clinical awareness and early preventive strategies for COPD in younger populations.

Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive disease. It is caused by smoking and noxious particles; however, nonmodifiable host factors are also known to contribute to its development [1]. Age is a known risk factor for COPD because physiological lung function declines with age [2, 3]. Age-related epigenetic changes in DNA have been shown to increase the risk of COPD exacerbation and mortality [4–6]. Smoking is an important risk factor for COPD[7]. It is well established that the risk of developing COPD increases in proportion to the duration of tobacco consumption, and older smokers have a higher prevalence of COPD [8, 9]. According to a Platino study, the prevalence of COPD is increasing in people over 60 years of age [10], and data from the Korea National Health Insurance Service (NHIS), the average age of COPD is 69.3 years [11]. Consistent with these findings, our previous nationwide study reported a mean age of 64.5 years among individuals with COPD [12].

However, a history of childhood asthma, smoking during adolescence, or severe childhood respiratory infections can adversely affect lung development and impair attainment of normal peak lung function [13–16]. Lung function peaks approximately 20–25 of age and then gradually declines [7]. A shortened plateau of lung function or an early decline increases the likelihood of developing COPD. In Global Initiative for Chronic Obstructive Lung Disease (GOLD), patients with post-bronchodilator FEV1/FVC < 0.7 in 20–50 years of age were defined as having young COPD [1].

The prevalence rate of young COPD in the United States has been reported to be approximately 1.64% and tended to increase with age. Similarly a Chinese study reported that COPD prevalence increased with age in the young COPD group [17, 18]. Young patients with

COPD have a greater burden of comorbidities and a higher mortality risk than healthy individuals without airflow limitation [19, 20]. There are also reports that patients with COPD aged 40–50 years have a higher risk of exacerbation than non-COPD participants [21].

However, the prevalence and mortality rates in young patients with COPD in Korea are not well understood. Therefore, this study aimed to investigate the prevalence and mortality rates of COPD in young patients.

Methods

Data sources

This serial cross-sectional study was conducted using a population-based database covering the entire South Korean population. We established a link between the National Health Information Database (NHID) from 2008 to 2017 and data on causes of death derived from the Cause of Death Statistics provided by Statistics Korea. The NHID, provided by the NHIS, is a public database that includes information on healthcare utilization, health screening, sociodemographic variables, and mortality for the entire population of South Korea.[22] In 2013, the NHIS covered 97.2% of the Korean population, and the Medical Aid system covered the remaining 2.8%.[23] This system not only provides universal insurance coverage to the entire population of South Korea but also maintains records of individual health information.

The Causes of Death Statistics were produced to identify the number and causes of death among the Korean population. The causes of death were selected from the underlying causes of death recorded on death certificates according to the World Health Organization's International Classification of Diseases (ICD). The causes of death were further classified according to the Korean Standard Classification of Diseases, 7th revision.[24] For this study, we only extracted data on the causes of death occurring up to the first half of 2018 for eligible participants within the NHID between 2008 and 2017, excluding the dates of death already included in the NHID.

Study population and definition of COPD

The linked database comprises an annual population of over 50 million individuals spanning all age groups. However, to describe the epidemiology of COPD among young individuals, we focused our analysis on adults aged 20–50-years. Individuals with COPD were identified using diagnostic codes because the NHID does not include clinical parameters such as spirometry data, which are used for COPD diagnosis. Individuals were classified as having COPD if they had two or more diagnostic codes for COPD (ICD-10 codes J41–J44) separated by a period of time or had experienced at least one hospitalization episode due to COPD.

Mortality

Death cases were counted as occurrences between January 1 and December 31 of each year. Mortality rates were calculated for all causes, as well as for the specific selected causes as follows: neoplasms (C00-D48), endocrine, nutritional and metabolic diseases (E00-E90), mental and behavioral disorders (F00-F99), diseases of the nervous system (G00-G99), diseases of the circulatory system (I00-I99), diseases of the respiratory system (J00-J99), diseases of the digestive system (K00-K93), diseases of the musculoskeletal system and connective tissue (M00-M99), and injury, poisoning and certain other consequences of external causes (S00-T98).

Other variables

We included data on the factors that could potentially influence the prevalence and mortality of COPD, including age, sex, income level, residence, and comorbidities. Income level was classified according to the NHIS insurance contribution, which is, in turn, based on the monthly wage for employees (employee-insured) and metrics of household wealth (e.g., income, property, and car ownership) for the self-employed (self-employed-insured). The categories comprise Medical Aid recipients as well as the 1st (lowest 25%), 2nd, 3rd, and 4th (highest 25%) insurance contribution quartiles. Residential areas were classified as metropolitan, urban, or rural based on the ZIP code. The cumulative burden of comorbidities in each individual was assessed using the Carlson Comorbidity Index (CCI). Individuals were classified into four groups based on their CCI scores: 0, 1–2, 3–4, and ≥ 5 (indicating the most severe comorbidities). Additionally, specific conditions, including diabetes mellitus, hypertension, dyslipidemia, stroke, ischemic heart disease, acute myocardial infarction, cancer, osteoporosis, and tuberculosis, were investigated as comorbidities.

Statistical analyses

Descriptive statistics were used to provide an overview of participants' general characteristics. We compared the number of COPD cases and percentage prevalence across various general characteristics, including sex, age, income level, residence, and CCI. Furthermore, for each year from 2008 to 2017, we calculated both the unadjusted (crude) and age- and sex-standardized prevalence rates of COPD. Subsequently, all analyses were performed separately for the male and female groups.

A chi-square test was used to determine whether there was a statistically significant difference in sociodemographic characteristics and comorbidities between individuals with and without COPD. To compare mortality rates between individuals with and without COPD and assess mortality trends over the past decade, we examined crude and age- and sex-standardized all-cause mortality rates for each year from 2008 to 2017. Mortality rate was calculated by stratifying the data according to sex. Cause-specific mortality rates for 9 different major causes, including seven subcategories, were analyzed using data from 2017. The association between COPD and mortality was examined using the Poisson regression model. The incidence rate ratios (IRRs) and 95% confidence intervals (CIs) for mortality were adjusted for age, sex, income level, residence, and CCI.

Standardization for prevalence and mortality rates was performed using the direct method with the mid-year Korean population of 2005 as the reference population. All analyses were conducted using the SAS statistical software (version 9.4; SAS Institute, Cary, NC, USA). Two-sided p-values of 0.05 were considered significant.

Results

Trends in young COPD prevalence from 2008 to 2017

Figure 1 shows the prevalence of COPD among young individuals between 2008 and 2017. The crude prevalence of COPD increased from 2.4% to 7.8% and showed a steady upward trend in both sexes (Fig. 1-A). Likewise, age-adjusted COPD prevalence also showed a notable increase from 2.3% to 7.7% over the same period, with parallel trends observed in both sexes (Fig. 1-B). The total number of participants aged between 20 and 50 years from 2008 and 2017 is shown in **supplemental table 1**.

Comparison of baseline characteristics between participants with COPD and participants without COPD

The most recent dataset from 2017 was used to describe the baseline characteristics of the enrolled participants with and without COPD (Table 1). In 2017, the prevalence of COPD was 7.7%. There were significantly more COPD cases among women than among men. (57.3% Vs 47.6% $p < 0.001$). Participants with COPD were older (37.7 ± 8.8 Vs 35.7 ± 9.0 years, $p < 0.001$), and the prevalence of COPD increased with age, especially among those aged 40–50 years (48.6%).

Table 1
Basic characteristics of enrolled participants with and without COPD (2017)

Variables	All participants (N = 24331291)	With COPD (N = 1907508)	Without COPD (N = 22423783)	P-value
Sex				< 0.001
Male	12567895 (51.7)	814695 (42.7)	11753200 (52.4)	
Female	11763396 (48.4)	1092813 (57.3)	10670583 (47.6)	
Age, Mean ± SD (yr)	35.9 ± 9.0	37.7 ± 8.8	35.7 ± 9.0	< 0.001
20–29	7039976 (28.9)	411012 (21.6)	6628964 (29.6)	< 0.001
30–39	7634244 (31.4)	569930 (29.9)	7064314 (31.5)	
40–50	9657071 (39.7)	926566 (48.6)	8730505 (38.9)	
Income level				< 0.001
Medical aid	390601 (1.6)	61089 (3.2)	329512 (1.5)	
1st quintile	4326327 (17.8)	350489 (18.4)	3975838 (17.7)	
2nd quintile	5532445 (22.7)	414189 (21.7)	5118256 (22.8)	
3rd quintile	6408899 (26.3)	485881 (25.5)	5923018 (26.4)	
4th quintile	7023904 (28.9)	556981 (29.2)	6466923 (28.8)	
Unknown	649115 (2.7)	38879 (2.0)	610236 (2.7)	
Residence				< 0.001
Metropolitan	15724515 (64.6)	1242203 (65.1)	14482312 (64.6)	
City	6939269 (28.5)	534266 (28.0)	6405003 (28.6)	
Rural	1642681 (6.8)	130965 (6.9)	1511716 (6.7)	
Unknown	24826 (0.1)	74 (0.004)	24752 (0.1)	
Charlson comorbidity index				< 0.001
0	16950651 (69.7)	866027 (45.4)	16084624 (71.7)	
1	6621348 (27.2)	885397 (46.4)	5735951 (25.6)	
2	612813 (2.5)	119383 (6.3)	493430 (2.2)	
≥ 3	146479 (0.6)	36701 (1.9)	109778 (0.5)	
Abbreviations: COPD, chronic obstructive pulmonary disease; SD, standard deviation.				
Values are presented as number (%).				

Additionally, individuals with COPD had a higher Charlson Comorbidity Index than those without COPD ($p < 0.001$), indicating a greater disease burden. COPD was also more common among Medical Aid beneficiaries, suggesting a possible link with lower socioeconomic status. In contrast, no substantial difference was observed in COPD prevalence according to the residential area.

Comparisons of participants' comorbidities are presented in Table 2. The prevalence of diabetes mellitus, hypertension, dyslipidemia, ischemic heart disease, cancer, osteoporosis, and tuberculosis was higher in participants with COPD than in those without COPD ($p < 0.001$). The incidence of stroke and MI was also higher in the COPD group than those without COPD group ($P < 0.001$).

Table 2
Comparison of comorbidity profiles on enrolled participants with and without COPD (2017)

Variables	All participants (N = 24331291)	With COPD (N = 1907508)	Without COPD (N = 22423783)	P-value
Diabetes mellitus	505,550 (2.1)	61910 (3.3)	443640 (2.0)	< 0.001
Hypertension	1227848 (5.1)	146747 (7.7)	1081101 (4.8)	< 0.001
Dyslipidemia	1104162 (4.5)	139994 (7.3)	964168 (4.3)	< 0.001
Stroke	18630 (0.1)	3510 (0.2)	15120 (0.1)	< 0.001
Ischemic heart disease	518456 (2.1)	88644 (4.7)	429812 (1.9)	< 0.001
Acute myocardial infarction	4612 (0.02)	561 (0.03)	4051 (0.02)	< 0.001
Cancers	519217 (2.1)	78763 (4.1)	440454 (2.0)	< 0.001
Osteoporosis	70900 (0.3)	11642 (0.6)	59258 (0.3)	< 0.001
Tuberculosis	14623 (0.1)	2788 (0.2)	11835 (0.1)	< 0.001
Prevalence: diabetes mellitus, hypertension, dyslipidemia, ischemic heart disease, cancers, osteoporosis, and tuberculosis.				
Incidence: stroke and acute myocardial infarction.				
Abbreviations: COPD, chronic obstructive pulmonary disease				
Values are presented as number (%).				

Trends in young COPD mortality rates from 2008 to 2017

Figure 2 shows the mortality rates from 2008 to 2017. The overall mortality rate of the study population decreased during this period. Particularly, participants with COPD had higher crude and age-standardized mortality rates than the overall population and those without COPD. This trend was similar in both sexes.

Comparative mortality risks with and without COPD

Table 3 shows incidence rate ratio (IRR) of mortality among participants with and without COPD. In overall mortality, it was higher in participants with COPD than in participants without COPD (adjusted IRR 1.18, 95% CI 1.14–1.23, $p < 0.001$). The incidence rate and risk of mortality due to neoplasm are higher than participants with COPD than in participants without COPD (adjusted IRR 1.21, 95% CI 1.13–1.28, $p < 0.001$). In particularly, incidence rate and risk of mortality due to lung cancer was higher than that those without COPD compared to other cancer types (adjusted IRR 3.16, 95% CI 2.62–3.83, $p < 0.001$). In particular, it was significantly higher the incidence rate and risk of mortality among participants with COPD than those without COPD in diseases of the nervous system (adjusted IRR 2.78, 95% CI 2.21–3.50, $p < 0.001$), diseases of the respiratory system (adjusted IRR 2.87, 95% CI 2.27–3.62, $p < 0.001$), and diseases of the musculoskeletal system and connective tissue (adjusted IRR 2.77, 95% CI 1.71–4.49, $p < 0.001$), respectively.

Table 3
Incidence rate and risk of mortality among participants with and without COPD (2017)

	All participants			With COPD			Without COPD			
Variables	No. at risk	No. of death	Crude IR (per 100000)	No. at risk	No. of death	Crude IR (per 100000)	No. at risk	No. of death	Crude IR (per 100000)	Adjusted IRR (95% CI) [a]
Overall (all-cause)	24331291	19624	80.7	1907508	3400	178.2	22423783	16224	72.4	1.18 (1.14–1.23)***
Neoplasms (C00-D48)		5095	20.9		1380	72.3		3715	16.6	1.21 (1.13–1.28)***
Malignant neoplasm of bronchus and lung (C34)		437	1.8		217	11.4		220	1.0	3.16 (2.62–3.83)***
Other malignant neoplasms (C00-D48 except C34)		4658	19.1		1163	61.0		3495	15.6	1.08 (1.01–1.16)*
Endocrine, nutritional and metabolic diseases (E00-E90)		406	1.7		104	5.5		302	1.3	1.37 (1.08–1.73)**
Diabetes mellitus (E10-E14)		315	1.3		84	4.4		231	1.0	1.36 (1.05–1.77)*
Mental and behavioural disorders (F00-F99)		263	1.1		42	2.2		221	1.0	1.29 (0.91–1.82)
Diseases of the nervous system (G00-G99)		371	1.5		125	6.6		246	1.1	2.78 (2.21–3.50)***
Diseases of the circulatory system (I00-I99)		2411	9.9		343	18.0		2068	9.2	0.99 (0.88–1.12)
Ischemic heart disease (I20-I25)		626	2.6		58	3.0		568	2.5	0.77 (0.58–1.01)
Heart failure (I50)		49	0.2		10	0.5		39	0.2	-
Cerebrovascular disease (I60-I69)		1001	4.1		173	9.1		828	3.7	1.02 (0.87–1.21)

Abbreviations: COPD, chronic obstructive pulmonary disease; IRR, incidence rate and risk; IR, incidence rate

[a] Adjusted for age, sex, income level, residence, and Charlson comorbidity index.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Abbreviations: COPD, chronic obstructive pulmonary disease

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	All participants		With COPD		Without COPD		
Diseases of the respiratory system(J00-J99)	343	1.4	128	6.7	215	1.0	2.87 (2.27–3.62)***
Pneumonia (J12-J18)	176	0.7	52	2.7	124	0.6	1.87 (1.33–2.64)***
Diseases of the digestive system (K00-K93)	1510	6.2	264	13.8	1246	5.6	0.80 (0.70–0.92)**
Diseases of the musculoskeletal system and connective tissue(M00-M99)	74	0.3	30	1.6	44	0.2	2.77 (1.71–4.49)***
Injury, poisoning and certain other consequences of external causes(S00-T98)	7380	30.3	684	35.9	6696	29.9	1.19 (1.10–1.29)***
Abbreviations: COPD, chronic obstructive pulmonary disease; IRR, incidence rate and risk; IR, incidence rate							
[a)] Adjusted for age, sex, income level, residence, and Charlson comorbidity index.							
* p < 0.05; ** p < 0.01; *** p < 0.001							
Abbreviations: COPD, chronic obstructive pulmonary disease							
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Discussion

To our knowledge, this is the first nationwide population-based study that comprehensively assessed the prevalence and mortality risk of COPD in young patients in South Korea. Our findings demonstrate that the prevalence of COPD in young patients has increased steadily over time shows a clear age-dependent increase, even within younger age groups. Importantly, young individuals with COPD already exhibit a substantial burden of comorbidities and experience significantly higher mortality than those without COPD, despite an overall decline in population-level mortality.

A notable finding of this study was the relatively high prevalence of young patients with COPD in South Korea. In 2017, the overall prevalence of COPD in young individuals was 7.8%, with a clear age-dependent increase observed across age groups: 5.8% in individuals in their 20s, 7.5% in their 30s, and 9.6% in individuals in their 40s. This age-related trend is consistent with previous studies conducted in China and the United States, which reported a progressive increase in COPD prevalence with advancing age in younger populations [17, 18]. However, the overall prevalence observed in the present study was substantially higher. Prior studies reported prevalence rates of 1.4%, 3.0%, and 5.1% among individuals aged 20–29, 30–39, and 40–49 years in China, and 0.18%–3.65% across corresponding age groups in the United States [17, 18]. Similarly, a previous Korean study based on the Korea National Health and Nutrition Examination Survey reported a COPD prevalence of approximately 4.2% among individuals in their 40s and 50s, which is lower than the estimates observed in our analysis [21]. One possible explanation for these discrepancies is differences in study design and population coverage. Most prior studies were cohort-based and therefore may not fully represent the general population[17, 18, 21]. In contrast, the present study analyzed nationwide data covering the entire South Korean population, which may have allowed for a more comprehensive capture of COPD cases, leading to higher prevalence estimates.

In our nationwide cohort, young individuals with COPD had a substantially higher burden of comorbidities than age-matched individuals without COPD, suggesting that multimorbidity is prevalent early in the disease course. COPD is widely recognized as a systemic disease

with inflammatory effects extending beyond the lungs, which may contribute to extrapulmonary organ involvement and the development of comorbidities [25, 26]. Although direct evidence specifically addressing the systemic mechanisms in young patients with COPD remains limited, it is plausible that similar inflammatory pathways and shared risk factors operate in this population. In addition, cumulative exposure to smoking and environmental hazards is likely to increase with age, even in younger populations, which may partly explain the observed increase in comorbidity burden [20, 25–27]. Beyond these mechanisms, early life exposure may contribute to the development of COPD in early adulthood. Adolescent cigarette smoking has been shown to be associated with mild airway obstruction and, importantly, impaired lung-function growth [16]. Such exposure may disrupt lung development during critical periods of pulmonary growth. National data from the 2017 Korea Youth Risk Behavior Web-Based Survey indicate that cigarette smoking among adolescents remains prevalent, underscoring the fact that early tobacco exposure has persisted in recent cohorts of Korean youth [28]. Moreover, growing evidence supports the “early origins” concept of COPD, whereby impaired lung growth and suboptimal lung-function trajectories from childhood to early adulthood increase susceptibility to COPD later in life; thus, delayed growth or impaired somatic development may plausibly translate into reduced maximally attained lung function and a higher risk of COPD in the third and fourth decades of life [29, 30].

Despite an overall decline in all-cause mortality in the general population over time, young individuals with COPD exhibit persistently higher mortality rates than age-matched individuals without COPD. Similarly, previous population-based cohort studies from the United States have reported increased mortality among adults diagnosed with COPD at a younger age[18]. In addition, elevated incidence rate ratios for mortality have been observed across multiple causes, including lung cancer; overall malignancies; and diseases of the nervous, respiratory, musculoskeletal, and connective tissue systems. Notably, the risk of lung cancer–related mortality is particularly high. Our findings extend previous observations by demonstrating that excess and cause-specific mortality in young patients with COPD is evident in a nationwide Asian population. Collectively, these results suggest that COPD in young adults may be underrecognized in clinical practice, highlighting the need for earlier case detection and risk stratification.

However, this study has several limitations. First, COPD was not defined using spirometric criteria, such as a post-bronchodilator forced expiratory volume in 1 second to forced vital capacity (FEV_1/FVC) ratio < 0.7, but was identified based on ICD-10 diagnostic codes [1]. Although we attempted to reduce misclassification by requiring multiple COPD-related codes or hospitalizations for COPD, this approach may not fully capture the entire spectrum of the disease, particularly in milder cases or in individuals who do not seek medical care. In addition, diagnostic overlap with asthma or asthma–COPD overlap in younger adults cannot be entirely excluded when using administrative codes, which may have contributed to misclassification. Second, detailed quantitative information on smoking intensity and other environmental or occupational exposures was not fully available in this database, and residual confounding may remain. Third, a higher prevalence of COPD was observed among women. This finding should be interpreted with caution, as previous Korean studies have reported higher healthcare utilization among women, which may increase the likelihood of COPD diagnosis and coding in administrative databases, potentially leading to an overestimation of prevalence in women [31].

Conclusion

In conclusion, this nationwide population-based study demonstrated that COPD among young adults is relatively common in South Korea and is associated with a substantial burden of comorbidities and increased mortality, despite the young age of those affected. The steadily increasing prevalence of COPD in young adults, together with its age-dependent rise even within younger populations, underscores that COPD should not be considered exclusively as a disease of older adults. These findings highlight the need for greater clinical awareness among young patients with COPD and support the importance of early detection, smoking cessation, and preventive strategies to reduce long-term adverse outcomes.

Abbreviations

COPD, chronic obstructive pulmonary disease;

GOLD, Global Initiative for Chronic Obstructive Lung Disease;

NHID, National Health Insurance Database;

NHIS, National Health Insurance Service;

ICD, International Classification of Diseases;

CCI, Charlson Comorbidity Index;

IRRs, incidence rate ratios;

CIs, confidence intervals;

FEV_1, forced expiratory volume in 1 second;

FVC, forced vital capacity.

Declarations

Human ethics approval delcaration

This study was approved by the Institutional Review Board (IRB) of Chungbuk National University (CBNU–202108–HRHR–0140). The requirement for written informed consent was waived because the database used in this study was based on routinely collected administrative and claims data. Under Korea's National Health Insurance Act, NHIS data can only be used for research purposes without the patient's individual consent, and were fully anonymized for all analyses. All the experiments were performed in accordance with the principles of the Declaration of Helsinki.

Consent for publication

Not applicable.

Competing of interests

None

Funding

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (MSIT) (Grant No. RS-2020-NR049557).

Author Contribution

SHK: Writing-original draft; writing-review & editing, JEP: Data curation; methodology; formal analysis; writing-original draft; writing-review & editing. SYK: Formal analysis; writing-review & editing. YYK: Formal analysis, BY: Conceptualization; methodology; writing-review & editing, JHP: Conceptualization; methodology; writing-original draft; writing-review & editing. All authors read and approved the fnal manuscript.

Acknowledgements

None

Data Availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

References

1. Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the prevention, diagnosis and management of chronic obstructive pulmonary disease. 2023 report.
2. Ito K, Barnes PJ. COPD as a disease of accelerated lung aging. Chest. 2009;135:173–80.
3. Mercado N, Ito K, Barnes PJ. Accelerated ageing of the lung in COPD: new concepts. Thorax. 2015;70:482–9.

4. Córdoba-Lanús E, Cazorla-Rivero S, García-Bello M, et al. Telomere length dynamics over 10 years and related outcomes in patients with COPD. Respir Res. 2021;22:1–9.
5. Hernández Cordero AI, Yang CX, Li X, et al. Epigenetic marker of telomeric age is associated with exacerbations and hospitalizations in chronic obstructive pulmonary disease. Respir Res. 2021;22:316.
6. Cordero AIH, Yang CX, Milne S, et al. Epigenetic blood biomarkers of ageing and mortality in COPD. Eur Respir J. 2021;58:2004439.
7. Kohansal R, Martinez-Camblor P, Agustí A, et al. The natural history of chronic airflow obstruction revisited: an analysis of the Framingham Offspring Cohort. Am J Respir Crit Care Med. 2009;180:3–10.
8. Rey-Brandariz J, Pérez-Ríos M, Ahluwalia JS, et al. Tobacco patterns and risk of chronic obstructive pulmonary disease: results from a cross-sectional study. Arch Bronconeumol. 2023;59:717–24.
9. Lundbäck B, Lindberg A, Lindström M, et al. Not 15 but 50% of smokers develop COPD? Report from the Obstructive Lung Disease in Northern Sweden studies. Respir Med. 2003;97:115–22.
10. Menezes AMB, Perez-Padilla R, Jardim JB, et al. Chronic obstructive pulmonary disease in five Latin American cities (the PLATINO study): a prevalence study. Lancet. 2005;366:1875–81.
11. Kim C, Yoo K, Rhee CK, et al. Health care use and economic burden of patients with diagnosed chronic obstructive pulmonary disease in Korea. Int J Tuberc Lung Dis. 2014;18:737–43.
12. Kim SH, Park JE, Yang B, et al. National trend in the prevalence and mortality of COPD in South Korea from 2008 to 2017. BMJ Open Respir Res. 2024;11:e002343.
13. de Marco R, Accordini S, Marcon A, et al. Risk factors for chronic obstructive pulmonary disease in a European cohort of young adults. Am J Respir Crit Care Med. 2011;183:891–7.
14. Aanerud M, Carsin AE, Sunyer J, et al. Interaction between asthma and smoking increases the risk of adult airway obstruction. Eur Respir J. 2015;45:635–43.
15. McGeachie MJ, Yates KP, Zhou X, et al. Patterns of growth and decline in lung function in persistent childhood asthma. N Engl J Med. 2016;374:1842–52.
16. Gold DR, Wang X, Wypij D, et al. Effects of cigarette smoking on lung function in adolescent boys and girls. N Engl J Med. 1996;335:931–7.
17. Wang C, Xu J, Yang L, et al. Prevalence and risk factors of chronic obstructive pulmonary disease in China (the China Pulmonary Health [CPH] study): a national cross-sectional study. Lancet. 2018;391:1706–17.
18. Wang Z, Li Y, Lin J, et al. Prevalence, risk factors, and mortality of COPD in young people in the USA: a population-based retrospective cohort study. BMJ Open Respir Res. 2023;10:e001876.
19. Çolak Y, Afzal S, Nordestgaard BG, et al. Prevalence, characteristics, and prognosis of early chronic obstructive pulmonary disease: the Copenhagen General Population Study. Am J Respir Crit Care Med. 2020;201:671–80.
20. Divo MJ, Marin JM, Casanova C, et al. Comorbidities and mortality risk in adults younger than 50 years of age with chronic obstructive pulmonary disease. Respir Res. 2022;23:267.
21. Jo YS, Kim KJ, Rhee CK, et al. Prevalence, characteristics, and risk of exacerbation in young patients with chronic obstructive pulmonary disease. Respir Res. 2022;23:212.
22. Cheol Seong S, Kim YY, Khang YH, et al. Data resource profile: the National Health Information Database of the National Health Insurance Service in South Korea. Int J Epidemiol. 2017;46:799–800.
23. Song SO, Jung CH, Song YD, et al. Background and data configuration process of a nationwide population-based study using the Korean National Health Insurance System. Diabetes Metab J. 2014;38:395–403.
24. Statistics Korea. Cause of death statistics 2020. Daejeon (KR): Statistics Korea; 2020.
25. Barnes PJ, Celli BR. Systemic manifestations and comorbidities of COPD. Eur Respir J. 2009;33:1165–85.
26. Cavaillès A, Brinchault-Rabin G, Dixmier A, et al. Comorbidities of COPD. Eur Respir Rev. 2013;22:454–75.
27. Divo M, Cote C, de Torres JP, et al. Comorbidities and risk of mortality in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2012;186:155–61.
28. Korea Disease Control and Prevention Agency. Korea Youth Risk Behavior Web-based Survey: 2017 statistical report. Cheongju (KR): KDCA; 2017.
29. Bui DS, Lodge CJ, Burgess JA, et al. Childhood predictors of lung function trajectories and future COPD risk: a prospective cohort study from the first to the sixth decade of life. Lancet Respir Med. 2018;6:535–44.

30. Narang I, Bush A. Early origins of chronic obstructive pulmonary disease. Semin Fetal Neonatal Med. 2012;17:112–8.
31. Park SC, Kim DU, Hwang CH, et al. Prevalence and medical utilization of metabolic syndrome in patients with chronic obstructive pulmonary disease. Goyang (KR): NHIS Ilsan Hospital Institute of Health Insurance & Clinical Research; 2015.

Figures

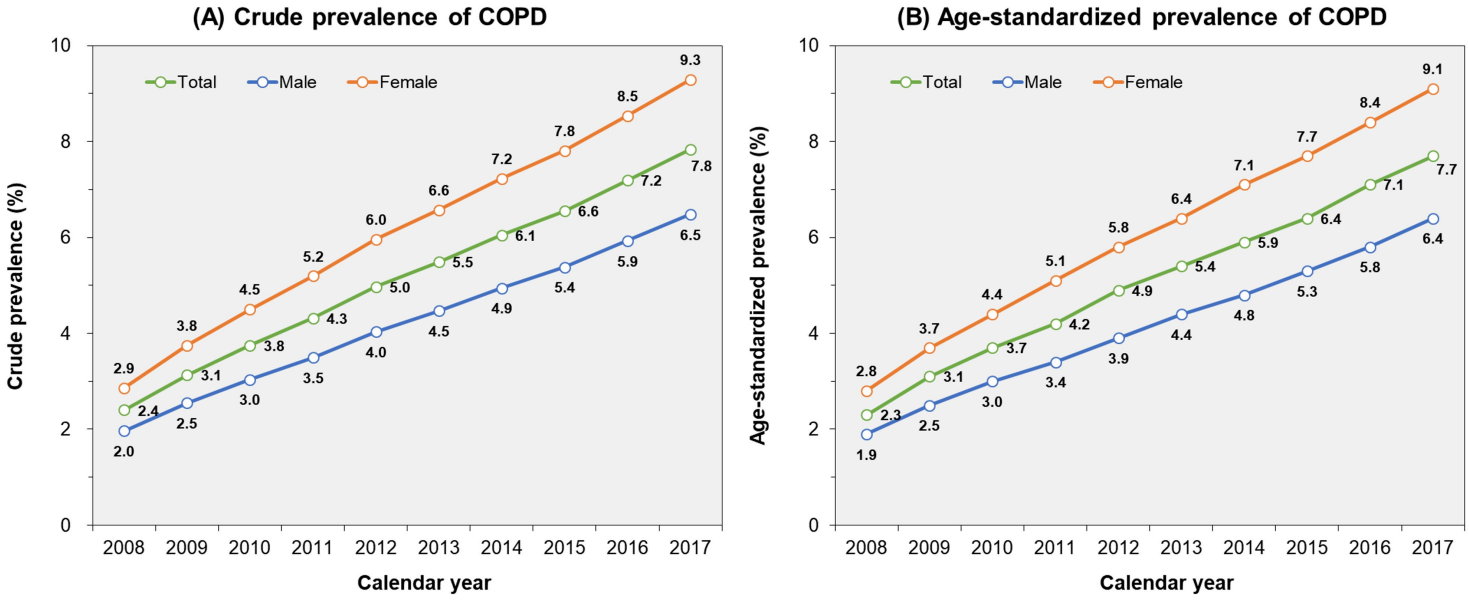


Figure 1

Trends in crude and age-standardized prevalence of COPD between 2008 and 2017

Abbreviations: COPD, chronic obstructive pulmonary disease

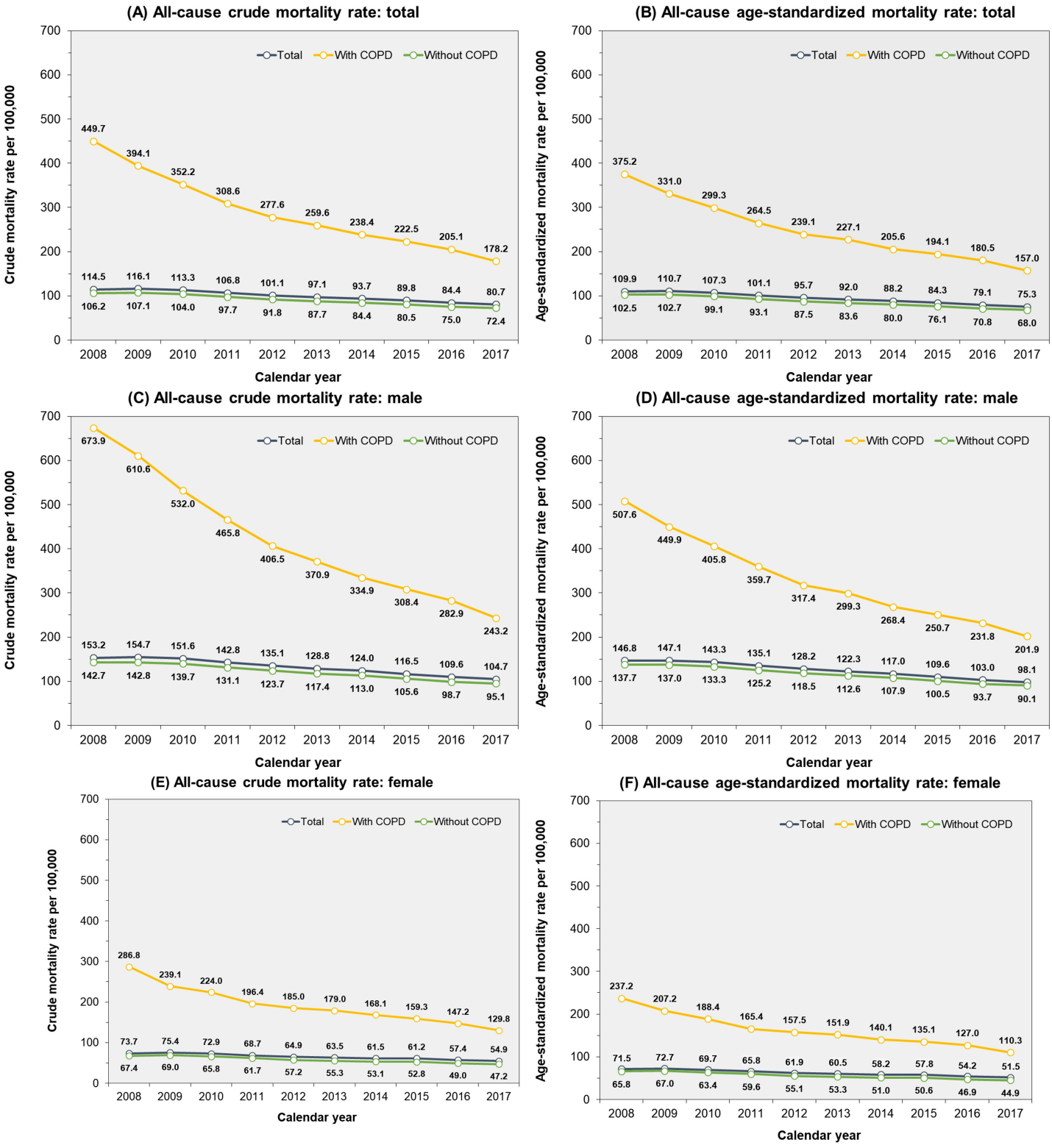


Figure 2

Trends in COPD mortality between 2008 and 2018 among participants with or without COPD

Abbreviations: COPD, chronic obstructive pulmonary disease.

Supplementary Files

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- SupplementalTable.docx