Clinical Characteristics of COVID-19 in Patients: A Meta-Analysis

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Abstract

An outbreak of coronavirus disease 2019 (COVID-19) was detected in Wuhan, China in December 2019, the causative agent is severe acute respiratory coronavirus 2 (SARS-Co-2). The virus spread quickly to other areas and countries and the disease has become pandemic. This meta-analysis study was carried out to evaluate the clinical characteristics and to assess the prevalence of comorbidities in COVID-19 confirmed patients from January 1, 2020 to December 1, 2020. Totally, 5580 cases were involved in this study, (55.2%) of them were males, the predominant clinical symptoms of COVID-19 patients were fever, cough, and fatigue (61.9, 50.1%, and 34.1% respectively). The most frequent comorbidities were hypertension, diabetes, as well as cardiovascular and cerebrovascular diseases (13.1%, 7.4 %, and 5.9% respectively). The majority of the patients in this study were male, the most prevalent signs and symptoms were fever, cough, and fatigue. The highly repeated comorbidities in the cases were hypertension, diabetes, also cardiovascular and cerebrovascular diseases.

Keywords: *COVID-19, clinical characteristics, comorbidity, meta-analysis.*

Introduction

In early December 2019, a set of acute respiratory infections, currently known as Corona Virus Disease 2019 (COVID-19) was identified in Wuhan, Hubei Province, China. The malady has spread rapidly from Wuhan to other areas of China and even countries around the world. The new novel corona virus was diagnosed in samples of airway epithelial cells from an infected individual in Wuhan (1). The disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (2), which is an enveloped, positive-sense, single-stranded RNA virus that belongs to the genus of Betacoronavirus and Coronaviridae family (3). The virus transmits via droplets as well as through contact with contaminated fomites (4). Commonly, the median incubation period of the disease is 3 days (range: 0–24 days) (5). COVID-19 has various clinical presentations, ranging from asymptomatic illness to mild respiratory infection to severest complications of pneumonia (6). The main clinical manifestations include fever, dry cough, dyspnoea, myalgia, fatigue, ageusia, anosmia, decreased leukocyte counts, and evidence of pneumonia in computed tomography (CT) (3, 7). In severe cases, shortness in breath and hypoxia may develop within seven days after onset of the disease and may promptly progress to acute respiratory distress syndrome, metabolic acidosis, septic shock, and coagulopathy(2). The main aim of this study is to identify the signs and symptoms, as well as comorbidities of COVID-19 reported in the currently available studies.

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Methods and Material

Data sources and inclusion criteria

The published articles related to clinical features of COVID-19 in PubMed, Scopus, and Web of Science between January 1, 2020 and December 1, 2020, with sample size ≥80 included in this study.

Statistical Analysis

Statistical analysis was achieved using SPSS program version 22. Texts, and Tables, were used for presentation of the results.

Ethical Considerations: The study does not need ethical approval because the meta-analysis depends on published studies.

Results

The researchers primarily found a total of 33 articles, afterward, the studies were checked for their titles and abstracts and the full-text were reviewed, only twelve articles met the predetermined inclusion criteria and eventually remained for analysis, which were Choi MH,et al. (2), Yang W,et al. (8), Liang W-h, et al. (9), Cao Z, et al. (10), Alsofayan YM, et al. (11), Guo T, et al(12). , Wu J, et al.(13), Wang X, et al. (14), Yang BY, et al. (15), Wan S, et al. (16), Chen T, et al. (17), Chen T, et al. (18).

Overall 5580 cases were included in this meta-analysis, 3082 (55.2%) were males. The results of the current meta-analysis reported that the most prevalent clinical signs and symptoms of COVID-19 was fever (61.9) followed by cough, and fatigue (50.1%, and 34.1% respectively). A minority of cases had diarrhea, and nausea and vomiting (8.4%, and 5.1% respectively) (Table 1).

The most prevalent comorbidities in this study were hypertension, diabetes, and cardiovascular and cerebrovascular diseases (13.1%, 7.4 %, and 5.9% respectively) (Table 2).

Table1. Main Characteristics of patients with COVID-19

Author (Reference)	Sample size	Age (years) mean±SD, Median (IQR)	Male No. (%)	Fever No. (%)	Chill No. (%)	Nasal congestion or rhinorrhea	Sore throat No. (%)	Cough No. (%)	Dyspnea No. (%)	Chest pain No. (%)	Fatigue No. (%)	Myalgia No. (%)	Headache No. (%)	Diarrhea No. (%)	Nausea and vomiting
Choi MH,et al. (2)	293	29 (24–47)	214 (73.0)	75 (25.6)	54 (18.4)	36 (12.3)	42 (14.3)	69 (23.5)	22 (7.5)	9 (3.1)	60 (20.5)	60 (20.5)	61 (20.8)	19 (6.5)	9 (3.1)
Yang W,et al. (8)	149	45.11±13.35	81 (54.4)	114 (76.51)	21 (14.1)	5 (3.36)	21 (14.1)	87 (58.39)	2 (1.34)	5 (3.36)	NA	5 (3.36)	13 (8.72)	11 (7.38)	2 (1.34)
Liang W-h, et al. (9)	1590	48.9±16.3	904 (57.3)	1351 (88.0)	163 (12.2)	73 (5.6)	21 (1.6)	1052 (70.2)	331 (20.8)	NA	584 (42.8)	234 (17.5)	205 (15.4)	57 (4.2)	80 (5.8)
Cao Z, et al. (10)	80	53±20	38 (47.5)	69 (86.3)	8 (10.0)	NA	NA	57 (71.3)	30 (37.5)	NA	30 (37.5)	12 (15.0)	8 (10.0)	5 (6.3)	6 (7.5)
Alsofayan YM, et al. (11)	1512	36	825 (54.3)	333 (85.6)	NA	139 (72.0)	257 (81.6)	429 (89.4)	NA	NA	NA	202 (28.6)	193 (27.3)	101 14.3	101 (14.3)
Guo T, et al. (12)	105	67 (64 -74)	48 (45.7)	70 (66.7)	NA	NA	NA	68 (64.8)	31 (29.5)	NA	35 (33.3)	8 (7.6)	9 (8.6)	10 (9.5)	6 (5.7)
Wu J, et al. (13)	80	46.10 ± 15.42	39 (48.8)	63 (78.75)	NA	5 (6.10)	11 (13.8)	51 (63.75)	30 (37.5)	3 (3.75)	NA	18 (22.5)	13 (16.25)	1 (1.25)	1 (1.25)
Wang X, et al. (14)	1012	50 (39-58)	524 (51.8)	761 (75.2)	182 (18.0)	69 (6.9)	144 (14.2)	531 (52.4)	231 (22.8)	NA	NA	170 (16.8)	152 (15.0)	152 (15.0)	36 (3.6)
Yang BY, et al. (15)	147	75.7 (13.2)	58 (46.8)	68 (46.3)	NA	NA	3 (2.0)	43 (29.3)	64 (43.5)	NA	59 (40.1)	1 (0.7)	4 (2.7)	9 (6.1)	14 (9.5)
Wan S, et al. (16)	135	47 (36□55)	72 (53.3)	120 (88.9)	NA	NA	NA	102 (76.5)	18 (13.3)	NA	44 (32.5)	44 (32.5)	34 (32.5)	18 (13.3)	4 (3.0)
Chen T, et al. (17)	274	62 (44-70)	171 (62.0)	249 (91,0)	NA	NA	NA	185 (68)	120 (44)	NA	137 (50)	60 (22)	31 (11)	77 (28)	24 (9)
Chen T, et al. (18)	203	54 (20–91)	108 (53.2)	181 (89.2)	NA	NA	NA	122 (60.1)	3 (1.5)	4 (2.0)	16 (7.9)	54 (26.6)	10 (4.9)	10 (4.9)	3 (1.5)
Prevalence %				61.9	9.4	9.2	10.6	50.1	21.7	2.9	34.1	34.1	13.2	8.4	5.1

No. number, NA not available

Table2. Comorbidity of patients with COVID-19

Author (Reference)	Chronic pulmonary disease No. (%)	Cardio-vascular and Cerebro-vascular diseases	Hyper-tension No. (%)	Diabetes No. (%)	Malignant tumour and immune-deficiency No. (%)	Chronic liver disease No. (%)	Chronic renal disease No. (%)	Other No. (%)
Choi MH,et al. (2)	17 (5.8)	11 (3.7)	29 (9.9)	21 (7.2)	7 (2.4)	5 (1.7)	1 (0.3)	72 (24.6)
Yang W,et al. (8)	1 (0.67)	28 (18.79)	NA	NA	2 (1.34)	NA	NA	21 (14.09)
Liang W-h, et al. (9)	24 (1.5)	89 (5.6)	269 (8.2)	130 (8.2)	21 (1.3)	28 (1.8)	21 (1.3)	3 (1.0)
Cao Z, et al. (10)	5 (6.3)	10 (12.5)	20(25.0)	6 (7.5)	NA	NA	NA	6 (7.5)
Alsofayan YM, et al.(11)	57 (5.2)	25 (2.3)	97 (8.8)	83 (7.6)	12 (1.1)	NA	13 (1.2)	54 (4.9)
Guo T, et al. (12)	9 (8.6)	17 (23.8)	46(43.8)	27 (25.7)	NA	5 (4.8)	5 (4.8)	NA
Wu J, et al. (13)	1 (1.25)	25 (31.25)	NA	NA	1 (1.25)	NA	1 (1.25)	9 (11.25)
Wang X, et al. (14)	20 (2.0)	15 (1.5)	46 (4.5)	27 (2.7)	NA	NA	NA	34 (3.3)
Yang BY, et al. (15)	26 (21.0)	52 (42.0)	44 (35.5)	25 (20.2)	9 (7.2)	NA	7 (5.6)	50 (40.3)
Wan S, et al. (16)	1 (0.7%)	7 (5.2)	13 (9.6)	12 (8.9)	4 (3.0)	2 (1.5)	NA	NA
Chen T, et al. (17)	18 (6.6)	27 (9.9)	93 (34)	47 (17.2)	7 (2.6)	11 (4.0)	4 (1.5)	10 (3.6)
Chen T, et al. (18)	8 (3.9)	25 (12.3)	43 (21.2)	16 (7.9)	7 (3.4)	8 (3.9)	8 (3.9)	6 (3.0)
Prevalence %	3.4	5.9	13.1	7.4	1.6	2.3	1.4	5.0

No.: number, NA: not available

Discussion

In the current meta-analysis study, males were higher prevalence than females, this finding is in agreement with the results of three meta-analyses studies (19-21). This is might be due to females develop greater innate and adaptive immune responses than males thus they are less vulnerable to many infections of viral, bacterial, fungal, and parasitic origin(22).

The results of our study showed that fever, cough, and fatigue were the most frequent clinical manifestation of COVID-19 infected patients, these findings are consistent with the findings of two other meta-analysis studies (20, 23). A minority of the patients had gastrointestinal tract symptoms, including diarrhea, nausea and vomiting. Similar two other meta-analyses found the same result (19, 21). The results display that the elevated levels of fecal calprotectin in infected individuals with

COVID-19 add to the increasing evidence that SARS-CoV-2 infection produces an inflammatory response in the intestinal tract (24). Calprotectin concentrations were significantly greater in COVID-19 cases who had suffered from diarrhea and with higher elevated serum interleukin 6 levels. In the diagnosis and particularly in the follow-up of COVID-19-associated diarrhea, the calprotectin measurement could be interested in monitoring the disease. Moreover, diarrhea may be secondary to virus-produced inflammation, which in turn is a result of the entry of inflammatory cells into the intestinal tract mucosa, including lymphocytes and neutrophils, thus disrupting the gut microbiota.

Viral SARS-CoV-2 particles were identified in feces during the second phase of COVID-19, followed by a decrease in the peak of inflammation. Consequently, COVID-19-associated inflammatory diarrhea was connected with reduced levels of fecal SARS-CoV-2 RNA (25).

Concerning comorbidities, hypertension, diabetes, as well as cardiovascular and cerebrovascular diseases were highly prevalent. Likewise, two meta-analyses studies reported that diabetes, hypertension, and cardiovascular diseases were most common comorbidities in COVID-19 infected patients (20, 23). Patients with diabetes mellitus are more prone to infectious diseases, this is due to a hyperglycemic environment, which increases the virulence of some pathogens and decreases production of interleukins in response to infection; declines chemotaxis and phagocytic activity, obstruct the movement of polymorphonuclear leukocytes(26).

Conclusions

Males were overrepresented than females. Fever, cough, fatigue were the most frequently clinical symptoms. Hypertension, diabetes, also cardiovascular and cerebrovascular diseases were the most predominant comorbidities for COVID-19 infection.

Ethical Clearance: The study does not require ethical approval because the meta-analysis depends on published studies.

Source of Funding: Self

Conflict of Interest: Nil.

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