Social burden and medical cost of COPD in Korea

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OBJECTIVE

- The aim of this study is to estimate the social burden and medical cost of chronic obstructive pulmonary disease (COPD), in population aged 40-79 years in South Korea

METHODS

- DALYs
  - The prevalence of COPD was estimated using data from the National Health and Nutrition Examination Survey (KNHANES 2016). The pre-bronchodilator lung function test results were corrected using the bronchodilator response in the general population [1]. FEV1/FVC of less than 0.7 was defined as COPD.
  - YLDs were calculated using prevalence and Korean-specific disability weights [2]. YLLs were derived based on life expectancy at each age group and severity-specific excess mortality [3]. In computing disability-adjusted life years (DALYs), future life years were not discounted, and no age-weights were applied following GBD 2010 method [4]
- QALE
  - QALY losses for COPD patients against general population were estimated using Markov state transition model. The same data used in calculating YLLs was used in estimating the survival of each population. For quality of life of each severity group, EQ-5D utility data surveyed from 298 COPD patient sample were used.
- Medical cost
  - Medical cost and healthcare use were investigated using national patient sample data of Health Insurance Review and Assessment Service (HIRA-NPS 2016). Patients were identified by ICD-10 codes (J43, J44, with exception of J430) and by use of COPD-related medications (LAMA, LABA, ICS, ICS/LABA, SAMA, SABA, systemic corticosteroids, methylxanthine and other Drugs for obstructive airway diseases). Analysis was confined to COPD-related use and cost.

RESULTS

1. PREVALENCE

- The prevalence of COPD was 9.5%, which was 30% lower than the unadjusted prevalence reported in previous studies. 79% were male and most of patients were 65 yrs or older.

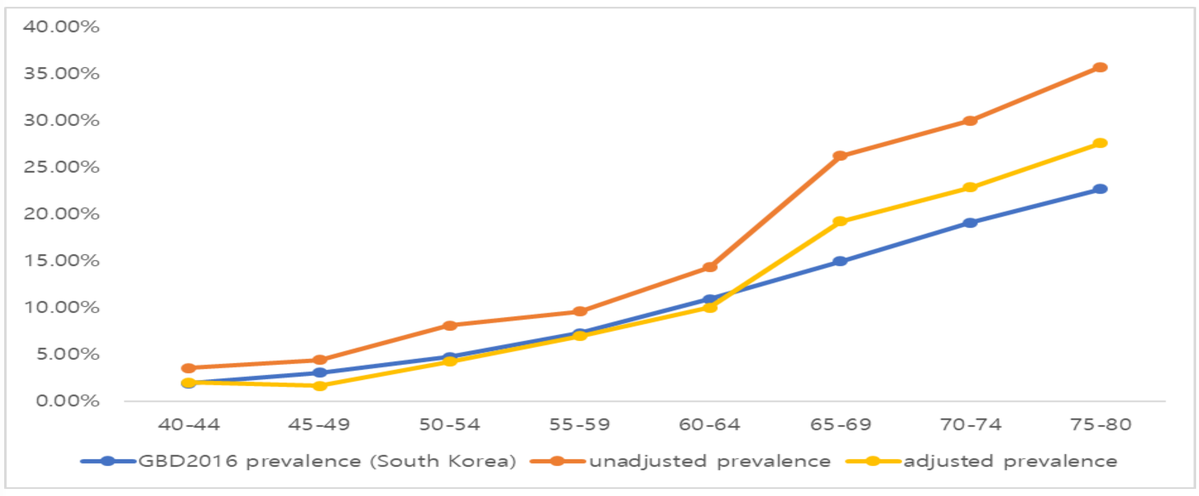

Figure 1. Prevalence of COPD by age-group

2. DALYs

- 3,812 DALYs (per 100,000 population aged 40-79) were lost due to COPD in 2016. Of those, 61% came from patients over 60 years old. 11% was due to premature death and 89% was computed from years lived with disability (YLDs) due to illness.

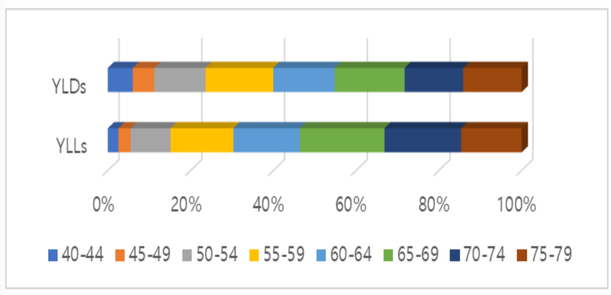

Figure 2. Age-composition of YLDs and YLLs

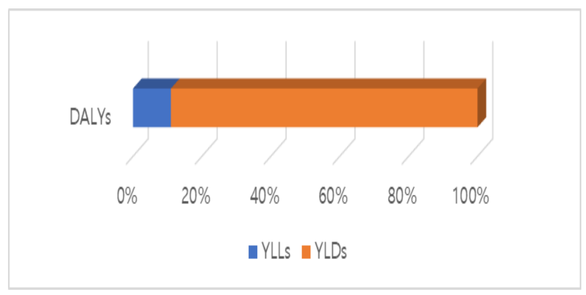

Figure 3. composition of DALYs

2. QALE LOSSES

- In 2016, a 42-year-old COPD patient is expected to have 29.1 years of quality adjusted life expectancy, while the general population of the same age is expected to have 37.7 years of QALE. Therefore, COPD contributed to a QALE loss of 8.6 years per patient, and 35% of this loss came from the impairment of quality of life. Overall QALE loss in COPD patients aged 40-79 is 4.41. When the prevalence of COPD is 9.5%, the QALE loss of COPD at the population level is 0.42 in 40-79 years old group.

Table 1. LE and QALE loss of COPD patient

age-group	individual-level						population-level		
	LE		QALE		LE loss	QALE loss	Prev.	LE loss	QALE loss
	COPD	General	COPD	General					
40-44	34.0	39.5	29.1	37.7	5.6	8.6	2.0%	0.11	0.17
45-49	29.9	34.8	25.5	33.1	5.0	7.6	1.7%	0.08	0.13
50-54	25.9	30.3	22.0	28.6	4.4	6.6	4.3%	0.19	0.28
55-59	22.1	25.9	18.6	24.3	3.8	5.7	7.0%	0.27	0.40
60-64	18.4	21.6	15.4	20.2	3.2	4.8	10.0%	0.32	0.48
65-69	14.8	17.5	12.3	16.3	2.7	4.0	19.3%	0.52	0.77
70-74	11.4	13.6	9.5	12.6	2.2	3.2	22.9%	0.50	0.72
75-79	8.5	10.2	7.0	9.4	1.7	2.4	27.6%	0.47	0.66
total (40-79)	16.8	14.0	19.7	18.4	2.9	4.4	9.5%	0.27	0.42

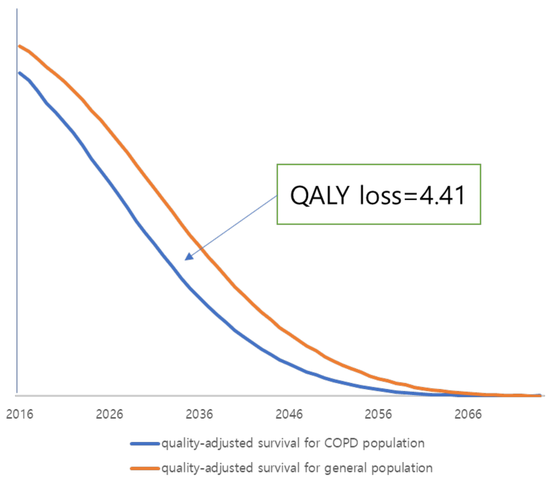

Figure 4. quality-adjusted survival estimation

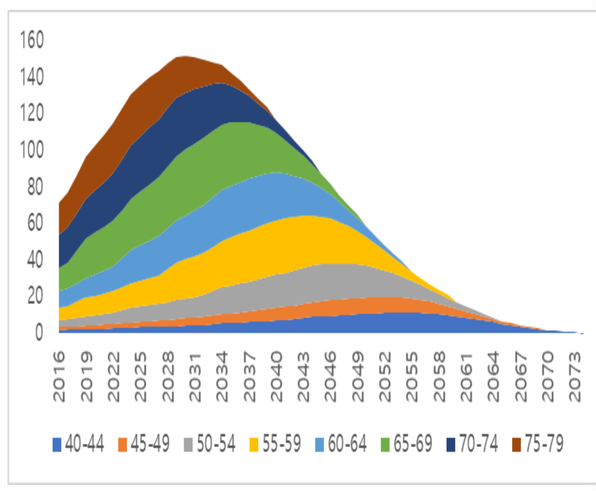

Figure 5. Loss of QALE (accumulative chart) for 1,000 COPD patients

4. ECONOMIC BURDEN

- The annual medical expenditure per COPD patient was 1,624 USD (2016) and the cost per acute exacerbation event was 1,156 USD. 26.6% of COPD patients were hospitalized due to COPD-related disease, and 19.6% of patients were treated for acute exacerbation.
- The most commonly prescribed drug was methylxanthines and the largest share of cost items was LAMA and ICS / LABA.

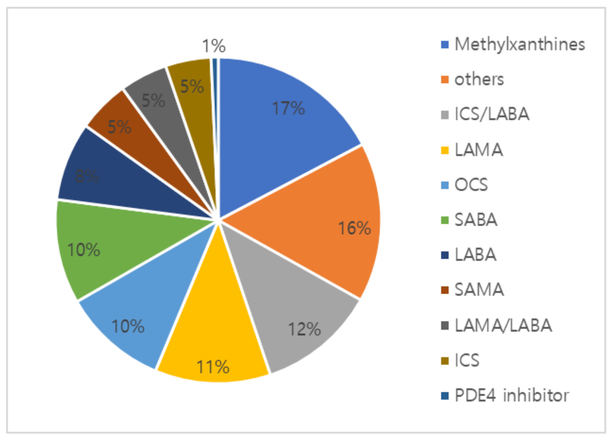

Figure 6. composition of drug use

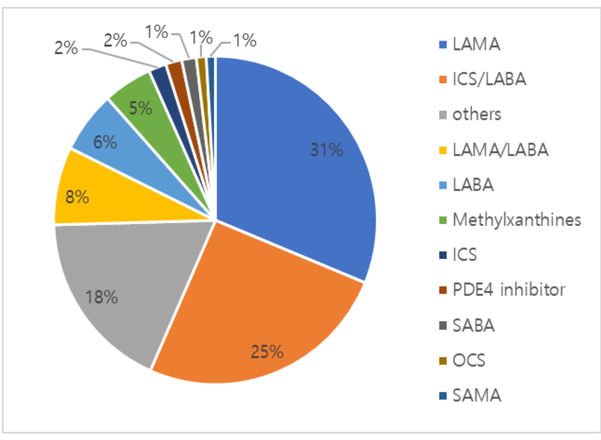

Figure 7. composition of drug cost

DISCUSSION & CONCLUSION

- In 2016, the prevalence of COPD among adults in Korea was 9.5%. Social burden of COPD was estimated through DALYs and QALE losses. The loss of DALYs per 100,000 population was 3,812 and COPD patients' lifetime loss of QALE was 4.1 QALYs. COPD is a disease that imposes significant burden both socially and economically.

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