

Table 1. Baseline characteristics of studies included in the systematic review.

Study	Country	All	Male (%)	Severe (%)	Death (%)	average age	HTN (%)	DM (%)	CVD (%)	Cardiac injury (%)	COPD (%)	CKD (%)	Cancer (%)
Aggarwal S	America	16	75.0	50.0	NA	67.0	57.0	31.0	NA	NA	13.0	38.0	19.0
Alkundi A	United Kingdom	232	62.5	NA	38.4	70.5	14.7	37.5	NA	NA	7.3	NA	3.0
AlSalameh A	France	433	55.0	18.5	20.3	72.5	59.1	26.6	45.7	8.8	9.0	15.2	16.6
Berenguer, J	Spain	4035	61.0	NA	28.0	70.0	51.2	21.8	NA	NA	17.9	NA	NA
Bhargava A	America	197	52.3	37.6	NA	60.6	70.1	37.1	NA	4.6	19.3	NA	NA
Borobia AM	Spain	2226	48.2	NA	20.7	61.0	41.3	17.1	NA	NA	6.9	7.8	NA
Buckner FS	America	105	50.0	48.6	33.0	69.0	59.0	33.0	38.0	19.0	10.0	26.0	15.0
Cai QX	China	298	48.7	19.5	1.0	47.5	15.8	6.0	8.4	6.7	NA	NA	1.3
Cao J	China	102	52.0	17.6	16.7	54.0	27.5	10.8	4.9	14.7	NA	3.9	NA
Cao Z	China	80	47.5	33.8	NA	53.0	25.0	7.5	12.5	NA	6.3	NA	NA
Cen Y	China	1007	49.0	24.2	4.3	67.0	26.8	11.8	NA	NA	4.6	1.4	NA
Chen F	China	660	44.7	NA	12.4	55.0	34.8	17.3	NA	NA	6.5	NA	NA
Chen FF	China	681	53.2	NA	15.3	65.0	43.0	16.7	NA	20.4	2.2	4.0	NA
Chen Q	China	145	54.5	29.6	NA	47.5	15.2	9.7	NA	NA	4.1	2.1	NA
Chen R	China	1590	56.9	NA	3.1	69.0	16.9	8.2	NA	NA	1.5	1.3	NA
Chen T	China	274	62.4	NA	41.2	62.0	33.9	17.2	8.4	44.0	6.6	1.5	2.6
Chen TL	China	203	53.2	52.7	NA	54.0	21.2	7.9	7.9	NA	3.9	3.9	3.4
Chen X	China	291	49.8	17.2	0.7	46.0	13.4	7.6	4.1	NA	3.4	0.7	0.7
Chen XH	China	48	77.1	56.3	6.3	64.6	49.7	25.0	NA	NA	NA	NA	12.5
Chilimuri S	America	375	63.0	NA	42.7	63.0	60.0	47.0	17.0	NA	17.0	14.0	NA
Ciardullo S	Italy	373	65.4	NA	38.1	72.0	64.8	18.5	37.7	NA	10.6	12.9	13.6
Ciceri F	Italy	410	72.9	NA	23.2	65.0	49.9	15.0	NA	NA	5.4	11.8	5.4
Colaneri M	Italy	44	63.6	38.6	4.5	67.5	34.1	15.9	25.0	NA	NA	NA	13.6
Covino M	Italy	69	53.6	79.7	33.3	84.0	59.4	13.0	NA	NA	10.1	NA	4.3
Deng G	China	44672	51.4	18.5	2.3	NA	12.8	5.3	4.2	2.4	NA	NA	0.5
Deng Y	China	225	55.0	NA	48.4	48.5	25.8	11.6	7.6	29.3	7.0	NA	3.6
Du RH	China	179	54.2	NA	11.3	57.6	32.4	18.4	16.2	NA	NA	2.2	2.2
Escalera-Antezana JP	Bolivia	107	51.4	NA	NA	43.9	9.4	4.7	NA	NA	NA	NA	NA
Fan H	China	73	67.1	NA	64.4	58.4	32.9	16.4	9.6	NA	NA	NA	NA
Feng Y	China	476	56.9	26.1	8.0	53.0	23.7	10.3	8.0	NA	4.6	NA	2.5

Fu L	China	200	49.5	NA	16.0	59.6	50.5	68.5	8.0	NA	4.0	NA	NA
Gao C	China	2877	51.1	25.9	1.9	NA	29.5	13.5	NA	0.4	1.1	1.0	1.7
Gao S	China	210	48.0	9.0	16.7	71.0	55.0	18.0	25.0	NA	1.0	9.0	3.0
Gao Y	China	43	60.5	34.9	NA	45.0	30.2	16.3	69.8	NA	18.6	NA	NA
Gayam V	America	408	56.6	28.8	67.6	67.0	66.4	43.2	NA	NA	10.6	16.9	NA
Ghweil AA	Egypt	66	72.7	45.5	3.0	NA	16.7	16.7	NA	NA	NA	NA	NA
Grasselli G	Italy	3988	79.9	NA	48.3	63.0	42.1	12.9	NA	NA	2.3	2.2	8.3
Gregoriano C	Switzerlan	99	63.0	35.4	19.0	67.0	57.0	22.0	NA	NA	7.0	28.0	11.0
Guan WJ	China	1590	57.3	16.0	3.1	48.9	20.9	8.2	3.7	NA	1.5	1.3	1.1
Guo T	China	187	48.7	NA	23.0	58.5	32.6	15.0	NA	27.8	2.1	3.2	7.0
Guo W	China	174	43.7	NA	5.2	59.0	24.7	21.2	18.4	NA	NA	7.5	4.6
Gupta S	America	2215	64.8	NA	35.4	60.5	59.7	38.9	NA	NA	7.8	12.6	5.1
Halvatsiotis P	Greece	90	80.0	NA	28.9	65.5	50.0	18.9	21.1	NA	8.9	4.4	7.8
Hu H	China	105	50.9	NA	18.1	60.8	26.7	3.8	5.7	NA	11.4	NA	5.7
Hu L	China	323	51.4	53.3	10.8	61.0	32.5	14.6	12.7	7.4	1.9	2.2	1.5
Huang H	China	64	57.8	32.8	3.1	47.8	21.9	9.4	NA	NA	NA	4.8	4.8
Huang R	China	202	57.4	11.4	0.0	44.0	14.4	9.4	2.5	NA	3.5	NA	1.0
Huang S	China	310	56.1	50.0	18.7	62.0	36.5	15.5	6.1	NA	NA	NA	0.3
Iaccarino G	Italy	1591	64.0	NA	11.8	66.5	54.9	16.9	NA	NA	7.7	5.5	NA
Inciardi RM	Italy	99	81.0	19.0	26.0	67.0	64.0	31.0	NA	NA	9.0	15.0	18.0
Itelman E	Israel	162	64.8	16.0	3.1	52.0	30.2	18.5	NA	NA	1.2	1.2	NA
Jang JG	Korea	110	43.6	20.9	7.3	56.9	33.6	26.4	9.1	NA	3.6	NA	5.5
Javanian M	Iran	100	51.0	NA	19.0	60.1	32.0	37.0	20.0	14.0	12.0	12.0	4.0
Ji W	Korea	7341	40.5	13.0	NA	47.1	22.2	14.2	NA	NA	NA	NA	4.6
Kalyanaraman	America	6284	62.0	NA	28.0	61.0	37.0	33.0	24	NA	4	11	10.0
Kim MK	Korea	1082	35.5	14.7	7.9	NA	37.2	21.7	6.8	NA	6.7	3.0	5.5
Lee JY	Korea	694	24.8	19.7	2.6	52.1	18.9	11.7	NA	NA	0.6	0.7	3.3
Lee JY (2)	Korea	98	44.9	NA	28.4	72.0	52.0	27.6	16.3	NA	8.2	6.1	11.2
Li J	China	362	52.2	47.8	21.3	66.0	NA	35.1	NA	NA	5	9.7	3
Li J (2)	China	596	47.0	6.9	9.1	58.0	NA	13.1	36.1	21.1	0.7	1.8	4.5
Li J (3)	China	74	66.0	100.0	18.9	59.5	47.3	18.9	NA	NA	NA	NA	2.7
Li K	China	102	58.0	NA	14, 7	57.0	30.0	15.0	4.0	NA	2.0	NA	5.0
Li KH	China	83	53.0	30.1	NA	45.5	6.0	7.8	0.0	NA	6.0	NA	NA
Li Q	China	325	51.4	8.0	0.9	51.0	24.0	9.2	5.5	9.2	1.2	1.2	0.9
Li T	China	312	59.9	33.7	6.7	69.2	57.1	38.8	29.8	33.0	8.7	3.2	3.9
Liu J	China	1190	53.4	3.9	13.2	57.0	26.1	12.2	7.3	NA	1.9	2.6	2.9

Liu JY	China	61	50.8	27.9	NA	40.0	19.7	8.2	1.6	NA	8.2	NA	NA
Liu L	China	51	62.7	13.7	NA	45.0	7.8	7.8	NA	NA	NA	NA	NA
Lv Z	China	354	49.4	43.8	3.1	62.0	20.9	9.9	NA	NA	1.7	NA	0.6
Ma KL	China	84	57.1	23.8	NA	48.0	14.3	11.9	6.0	42.9	6.0	1.2	1.2
Mao L	China	214	40.7	41.1	NA	52.7	23.8	14.0	7.0	NA	NA	2.8	6.1
Mehra MR	Asia, Europe, and America	8910	59.9	NA	5.8	NA	26.3	14.3	NA	NA	2.3	NA	NA
Mikami T	America	2820	48.9	NA	28.6	NA	33.0	23.3	NA	NA	3.8	11.2	6.9
Nowak B	Poland	169	51.5	16.0	27.2	63.7	47.3	18.9	34.3	NA	13.0	20.7	20.7
Pan F	China	124	68.5	73.4	71.8	68.0	50.0	20.2	15.3	NA	8.9	NA	NA
Pellaud C	Switzerlan	196	61.0	25.0	16.8	70.0	60.0	27.0	NA	NA	8.0	NA	8.0
Qin C	China	452	52.0	63.3	NA	58.0	29.5	16.4	5.9	NA	2.6	2.2	3.1
Ruan Q	China	150	68.0	NA	45.3	NA	34.7	16.7	8.7	NA	3.0	3.0	3.0
Schalekamp S	Netherlan	356	67.0	47.0	27.2	69.0	37.4	18.5	27.8	NA	19.4	14.3	NA
Shah P	America	522	41.8	23.6	17.6	63.0	79.7	42.3	NA	NA	9.0	14.9	9.2
Shahriarirad R	Iran	113	62.8	9.7	8.0	53.8	19.5	14.2	14.2	NA	8.0	5.3	0.9
Shi S	China	416	49.3	NA	13.7	64.0	30.5	14.4	NA	19.7	2.9	3.4	2.2
Shi S (2)	China	671	48.0	100.0	9.2	63.0	29.7	14.5	NA	NA	3.4	4.2	3.4
Shi Y	China	487	53.2	10.1	NA	46.0	20.3	6.0	2.3	NA	NA	1.4	1.0
Sun H	China	244	51.4	NA	49.6	NA	56.6	20.9	NA	NA	NA	NA	NA
Tabata S	Japan	71	55.0	39.4	NA	67.0	NA	3.0	31.0	NA	NA	NA	4.0
Tian J	China	751	50.0	42.0	14.0	64.0	39.0	26.0	NA	NA	1.0	3.0	30.9
Wan S	China	135	53.3	29.6	0.7	47.0	9.6	8.9	5.2	7.4	0.7	NA	3.0
Wang B	China	483	45.1	12.8	NA	48.4	7.0	5.0	NA	NA	NA	NA	1.0
Wang D	China	107	53.3	NA	17.8	51.0	24.3	10.3	12.1	11.2	2.8	2.8	NA
Wang K	China	548	50.9	NA	14.2	60.0	30.3	15.1	NA	21.7	3.1	1.8	4.4
Wang K (2)	China	296	47.3	NA	6.4	47.3	14.2	10.1	NA	NA	0.7	1.7	0.3
Wang W	China	421	50.8	14.0	NA	52.0	10.5	3.1	NA	NA	4.3	NA	1.0
Wang Y	China	334	52.0	NA	39.0	64.0	41.0	18.6	11.6	32.3	4.7	NA	NA
Wang YF	China	110	43.6	34.5	65.3	NA	20.9	13.7	NA	NA	5.5	NA	NA
Wang YP	China	275	46.5	16.4	0.0	49.0	19.6	6.2	NA	NA	NA	1.5	0.7
Wei JF	China	101	53.5	36.6	3.0	49.0	21.0	13.9	NA	5.9	1.0	NA	NA
Wei Y	China	276	56.2	5.1	1.8	51.0	17.0	5.1	NA	NA	2.5	NA	1.1
Wu C	China	201	63.7	41.7	21.9	51.0	19.4	10.9	4.0	NA	2.5	1.0	0.5
Xie H	China	79	55.7	35.4	NA	60.0	17.7	10.1	NA	NA	NA	NA	NA

Xie Y	China	62	43.5	38.7	3.2	66.0	38.7	21.0	53.2	NA	NA	NA	NA
Xu J	China	239	59.8	100.0	61.5	62.5	43.9	5.4	14.6	NA	5.0	NA	18.4
Xu PP	China	703	54.0	15.2	4.7	46.1	17.0	9.0	5.0	NA	2.0	1.0	1.0
Yang Q	China	136	48.5	33.2	16.9	56.0	27.1	14.7	6.6	8.1	NA	2.9	2.9
Yang X	China	52	67.0	100.0	61.5	59.7	NA	0.2	10.0	23.0	8.0	NA	4.0
Yao Q	China	108	39.8	12.0	11.8	52.0	14.8	4.6	3.7	7.2	2.8	NA	1.9
Ye C	China	856	51.3	18.0	0.1	46.0	16.6	7.5	1.5	NA	NA	0.8	0.9
Yu C	China	1663	50.4	52.0	10.2	64.0	20.9	14.7	NA	NA	3.7	1.9	1.1
Yu C (2)	China	1464	50.3	NA	14.5	64.0	20.9	14.4	NA	NA	3.4	1.8	1.2
Yu X	China	333	51.7	7.8	0.6	50.0	19.2	8.4	7.2	NA	NA	NA	NA
Yuan M	China	27	45.0	NA	37.0	60.0	19.0	22.0	11.0	NA	NA	NA	4.0
Zhang F	China	48	68.7	45.8	35.4	70.6	66.7	20.8	NA	27.1	NA	10.4	NA
Zhang GQ	China	221	48.9	24.9	5.4	55.0	24.4	10.0	10.0	7.7	2.7	2.7	4.1
Zhang JJ	China	140	50.7	41.4	NA	57.0	30.0	12.1	NA	5.0	1.4	1.4	NA
Zhang SY	China	788	51.6	9.9	0.0	NA	16.0	7.2	1.4	NA	0.4	0.9	0.8
Zhang XY	China	91	53.8	33.0	2.2	46.0	19.8	3.3	NA	15.4	1.0	1.0	3.3
Zhang Y	China	258	53.5	66.3	5.8	64.0	38.0	24.4	15.1	7.4	3.5	3.5	4.7
Zhao J	China	29	48.3	72.4	3.4	56.0	NA	24.1	34.5	NA	NA	NA	NA
Zhao W	China	77	44.2	26.0	NA	52.0	20.8	7.8	11.7	NA	7.8	6.5	5.2
Zheng F	China	161	49.7	18.6	NA	45.0	13.7	4.3	NA	NA	3.7	NA	NA
Zheng S	China	96	60.0	77.1	NA	55.0	36.0	11.0	7.0	NA	4.0	1.0	1.0
Zhu L	China	7337	47.4	8.5	3.4	54.0	24.0	13.0	NA	3.5	0.8	1.8	NA
Zhu Z	China	127	35.4	12.6	NA	50.9	24.4	7.9	4.7	NA	4.7	NA	3.9

CVD: cardiovascular disease; COPD: chronic obstructive pulmonary disease; CKD: chronic kidney disease; NA: not available.

sTable 2: The pooled outcome in patients with comorbidities or cardiac injury.

Co-morbidity	Effect size			Publication bias
	OR	95% CI	P-value	P (Egger's test)
Severe COVID-19				
Hypertension	2.565	2.117-3.108	0.000	0.360
DM	2.542	1.893-3.414	0.000	0.001
CVD	3.863	2.704-5.518	0.000	0.411
COPO	2.710	1.984-3.702	0.000	0.698
CKD	2.196	1.268-3.802	0.005	0.228
Cancer	2.416	1.815-3.217	0.000	0.552
Cardiac injury	6.568	3.704-11.646	0.000	1.000
Mortality				
Hypertension	2.504	2.017-3.109	0.000	0.542
DM	2.087	1.803-2.416	0.000	0.991
CVD	2.654	1.869-3.769	0.000	1.000
COPO	2.478	2.047-2.999	0.000	0.840
CKD	3.072	2.434-3.878	0.000	0.66
Cancer	1.900	1.572-2.297	0.000	0.247
Cardiac injury	16.959	7.892-36.441	0.000	1.000