Clinical Recommendation for Emergency Physicians to Approach to Signs and Symptoms Related to COVID-19; a Preliminary Study

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Abstract

Introduction: There is not enough and comprehensive evidence on signs and symptoms of COVID-19; therefore, it seems too early to provide an appropriate clinical decision-making rule for this newly emerged pandemic viral disease.

Objective: We tried to categorize patients' signs and symptoms from very highly suspected to non-suspected, regarding having COVID-19.

Methods: Most recently published English-language articles on COVID-19, were reviewed by the researchers. We considered each complaint, separately, and gathered available data, such as percentage of involved patients and their crude number. Then we considered the pooled and collected results as the final percentage of the occurrence of every specific symptom. We categorized patients' complaints into six types, based on the data obtained. All extracted complaints were categorized and scored.

Results: Twenty-seven articles were reviewed, of which, 12 considered for analysis. The selected papers had reported various numbers of patients, ranging from 16 to 1,099 patients (mean=229 patients per study). In total, nineteen different complaints, with an average of nine complaints per article, had been reported (IQR= 8-11). In terms of overall prevalence, based on the total number of patients, fever and dry cough were reported in more than half of the referred patients. The complaints were categorized in six types with and scored.

Conclusions: The patients with score ≥17 are very highly suspected to COVID-19; However, patients with score <5 could be considered as non-suspected to COVID-19.

Key words: Clinical Decision Rules; COVID-19; Probability; Risk Assessment; Signs and Symptoms

INTRODUCTION

The world has been entrapped with a new Corona Virus Disease (COVID-19) since early 2020. Most of the signs and symptoms caused by the new coronavirus are similar to other upper respiratory diseases. Although most of the reported complaints were related to upper and lower respiratory tracts, recently, some gastrointestinal and even dermatologic problems have emerged as chief complaints in some patients [1-4]. Like other physicians, emergency medicine professionals need to know the prevalence and importance of each symptom in patients suffering from COVID-19, and decide which patients should be considered as definite or suspected cases of COVID-19 [5]. There is not enough and comprehensive evidence on signs and symptoms of COVID-19; therefore, it seems too early to provide an appropriate clinical decision-making rule for this newly emerged pandemic viral disease. In this study, by reviewing recently published papers, we tried to categorize patients' signs and symptoms from very highly suspected to non-suspected, regarding having COVID-19.

Methods

Most recently published English-language articles on COVID-19, were reviewed by the researchers. All papers that reported signs and symptoms of patients who had referred to the hospitals (inpatients or outpatients), especially emergency departments, were included in this study. Exclusion criteria were as follows: articles that reported pediatric patients, and those that did not mention the number of patients. The only exception was WHO coronavirus article [1]. The research team decided not to exclude this article considering its valuable data on the percentage of symptoms. Furthermore, we only used the

reported percentages of the patients` complaints in this paper and did not add them to the pooled database. We considered each complaint, separately, and gathered available data, such as percentage of involved patients and their crude number. Then we considered the pooled and collected results as the final percentage of the occurrence of every specific symptom. Thereafter, we categorized patients' complaints into six types, based on the data obtained. All extracted complaints were categorized based on three main variables: the overall percentage of the patients with a particular symptom, the number of articles that reported each complaint, which could indicate the distribution of that particular complaint in various populations, and the importance of the complaints for diagnosis of COVID-19. For each type, a score of zero to three was given to each of the 3 mentioned variables, based on their power.

Results

Twenty-seven articles were reviewed, thirteen of which were excluded due to not reporting the number or percentage of different signs and symptoms in COVID-19 patients. Two other articles with the subject of COVID-19 in pediatrics were also excluded. In the end, 12 studies [1-3, 6-14] met our inclusion criteria and were analyzed. The selected

Table 1: Complaints reported by selected articles

Sign or Symptoms	No. of Studies*	Total patients	Min (%)	Max (%)	Crude mean (%)**	Pooled mean (%)***
Fever	12 [1-3, 6-14]	2527	61	98.6	81.5	81.8
Dry cough	11 [1-3, 6-13]	2270	48	82	63.6	66.2
Shortness of breath	10 [1-3,6,8,9, 11-14]	2353	3.3	31.2	24.4	16.35
All 3 above	3 [2,6,11]	305	14.7	15	14.85	14.7
Fatigue	9 [1-3,8,10-14]	2293	5.9	68	36.3	34.69
Sore throat	9 [1-3,6,8-11,13]	2235	5	31.2	17.4	13.75
Sputum in cough	8 [1-3,7-9,11,13]	2051	17	39.2	36.2	33.05
Headache	7 [1-3,8,10,11,13]	2013	3.9	21.6	12.4	11.73
Myalgia and/or arthralgia	7 [1-3,6,8,10,11]	2192	10.5	34.8	22.65	15.39
Diarrhea	9 [1-3,8,-13]	1558	2	32.5	17.25	9.97
Nasal congestion	5 [11,12,15,17,1]	776	2.7	6.1	5	5.48
Nausea and/or vomiting	5 [1-3,8,12]	1336	1	13.7	7.35	7.01
Hemoptysis	3 [1,3,14]	1869	0.9	4	2.45	1.4
Anorexia	3 [2,8,12]	309	5.9	39.9	19.3	37.5
Chills	3 [1,3,11]	1099	11.4	11.5	11.45	11.5
Confusion	2 [6,14]	305	9	34	21.5	25.9
Dizziness	3 [8,9,11]	154	9.4	12.5	10.95	11
Abdominal pain	3 [2,8,12]	344	2.2	4.4	3.3	3.51
Tonsil swelling	1 [3]	1099	2.1	2.1	2.1	2.1
Weakness	1 [9]	16	31.25	31.25	31.25	31.25
Belching	1 [12]	120	5	5	5	5

* Number of articles that reported each complaint
** Average percentage of reported complaints
*** The mean percentage calculated via pooling of data from various studies and dividing the total number of patients with a particular symptom to the total number of patients reported in the articles that reported that particular symptom

Table 2: Categorization of complaints reported in the selected articles

Types of Complaints	Number of articles that reported the Complaints (point)	Number of involved patients (point)	Importance of the complaints in COVID-19 diagnosis (point)	Original Samples	Final Points (0 – 9)
TYPE I	Nearly all (3)	More than 65% (3)	Very Common and Definitive(3)	Fever, Cough, Shortness of Breath	9
TYPE II	Most of them (2)	33% (2)	Common and highly suspective (2)	Fatigue, Sore Throat, Sputum in Cough	6
TYPE III	More than half (1)	10 - 15% (1)	Not common but suspective (0)	Headache, Myalgia and or Arthralgia, Diarrhea	2
TYPE IV	Less than half (0)	5 - 7% (0)	Not Common, Non-suspective (0)	Nasal Congestion, Nausea and or Vomiting, Hemoptysis	0
TYPE V	a small number (0)	25 – 35% (1)	Common in some areas, suspective (1)	Anorexia, confusion, weakness	2
TYPE VI	A rare number (0)	Less than 10% (0)	Rare, non-suspective (0)	Chills, dizziness, belching, tonsil swelling	0

Table 3: Clinical Recommendations for Emergency Physicians regarding their approach to signs and symptoms related to COVID-19

Points	Suspected to COVID19	Recommended Approach
≥17	Very Highly	Full personal protection, Admission to ED, Ask for Lab Test, Start Treatment
13-16	Highly	Full personal protection, Admission to ED, Ask for Lab Test
9 - 12	Moderately	Full personal protection, Ask for Lab Test
6 - 8	Low	Personal protection, Consider for Lab Test request
0 - 5	Non-Suspected	Personal protection

papers had reported various numbers of patients, ranging from 16 to 1,099 patients (mean=229 patients per study). Two articles [7, 14] covered only three major symptoms, but three articles had reported thirteen different symptoms, some of which were very rare. In total, nineteen different complaints, with an average of nine complaints per article, had been reported (IQR= 8-11). In terms of overall prevalence, based on the total number of patients, fever and dry cough were reported in more than half of the referred patients. Table 1 demonstrates all complaints reported by the patients. Table 2 demonstrates the categorization of all extracted complaints. Table 3 reveals the categorization of COVID-19 patients from very highly suspected to non-suspected cases according to the final points in table 2.

DISCUSSION

Although there is not enough available data for calculating sensitivity, specificity and positive likelihood ratio of every sign or symptom, some recommendations are made in this study, according to the findings are reported in table 2. It is recommended that emergency medicine specialists who encounter patients with at least two TYPE-I complaints or one TYPE I + two TYPE II complaints consider them a known case of COVID-19, and take serious preventive and diagnostic measures regarding these patients. Although being in contact with a known or suspected case of COVID-19 could be very useful for identification of new cases [1, 15] many patients deny any close contact with such well-defined cases. Table 3 demonstrates the categorization of COVID-19 patients from very highly suspected to non-suspected cases according to the final points in table 2. Therefore, physicians should rate every patient and consider the recommended approach in their practice. Although the above-mentioned approach, obtained through this study, requires further clinical research, using the given advice does not seem utterly illogical.

CONCLUSIONS

The patients with score ≥17 are very highly suspected to COVID-19; However, patients with score <5 could be considered as non-suspected to COVID-19

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