



60th Anniversary Hatyai Hospital
โรงพยาบาลหาดใหญ่

Clinical outcomes and risk factor of severe disease in young adult patients compared with middle-aged patients who infected with COVID-19: a large cohort study in tertiary hospital



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Background:

Coronavirus disease 2019 (COVID-19) is increasing rapidly among young adults in worldwide. A few studies described outcome of young adults with COVID-19 infection. A recent large retrospective study in US found increasing severity of COVID-19 in young adults due to obesity, hypertension, and diabetes, however there is lacking Asian ethnicity in this study. We aim to evaluate clinical outcome of COVID-19 infection in young adult patients.

Materials/methods:

A cohort study was carried out 10,072 patients with COVID-19 infection were admitted to Hatyai hospital, Thailand from 1 April 2021 to 31 December 2021. We collected data directly from patient and medical record. The result of primary objective was compared outcome of young adults and middle-aged patients and secondary objective was risk factor of severe COVID-19 among young adult patients.

Results:

The prevalence of young adult was 45.94% (4,632/10,072 patients). The preexisting disorders were significant observed in middle-aged group. Obesity was the most common in both groups, [540 (11.66%) and 800 (14.17%) patients; $p < 0.001$] in young adult and middle-aged group respectively. Diabetes and hypertension were frequently observed in middle-aged group. Severity of clinical outcome was more observed in middle-aged group. Severe pneumonia was found [500 (9.19%) compared with 99 (2.14%); (adjusted odd ratios (aORs) 2.75; 95% confident interval (CI) 2.18 – 3.49); $p < 0.001$] patients in middle-aged group and young adult group. mortality was more in middle-aged group. [91 (1.67%) and 11 patients (0.24%); [aORs 4.08 (95%CI 2.12 – 7.87); $p < 0.001$]. The risk of severe pneumonia among young adults. Diabetes was the most increased risk [aOR 16.27 (95%CI 5.82 – 45.5; $p < 0.001$)] followed by cardiovascular disease [aOR 12.31 (95%CI 3.96 – 38.24); $p < 0.001$].

Conclusion:

Data from our study was different. In US or Europe young adult was increased severity of COVID-19 due to their pre-existing disease (obesity, diabetes, and hypertension). But in Asian population co-morbidity not much as in US or Europe therefore middle-aged group still had more severe COVID-19 than young adults. The factor contributing to the severe COVID-19 among young adult group, diabetes was the most common and followed by cardiovascular disease.

Table. Baseline characteristics, laboratory, treatment, and outcome of young adult patients with COVID-19 infection compare with middle-aged patients with COVID-19 infection

	Young adult patient with COVID-19 infection (n=4,632 (45.99%))		Middle age with COVID-19 infection (n=5,439 (54.01%))		p-value*
	No.	(%)	No.	(%)	
Clinical characteristic					
- Age (mean) (\pm SD)	25.33	(\pm 5.40)	47.63	(\pm 8.37)	<0.001
- Gender (male)	1,962	42.36	2,196	40.38	0.044
- Obesity (BMI \geq 30)	540	11.66	800	14.71	<0.001
- Hypertension	35	0.76	798	14.67	<0.001
- Diabetes mellitus	23	0.50	547	10.06	<0.001
- Cancer	12	0.26	69	1.27	<0.001
- Cerebrovascular disease	7	0.15	100	1.84	<0.001
- Respiratory disease	65	1.40	162	2.98	<0.001
- Chronic kidney disease	6	0.13	97	1.78	<0.001
- HIV infection	27	0.58	78	1.43	<0.001
Laboratory**					
- Absolute lymphocyte < 1000 cell/mm ³ ¹	62	26.84	329	36.23	0.008
- Platelet < 100x10 ³ cell/mm ³ ²	4	2.50	22	3.75	0.627
- Creatinine > 1 mg/dL ³	20	9.01	185	24.93	<0.001
- AST > 40 U/L ⁴	43	24.29	253	39.84	<0.001
- ALT > 40 U/L ⁴	51	28.81	228	35.91	0.089
- CRP > 64.5 mg/dL ⁵	31	15.98	235	32.64	<0.001
Treatment					
- Favipiravir	2,978	64.29	4,066	74.76	<0.001
- Remdesivir	28	0.60	153	2.81	<0.001
- Dexamethasone	426	9.20	1,315	24.18	<0.001
- IL-6inhibitor	5	0.11	11	0.20	0.317
- LMWH	42	0.91	241	4.43	<0.001
Outcome					
- Pneumonia	609	13.15	1,650	30.34	<0.001
- Severe pneumonia	99	2.14	500	9.19	<0.001
- ICU admission	101	2.22	241	4.43	<0.001
- Shock	36	0.78	127	2.34	<0.001
- HFNC	31	0.67	176	3.24	<0.001
- Mechanical ventilator	21	0.45	106	1.95	<0.001
- Dead	11	0.24	91	1.67	<0.001

HIV; human immunodeficiency virus, AST; aspartate aminotransferase, ALT; alanine transaminase, CRP; c-reactive protein, IL-6; interleukin 6, LMWH; low molecular weight heparin, ICU; intensive care unit, HFNC; high flow nasal cannula

*The chi-square test or Fisher's exact test were used for the categorical data

**Only patients who hospitalized in medical center

¹ ² ³ ⁴ ⁵ There were prognostic factor from reported of ¹ Jason Wagner, et al., Int J Hematol, 2020, ² Xiaobo Yang., et al, J thromb Haemost, 2020, ³ Shen JX, et al., Journal of Multidisciplinary Healthcare 2021, ⁴ Jian Wu, et al., Transpl Infect Dis, 2021, ⁵ Mahmoud SHZ, et al., Hindawi 2021

Figure 1. Multivariable adjusted odds ratios (aORs) and 95% Cis of clinical outcome of COVID-19 infection, from multivariable logistic regression compared middle-aged patients with young adult patients

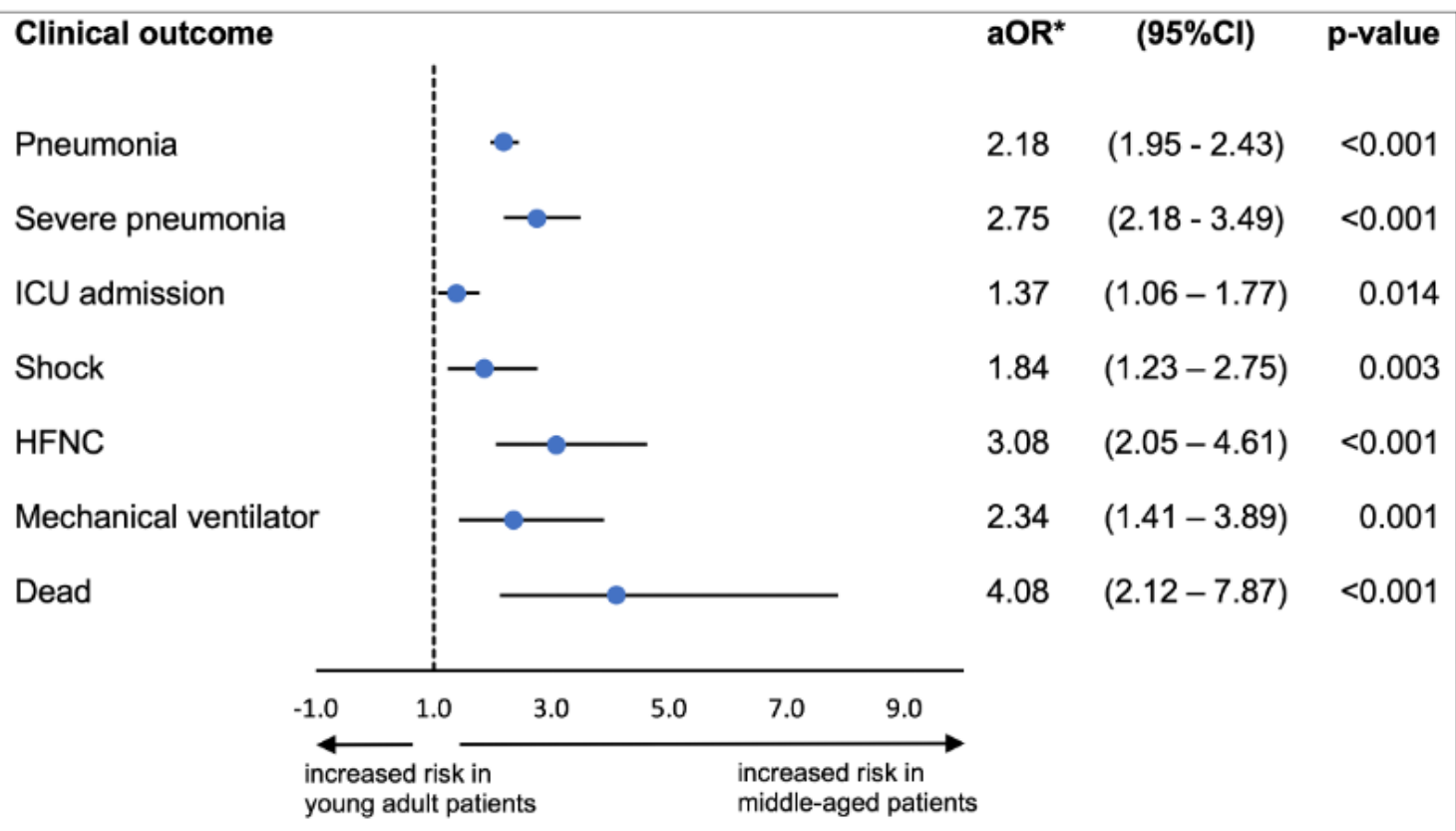
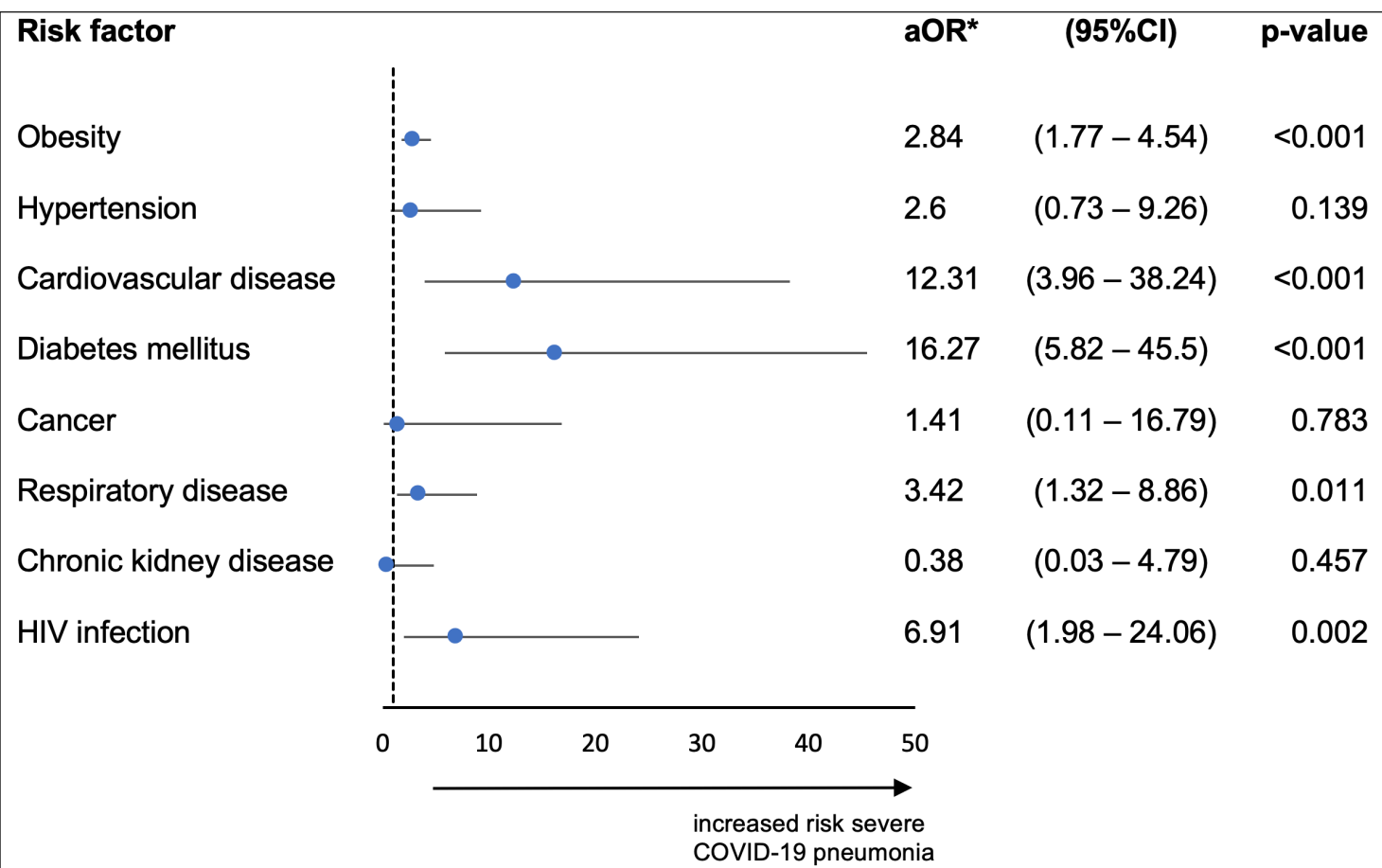


Figure 2. Multivariable adjusted odds ratios (aORs) and 95% Cis of risk factor of severe COVID-19 pneumonia among young adult patients with COVID-19 infection



ICU; intensive care unit, HFNC; high flow nasal cannula, aOR; adjusted odds ratio

* Adjusted with age, gender, obesity, hypertension, cardiovascular disease, diabetes mellitus, cancer, cerebrovascular disease, respiratory disease, chronic kidney, and HIV infection