


# Clinical Presentation of Patients Infected with Coronavirus Disease 19: A Systematic Review

Infectious Diseases: Research and Treatment  
Volume 13: 1–8  
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DOI: 10.1177/1178633720952076



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## ABSTRACT

**BACKGROUND:** The coronavirus disease-19 has been labeled a pandemic by World Health Organization. By virtue of its highly contagious attribution, this virus has spread across over the world and the numbers are still rapidly increasing. Increasing numbers of confirmed cases and mortality rates of coronavirus disease 2019 are occurring in several countries. The aim of this systematic review was to summarize clinical presentations of this newly emerging coronavirus disease.

**METHODS:** A systematic review of published articles was conducted using databases such as PubMed, Scopus, and Google Scholar. A search was conducted on 18 to 25 April 2020. Search terms included “novel coronavirus,” “2019 novel coronavirus,” “Coronavirus disease 2019,” “COVID-19,” “severe acute respiratory syndrome coronavirus 2.” The studies published in the English language and their full texts available were included. The eligible study designs were cross-sectional, case-control, cohort, and case series.

**RESULTS:** Thirty (30) studies which contain 4829 participants were included in this review. From included studies, the age of infected patients were found in range 0.25 to 94 years. The main clinical symptoms of COVID-19 patients were fever (77.6%), cough (64.8%), fatigue (27.2%), dyspnea (21.2%) and sputum production (18.0%).

**CONCLUSION:** This systematic review identified that fever, cough, fatigue, and dyspnea were the most common reported clinical features of coronavirus disease 19. Understanding of the clinical spectrum and impact of this novel disease is important for all individuals, especially for healthcare workers to manage and prevent it.

**KEYWORDS:** Coronavirus disease 19, COVID-19, clinical presentation, systematic review

**RECEIVED:** June 17, 2020. **ACCEPTED:** August 2, 2020.

**TYPE:** Systematic Review

**FUNDING:** The author(s) received no financial support for the research, authorship, and/or publication of this article.

**DECLARATION OF CONFLICTING INTERESTS:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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## Background

Coronavirus disease 19 (COVID-19) is a respiratory virus which is occurred by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).<sup>1</sup> Toward the end of December 2019, it was identified with human-to-human transmission and severe human infection, originating in Wuhan, China. The virus has been labeled a pandemic by World Health Organization (WHO) since March, 2020.<sup>2</sup> By virtue of its highly contagious attribution, this novel coronavirus has spread across over the world and the numbers are still rapidly increasing.<sup>3</sup> As of 25 April 2020, more than 3 million laboratory-confirmed cases have been documented and several death cases reported globally. Almost all countries in world have identified confirmed cases of COVID-19.<sup>4</sup>

Increasing numbers of confirmed cases and mortality rates of coronavirus disease 2019 are occurring in several countries.<sup>5</sup> United States (U.S) is a country with the highest coronavirus cases. U.S has also witnessed the highest number of deaths due to COVID-19 in the world. Coronavirus continues to be severe in Italy and Spain, making it the most-affected countries in Europe.<sup>4</sup> It is identified that about 15% of COVID-19 patients have severe illness and 5% have critical illness. The mortality rate due the virus ranges from 0.25% to 3.0%. The mortality

rates are much greater for susceptible populations, such as older people and those having underlying disorders.<sup>6</sup>

Elderly patients are susceptible to severe coronavirus disease 2019 outcomes as a consequence of their age and, in some cases, underlying health conditions.<sup>7</sup> Studies from China have indicated that elderly patients, particularly those with chronic comorbidities, are at increased risk for severe illness and death. Even though the majority of COVID-19 cases in China were mild (81%), elderly people above 60 years deaths were approximately 80%.<sup>8</sup> A study from US reported that 80% of deaths due to COVID-19 were aged  $\geq 65$  years with the greatest percentage of severe outcomes amid people aged  $\geq 85$  years.<sup>9</sup> Although elderly and those with underlying disorders appear to be more vulnerable to becoming severely ill with the virus, people of all ages can be infected by the virus.<sup>2</sup>

The ongoing COVID-2019 outbreak brought a significant threat to global public health and created a global health crisis.<sup>10</sup> The outbreak of coronavirus disease 19 not only resulted great public concern, but also brought about huge psychological disturbance, particularly for health care workers. A study identified that more than one third of healthcare professionals standing frontline to handle the outbreak during its peak in China had insomnia. The healthcare professionals who



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suffered from insomnia were also more likely to feel depressed, anxious, and have stress-based trauma.<sup>11</sup>

It is confirmed that COVID-19 is spread by human-to-human transmission via droplets or direct contact, and infection has been estimated to have mean incubation period of 6.4 days.<sup>12</sup> COVID-19 may cause disease ranging from asymptomatic to fatal disease.<sup>13</sup> Recent evidence suggests that even someone who is non-symptomatic can spread COVID-19 with high efficiency, and conventional measures of protection, such as face masks, provide insufficient protection. A patient undergoing surgery in a hospital in Wuhan infected 14 health-care workers while asymptomatic.<sup>14</sup>

The signs and symptoms of COVID-19 were extensively explained in WHO-China joint report on COVID-19. Symptoms are non-specific and the presentation of disease can range from asymptomatic to severe pneumonia and death. It was reported that fever, dry cough, fatigue, sputum production and shortness of breath were the most common symptoms.<sup>15</sup> Severe damage on the lung tissue can result in acute respiratory distress syndrome (ARDS) which is the major contributor to intensive care unit care and mortality from COVID-19, especially in those older than 60 years, with history of smoking, and underlying disorders.<sup>16</sup>

COVID-19 is newly emerged and rapidly growing infectious disease outbreak which is challenging global community because of the limited amount of data available about the disease. As the spread virus is ongoing, the number of people infected with the virus will be increased and health workers need to understand these to minimize the impact of COVID-19 infection. Although the number of people infected by the virus is increasing through the world, no enough attention has been given to summarizing the clinical presentations of the virus. This review was aimed to summarize clinical presentations of COVID-19 which will help healthcare providers and public health policy makers in their efforts to treat patients and contain the current outbreak. Moreover, it will help to strengthen the knowledge of any reader about the clinical features of the disease.

## Methods

### *Search strategy and database*

The aim of this review was to summarize the clinical presentation of COVID-19 based on available literatures. This systematic review was performed according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.<sup>17</sup> A systematic review of published literature was undertaken to identify studies that included clinical features of COVID-19.

The data bases such as PubMed, Scopus and Google scholar were employed to identify all relevant articles published on the theme of this review. A search was conducted for primary articles published in English language. A search was conducted on 18 to 25 April 2020 using the search MeSH “novel coronavirus,” “2019 novel coronavirus,” “2019-nCoV,” “Coronavirus disease 2019,” “COVID-19,” “severe acute respiratory syndrome coronavirus 2” and “SARS-CoV-2.” All studies identified during the database

search were assessed for relevance to the review based on the information provided in the title and abstract. The full texts of eligible articles were then downloaded for further screening and final inclusion.

Among the 30 research articles included in this review, 23 articles were cross-sectionals, 4 articles were case series and 3 studies were retrospective cohorts. The studies included in this review were conducted in 9 different countries. These were China, US, Italy, Bolivia, Japan, German, Belgium, France, and Spain. However, the majority of studies were obtained from China as largest proportions of available articles were published by Chinese scholars.

### *Eligibility criteria and study selection*

The studies published in the English language and their full texts available were included. Studies were included if they were published in peer-reviewed journals. The eligible study designs were cross-sectional, case-control, cohort, and case series. Studies were excluded on any 1 of the following conditions: the full article was not available, outcomes were not well-defined, a duplicate citation, review articles and the studies did not report to COVID-19 signs and symptoms. After duplicated removed, the title and abstract were used to screen the results of the initial search. The full texts of relevant articles were assessed for inclusion and exclusion criteria.

### *Data collection process and data items*

Data extracted from eligible studies onto a standardized data abstraction sheet. The studies were extracted using author, publication year, country, study design, sample size, patient demographics such as age and sex, and clinical presentations. Two reviewers performed the data extraction and 1 reviewer assessed the accuracy of the extracted data.

### *Methodology quality assessment*

The Agency for Healthcare Research and Quality (AHRQ) was used to assess the quality of included studies. It was done by 2 reviewers. These criteria included 11 items, including subjects' selection, research quality control and data processing. Each question has “yes,” “no” or “unclear” and “not applicable” alternative responses in which 1 them is answer.<sup>18</sup>

## Results

### *Search results*

About 6261 studies were retrieved using search strategy. After removal of duplicates and irrelevant articles, about 49 articles obtained. Full texts of these 49 articles were accessed and 30 articles were accepted and considered for final review (Figure 1).

### *Characteristics of included studies*

A total of 4829 study participants were included in this systematic review. The smallest age of in this study was 0.25 year and the oldest age was 94 years.

**Table 1.** The characteristics and demographic data of the included studies.

AUTHOR	YEAR	COUNTRY	STUDY DESIGN	SAMPLE SIZE	AGE (RANGE IN YEARS)	SEX (MALE, %)
Zheng et al <sup>19</sup>	2020	China	Cross sectional	161	33.5-57	49.7
Li et al <sup>22</sup>	2020	China	Cross sectional	131	20-90	48
Cheng et al <sup>23</sup>	2020	China	Cross sectional	11	35-65	72.7
Lian et al <sup>20</sup>	2020	China	Cross sectional	788	0.25-94	51.6
Cao et al <sup>21</sup>	2020	China	Cohort	102	37-67	52.0
Zhang et al <sup>24</sup>	2020	China	Cross sectional	17	23-74	47.1
Wan et al <sup>25</sup>	2020	China	Case series	135	36-55	53.3
Li et al <sup>26</sup>	2020	China	Cross sectional	25	29-66	48
Yang et al <sup>27</sup>	2020	China	Cohort	149	32-59	54.4
Li et al <sup>28</sup>	2020	China	Cross sectional	83	31-66	53
Guan et al <sup>29</sup>	2020	China	Cross sectional	1099	35-58	58.2
Goyal et al <sup>30</sup>	2020	US	Case series	393	18-75	60.6
Giacomelli et al <sup>31</sup>	2020	Italy	Cross sectional	59	50-74	67.8
Song et al <sup>32</sup>	2020	China	Cross sectional	51	33-65	49
Escalera-Antezana et al <sup>33</sup>	2020	Bolivia	Cross sectional	12	25-43	50
Huang et al <sup>34</sup>	2020	China	Cross sectional	41	41-58	73
Wang et al <sup>35</sup>	2020	China	Cross sectional	69	35-62	46
Tabata et al <sup>36</sup>	2020	Japan	Cross sectional	104	25-93	51.9
Zhao et al <sup>3</sup>	2020	China	Cohort	77	1-94	44.2
Chen et al <sup>37</sup>	2020	China	Cross sectional	99	21-82	68
Chen et al <sup>38</sup>	2020	China	Cross sectional	29	26-79	72.4
Wang et al <sup>39</sup>	2020	China	Cross sectional	138	42-68	54.3
Liu et al <sup>40</sup>	2020	China	Cross sectional	137	20-83	44.5
Liu et al <sup>41</sup>	2020	China	Case series	24	12-84	33.3
Yang et al <sup>42</sup>	2020	China	Cross sectional	52	33.6-85.8	67.3
Luers et al <sup>43</sup>	2020	German	Cross sectional	72	21-87	56.9
Zou et al <sup>44</sup>	2020	China	Cross sectional	81	50-68.5	46.9
Lechien et al <sup>45</sup>	2020	Belgium*	Cross sectional	417	19-77	36.9
Mao et al <sup>46</sup>	2020	China	Case series	214	37-68	40.7
Yan et al <sup>47</sup>	2020	US	Cross sectional	59	18-79	49.2

\*-Included other 3 countries: France, Spain and Italy.

A study conducted in North Hospital of Changsha first Hospital in China reported that 18.6% of patients were severely ill. It was identified that one-fifth of total patients were had with at least 1 comorbid and advanced age is a high-risk factor for severe illness.<sup>19</sup> Another study in China identified that 32% cases were over 60 years. It was also found that more patients in older group were diagnosed as severe.<sup>20</sup> A Study from Wuhan, China reported that 33.3% of 102 patients infected with the virus in the hospital setting. This study identified that younger patients and health care workers were more likely to survived.<sup>21</sup> The characteristics of the included studies are shown in Table 1.

By summarizing the clinical presentation of COVID-19, we found that the main clinical symptoms of COVID-19 patients were fever (77.6%), cough (64.8%), fatigue (27.2%), and dyspnea (21.2%). Less commonly reported symptoms include headache or dizziness (15.2%), diarrhea (11.8%), and nausea and vomiting (5.9%). Some studies reported olfactory disorders and gustatory disorders which counted 10.1% and 10%, respectively. Symptoms like hemoptysis, chills, fear of cold, chest pain/tightness, anorexia, confusion, and rhinitis were rarely reported clinical features of COVID-19 (Tables 2 and 3).

**Table 2.** Clinical features of coronavirus from the included studies, 2020.

AUTHOR	N	FEVER	COUGH	DYSPNEA	SORE THROAT	FATIGUE	MUSCLE ACHE / ARTHRALGIA	HEADACHE/ DIZZINESS	DIARRHEA	NAUSEA AND VOMITING	SPUTUM PRODUCTION	OLFACTORY DISORDERS	GUSTATORY DISORDERS	OTHERS
Zheng et al <sup>19</sup>	161	122 (75.8)	101 (62.7)	23 (14.3)	-	64 (39.8)	18 (11.2)	12 (7.5)	17 (10.6)	6 (3.7)	-	-	-	-
Li et al <sup>22</sup>	131	85 (65)	85 (65)	5 (4)	-	13 (10)	2 (2)	-	1 (1)	-	-	-	-	-
Cheng et al <sup>23</sup>	11	8 (72.7)	7 (63.6)	1 (9.1)	1 (9.1)	-	3 (27.3)	-	1 (9.1)	-	3 (27.3)	-	-	-
Lian et al <sup>20</sup>	788	636 (80.7)	506 (64.2)	37 (4.7)	111 (14.1)	139 (17.6)	91 (11.5)	75 (9.5)	-	-	265 (33.6)	-	-	47 (5.9), 15 (1.9)
Cao et al <sup>21</sup>	102	83 (81.4)	50 (49)	-	-	56 (54.9)	35 (34.3)	-	11 (10.8)	-	-	-	-	-
Zhang et al <sup>24</sup>	17	12 (70.6)	9 (52.9)	1 (5.9)	1 (5.9)	6 (35.3)	7 (41.2)	4 (23.5)	-	-	7 (41.2)	-	-	5 (29.4)
Wan et al <sup>25</sup>	135	120 (88.9)	102 (76.5)	18 (13.3)	24 (17.7)	44 (32.5)	-	-	18 (13.3)	-	12 (8.8)	-	-	14 (10.3), 12 (8.8)
Li et al <sup>26</sup>	25	24 (96)	17 (68)	20 (80)	-	17 (68)	-	-	5 (20)	-	-	-	-	-
Yang et al <sup>27</sup>	149	114 (76.5)	87 (58.4)	2 (1.34)	21 (14.1)	-	5 (3.36)	13 (8.7)	11 (7.4)	2 (1.34)	48 (32.2)	-	-	21 (14.1), 16 (10.7)
Li et al <sup>28</sup>	83	72 (86.7)	65 (78.3)	9 (10.8)	6 (7.2)	-	15 (18.1)	9 (10.8)	7 (8.4)	-	15 (18.1)	-	-	5 (6)
Guan et al <sup>29</sup>	1099	966 (87.9)	744 (67.7)	204 (18.6)	153 (13.9)	419 (38.1)	163 (14.8)	150 (13.6)	41 (3.7)	55 (5.0)	367 (33.4)	-	-	125 (11.4), 53 (4.8)
Goyal et al <sup>30</sup>	393	303 (77.1)	312 (79.4)	222 (56.5)	-	-	94 (23.9)	-	93 (23.7)	75 (19.1)	-	-	-	-
Giacomelli et al <sup>31</sup>	59	43 (72.8)	22 (37.3)	15 (25.4)	1 (1.7)	-	3 (5.1)	2 (3.4)	-	-	-	14 (23.7)	17 (28.8)	-

Others: hemoptysis, chills, fear of cold, chest pain/tightness, anorexia, nasal obstruction, nasal congestion.

**Table 2.** Clinical features of coronavirus from the included studies, 2020 (continued).

AUTHOR	N	SIGNS AND SYMPTOMS (%)												
		FEVER	COUGH	DYSPNEA	SORE THROAT	FATIGUE	MUSCLE ACHES /ARTHRALGIA	HEADACHE/ DIZZINESS	DIARRHEA	NAUSEA & VOMITING	SPUTUM PRODUCTION	OLFACTORY DISORDERS	GUSTATORY DISORDERS	OTHERS
Song et al <sup>32</sup>	51	49 (96)	24 (47)	7 (14)	3 (6)	16 (31)	-	8 (16)	5 (10)	3 (6)	2 (4)	-	-	9 (18)
Escalera-Antezana et al <sup>33</sup>	12	9 (75)	9 (75)	-	5 (41.7)	4 (33.3)	5 (41.7)	-	2 (16.7)	1 (8.3)	-	-	-	-
Huang et al <sup>34</sup>	41	40 (98)	31 (76)	22 (55)	-	18 (44)	-	3 (8)	-	-	11 (28)	-	-	2 (5)
Wang et al <sup>35</sup>	69	60 (87)	38 (55)	20 (29)	6 (9)	29 (42)	21 (30)	15 (21.7)	10 (14)	3 (4)	20 (29)	-	-	14 (20), 7 (10)
Tabata et al <sup>36</sup>	104	39 (37.5)	50 (48.1)	22 (21.2)	11 (10.6)	24 (23.1)	-	20 (19.2)	11 (10.6)	-	24 (23.1)	-	-	-
Zhao et al <sup>3</sup>	77	66 (85.7)	49 (63.6)	16 (20.8)	5 (6.5)	21 (27.3)	9 (11.7)	10 (13)	1 (1.3)	6 (7.8)	8 (10.4)	-	-	9 (11.7)
Chen et al <sup>37</sup>	99	82 (83)	81 (82)	31 (31)	5 (5)	-	11 (11)	8 (8)	2 (2)	1 (1)	-	-	-	9 (9)
Chen et al <sup>38</sup>	29	28 (96.6)	21 (72.4)	17 (58.6)	-	12 (41.4)	-	2 (6.9)	4 (13.8)	-	21 (72.4)	-	-	-
Wang et al <sup>39</sup>	138	136 (98.6)	82 (59.4)	43 (31.2)	24 (17.4)	96 (69.6)	48 (34.8)	22 (15.9)	14 (10.1)	19 (13.8)	37 (26.8)	-	-	55 (39.9)
Kui et al <sup>40</sup>	137	112 (81.8)	66 (48.2)	26 (19.0)	-	44 (32.1)	-	13 (9.5)	11 (8.0)	-	6 (4.4)	-	-	7 (5.1)
Liu et al <sup>41</sup>	24	19 (79.2)	6 (25.0)	2 (8.3)	-	6 (25.0)	-	4 (16.7)	-	-	-	-	-	-
Yang et al <sup>42</sup>	52	51 (98.1)	40 (76.9)	33 (63.5)	-	18 (34.6)	7 (13.5)	3 (5.8)	-	2 (3.8)	3 (5.8)	-	-	1 (1.9)

Others: anorexia, chest tightness/pain, confusion, hemoptysis.

**Table 2.** Clinical features of coronavirus from the included studies, 2020 (continued).

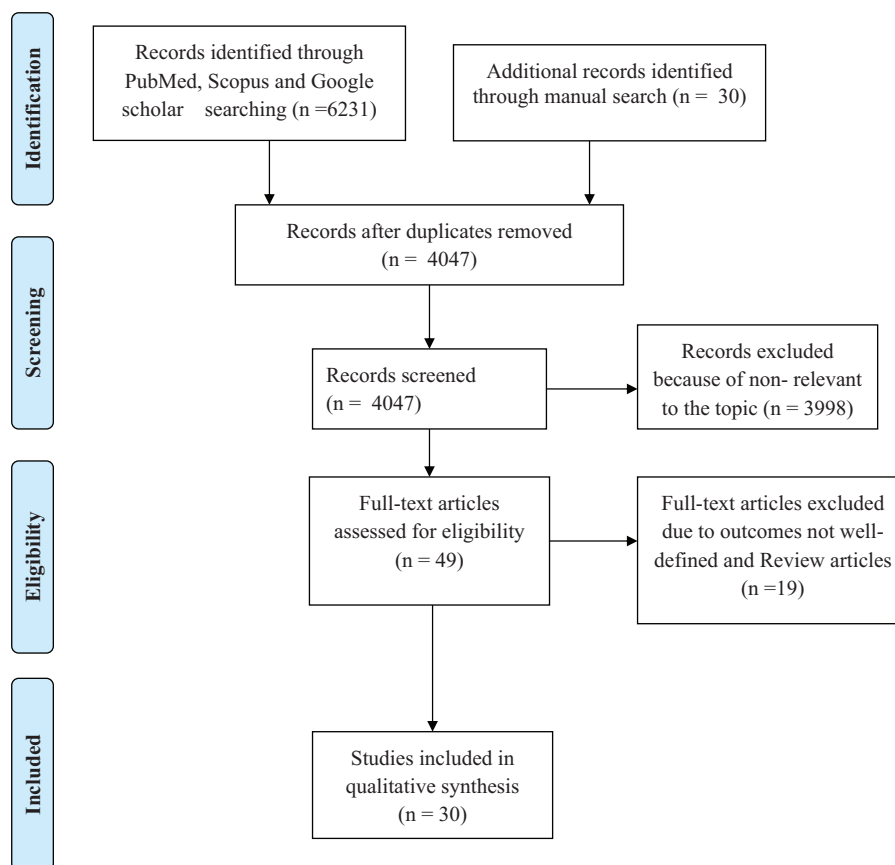
AUTHOR	N	SIGNS AND SYMPTOMS (%)												
		FEVER	COUGH	DYSPNEA	SORE THROAT	FATIGUE	MUSCLE ACHES /ARTHRALGIA	HEADACHE/ DIZZINESS	DIARRHEA	NAUSEA & VOMITING	SPUTUM PRODUCTION	OLFACTORY DISORDERS	GUSTATORY DISORDERS	OTHERS
Luers et al <sup>43</sup>	72	36 (50)	54 (75)	-	45 (62.5)	-	51 (70.8)	56 (77.8)	22 (30.6)	-	-	53 (73.6)	50 (69.4)	40 (55.6)
Zou et al <sup>44</sup>	81	59 (72.8)	-	-	-	30 (37)	-	12 (14.8)	-	-	-	11 (13.6)	21 (25.9)	22 (27.2)
Lechien et al <sup>45</sup>	417	201 (48.2)	326 (78.2)	198 (47.5)	224 (53.7)	190 (45.6)	241 (57.8)	192 (46.0)	213 (51.1)	96 (23.0)	-	357 (85.6)	342 (88.8)	218 (52.3)
Mao et al <sup>46</sup>	214	132 (61.7)	107 (50)	-	31 (14.5)	-	-	64 (29.9)	41 (19.2)	-	-	11 (5.1)	12 (5.6)	68 (31.8)
Yan et al <sup>47</sup>	59	41 (69.5)	39 (66.1)	32 (54.2)	19 (32.2)	48 (81.4)	37 (62.7)	39 (66.1)	28 (47.5)	16 (27.1)	18 (30.5)	40 (67.8)	42 (71.2)	28 (47.5)

Others: Rhinitis, chest pain, Anorexia and nasal obstruction.

**Table 3.** Common patterns and distribution on clinical manifestation of patients with COVID-19.

CLINICAL MANIFESTATION	NO. OF NUMBER OF STUDIES	NO. OF CASES/TOTAL NO. OF PATIENTS	%
Fever	30	3748/4829	77.6
Cough	29	3130/4829	64.8
Dyspnea	25	1026/4829	21.2
Sore throat	19	696/4829	14.4
Fatigue	22	1314/4829	27.2
Muscle ache /Arthralgia	20	866/4829	17.9
Headache/dizziness	23	736/4829	15.2
Diarrhea	23	569/4829	11.8
Nausea and vomiting	13	285/4829	5.9
Sputum production	17	867/4829	18.0
Olfactory disorders	6	486/4829	10.1
Gustatory disorders	6	484/4829	10.0
Others	12	802/4829	16.6

Others: hemoptysis, chills, fear of cold, chest pain/tightness, anorexia, confusion and rhinitis.

**Figure 1.** PRISMA flow chart for study selection.

Inclusion criteria were primary articles published in English language and their full texts were available. The eligible study designs were cross-sectional, case-control, cohort, and case series. The study was excluded when outcomes were not well-defined, and did not report to COVID-19 signs and symptoms.

## Discussion

COVID-19 has already reached almost all countries around the world, sending billions of people into lockdown as health services struggle to contain it. Over the last 4 months, more than 3 millions laboratory-confirmed cases have been documented globally.<sup>4</sup> The outbreak of this virus is an unprecedented disaster which affects the world including developed countries like U.S, China, and Italy in all aspects, especially health, social and economic.<sup>48</sup>

Even though COVID-19 presents with fever associated with cough, and dyspnea, the clinical presentations of COVID-19 are not specific which is difficult to differentiate it from other viral respiratory infections. Its clinical spectrum varies from asymptomatic to clinical conditions characterized by severe respiratory failure that necessitates mechanical ventilation and support in an intensive care unit. The virus may cause systemic manifestations in terms of sepsis and multiple organ dysfunction syndromes.<sup>49,50</sup>

A sufficient understanding of the characteristics of the coronavirus disease 19 is essential to effectively management the disease. It is also important to implement necessary measures in a timely manner. Even though we have some basic understanding of the clinical manifestations of coronavirus, our understanding is inadequate. This is due to inconsistencies reports still exist in the findings of many available literatures, and the sample sizes in of most of these literatures were too small for a dependable summary to be drawn.<sup>51</sup> This systematic review combined data from 30 studies in order to bring a more reliable summary of the signs and symptoms of patients infected with coronavirus disease 19.

In this systematic review, we tried to summarize clinical presentation of COVID-19 confirmed cases. We found 4829 cases from 30 articles to summarize the major clinical manifestations of COVID-19. The most commonly observed symptoms were fever and cough. Fever was identified in 3748 cases (77.6%) which reported by all studies included in this review and its range was 42.3% to 98.6%. Cough was the second most common reported symptom in this review which presented in 3130 cases (64.8%) and its value varied from 25.0% to 82.0%.<sup>3,19-47</sup> Fatigue was the third most common symptoms which experienced by 1314 cases (27.2%) (Tables 2 and 3). This finding was consistent with a systematic review and meta-analysis conducted by Rodriguez-Morales et al<sup>52</sup> in which they reported fever and cough were the most frequently symptoms experienced by patients infected by coronavirus disease 19. They found fever in 88.7% 8, cough in 57.6% and fatigue in 29.4%. Our review was also in line with another systematic review and meta-analysis performed by Sun et al<sup>53</sup> They reported that fever occurred in 89.8% of cases, cough in 72.2% and fatigue in 42.5%. This systematic review was also found similar results with a systematic review done by Lovato et al<sup>54</sup> which reported that fever (85.6%), cough (68.7%), and fatigue (39.4%) were the most common symptoms of COVID-19.

Our review identified that gastrointestinal symptoms such as diarrhea, nausea and vomiting were minor clinical features of COVID-19. Some studies reported that patients also

experienced olfactory disorders and gustatory disorders. Symptoms like hemoptysis, chills, fear of cold, chest pain/tightness, anorexia, confusion and rhinitis were rarely reported by some studies. Even though the virus is highly contagious, about 80% of infected people have mild symptoms or no symptoms.<sup>55</sup> Therefore, healthcare workers have to understand these to minimize the impact COVID-19 on population, health systems, and economic risks and implement protective measures which enable to contain the disease.

One of the limitations of this review was language restriction. Only articles published in English language were considered. The second limitation was only available data from published articles were collected. Data from unpublished papers were not included. The other limitation could be exclusion of articles with no full texts as it can reduce sample size.

## Conclusion

Clinical presentations of COVID-19 patients were mostly heterogeneous. Therefore, it is difficult to differentiate the virus from other respiratory infectious diseases based on the symptoms alone. This systematic review identified that fever, cough, fatigue, and dyspnea were the most common reported clinical features of coronavirus disease 19. Although symptoms such as hemoptysis, chills, fear of cold, chest pain/tightness, anorexia, confusion, and rhinitis were expressed by few people, they should not be ignored. Understanding of the clinical spectrum and impact of this novel disease is important for all individuals, especially for healthcare workers to manage and prevent it.

## Authors' contributions

TSH designed, arranged and supervised this study as the corresponding author. FB and TA participated in study design, searching articles, extracting, analysis, and/ or interpretation of data. TSH drafted the manuscript and all authors revised it. All authors have read and approved the final manuscript.

## Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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