

Medical Aid beneficiaries have a high risk of mortality due to COVID-19

국민건강보험공단 일산병원

이형국, 박세준, 전한호, 최흔, 육태미

Background/Aims: Coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is a major global health crisis. This study aimed to determine whether COVID-19 patients receiving medical aid have a higher mortality rate than those with National Health Insurance in Korea.

Methods: Data of confirmed COVID-19 patients were retrieved from the Health Insurance Review and Assessment Service dataset for the period January 3–June 1, 2020. We used multivariate logistic regression models to identify the risk factors for mortality in patients with COVID-19.

Results: We identified 7,333 COVID-19 patients, of whom 227 (3.1%) died. Further, 42 (18.5%) of 619 Medical Aid beneficiaries died. In multivariate analysis, the independent risk factors associated with COVID-19 mortality were Medical Aid beneficiary (odds ratio [OR]: 1.54, $P = 0.0282$), male sex (OR: 1.92, $P < 0.0001$), older age (age > 65 years) (OR: 11.00, $P < 0.0001$), living in a large outbreak area (OR: 2.61, $P < 0.0001$), Charlson Comorbidity Index score ≥ 3 (OR: 3.25, $P = 0.029$), hypertension (OR: 1.90, $P = 0.0013$), chronic obstructive pulmonary disease (COPD) (OR: 1.61, $P = 0.0374$), congestive heart failure (CHF) (OR: 2.14, $P = 0.0001$), and end-stage renal disease (ESRD) (OR: 5.69, $P = 0.0090$).

Conclusions: Medical Aid beneficiaries have a greater risk of mortality than individuals with National Health Insurance in Korea. Comorbidities such as hypertension, COPD, CHF, and ESRD could greatly influence the mortality of COVID-19 patients.

Table 1 Baseline characteristics of patients with COVID-19

Variables	Overall (N = 7,333)
Age (years), median (min, max)	48.0 (19,88)
19–25, n (%)	2,430 (33.2)
26–30, n (%)	1,405 (19.2)
31–45, n (%)	2,151 (29.3)
46–55, n (%)	1,340 (18.3)
56–65, n (%)	2,966 (40.4)
Male, n (%)	619 (8.4)
Medical Aid beneficiaries, n (%)	4,025 (54.9)
Daejeon and Gyeongsangbuk-do province, n (%)	2,472 (33.7)
CCL, n (%)	1,958 (26.7)
0	1,104 (15.1)
1	1,799 (24.5)
2	1,340 (18.3)
3	1,687 (23.0)
Hypertension, n (%)	1,562 (21.3)
DM, n (%)	222 (3.0)
Asplenia, n (%)	54 (0.7)
COPD, n (%)	239 (3.3)
CHF, n (%)	425 (5.8)
Congestive heart failure, n (%)	96 (1.3)
Cancer, n (%)	19 (0.3)
Liver cirrhosis, n (%)	21 (0.3)
ESRD on dialysis, n (%)	4 (0.05)

COVID-19, coronavirus disease 2019; CCL, Charlson Comorbidity Index; DM, diabetes mellitus; COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure; ESRD, end-stage renal disease; IBD inflammatory bowel disease

Table 2 Comparison outcomes by COVID-19-related death

Variables	Non-survivor (N = 227)	Survivor (N = 7,106)	P value
Age (years), median (min, max)	80.0 (36,98)	48.0 (19,88)	< 0.0001
19–25, n (%)	0 (0.0)	2,430 (33.2)	< 0.0001
26–30, n (%)	0 (0.0)	1,405 (19.2)	< 0.0001
31–45, n (%)	0 (0.0)	2,151 (29.3)	< 0.0001
46–55, n (%)	0 (0.0)	1,340 (18.3)	< 0.0001
56–65, n (%)	194 (85.3)	2,772 (38.9)	< 0.0001
Male, n (%)	121 (53.3)	7,004 (98.4)	< 0.0001
Medical Aid beneficiaries, n (%)	42 (18.5)	5,983 (83.6)	< 0.0001
Daejeon and Gyeongsangbuk-do province, n (%)	198 (87.2)	3,827 (53.9)	< 0.0001
CCL, n (%)	0	1,958 (26.7)	< 0.0001
0	0	1,104 (15.1)	< 0.0001
1	0	1,799 (24.5)	< 0.0001
2	0	1,340 (18.3)	< 0.0001
3	0	1,687 (23.0)	< 0.0001
Hypertension, n (%)	181 (79.7)	1,381 (19.4)	< 0.0001
DM, n (%)	145 (63.9)	1,077 (15.2)	< 0.0001
Asplenia, n (%)	81 (35.6)	1,479 (20.8)	< 0.0001
COPD, n (%)	40 (17.6)	1,821 (25.6)	< 0.0001
CHF, n (%)	56 (24.7)	440 (6.2)	< 0.0001
Congestive heart failure, n (%)	61 (27.0)	366 (5.1)	< 0.0001
Cancer, n (%)	41 (18.1)	184 (2.6)	< 0.0001
Liver cirrhosis, n (%)	6 (2.6)	90 (1.3)	< 0.0001
ESRD on dialysis, n (%)	4 (1.8)	15 (0.2)	< 0.0001
IBD, n (%)	1 (0.4)	20 (0.3)	< 0.0001

COVID-19, coronavirus disease 2019; CCL, Charlson Comorbidity Index; DM, diabetes mellitus; COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure; ESRD, end-stage renal disease; IBD inflammatory bowel disease

Table 3 Association between potential risk factors and COVID-19-related death

Variable	OR (95% CI)	P value
Male	1.92 (1.43–2.39)	< 0.0001
Age > 65 years	11.00 (7.16–16.89)	< 0.0001
Medical Aid beneficiaries	1.54 (1.05–2.27)	0.0282
Daejeon and Gyeongsangbuk-do province	2.61 (1.73–3.96)	< 0.0001
CCL (ref: CCL = 0)		
1	1.56 (0.68–3.55)	0.2801
2	2.14 (0.90–4.79)	0.0831
3	3.25 (1.39–7.05)	0.0029
Hypertension	1.90 (1.29–2.80)	0.0013
DM	1.29 (0.62–1.86)	0.1448
Asplenia	1.00 (0.72–1.39)	0.9901
COPD	1.61 (1.05–2.45)	0.0374
CHF	0.75 (0.31–1.16)	0.1391
Congestive heart failure	2.14 (1.45–3.32)	0.0001
Cancer	1.73 (0.81–3.68)	0.1369
Liver cirrhosis	0.67 (0.27–1.67)	0.3809
ESRD on dialysis	5.69 (1.55–20.97)	0.0090
IBD	1.79 (0.21–15.29)	0.5940

COVID-19, coronavirus disease 2019; CCL, Charlson Comorbidity Index; DM, diabetes mellitus; COPD, chronic obstructive pulmonary disease; CHF, congestive heart failure; ESRD, end-stage renal disease; IBD inflammatory bowel disease