



Prevalence of different pain patterns in patients with COVID-19: A systematic review and meta-analysis

Ali Gholami^{1,2}, Mohammad Karimian³, Behzad Badakhsh⁴, Feizollah Mansouri⁵, Mohamadreza Kafashian⁶, Ali Khorshidi⁷, Behrouz Soltany^{8,2}, Somayeh Mahdikhani⁹, Milad Borji^{10,11}, Asma Tarjoman^{10,11}, Lida Nouri¹¹

ABSTRACT

1-Assistant Professor of Anesthesiology, Department of Anesthesiology; 2-Student Research Committee, 5-Professor of Infectious Disease, Infectious Diseases Department; 8-MSc Nursing, Department of Nursing, Faculty of Nursing and Midwifery, Kermanshah University of Medical Science, Kermanshah, IR Iran

3-Assistant Professor of Vascular Surgery; 4-Assistant Professor of Internal Medicine; 6-Associate Professor of Physiology, Department of Physiology; 7-Associate Professor of Epidemiology, School of Medicine, Psychosocial Injuries Research Center; 10-Student Research Committee; 11-Zoonotic Disease Research Center; 11-Assistant Professor of Anesthesiology, Department of Anesthesiology, Ilam University of Medical Sciences, Ilam, IR Iran

9-PhD Nursing Student, Università degli Studi "La Sapienza" di Roma, Public Health and Infectious Diseases, Undergraduate, (Italy)

Correspondence: Dr Lida Nouri, Assistant Professor of Anesthesiology, Department of Anesthesiology, Ilam University of Medical Sciences, Ilam, IR Iran. Tell: +98-9183404704, E-mail:

lidanouri2016@gmail.com

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Background and Objectives: Pain assessment is very important in these patients, but no comprehensive systematic reviews / meta-analyses (SRs/MAs) have been performed so far. For this reason, this study was performed to determine the prevalence of pain in patients with Covid-19 in the world by SR/MA method.

Methodology: The researchers collected English language articles in which COVID-19 was confirmed and all SRs/MAs and case reports articles were excluded. Search was carried on at SCOPUS[®], PubMed[®] / MEDLINE[®], Web of Science[®], Science Direct[®] and Google Scholar's search engine. To extract the data the checklist contained general information about articles, e.g. authors' names, year of publication, number of patients, country, journal's name, and specific information, e.g. prevalence and percentage of 'sore throat', 'abdominal pain', 'chest pain', 'headache' and 'myalgia'.

Results: According to the findings, 326 articles were extracted in the initial search, 218 articles of these were classified as duplicate articles because of the frequency in their authors, magazines and sample size, and were excluded. Also, by reviewing the title, abstract and complete files of articles, 73 articles were excluded as being non-relevant. Out of 35 remaining articles 2 were SRs/MAs in the field of COVID-19 by Iranian authors, and were also excluded. In the remaining 33 articles included in this SR/MA study, the sample size was 3781 patients.

Regarding the prevalence of pain in patients, prevalence rate of abdominal pain was 0.02% (95% CI: 0.01, 0.04), headache 10% 95% CI: 0.10 (0.08, 0.12) and myalgia was 18% 95% CI: 0.18 (0.14, 0.23), chest pain was 4% (95% CI: 0.04 (0.01, 0.06), Sore throat was 12% (95% CI: 0.12 (0.08, 0.15).

Conclusion: The results of this study can serve as important criteria to be considered for screening as well as identifying suspected cases of COVID-19. These can also be helpful in formulating the guidelines for the periodic physical evaluation and for clinical management of COVID-19 patients.

Key words: COVID-19; Pain, Coronavirus; Systematic review; Meta-analysis

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INTRODUCTION

A significant population of the world has been affected by infectious diseases which have led to a decline in the quality of life and caused the death of these patients.^{1,2} These days COVID-19 is one of the most dangerous infectious diseases affecting the whole world.³⁻⁶ According to various studies that have been conducted in this field, symptoms of this disease may include fever, cough, nausea and/or vomiting, loss of sense of smell and taste, runny nose, fatigue and pain. The patients might also experience various types of pain, including sore throat, abdominal pain, chest pain, headache and myalgia.^{5,7-9}

Pain is one of the variables affecting health status that brings the patient to a hospital and helps the physician to early diagnosis of the disease.¹⁰⁻¹² Considering, that the disease is a newfound illness, the presence of pain may not be taken seriously or might be mistaken to be originating due to other illnesses. Therefore, identifying clinical symptoms in this disease is very important and needs to be investigated and documented.¹³⁻¹⁵

OBJECTIVES

Pain assessment is very important in these patients, but no comprehensive SR/MA studies have been performed so far. For this reason, this study was performed to determine the prevalence of pain in patients with COVID-19 in the world by SR/MA method.

METHODOLOGY

1. Protocol

Researchers conducted a SR/MA type of study to determine the prevalence of pain in patients with COVID-19 according to the SR/MA statement (PRISMA) check list.¹⁶

2. Inclusion and exclusion criteria

The researchers collected English language articles in which COVID-19 disease was confirmed and all SRs/MAs and case reports were excluded.

3. Information sources and search strategy

Search was carried on at SCOPUS®, PubMed® / MEDLINE®, Web of Science®, Science Direct® and Google Scholar's search engines. Key words used for search included COVID-19, Novel coronavirus, SARS-CoV-2, Wuhan coronavirus, Novel coronavirus 2019, Wuhan pneumonia, 2019 nCoV and pain or pain related terms including Sore throat, Abdominal pain, Chest pain, Headache and Myalgia.

4. Study selection

In the early searches, articles were reviewed for title and abstract by MB and AT, then full texts and references of articles that met the inclusion criteria of these article were studied and according to the existing checklist, required information was extracted. Duplicate articles or those containing incomplete information were excluded. After the search results finalized, articles extracted were reviewed and approved by a third researcher of the AG Study Team.

5. Data collection process and data items

To extract the data a tabulated form was used containing general information of articles (author's name, year of publication, number of patients, country, journal's name) and specific information (prevalence and percentage of Sore throat, Abdominal pain, Chest pain, Headache, Myalgia) (Table 1).

Data analysis:

Data were analyzed using Stata software.

RESULTS

According to the findings, 326 articles were extracted in the initial search, 218 of these were classified as duplicated articles, because of the multiple appearance of their author names, magazines and sample size. Also, by reviewing the title, abstract and complete file of 73 articles were excluded being non-relevant. The left over 35 articles were again analyzed and 2 Iranian SRs/MAs in the field of COVID-19, were also excluded (Figure 1).

In the 33 articles included in this SR/MA study, the sample size was 3781 patients (Table 1). Regarding the prevalence of pain in patients, the prevalence of abdominal pain was 0.02% (95% CI: 0.01, 0.04), the prevalence of headache was 10% (95% CI: 0.10 (0.08, 0.12), myalgia 18% (95% CI : 0.18 (0.14, 0.23), chest pain was 4% (95% CI : 0.04 (0.01, 0.06) and sore throat was 12% (95% CI : 0.12 (0.08, 0.15) (Figures 2-6).

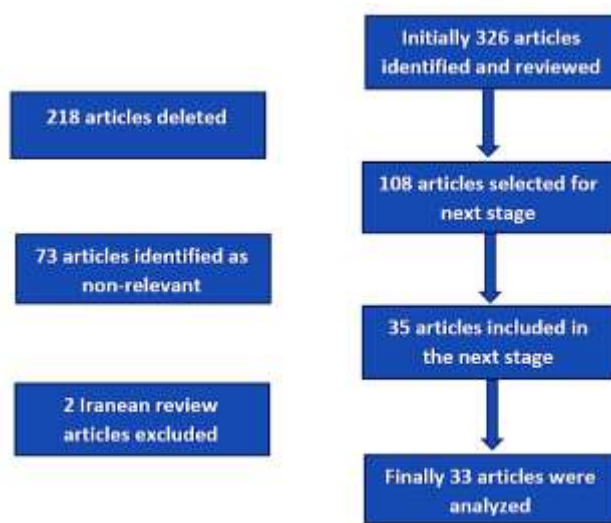


Figure 1: Flowchart for SR/MA

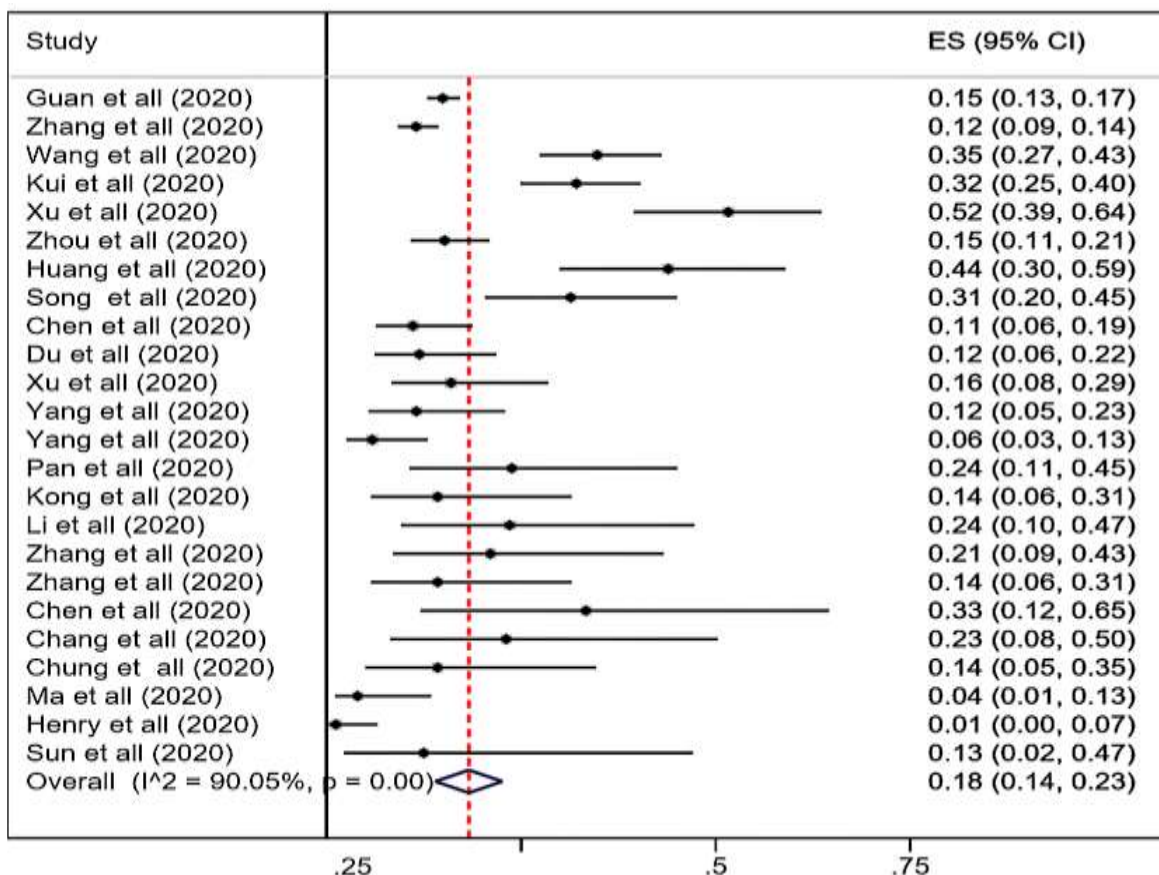


Figure 2: Prevalence of myalgia in studies entered into the SR/MA

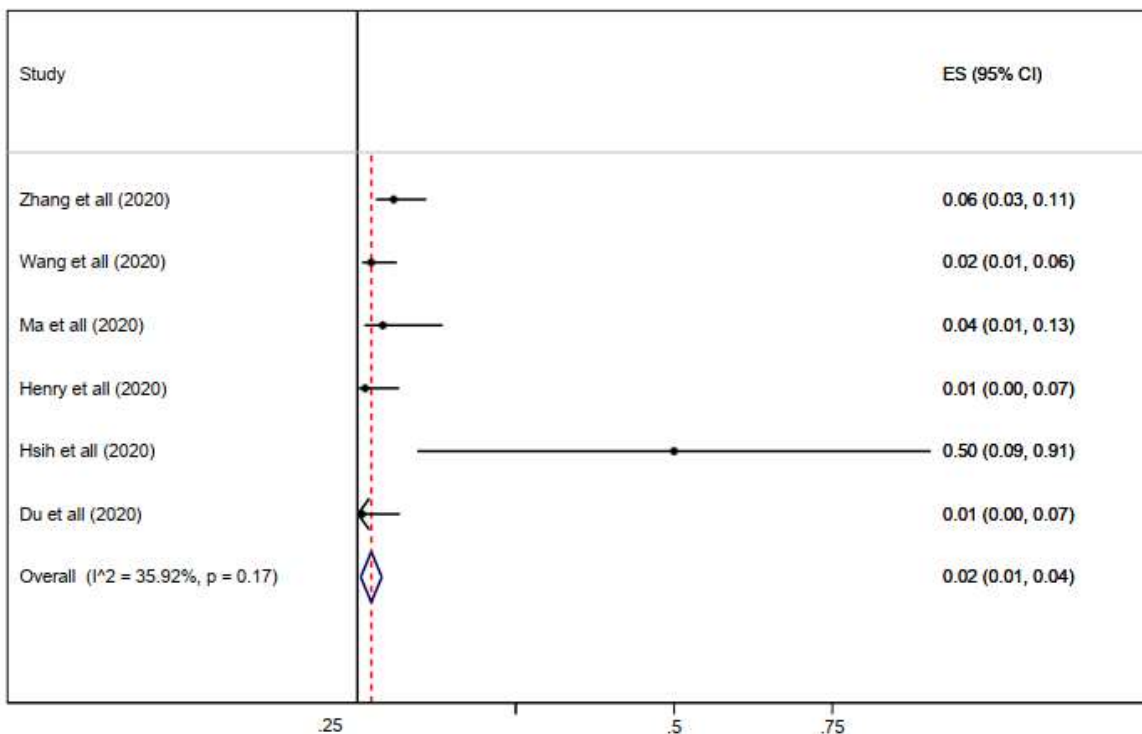


Figure 3: Prevalence of abdominal pain in studies entered into the SR/MA

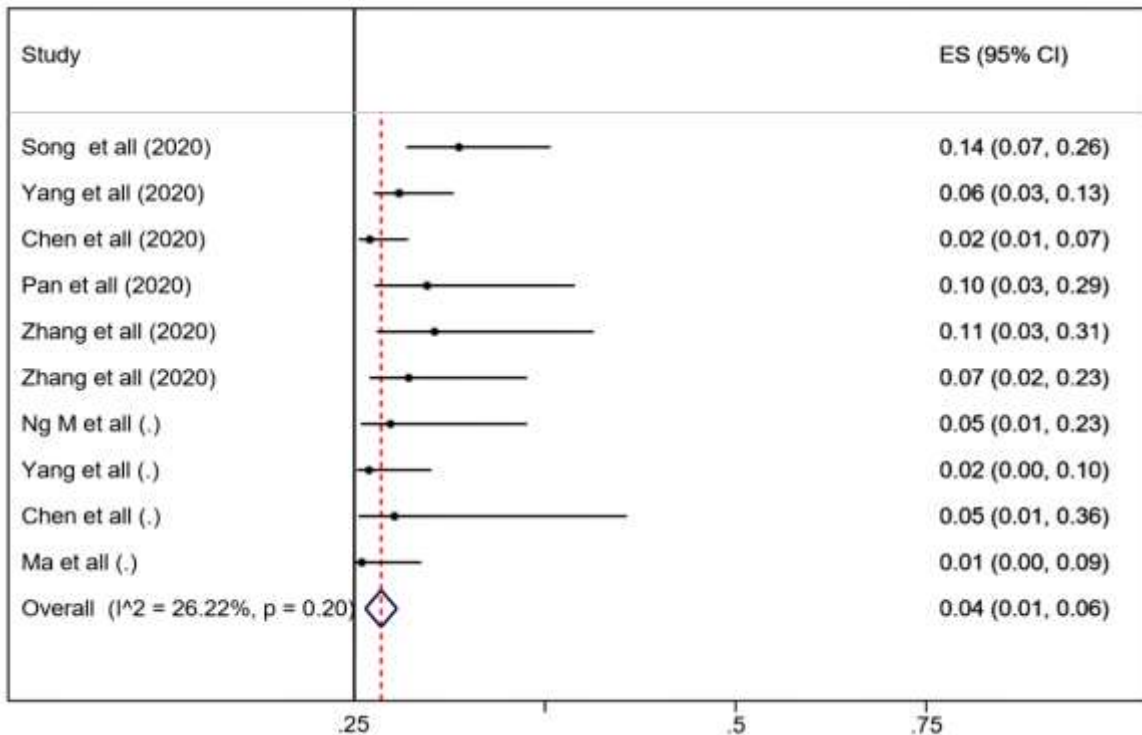


Figure 4: Prevalence of chest pain in studies entered into the SR/MA

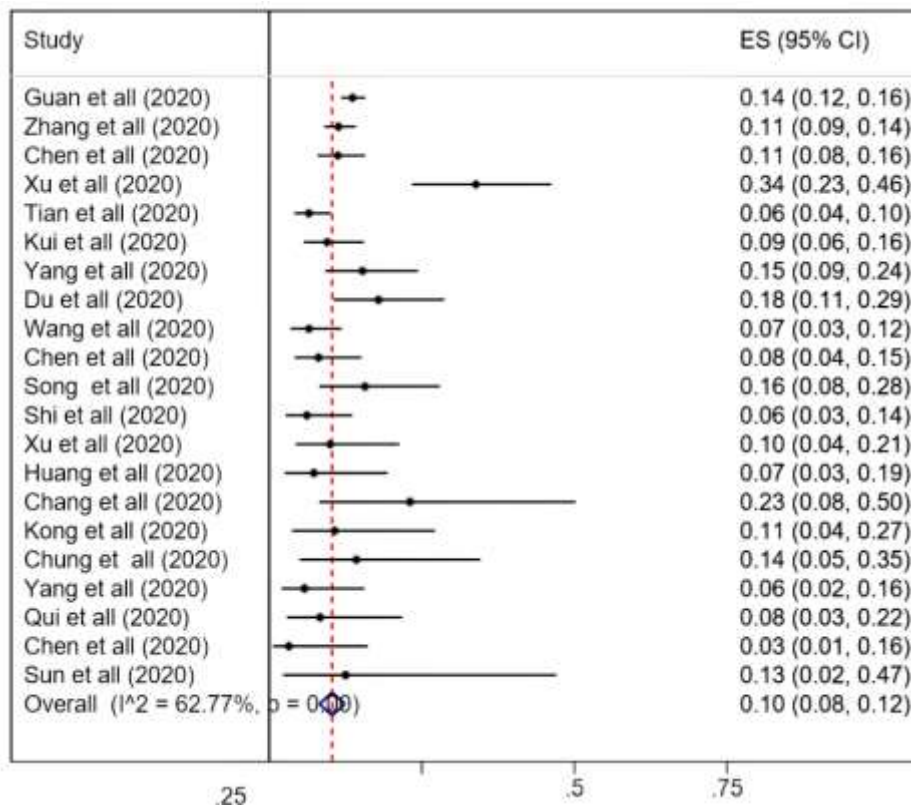


Figure 5: Prevalence of headache in studies entered into the SR/MA

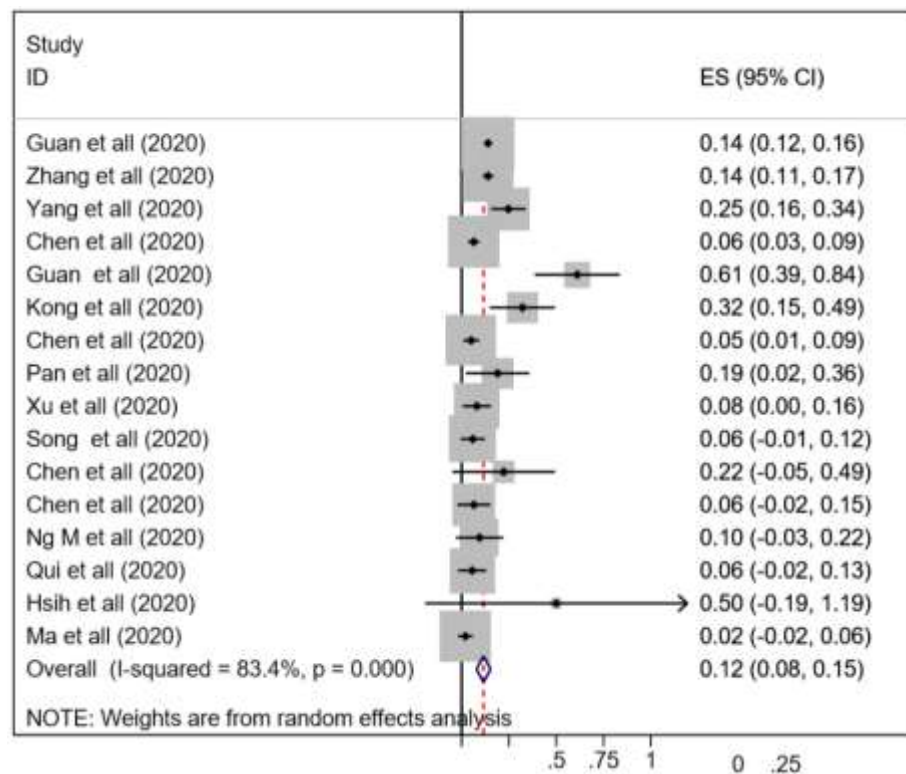


Figure 6: Prevalence of sore throat in studies entered into the SR/MA

Table 1: Specifications of studies entered into the SR/MA

	Author	Age	Country	N	Male N (%)	Female N (%)	Journal	Myalgia N (%)	Headache N (%)	Chest pain N (%)	Abdomi- nal pain	Sore throat
1	Huang et al. (2020) ¹⁷	49 (41–58)	China	41	30 (73)	11 (27)	Lancet	18 (44)	3 (8)	-	-	-
2	Chen et al. (2020) ¹⁸	55.5 (13-1)	China	99	67 (68%)	32 (32%)	Lancet	11 (11)	8 (8)	2 (2)	-	5 (5)
3	Chen et al. (2020) ¹⁹	29.88	China	9	-	-	Lancet	3 (33)	-	0 (0)	-	2 (22)
4	Wang et al. (2020) ²⁰	56	China	138	63 (45.7)	75 (54.3)	JAMA	48 (34.8)	9 (6.5)	--	3 (2.2)	-
5	Guan et al. (2020) ²¹	47 (31-73)	China	18	9 (50)	9 (50)	JAMA	-	-	-	-	11 (61)
6	Zhang et al. (2020) ²²	57 (25-87)	China	140	71 (50.7)	69 (49.3)	Al. ergy	-	-	-	8 (5.8)	-
7	Guan et al. (2020) ²³	47 (35–58)	China	1099	640 (58.1)	459 (41.9)	N Engl J Med	164 (14.9)	150 (13.6)	-	-	153 (13.9)
8	Kui et al. (2020) ²⁴	57 (20–83)	China	137	61 (44.5)	76 (55.5)	Chin Med J	44 (32.1)	13 (9.5)	-	-	-
9	Xu et al. (2020) ²⁵	41 (32-52)	China	62	35 (56)	27 (44)	BMJ	32 (52)	21 (34)	-	-	-
10	Chang et al. (2020) ²⁶	34 (34-48)	China	13	-	-		3 (23.1)	3 (23.1)	-	-	-
11	Chen et al. (2020) ²⁷	7.33 ± 4.35	China	31	13 (41.9)	18 (58.1)	Lancet Child Adolesc Health	-	1 (3.2%)	-	-	2 (6.5)
12	Henry et al. (2020) ²⁸	0-19	China	82	43 (52.4)	27 (32.9)	-	1 (4)	-	-	1 (4)	-
13	Kong et al. (2020) ²⁹	20-79	South Korea	28	15 (53.6)	13 (46.4)	Osong Public Health Res Perspect	4 (14.3)	3 (10.7)	-	-	9 (32.1)
14	Yang et al. (2020) ³⁰	45.11 ± 13.35	China	85	81	68	J Infect	5 (3.36)	13 (8.72)	5 (3.36)	-	21 (14.09)
15	Li et al. (2020) ³¹	45.1 ± 12.8		17	9 (52.9)	8 (47.1)		4 (23.5)	-	-	-	-
16	Pan et al. (2020) ³²	40 ± 9 (25 - 63)	China	21	6 (29%)	15 (74%)	Radiology	5 (24)	-	2 (9.5)	-	4 (19)

17	Ng M et al. (2020) ³³	56 (37-65)	Hong Kong	21	13 (62)	8 (38)		-	-	1 (5%)	-	2 (10%)
18	Tian et al. (2020) ³⁴	47.5 (1-94)		262	127 (48.5)	135 (51.5)	J Infect	-	17 (6.5)	-	-	-
19	Song et al. (2020) ³⁵	49 ± 16		51	25 (49)	26 (51)		16 (31)	8 (16)	7 (14)	-	3 (6)
20	Chung et al. (2020) ³⁶	51 ± 14	China	21	-	-	Radiology	3 (14)	3 (14)	-	-	-
21	Zhou et al. (2020) ³⁷	56.0 (46.0-67.0)	China	191	72 (38)	119 (62)	Lancet	29 (15)	-	-	-	-
22	Shi et al. (2020) ³⁸	49.5 (11)	China	81	42 (52)	39 (48)	Lancet Infect Dis	-	5 (6)	-	-	-
23	Hsieh et al. (2020) ³⁹	45.0 (39-51)	China	2	1 (50)	1 (50)	J Microbiol Immunol Infect	-	-	-	1 (50)	1 (50)
24	Yang et al. (2020) ⁴⁰	59.7 (13-3)	China	52	35 (67)	17 (33)	Lancet Respir Med	6 (11.5)	3 (6)	1 (2)	-	-
25	Ma et al. (2020) ⁴¹	-	China	50	28 (56)	22 (44)	The Lancet	2 (4)	-	0 (0)	2 (4)	1 (2)
26	Qui et al. (2019) ⁴²	8.3	China	36	23 (64)	13 (36)	Lancet Infect Dis	-	3 (8)	-	-	2 (6)
27	Du et al. (2020) ⁴³	34.10	China	67	32 (47.8)	35 (52.2)	Lancet Infect Dis	8 (11.9)	12 (17.9)	-	0 (0)	-
28	Xu et al (2020) ⁴⁴	43.9 ± 16.8	China	50	29 (58)	21 (42)	J Infect	8 (16)	5 (10)	-	-	4 (8)
29	Zhang et al. (2020) ⁴⁵			19				4 (14.3)	-	2 (7.1)	-	-
30	Chen et al. (2020) ⁴⁶	51 (36-64)	China	249	126 (50.6)	123 (49.4)	J Infect	-	28 (11.2)	-	-	16 (6.4)
31	Zhang et al. (2020) ⁴⁷	46.65 ± 13.82		573	295 (51.5)	278 (48.5)		66 (11.5)	65 (11.3)	-	-	80 (14)
32	Sun et al. (2020) ⁴⁸	-	China	8	6 (75)	2 (25)	World J Pediatr	1 (12.5)	1 (12.5)	-	-	-
33	Zhang et al. (2020) ⁴⁹	65.0 (56-70)	China	28	17 (60.7)	11 (39.3)	Ann Oncol	4 (14.3)	-	2 (7.1)		

DISCUSSION

Patients with COVID-19, experience a wide range of symptoms including fever, chills, nausea, vomiting, diarrhea, coughing and runny nose.^{50,51} Pain is another symptom of these patients which in this study has been investigated specifically.

This SRs/MAs study investigated pain in 33 articles in which, for the first time in the world, the pain of patients with COVID-19 was evaluated. In the SRs/MAs study published by Nasiri et al, the prevalence of Myalgia in 17 articles was 34.7 (26.0-44.4), headache prevalence in 12 articles was 11.1 (7.7-15.7) and sore throat was 14.5 (10.6-19.5)⁵². While in this study, the prevalence of Myalgia in 28 analyzed articles was 18% (95% CI : 0.18 (0.14, 0.23) .Headache prevalence in 21 articles was equal 10% (95% CI : 0.10 (0.08, 0.12) and the prevalence of sore throat with analyze of 16 articles was 12% (95% CI : 0.12 (0.08, 0.15). It seems that regard to more articles have entered SRs/MAs phase and larger sample size, this study has been able to provide more accurate information.

This study investigated the specificity of pain as an important variable in patients' health status

which is the innovation of this study. One of the disadvantages of this study is the lack of evaluation of pain status based on the demographic characteristics of the patients. For this reason, it is suggested that by updating articles on clinical symptoms and according to types of pain in patients with COVID-19, in future studies analyze accomplish according to demographic characteristics of patients and underlying diseases.

CONCLUSION

The results of this study can serve as an important criterion in evaluation of patients' health status also consider for screening as well as identifying suspected cases of COVID-19.

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Author contributions

AG, LLN BB: Manuscript writing

MK, FM: Editing

MK, AK: Analysed

BS, MB, AT : Literature search

SM : Translation

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