Supplementary Table S1. List of excluded papers based on full-text evaluation.

Sl. No.	First author-name	Title	Reason for exclusion
1	Betul Borku *et al*.,	Tocilizumab challenge: A series of cytokine storm therapy experiences in hospitalised COVID-19 pneumonia patients	1. No control group
2	Federico Alberici *et al*.,	Management of patients on dialysis and with kidney transplantation during the SARS-CoV-2 (COVID-19) pandemic in Brescia, Italy	1. No numerical data reported
3	Marcus R. Pereira *et al*.,	COVID-19 in solid organ transplant recipients: Initial report from the US epicentre	1. Patients have a history of solid organ transplant 2. No control group
4	Marfella *et al*.,	Negative impact of hyperglycaemia on tocilizumab therapy in Covid-19 patients	1. Evaluations related to glycaemic control in the diabetic population 2. No control group 3. No numerical data
5	Maria Mazzitelli *et al*.,	Use of subcutaneous tocilizumab in patients with COVID-19 pneumonia	1. No numerical data 2. No control group
6	Nahéma Issa *et al*.,	Feasibility of Tocilizumab in ICU patients with COVID-19	1. No control group 2. Only biochemical parameters are considered, which are out of the scope of the present review.
7	Nan Yu *et al*.,	Clinical features of obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective, single-centre, descriptive study, March 24, 2020: 30176-6. http://doi.org/10.1016/S1473-3099(20)30176-6.	1. Case series without a parallel control
8	Pan Luo *et al*.,	Tocilizumab treatment in COVID-19: A single-center experience	1. Case series without a control group. 2. Only CRP and IL-6 were considered as parameters, which are not out of the scope of the present review.
9	Patel K *et al*.,	Use of the IL-6R antagonist tocilizumab in hospitalised COVID-19 patients.	1. No control group
10	Şiran Keske *et al*.,	Appropriate use of tocilizumab in COVID-19 infection	1. No control group
11	Timothy *et al*.,	Tocilizumab for severe COVID-19 pneumonia: Case series of 5 Australian patients	1. Case series without parallel control.
12	Tomasiewicz *et al*.,	Tocilizumab for patients with severe COVID-19: a retrospective, multi-center study	1. No control group 2. The parameters evaluated are out of the scope of the present review.
13	Xu X *et al*.,	Effective treatment of severe COVID-19 patients with tocilizumab.	1. No control group 2. The parameters evaluated are out of the scope of the present review

Supplementary Table S2. Quality assessment of Included papers by Newcastle-Ottawa scale (NOS).

Sl. No	Included Studies ≠	Selection				Comparability	Outcome			Quality score	Study rating
		Representativeness of the exposed cohort	Selection of non-exposed cohort	Ascertainment of exposure	Demonstration that outcome of interest was not present at the start of the study	Comparability of the cohorts on the basis of design or analysis	Assessment of outcome	Was follow up long enough for outcomes to occur	Adequacy of follow-up cohorts		
1	Andrew IP *et al*., 2020 [18]	1	0	1	1	1	1	1	0	6	Good
2	Biran N *et al*., 2020[44]	1	1	0	1	1	0	1	1	6	Fair
3	Campochiaro C *et al*., 2020 [33]	1	0	1	1	1	1	1	1	7	Good
4	Canziani LM *et al*., 2020[36]	1	0	1	1	1	1	1	1	7	Fair
5	Capra R *et al*., 2020[21]	1	1	1	1	1	1	1	1	8	Good
6	Colaneri M *et al*., 2020 [39]	1	1	1	1	1	1	0	0	6	Fair
7	De Rossi N *et al*., 2020 [41]	1	0	1	1	1	0	1	1	6	Fair
8	Gokhale Y *et al*., 2020 [31]	1	1	1	1	1	1	1	0	7	Good
9	Guaraldi G *et al*., 2020[28]	1	0	1	1	1	1	0	1	6	Fair
10	Kewan T *et al*., 2020 [30]	1	0	1	1	1	1	0	1	6	Fair
11	Klopfenstein T *et al*., 2020[25]	1	1	1	1	1	1	0	1	7	Good
12	Martínez-Sanz J *et al*., 2020 [23]	1	1	1	1	1	1	0	1	7	Good
13	Mikulska M *et al*., 2020 [29]	1	1	1	1	1	1	1	1	8	Good
14	Moreno-García E *et al*., 2020 [22]	0	1	1	1	1	1	1	1	7	Good
15	Moreno-Pérez O *et al*., 2020 [42]	1	1	1	1	1	0	0	1	6	Fair
16	Pettit NN *et al*., 2020 [37]	1	0	1	1	0	1	1	1	6	Good
17	Quartuccio L *et al*., 2020[38]	1	1	1	0	1	0	1	1	6	Fair
18	Ramaswamy M *et al*., 2020 [43]	0	1	1	0	1	1	1	1	6	Fair
19	Rojas-Marte G *et al*., 2020 [34]	1	0	1	0	1	1	1	1	5	Fair
20	Rossi B *et al*., 2020[19]	0	1	0	1	1	1	1	1	6	Good
21	Roumier M *et al*., 2020 [24]	1	0	1	1	0	1	1	1	6	Good
22	Somers EC *et al*., 2020 [35]	0	1	1	0	1	1	1	0	6	Fair
23	Wadud N *et al*., 2020 [40]	1	0	1	1	1	0	1	1	6	Fair
24	Zheng KL *et al*., 2020 [20]	1	1	1	1	1	0	1	1	7	Good

Quality assessment or rating of status based on NOS and Thresholds for converting the NOS to AHRQ standards (good, fair, and poor).
1. Good quality: 3 or 4 stars in Selection domain AND 1 or 2 stars in Comparability domain AND 2 or 3 stars in Outcome/Exposure domain
2. Fair quality: 2 stars in Selection domain AND 1 or 2 stars in Comparability domain AND 2 or 3 stars in Outcome/Exposure domain
3. Poor quality: 0 or 1 star in Selection domain OR 0 stars in Comparability domain OR 0 or 1 stars in Outcome/Exposure domain.

Reference:
https://www.ncbi.nlm.nih.gov/books/NBK115843/bin/appe-fm3.pdf

Supplementary Table S3. Risk of Bias assessment for Included studies using ROBINS-I (Risk of Bias In Non-randomised Studies of Interventions) (Sterne Jonathan *et al*., 2016).

Sl. No	Included Studies	Bias Domains							Overall RoB Judgment
		Confounding	Selection of participants into the study At intervention	Classification of interventions	Deviation from intended interventions	Missing Data	Measurement of Outcomes	Selection of Reported Results	
1	Andrew IP *et al*., 2020 [18]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
2	Biran N *et al*., 2020 [44]	Moderate	Low	Low	Low	Moderate	Low	Moderate	Moderate
3	Campochiaro C *et al*., 2020 [33]	Low	Moderate	Low	Low	Low	Low	Low	Moderate
4	Canziani LM *et al*., 2020 [36]	Low	Low	Low	Low	Low	Low	Low	Low
5	Capra R *et al*., 2020 [21]	Low	Low	Low	Low	Low	Low	Low	Low
6	Colaneri M *et al*., 2020 [39]	Moderate	Moderate	Low	Low	Moderate	Low	Low	Moderate
7	De Rossi N *et al*., 2020 [41]	Serious	Moderate	Low	Low	Serious	Low	Low	Serious
8	Gokhale Y *et al*., 2020 [31]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
9	Guaraldi G *et al*., 2020 [28]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
10	Kewan T *et al*., 2020 [30]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
11	Klopfenstein T *et al*., 2020 [25]	Low	Low	Low	Low	Low	Low	Low	Low
12	Martínez-Sanz J *et al*., 2020 [23]	Low	Low	Low	Low	Low	Low	Moderate	Moderate
13	Mikulska M *et al*., 2020 [29]	Low	Low	Low	Low	Low	Low	Low	Low
14	Moreno-García E *et al*., 2020 [22]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
15	Moreno-Pérez O *et al*., 2020 [42]	Low	Low	Low	Low	Low	Moderate	Low	Moderate
16	Pettit NN *et al*., 2020 [37]	Moderate	Low	Low	Low	Low	Low	Low	Moderate
17	Quartuccio L *et al*., 2020[38]	Moderate	Serious	Low	Low	Moderate	Low	Serious	Serious
18	Ramaswamy M *et al*., 2020 [43]	Moderate	Moderate	Low	Low	Moderate	Low	Low	Moderate
19	Rojas-Marte G *et al*., 2020 [34]	Serious	Moderate	Moderate	Moderate	Low	Low	Low	Serious
20	Rossi B *et al*., 2020 [19]	Moderate	Moderate	Low	Low	Low	Low	Low	Moderate
21	Roumier M *et al*., 2020 [24]	Moderate	Serious	Low	Low	Low	Low	Low	Serious
22	Somers EC *et al*., 2020 [35]	Low	Low	Moderate	Low	Moderate	Low	Low	Moderate
23	Wadud N *et al*., 2020 [40]	Low	Low	Moderate	Low	Low	Low	Low	Moderate
24	Zheng KL *et al*., 2020 [20]	Low	Low	Low	Low	Moderate	Low	Low	Moderate

Assessment options for each signalling question : Yes, Probably, Yes, Probably No, No, No Information.
Domain level RoB assessment options: Low, Moderate, Serious, Critical, No information.
Overall assessment (by outcome): Low, Moderate, Serious, Critical.

Appendix 1. Consensus overall risk of bias ratings by study and corresponding reasons for ranking of included studies.

Sl. N o	Study	Overall RoB Judgements	Comments
1	Andrew IP *et al*., 2020 [18]	Moderate	- Confounders: If not listed in the patient's record, the comorbidity (hypertension, diabetes, chronic lung disease (COPD or asthma), hypertension, cancer, coronary artery disease, cerebrovascular disease, renal failure, and rheumatologic disorder) was recorded as absent. - Appropriate adjustments (by means of propensity score matching) were done while doing the data analysis. - Selection of participants, there is moderate age difference between the TCZ groups and control group.
2	Biran N *et al*., 2020 [44]	Moderate	- Possibility of indication bias - Possibility of sampling bias since we obtained data from a convenience sample in attempts to do a rapid investigation during a pandemic - misclassifications of data was possible because the data was manually extracted structured and unstructured electronic health records.
3	Campochiaro C *et al*., 2020 [33]	Moderate	- The control and TCZ treatment were given at different frames. Briefly, patients admitted between March 13th and March 19th, 2020 were treated with tocilizumab. While, the patients admitted to hospital outside the time frame (March 13th and March 19th, 2020) and who retrospectively fulfilled eligibility criteria for tocilizumab treatment were used as a comparison group.
4	Canziani LM *et al*., 2020 [36]	Low	- Confounder: difference in onset of symptoms between the treatement and control group.
5	Capra R *et al*., 2020 [21]	Low	- Subject allocation was done appropriately considering the all baseline details and comorbidities.
6	Colaneri M *et al*., 2020 [39]	Moderate	- Confounding influence of steroid therapy on the anti-inflammatory effects of tocilizumab is to be considered. - Missing data is one of the main concern at day-7. - Propensity score matching might be useful in reducing the bias since it mimics randomization.
7	De Rossi N *et al*., 2020 [41]	Moderate	- The control and TCZ treatment were given at different frames. Briefly, patients admitted between 26th February 2020 to 13th March 2020 underwent a standard therapy (hydroxychloroquine 400 mg daily,lopinavir 800 mg daily plus ritonavir 200 mg per day). Patients admitted after 13th March 2020 received off-label a single low dose administration of tocilizumab in addition to standard therapy. - Confounders: the patients treated with standard care were older and with higher prevalence of comorbidities compared to patients treated with tocilizumab. - Control group including patients treated with tocilizumab during the late stage of respiratory failure is missing.
8	Gokhale Y *et al*., 2020 [31]	Moderate	- Confounders: Tocilizumab group had younger patients than control group
9	Guaraldi G *et al*., 2020 [28]	Moderate	- Confounders: Tocilizumab group had younger patients than control group. - In the tocilizumab group, there were two patients with cancer and two patients with renal insufficiency, and in the standard of care group, there were eight patients with cancer and seven with chronic renal insufficiency. - The study was also open label, so that staff involved knew which patients were receiving tocilizumab. - The patients who received tocilizumab + standard of care treatment were mainly selected based on the availability of the drug and they were more compromised patients with lower PaO2/FiO2 ratios and higher SOFA scores compared with those treated with standard of care alone. However, these differences were balanced through adjusting the SOFA and Charlson Comorbidity Index.
10	Kewan T *et al*., 2020 [30]	Moderate	- Confounders: Tocilizumab group had younger patients than control group. - Confounders: Tocilizumab group had more comorbidities than control group.
11	Klopfenstein T *et al*., 2020 [25]	Low	- Confounders: the control group had younger patients than the Tocilizumab group. However not statistically significant.
12	Martínez-Sanz J *et al*., 2020 [23]	Moderate	- Use of CRP instead of IL-6 limited the scope of the results.
13	Mikulska M *et al*., 2020 [29]	Low	- The inclusion of consecutive patients using the same SOC but not treated with tocilizumab or methylprednisolone, and adjustment for the outcome-associated variables, allowed to note the improvement in patient outcomes. - The adjustment for the differences between patient groups through propensity score and conservative approach with the use of landmark analysis were directly at minimising the risk associated with an absence of randomization.

Sl. N o	Study	Overall RoB Judgements	Comments
14	Moreno-García E *et al*., 2020 [22]	Moderate	- 50.6% of Toclizumab group subjects have received steroid prior ICU admission, however, it was 27.7% in control group.
15	Moreno-Pérez O *et al*., 2020 [42]	Moderate	- Misclassifications of data was possible because the data was manually extracted structured and unstructured electronic health records.
16	Pettit NN *et al*., 2020 [37]	Moderate	- Confounding influence: differences in baseline characteristics and length of stay. - Possibility of selection and allocation bias. However, to avoid the bias clinical score matching such as SOFA or APACHE II was performed.
17	Quartuccio L *et al*., 2020 [38]	Serious	- The baseline values (data) for some of the subjects was not available since these patients were transferred from other hospitals due to emergency. - About 50% of the TCZ group were admitted to the ICU within 24 h from admission, thus they already presented a more serious disease at the time of admission. - The viral load measurement was not available, while viral clearance was finally assessed by repeating swab test in almost all the patients.
18	Ramaswamy M *et al*., 2020 [43]	Moderate	- The patients allocated to TCZ group are slightly older and sicker than control group. - This study has possible inclusion or selection bias. - There was missing laboratory values for some of the patients.
19	Rojas-Marte G *et al*., 2020 [34]	Serious	- The control and treatment groups were not matched. - Confounding: More patients in the TCZ group were of male sex, reported more fever, cough and shortness of breath and with lower oxygen saturation
20	Rossi B *et al*., 2020 [19]	Moderate	- The control and treatment groups were not matched. The patients in the SOC group were older than TCZ treated group. However, multivariate Cox proportional hazard model was applied to remove the potential biasing effect of these unmatched variables on the primary results. - An additional control group, including patients treated with tocilizumab during the late stage of respiratory failure is missing. - Confounding factors: The patient's inclusion strategy applied does not allow definitely ruling out the potential impact of unmeasured and unconscious confounding factors on the results, as for example the acquired clinical experience of managing the disease.
21	Roumier M *et al*., 2020 [24]	Serious	- Confounding factors: the patients allocated to control group are slightly older and more Cardiovascular and cerebrovascular comorbidities than TCZ group.
22	Somers EC *et al*., 2020 [35]	Moderate	- For patients transferred from other hospitals due to emergency, the baseline data on initial period of care and status of toclizumab administration prior to transfer is not consistently available. - Tocilizumab administration protocol was not standardised.
23	Wadud N *et al*., 2020 [40]	Low	- Unclear acquisition of control. causes of death are not clear.
24	Zheng KL *et al*., 2020 [20]	Moderate-	Missing Viral load data.

Reference

STERNE JAC, HERNÁN MIGUEL A, REEVES BC, SAVOVIĆ J, BERKMAN ND, VISWANATHAN M *et al*.: ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ* 2016; 355 :i4919. https://doi.org/10.1136/bmj.i4919

Appendix 2. Search strategy.

1. Search strategy using PUBMED

Sl No.	Search Terms	Results
1	'Coronavirus disease 2019' OR 'Coronavirus infection' OR 'Coronavirus' OR 'SARS COV-2' OR 'nCOV 2019' 'Severe acute respiratory syndrome COV 2'	112565
2	'Tocilizumab' OR 'Interleukin-6 inhibitors' OR 'Cytokine storm' OR 'COVID-19 treatment'	13178
3	1 AND 2	613
4	3 NOT ('Meta-analysis' OR 'Practice guideline' OR 'Systematic review' OR)	550
5	4 NOT ('Newsletters' OR 'Commentaries' OR 'Opinions' OR 'Editorial' OR 'letter to the editor' OR 'Short survey')	475

2. Search strategy using GOOGLE SCHOLAR

Sl No.	Search Terms	Results
1	'Coronavirus disease 2019' OR 'Coronavirus infection' OR 'Coronavirus' OR 'SARS COV-2' OR 'nCOV 2019' 'Severe acute respiratory syndrome COV 2'	2013421
2	'Tocilizumab' OR 'Interleukin-6 inhibitors' OR 'Cytokine storm' OR 'COVID-19 treatment'	18252
3	1 AND 2	578
4	3 NOT ('Meta-analysis' OR 'Practice guideline' OR 'Systematic review' OR)	441
5	4 NOT ('Newsletters' OR 'Commentaries' OR 'Opinions' OR 'Editorial' OR 'letter to the editor' OR 'Short survey')	370