

Original Article

Assessment of quality of reporting meta-analysis and systematic review of pharmacotherapy of COVID-19 using preferred reporting items for systematic reviews and meta-analyses 2020 statement

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ABSTRACT

This research aimed to evaluate how well systematic reviews and meta-analyses (MAs) on COVID-19 pharmacotherapy adhered to the Preferred Reporting Items for Systematic Reviews and MAs (PRISMA) 2020 reporting guidelines. Fourteen studies published between January 2022 and June 25, 2023, in PubMed were analysed. Reporting quality in both abstracts and full texts was analysed using the PRISMA 2020 checklist. Two types of scores were performed: one evaluating the 26-item score with merged subgroups, and another evaluating the 41-item score with unmerged subgroups. The characteristics of these MAs revealed that the number of studies included ranged from 6 to 34, while the journal impact factors varied from 1.8 to 76.2. Most MAs (12/14) applied the Cochrane Handbook to evaluate quality and risk of bias. On average, each meta-analysis had 8.43 authors and 8010.93 participants. The mean score of PRISMA items was 91.20 ± 7.14 for the 26 score and 87.80 ± 8.81 for the 41 score in 14 MAs. Regarding the PRISMA items percentage score, 17 PRISMA items were 100% reported. However, certain items, such as registration and protocol (50%) and certainty assessment (57.14%) were less reported. For abstracts, three sub-items were 100% reported, while limitations of evidence (14.28%) and funding (21.42%) were the least reported. There was no statistically significant difference between the mean scores from the two scoring methods ($P = 0.27$). A positive correlation was observed between the PRISMA score and the number of authors ($P < 0.05$). Linear regression analysis was performed for 26 items ($P = 0.051$) and for 41 items ($P = 0.042$), and linearity was established. No significant differences were found between MAs with higher PRISMA scores ($\geq 24/26$ and $\geq 36/41$) and lower PRISMA scores ($\leq 23/26$ and $\leq 35/41$), MAs with and without PRISMA endorsement, and among those using different bias assessment tools for both models. There was no significant correlation between the PRISMA score and the guidance tool for quality and risk of bias assessment ($P = 0.45 < 0.05$) for both scores. A Chi-square test also indicated no significant correlation between the use of risk assessment tools and PRISMA scores ($P = 0.45$). The compliance is good for the 26-item score analysis as compared to 41 items. The protocol and registration item have suboptimal compliance. The study supports mandating PRISMA adherence during article submissions. The number of authors significantly influences reporting quality, highlighting the need for universal adherence to PRISMA guidelines to meet essential reporting standards. Greater emphasis should be placed on the risk of bias assessment and outcomes as critical components of reporting quality.

Keywords: COVID-19, Meta-analyses, Preferred reporting items for systematic reviews and meta-analyses 2020, Reporting quality, Systematic review

INTRODUCTION

The global impact of the COVID-19 pandemic has catalysed an unprecedented volume of research focused on identifying effective treatment options, leading to an increase in clinical trials

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and subsequent meta-analyses (MAs). These MAs, which combine data from randomised controlled trials (RCTs), play a vital role in generating evidence to guide clinical practice. However, the reliability and utility of these MAs depend on transparent and comprehensive reporting, a critical aspect addressed by the Preferred Reporting Items for Systematic Reviews and MAs (PRISMA) statement.^[1]

As researchers continue to grapple with the complexities of COVID-19, the years 2022–2023 are expected to be marked by fruitful research aimed at improving our understanding of effective treatment modalities.^[2] The new study seeks to assess the quality of meta-analysis reports published during this period using the PRISMA statement as a rigorous evaluation framework.^[3]

The abundance of clinical trials and subsequent MAs presents an opportunity to gain valuable insights into treatment options for COVID-19. However, the validity and generalisability of these findings largely depend on the clarity and completeness of the reports. Inadequate reporting can cause bias, hinder reproducibility and impede the translation of research findings into applicable clinical guidelines.^[4]

As the dynamic landscape of the pandemic unfolds, it is imperative to critically evaluate the quality of meta-analysis reports. MAs conducted between 2022 and 2023 summarise the latest developments in research into the treatment of COVID-19, making this period an ideal focus for evaluating reporting practices. Such assessment is essential to recognise patterns, identify potential biases and facilitate improvements in reporting standards.^[5]

MAs have a substantial impact, shaping clinical decisions and informing public health strategies. Robust reporting not only strengthens the credibility of MAs but also makes the translation of research into practical knowledge more efficient. Through the lens of the PRISMA statement, this study aims to identify specific aspects of reporting that can benefit from standardisation and provide a basis for greater transparency and reliability.^[6]

Careful assessment of the quality of reporting is critical to advancing evidence-based practice for the treatment of COVID-19. Transparent reporting not only instils confidence in the synthesised evidence but also facilitates accurate interpretation and comparison of results across studies. In the context of a rapidly evolving pandemic, where timely and informed clinical decisions are paramount, the reliability of synthesised evidence is of the utmost importance.^[6]

MATERIALS AND METHODS

This evaluation focused on examining the reporting standards of MAs based on RCTs, specifically concerning COVID-19 pharmacotherapy. The PRISMA 2020 guidelines served as

the framework for assessing whether the selected studies presented their methodology and procedures with sufficient transparency. This evaluation is specifically confined to meta-analysis with a systematic review. Furthermore, it exclusively considers studies employing RCT designs. The assessment entails scrutinising the quality of reporting MAs through PRISMA scoring and rigorous statistical analysis.

Ethical consideration

As the study did not involve human participants or patient data, institutional ethical approval was deemed unnecessary.

Eligibility criteria

All included meta-analyses in this study had to fulfil the following criteria:

- The MAs are published in the English language
- The MAs are freely accessible full-text articles
- The MAs contain only quantitative analysis (i.e. meta-analysis)
- The MAs analysed RCTs only
- The MAs investigate the pharmacotherapy of COVID-19
- The MAs published from 1st January 2022 to 25th June 2023.

Exclusion criteria

- Any other study design type, for example, retrospective studies, preclinical studies, cohort studies, case-cohort studies
- Any other topic relevant to COVID-19, but not applicable to the pharmacotherapy of COVID-19
- Any systematic review without a meta-analytic assessment.

Search strategy

Utilising PubMed as our primary electronic database, we systematically searched for relevant literature spanning from January 2022 to 25th June 2023. The initial screening process involved a thorough examination of titles and abstracts, filtered by publication date and language. The initial search terms involved: (“COVID-19” [MeSH]) AND “COVID-19 Drug Treatment” [MeSH] AND meta-analysis AND Systematic Review NOT network.

Data extraction

The initial query returned 197 studies, from which 166 were excluded following eligibility assessment, leaving 31 for full review. Fourteen MAs met all criteria and were included for final evaluation. Four-phase flow diagram summarises this process [Figure 1]. The 27-item checklist of PRISMA 2020 was determined for each meta-analysis.

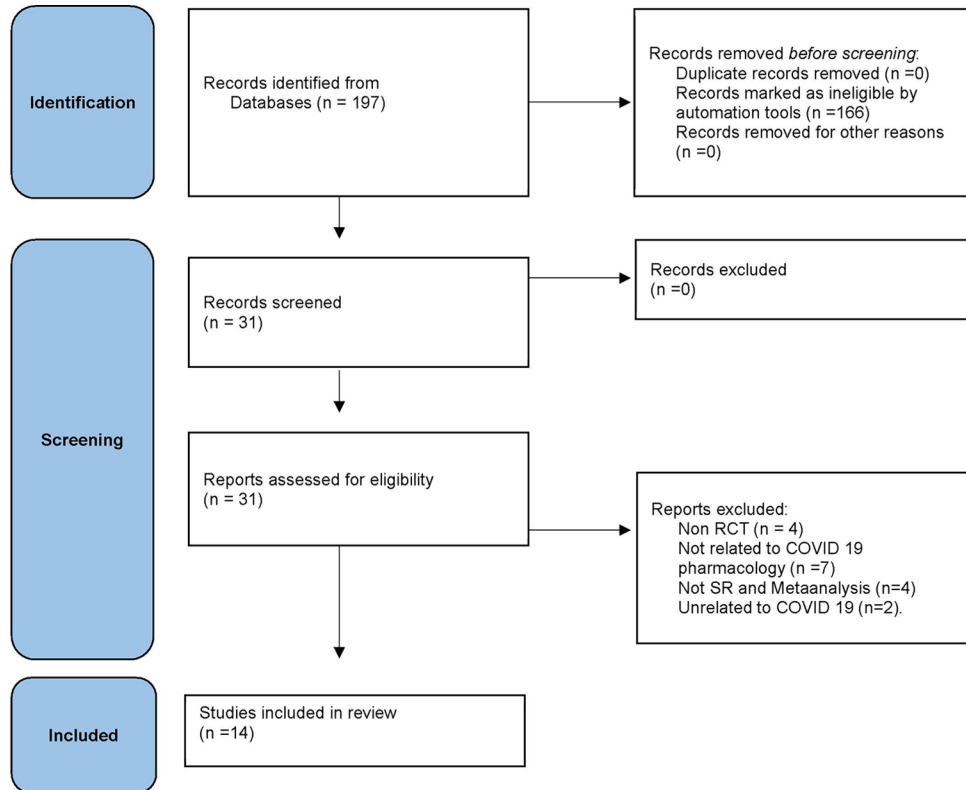


Figure 1: Preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 flow diagram. RCT: Randomized Controlled Trials, SR: Systematic Reviews.

PRISMA guideline adherence

The PRISMA 2020 checklist was used to score the quality of reporting. The included articles were read and assessed independently by three authors (BP, BK, SS). We evaluated the number of items of the PRISMA checklist that were adequately reported. For scoring, two models were used: the Merged model: 26-item score (excluding abstract, with sub-items grouped) and the unmerged model: 41-item score (with each sub-item scored individually). The total number of items on the PRISMA checklist is 27; however, item 2 (Abstract) was scored separately (see PRISMA for Abstracts adherence). The score assigned to each item was either 0 or 1. Zero represents the lack of adequate reporting, and one was assigned to papers where the reporting was sufficiently accurate. The total maximum score is 26/26 (100%), and the total minimum score is 0/26 (0%) for PRISMA 2020. In the PRISMA 2020 statement, there are many sub-items, so we assigned a score to each sub-item, excluding the abstract. The maximum score is 41/41 (100%) and the minimum score is 0/41 (0%) for PRISMA 2020. Finally, we have two scores: one is a 27-item score where sub-items were merged, and the other is a 42-item score without merging sub-items. Any discrepancies in reviewer scoring were resolved by consensus.

PRISMA for abstracts adherence

Each abstract was evaluated using the 12-item PRISMA for Abstracts checklist. The same three reviewers independently scored each item. The score assigned to each item was either 0 or 1. Zero represents the lack of adequate reporting, and one was assigned to papers where the reporting was sufficiently accurate. Differences were discussed and resolved jointly.

Statistical analysis

The score was calculated as a percentage of individual items. Data were analysed by software (Medcalc[®] trial version). A significance level of $P < 0.05$ was set. An unpaired t test was applied to find out the statistically significant difference between the 27-item score and the 42-item score. The Pearson correlation 'r' was calculated for the investigation of the correlation between the PRISMA score and other variables. Subgroup multivariate analysis was conducted by statistical software (IBM Statistical Package for the Social Sciences Software[®] trial version) to explore associations between PRISMA adherence and reporting characteristics, including differences between studies with high ($\geq 24/26$ and $\geq 36/41$) and low ($\leq 23/26$ and $\leq 35/41$) PRISMA scores.

RESULTS

Characteristic of the meta-analysis included

Totally 14 meta-analyses met the predefined inclusion criteria.^[6-19] The key features of the meta-analysis are shown in Table 1. The number of studies incorporated per MAs ranged from 6 to 34. The average number of studies was 13.21. The journals in which these reviews were published had journal impact factors (JIFs) ranging from 1.8 to 76.2, and the mean JIF was 12.50. Twelve reviews adhered to the Cochrane Handbook for assessing methodological quality and bias, whereas the remaining two utilised either the Jadad scale or the GRADE approach. The number of authors who contributed per MAs ranged from 3 to 35. The mean number of studies was 8.43. The total number of patients per MAs ranged from 293 to 23,550. The mean number of patients was 8010.93. Only 2 out of the 14

studies explicitly stated that they endorsed the PRISMA statement.

PRISMA compliance overview

As presented in Table 2, 17 PRISMA checklist items demonstrated full (100%) compliance across all included MAs. However, Item 24 (protocol and registration) was reported in only 50% of the studies, while Item 15 (Certainty assessment) showed 57.14% compliance. Regarding the abstracts, three checklist components were fully addressed in all articles, while sub-item 2i (Limitations of evidence) and sub-item 2k (Funding sources) were reported in just 14.28% and 21.42% of cases, respectively.

Difference in means score based on PRISMA models

To detect the difference in mean score, two models were used: the Merged model: 26-item score (excluding abstract, with

Table 1: Summary of meta-analysis characteristics.

Sr. No.	Meta analysis	Journal	Impact factor	No. of authors	No. studies	PRISMA endorsement	No of patients	Assessment tool for risk of bias and quality reporting
1	Xabier García-Albéniz ^[12]	European Journal of Epidemiology	12.44	5	11	No	9736	Cochrane risk of bias tool for randomised trials
2	Arthur M.Albuquerque ^[13]	Clinical Microbiology and Infection	14.2	7	27	No	13549	Cochrane risk of bias tool for randomised trials
3	Ahmed M. Kamel ^[14]	Wiley Online Library	22.7	5	6	No	8822	Cochrane risk of bias tool for randomised trials
4	Jingwen Peng ^[15]	Ageing	5.9	8	10	No	6520	Cochrane risk of bias tool for randomised
5	Hyun-Jun Lee ^[7]	International Journal of Environmental Research and Public Health	4.6	5	34	No	23550	Cochrane risk of bias tool for randomised trials
6	Adrian V.Hernandez ^[16]	American Journal of Medicine	5.9	10	27	No	8253	Cochrane risk of bias tool for randomised trials
7	Stefanie Reis ^[17]	Thrombosis Research	10.4	7	13	Yes	7364	GRADE methodology
8	Shao-Huan Lan ^[18]	Annals of Medicine	4.4	5	7	No	1650	Cochrane risk of bias tool for randomised trials
9	Cong-wen Yang ^[11]	Frontiers in Immunology	7.3	5	10	No	293	Modified Jadad scale
10	Samiksha Gupta ^[6]	J Investig Med	2.89	5	6	No	3013	Cochrane risk of bias tool for randomised trials
11	Paula Ribeiro Lopes Almeida ^[8]	Sao Paulo Med J	1.8	7	8	No	6139	Cochrane risk of bias tool for randomised trials
12	Chia Siang Kow ^[10]	Immunopharmacology and Immunotoxicology J	3.7	3	9	No	9565	Cochrane risk of bias tool for randomised trials
13	Rosa Lucchetta ^[19]	Erq bras Cardiol	2.6	11	8	No	3219	Cochrane risk of bias tool for randomised trials
14	Alain Amstutz ^[9]	Lancet Respir Med	76.2	35	9	Yes	10480	Cochrane risk of bias tool for randomised trials

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

Table 2: PRISMA compliance across 14 meta-analyses.

Section	No.	PRISMA item (definition)	Percentage of PRISMA score
Title	1	Title	100
Abstract	2	Abstract	92.86
	2a	Title	100
	2b	Objectives	92.85
	2c	Eligibility criteria	28.57
	2d	Information sources	78.58
	2e	Risk of bias	35.74
	2f	Synthesis of results	92.85
	2g	Included studies	92.85
	2h	Synthesis of results	100
	2i	Limitations of evidence	14.28
	2j	Interpretation	100
	2k	Funding	21.42
	2l	Registration	28.57
Introduction	3	Rationale	100
	4	Objectives	100
Methods	5	Eligibility criteria	100
	6	Information sources	100
	7	Search strategy	100
	8	Selection process	100
	9	Data collection process	100
	10	Data item	100
	10a		100
	10b		92.86
	11	Study risk of bias assessment	100
	12	Effect measures	100
	13	Synthesis methods	100
	13a		92.86
	13b		64.29
	13c		92.86
	13d		100
13e		92.86	
13f		64.29	
14	Reporting bias assessment	78.57	
15	Certainty assessment	57.14	

(Contd...)

Table 2: (Continued).

Section	No.	PRISMA item (definition)	Percentage of PRISMA score
Result	16	Study selection	100
	16a		100
	16b		100
	17	Study characteristics	100
	18	Risk of bias in studies	100
	19	Results of individual studies	100
	20	Results of syntheses	92.86
	20a		100
	20b		92.86
	20c		92.86
	20d		71.43
	21	Reporting biases	85.71
Discussion	22	Certainty of evidence	85.71
	23	Discussion	100
	23a		100
	23b		92.86
	23c		64.29
Other information	23d		100
	24	Registration and protocol	50
	24a		57.14
	24b		42.86
	24c		57.14
	25	Support	85.71
	26	Competing interests	64.29
27	Availability of data, code and other materials	71.43	

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

sub-items grouped) and the unmerged model: 41-item score (with each sub-item scored individually). As shown in Table 3, the mean score of PRISMA items was 91.20 ± 7.14 for 26-item model and 87.80 ± 8.81 for 41-item model in 14 MAs. Shapiro-Wilk tests confirmed normal data distribution ($P = 0.05$), and the unpaired t -test showed no statistically significant difference between the two scoring approaches ($P = 0.27 > 0.05$).

Correlation between score of PRISMA items and number of studies, number of authors, number of patients, year of publication and JIFs

There was a significant positive correlation observed between PRISMA score and number of authors, as shown in Table 4.

Table 3: PRISMA score of individual meta-analyses by two models.

Sr. No	Meta-analysis	PRISMA score (out of 26)	Percentage of score	PRISMA score (out of 41)	Percentage of score
1	Xabier García-Albéniz	21	80.7692	30	73.1707
2	Arthur M. Albuquerque	26	100	41	100
3	Ahmed M. Kamel	24	92.3077	38	92.6829
4	Jingwen Peng	23	88.4615	33	80.4878
5	Hyun-Jun Lee ^[7]	23	88.4615	35	85.3659
6	Adrian V. Hernandez	25	96.1538	38	92.6829
7	Stefanie Reis	26	100	38	92.6829
8	Shao-Huan Lan	22	84.6154	34	82.9268
9	Cong-wen Yang ^[11]	22	84.6154	34	82.9268
10	Samiksha Gupta	23	88.4615	34	82.9268
11	Paula Ribeiro Lopes Almeida ^[8]	24	92.3077	36	87.8049
12	Chia Siang Kow ^[10]	21	80.7692	31	75.6098
13	Rosa Lucchetta	26	100	41	100
14	Alain Amstutz ^[9]	26	100	41	100

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

Table 4: Correlation analysis between PRISMA score and study characteristics.

Correlation between PRISMA % score with variables	PRISMA % score (26 score)			PRISMA % score (41 score)		
	Correlation coefficient	P-value	Significance (P<0.05)	Correlation coefficient	P-value	Significance (P<0.05)
Year of publication	0.355	0.21	No	0.379	0.18	No
Number of authors	0.53	0.05	Yes	0.549	0.04	Yes
Number of studies	0.229	0.43	No	0.213	0.46	No
Number of patients	0.106	0.71	No	0.095	0.74	No
Journal impact factor	0.382	0.17	No	0.441	0.11	No

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

Further regression analysis [Table 5] confirmed linear relationships between PRISMA adherence and other study characteristics ($P < 0.05$).

Multivariate analysis between: High versus low PRISMA scores

Using high ($\geq 24/26$ and $\geq 36/41$) and low ($\leq 23/26$ and $\leq 35/41$) PRISMA score thresholds, a multivariate analysis was conducted to examine continuous variables such as number of authors, number of studies, patient population, publication year and JIFs. No significant differences were observed [Table 6].

Difference in means scores based on PRISMA endorsement

Our data follow normal distribution (normality test resulted in $P = 0.552 > 0.05$) and an unpaired t -test

showed a nonsignificant difference in this outcome ($P = 0.147 > 0.05$).

Multivariate analysis between MAs with and without PRISMA endorsement

Using PRISMA endorsement status, a multivariate analysis was conducted to examine continuous variables such as number of authors, number of studies, patient population, publication year and JIFs. No significant associations across the variables were observed [Table 7].

Difference in means score based on assessment tools for risk of bias and reporting quality

The normality test resulted in $P = 0.474 > 0.05$ and thus follows normal distribution (normality test $P = 0.474 > 0.05$), and the unpaired t -test showed no significant difference based on assessment tools ($P = 0.552 > 0.05$).

Table 5: Regression model outputs.

Model ANOVA	Sum of squares	Df	Mean square	F	Significance
26 score					
Regression	185.994	1	185.994	4.684	0.051 ^b
Residual	476.490	12	39.707		
Total	662.484	13			
41 score					
Regression	304.311	1	304.311	5.167	0.042 ^b
Residual	706.776	12	58.898		
Total	1011.088	13			
a. Dependent variable: PRISMA					
b. Predictors: (Constant), author					
ANOVA: Analysis of variance, Df: Degree of freedom, F: F-statistics, PRISMA: Preferred reporting items for systematic reviews and meta-analyses					

Multivariate analysis between MAs according to assessment tools for risk of bias and reporting quality

Using assessment tools, a multivariate analysis was conducted to examine continuous variables such as number of authors, number of studies, patient population, publication year and JIFs. Indicated no meaningful variation based on the chosen risk-of-bias frameworks [Table 8].

Subgroup comparisons between high and low PRISMA scoring groups, stratified by the type of bias assessment tool, revealed no statistically significant associations ($P = 0.45 < 0.05$) for both scores.

DISCUSSION

Considering the pyramid of evidence-based medicine, systematic reviews (SRs) and meta-analyses (MAs) are at the top and provide high-level information and evidence about healthcare interventions. They synthesise findings from multiple studies, offering comprehensive insights into clinical interventions and informing evidence-based guidelines. MAs, in particular, aggregate effect sizes across studies, yielding more precise estimates through weighted data analysis.^[20]

The guidance tool called the PRISMA statement was published in 2009.^[20] The 2020 revision comprises 27 main items and a structured four-phase flow diagram to enhance transparency and reproducibility. To the best of our knowledge, this study is the first to assess the quality of reporting of SRs and MAs of pharmacotherapy of COVID-19 using PRISMA 2020 statement where apart from assign scoring to the main items in checklist we also assign scoring to the sub-items and compare the both scores to see that assign the scoring to the sub-items have play any role for the assessment of quality of reporting of SRs and MAs.

The median compliance of this assessment was 17 out of 26 items (65.38%) or 20 out of 41 items (48.78%). In the 26-item analysis comparison with Gundogan *et al.*, it was 83% in Cochrane and 73% in non-Cochrane-based articles. Also, in Tounakaki *et al.*'s study, the mean score of PRISMA items was 23.2/27 (86.1%), and in Peters *et al.*'s journal, the mean item reported in 5 journals was 54.4% and the CDSR journal reported 100%.^[20-22] In comparison to the our 42-item score analysis, a study done by Park *et al.*, which identified 24 items reported in <80% articles.^[23] It is notably higher compared to previous studies in other fields. This result may reflect an overall improvement in the adherence to the PRISMA statement by authors over time. In addition, it suggests that the mandatory requirement by journal editors and reviewers for PRISMA statement compliance as a condition for manuscript acceptance has contributed to enhanced reporting quality.^[20]

However, compliance was suboptimal in several areas, such as registration information (57.14%), protocol accessibility (42.85%), and amendment details (57.14%), all this included in protocol and registration which scored 52.38% in our finding which is similar to study done by Gundogan *et al.* reported 53% and higher than compared to study done by Park *et al.* (0%) and Tounakaki *et al.* (41.60%).^[20,21,23] Certainty assessment in our study reported 57.14% which is lower than the study done by Gundogan *et al.* (63%) but higher than the study done by Park *et al.* (9%).^[21,23] The insufficient reporting of protocol and registration details is consistent with findings from previous studies in other fields.^[22,23] In contrast, bias assessment in both methodology (78.57%), which is lower than Gundogan *et al.* (96%) but higher than that of the study done by Park *et al.* (65%) and Tounakaki *et al.* (55.50%).^[20,21,23] Bias results reporting (85.71%), which is similar to the study done by Gundogan *et al.* (88%) but higher than the study done by Park *et al.* (65%) and Tounakaki *et al.* (55.50%), as well as robustness evaluation (71.42%), which is higher than the study done by Park *et al.* (28%), showed higher compliance compared to other investigations.^[20,21,23] The use of structured bias assessment tools is essential for improving MA reliability and clinical applicability. In evidence-based medicine, the ability to evaluate methodological quality is vital for translating findings into practice.

Correlation analysis between PRISMA score % with various parameters of our study shows positive correlation between the number of authors and PRISMA score % ($r = 0.53$, $P < 0.05$) in comparison with the study done by Tounakaki *et al.*, which reported there is no correlation, but there is a positive correlation with JIFs in Tounakaki *et al.*'s study ($r = 0.792$, $P = 0.002$), but not significant in our study. Regression analysis of PRISMA score % and number of authors in both 26 items and 41 items shows there is a significant relation in 41 items ($F = 5.167$, $P < 0.05$) but no significant relation in 26 items ($F = 4.684$, $P > 0.05$).^[20]

Table 6: Multivariate analysis between PRISMA high score with PRISMA low score MAs.

Continuous variables	PRISMA % score (26 score)		PRISMA % score (41 score)	
	Hotelling's trace P value	Significance	Hotelling's trace P value	Significance
Number of studies, number of authors, number of patients, year of publication, journal impact factor	0.8	No	0.8	No
Number of studies, number of authors, number of patients, year of publication	0.66	No	0.65	No
Number of studies, number of authors, year of publication, journal impact factor	0.66	No	0.67	No
Number of authors, number of patients, year of publication, journal impact factor	0.66	No	0.69	No
Number of studies, number of patients, year of publication, journal impact factor	0.66	No	0.69	No
Number of studies, number of authors, number of patients, journal impact factor	0.66	No	0.66	No
Number of studies, number of authors, year of publication	0.5	No	0.48	No
Number of authors, number of patients, year of publication	0.5	No	0.5	No
Number of authors, year of publication, journal impact factor	0.5	No	0.5	No
Number of studies, number of authors, number of patients	0.5	No	0.47	No
Number of studies, number of authors, journal impact factor	0.5	No	0.5	No
Number of studies, number of patients, journal impact factor	0.5	No	0.53	No
Number of patients, year of publication, journal impact factor	0.56	No	0.58	No
Number of authors, number of patients, journal impact factor	0.5	No	0.53	No
Number of studies, year of publication, journal impact factor	0.56	No	0.56	No
Number of studies, number of patients, year of publication	0.79	No	0.79	No
Number of authors, year of publication	0.29	No	0.29	No
Number of studies, year of publication	0.58	No	0.58	No
Number of patients, year of publication	0.58	No	0.58	No
Year of publication, journal impact factor	0.36	No	0.36	No
Number of studies, number of authors	0.32	No	0.29	No
Number of authors, number of patients	0.32	No	0.32	No
Number of authors, journal impact factor	0.32	No	0.32	No
Number of studies, number of patients	0.95	No	0.95	No
Number of studies, journal impact factor	0.41	No	0.42	No
Number of patients, journal impact factor	0.47	No	0.47	No

PRISMA: Preferred reporting items for systematic reviews and meta-analyses, MAs: Meta-analysis

The final primary outcome examined the association between high PRISMA scores ($\geq 24/26$ and $\geq 36/41$) and low PRISMA scores ($\leq 23/26$ and $\leq 35/41$) in MAs with various combination of variables such as the number of studies, number of authors, number of patients, year of publication and JIFs ($P = 0.8$ for 26 and 41 item). Similarly, multivariate analysis showed no meaningful relationship between the type of bias assessment tool and PRISMA compliance ($P = 0.93$ for 26 items; $P = 0.87$ for 41 items).

Analysis by PRISMA endorsement status also showed no significant correlation with overall reporting quality ($P = 0.41$ for 26 items; $P = 0.97$ for 41 items). However, one notable finding was that a combination of JIFs and PRISMA score (26-item) correlated significantly with endorsement status ($P = 0.02$), suggesting that higher-impact journals may enforce stronger compliance.

This study also conducted a separate assessment of PRISMA for Abstract items. Abstract reporting showed

Table 7: Comparison of variables by PRISMA endorsement status.

Continuous variables	PRISMA % score (26 score)		PRISMA % score (41 score)	
	Hotelling's trace P value	Significance	Hotelling's trace P value	Significance
Number of studies, number of authors, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.41	No	0.97	No
Number of studies, number of authors, number of patients, year of publication, journal impact factor	0.29	No	0.93	No
Number of studies, number of authors, number of patients, year of publication, percentage PRISMA score	0.29	No	0.93	No
Number of studies, number of authors, number of patients, journal impact factor, percentage PRISMA score	0.26	No	0.96	No
Number of studies, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.27	No	0.93	No
Number of authors, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.26	No	0.95	No
Number of studies, number of authors, number of patients, year of publication,	0.19	No	0.84	No
Number of studies, number of authors, year of publication journal impact factor	0.17	No	0.87	No
Number of studies, number of authors, year of publication, percentage PRISMA score	0.17	No	0.87	No
Number of authors, number of patients, year of publication, journal impact factor,	0.17	No	0.88	No
Number of authors, number of patients, year of publication, percentage PRISMA score	0.18	No	0.87	No
Number of authors, year of publication, journal impact factor, percentage PRISMA score	0.14	No	0.88	No
Number of studies, number of patients, year of publication, journal impact factor	0.18	No	0.83	No
Number of studies, number of patients, year of publication, percentage PRISMA score	0.52	No	0.85	No
Number of studies, year of publication, journal impact factor, percentage PRISMA score	0.15	No	0.88	No
Number of patients, year of publication, journal impact factor, percentage PRISMA score	0.15	No	0.87	No
Number of studies, number of authors, number of patients, journal impact factor	0.17	No	0.91	No
Number of studies, number of authors, number of patients, percentage PRISMA score	0.17	No	0.91	No
Number of authors, number of patients, journal impact factor, percentage PRISMA score	0.14	No	0.96	No
Number of studies, number of authors, journal impact factor, percentage PRISMA score	0.14	No	0.97	No
Number of studies, number of patients, journal impact factor, percentage PRISMA score	0.15	No	0.92	No
Number of studies, number of authors, year of publication	0.10	No	0.74	No
Number of authors, number of patients, year of publication	0.10	No	0.74	No
Number of authors, year of publication, journal impact factor	0.08	No	0.74	No
Number of authors, year of publication, percentage PRISMA score	0.08	No	0.74	No

(Contd...)

Table 7: (Continued).

Continuous variables	PRISMA % score (26 score)		PRISMA % score (41 score)	
	Hotelling's trace P value	Significance	Hotelling's trace P value	Significance
Number of studies, number of patients, year of publication	0.62	No	0.7	No
Number of studies, year of publication, journal impact factor	0.09	No	0.74	No
Number of studies, year of publication, percentage PRISMA score	0.48	No	0.74	No
Number of patients, year of publication, journal impact factor	0.09	No	0.74	No
Number of patients, year of publication, percentage PRISMA score	0.54	No	0.73	No
Year of publication, journal impact factor, percentage PRISMA score	0.07	No	0.74	No
Number of studies, number of authors, number of patients	0.09	No	0.8	No
Number of studies, number of authors, journal impact factor	0.08	No	0.9	No
Number of studies, number of authors, percentage PRISMA score	0.08	No	0.91	No
Number of authors, number of patients, journal impact factor	0.08	No	0.92	No
Number of authors, number of patients, percentage PRISMA score	0.09	No	0.92	No
Number of authors, journal impact factor, percentage PRISMA score	0.06	No	0.91	No
Number of studies, number of patients, journal impact factor	0.09	No	0.81	No
Number of studies, number of patients, percentage PRISMA score	0.41	No	0.88	No
Number of studies, journal impact factor, percentage PRISMA score	0.07	No	0.94	No
Number of patients, journal impact factor, percentage PRISMA score	0.07	No	0.94	No
Number of authors, year of publication,	0.04	Yes	0.52	No
Number of studies, year of publication,	0.61	No	0.52	No
Number of patients, Year of publication	0.69	No	0.52	No
Year of publication, journal impact factor	0.03	Yes	0.53	No
Year of publication, percentage PRISMA score	0.33	No	0.52	No
Number of studies, number of authors	0.04	Yes	0.77	No
Number of authors, number of patients	0.04	Yes	0.82	No
Number of authors, journal impact factor	0.03	Yes	0.78	No
Number of authors, percentage PRISMA score	0.03	Yes	0.79	No
Number of studies, number of patients	0.72	No	0.8	No
Number of studies, journal impact factor	0.03	Yes	0.85	No
Number of studies, percentage PRISMA score	0.32	No	0.82	No
Number of patients, journal impact factor	0.03	Yes	0.91	No
Number of patients, percentage PRISMA score	0.36	No	0.83	No
Journal impact factor, percentage PRISMA score	0.02	Yes	0.83	No

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

an average compliance rate of 65.48%. In line with these findings, a study done by Hopewell *et al.* identified several inadequately reported items in conference abstracts, including key aspects such as participant information, adverse effects, study strengths and limitations and funding sources.^[24] This highlights ongoing gaps in abstract reporting that may influence the clarity and transparency of research findings.

The inclusion of MAs which analysed only RCTs is one of the key strengths of this study, but along with it, the COVID-19

pandemic presented challenges such as limited time and available data, which may have impacted the quality of reporting in some cases.

A major limitation of this study is that the high compliance (100%) in 20 PRISMA items could suggest some scoring leniency. Nevertheless, the scoring approach remained stringent and aligned with previous studies when evaluating items related to risk of bias assessment. Another limitation is that the exclusion of unpublished or preprint MAs may introduce publication bias.

Table 8: Comparative analysis based on bias assessment tool used.				
Continuous variables	PRISMA % score (26 score)		PRISMA % score (41 score)	
	Hotelling's trace P value	Significance	Hotelling's trace P value	Significance
Number of studies, number of authors, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.93	No	0.87	No
Number of studies, number of authors, number of patients, year of publication, journal impact factor	0.89	No	0.75	No
Number of studies, number of authors, number of patients, year of publication, percentage PRISMA score	0.88	No	0.91	No
Number of studies, number of authors, number of patients, journal impact factor, percentage PRISMA score	0.86	No	0.76	No
Number of studies, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.88	No	0.88	No
Number of authors, number of patients, year of publication, journal impact factor, percentage PRISMA score	0.96	No	0.91	No
Number of studies, number of authors, number of patients, year of publication,	0.81	No	0.8	No
Number of studies, number of authors, year of publication journal impact factor	0.79	No	0.99	No
Number of studies, number of authors, year of publication, percentage PRISMA score	0.76	No	0.99	No
Number of authors, number of patients, year of publication, journal impact factor,	0.82	No	0.84	No
Number of authors, number of patients, year of publication, percentage PRISMA score	0.89	No	0.88	No
Number of authors, year of publication, journal impact factor, percentage PRISMA score	0.97	No	0.99	No
Number of studies, number of patients, year of publication, journal impact factor	0.82	No	0.71	No
Number of studies, number of patients, year of publication, percentage PRISMA score	0.76	No	0.8	No
Number of studies, year of publication, journal impact factor, percentage PRISMA score	0.77	No	0.1	No
Number of patients, year of publication, journal impact factor, percentage PRISMA score	0.9	No	0.91	No
Number of studies, number of authors, number of patients, journal impact factor	0.78	No	0.59	No
Number of studies, number of authors, number of patients, percentage PRISMA score	0.76	No	0.81	No
Number of authors, number of patients, journal impact factor, percentage PRISMA score	0.95	No	0.98	No
Number of studies, number of authors, journal impact factor, percentage PRISMA score	0.9	No	0.81	No
Number of studies, number of patients, journal impact factor, percentage PRISMA score	0.77	No	0.8	No
Number of studies, number of authors, year of publication	0.64	No	0.96	No
Number of authors, number of patients, year of publication	0.8	No	0.76	No
Number of authors, year of publication, journal impact factor	0.93	No	0.97	No
Number of authors, year of publication, percentage PRISMA score	0.91	No	0.97	No

(Contd...)

Table 8: (Continued).

Continuous variables	PRISMA % score (26 score)		PRISMA % score (41 score)	
	Hotelling's trace P value	Significance	Hotelling's trace P value	Significance
Number of studies, number of patients, year of publication	0.66	No	0.63	No
Number of studies, year of publication, journal impact factor	0.67	No	0.99	No
Number of studies, year of publication, percentage PRISMA score	0.59	No	0.99	No
Number of patients, year of publication, journal impact factor	0.82	No	0.79	No
Number of patients, year of publication, percentage PRISMA score	0.82	No	0.79	No
Year of publication, journal impact factor, percentage PRISMA score	0.94	No	0.99	No
Number of studies, number of authors, number of patients	0.65	No	0.64	No
Number of studies, number of authors, journal impact factor	0.62	No	0.96	No
Number of studies, number of authors, percentage PRISMA score	0.59	No	0.93	No
Number of authors, number of patients, journal impact factor	0.8	No	0.69	No
Number of authors, number of patients, percentage PRISMA score	0.77	No	0.73	No
Number of authors, journal impact factor, percentage PRISMA score	0.91	No	0.95	No
Number of studies, number of patients, journal impact factor	0.69	No	0.64	No
Number of studies, number of patients, percentage PRISMA score	0.59	No	0.65	No
Number of studies, journal impact factor, percentage PRISMA score	0.6	No	0.98	No
Number of patients, journal impact factor, percentage PRISMA score	0.77	No	0.79	No
Number of authors, year of publication,	0.82	No	0.91	No
Number of studies, year of publication,	0.45	No	0.96	No
Number of patients, Year of publication	0.74	No	0.58	No
Year of publication, journal impact factor	0.89	No	0.96	No
Year of publication, percentage PRISMA score	0.84	No	0.99	No
Number of studies, number of authors	0.42	No	0.87	No
Number of authors, number of patients	0.59	No	0.55	No
Number of authors, journal impact factor	0.8	No	0.88	No
Number of authors, percentage PRISMA score	0.77	No	0.88	No
Number of studies, number of patients	0.49	No	0.42	No
Number of studies, journal impact factor	0.46	No	0.92	No
Number of studies, percentage PRISMA score	0.38	No	0.96	No
Number of patients, journal impact factor	0.61	No	0.58	No
Number of patients, percentage PRISMA score	0.62	No	0.58	No
Journal impact factor, percentage PRISMA score	0.81	No	0.96	No

PRISMA: Preferred reporting items for systematic reviews and meta-analyses

CONCLUSION

The compliance is good for the 26-item score analysis as compared to the 41 items. The protocol and registration item have suboptimal compliance. There is a moderate positive association between the score of PRISMA items of individual meta-analyses and the number of authors. We recommend that journals mandate the inclusion of the PRISMA checklist during the submission process to promote consistency and transparency in systematic review reporting. Furthermore, the

number of authors appears to be a significant factor influencing reporting quality. To elevate the standard of published evidence syntheses, stricter adherence to the PRISMA 2020 guidelines is essential, with particular emphasis on clearly documenting risk of bias procedures and outcome assessments.

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REFERENCES

- Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med* 2009;6:e1000097.
- Omary MB, Eswaraka J, Kimball SD, Moghe PV, Panettieri RA Jr., Scotto KW. The COVID-19 pandemic and research shutdown: Staying safe and productive. *J Clin Invest* 2020;130:2745-8.
- Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, *et al.* The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
- Glasziou PP, Sanders S, Hoffmann T. Waste in covid-19 research. *BMJ* 2020;369:m1847.
- Luo J, Chen Z, Liu D, Li H, He S, Zeng L, *et al.* Methodological quality and reporting quality of COVID-19 living systematic review: A cross-sectional study. *BMC Med Res Methodol* 2023;23:175.
- Gupta S, Padappayil RP, Bansal A, Daouk S, Brown B. Tocilizumab in patients hospitalized with COVID-19 pneumonia: Systematic review and meta-analysis of randomized controlled trials. *J Investig Med* 2022;70:55-60.
- Lee HJ, Lee JH, Cho Y, Ngoc LT, Lee YC. Efficacy and safety of COVID-19 treatment using convalescent plasma transfusion: Updated systematic review and meta-analysis of randomized controlled trials. *Int J Environ Res Public Health* 2022;19:10622.
- Almeida PR, Person OC, Puga ME, Giusti MF, Pinto AC, Rocha AP, *et al.* Effectiveness and safety of tocilizumab for COVID-19: A systematic review and meta-analysis of randomized clinical trials. *Sao Paulo Med J* 2022;141:168-76.
- Amstutz A, Speich B, Mentre F, Rueegg CS, Belhadi D, Assoumou L, *et al.* Effects of remdesivir in patients hospitalised with COVID-19: A systematic review and individual patient data meta-analysis of randomised controlled trials [published correction appears in *Lancet Respir Med*. 2023 Aug;11(8):e77]. *Lancet Respir Med* 2023;11:453-64.
- Kow CS, Ramachandram DS, Hasan SS. The use of neutralizing monoclonal antibodies and risk of hospital admission and mortality in patients with COVID-19: A systematic review and meta-analysis of randomized trials. *Immunopharmacol Immunotoxicol* 2022;44:28-34.
- Yang CW, Chen RD, Zhu QR, Han SJ, Kuang MJ. Efficacy of umbilical cord mesenchymal stromal cells for COVID-19: A systematic review and meta-analysis [published correction appears in *Front Immunol*. 2024 Jan 04;14:1344990]. *Front Immunol* 2022;13:923286.
- García-Albéniz X, Del Amo J, Polo R, Morales-Asencio JM, Hernán MA. Systematic review and meta-analysis of randomized trials of hydroxychloroquine for the prevention of COVID-19. *Eur J Epidemiol* 2022;37:789-96.
- Albuquerque AM, Eckert I, Tramuja L, Butler-Laporte G, McDonald EG, Brophy JM, *et al.* Effect of tocilizumab, sarilumab, and baricitinib on mortality among patients hospitalized for COVID-19 treated with corticosteroids: A systematic review and meta-analysis. *Clin Microbiol Infect* 2023;29:13-21.
- Kamel AM, Monem MS, Sharaf NA, Magdy N, Farid SF. Efficacy and safety of azithromycin in Covid-19 patients: A systematic review and meta-analysis of randomized clinical trials. *Rev Med Virol* 2022;32:e2258.
- Peng J, She X, Mei H, Zheng H, Fu M, Liang G, *et al.* Association between tocilizumab treatment and clinical outcomes of COVID-19 patients: A systematic review and meta-analysis. *Aging (Albany NY)* 2022;14:557-71.
- Hernandez AV, Piscoya A, Pasupuleti V, Phan MT, Julakanti S, Khen P, *et al.* Beneficial and harmful effects of monoclonal antibodies for the treatment and prophylaxis of COVID-19: Systematic review and meta-analysis. *Am J Med* 2022;135:1349-61.e18.
- Reis S, Popp M, Schießer S, Metzendorf MI, Kranke P, Meybohm P, *et al.* Anticoagulation in COVID-19 patients - An updated systematic review and meta-analysis. *Thromb Res* 2022;219:40-8.
- Lan SH, Hsu CK, Chang SP, Lu LC, Lai CC. Clinical efficacy and safety of interleukin-1 blockade in the treatment of patients with COVID-19: A systematic review and meta-analysis of randomized controlled trials. *Ann Med* 2023;55:2208872.
- Lucchetta R, Matuoka JY, Oliveira Junior HA, Oliveira G, Cavalcanti AB, Azevedo L, *et al.* Hydroxychloroquine for non-hospitalized COVID-19 patients: A systematic review and meta-analysis of randomized clinical trials. *Hidroxicloroquina para Pacientes com COVID-19 não Hospitalizados: Uma Revisão Sistemática e Metanálise de Ensaios Clínicos Randomizados*. *Arq Bras Cardiol* 2023;120:e20220380.
- Tounakaki O, Tsakou A, Malamas A, Chrisoula D, Ioannis S, Elias Z. Assessment of reporting quality of meta-analyses of randomized controlled trials in neovascular age-related macular degeneration published from April 2014 to May 2018 using PRISMA statement. *Int Ophthalmol* 2020;40:1163-80.
- Gundogan B, Dowlut N, Rajmohan S, Borrelli MR, Millip M, Iosifidis C, *et al.* Assessing the compliance of systematic review articles published in leading dermatology journals with the PRISMA statement guidelines: A systematic review. *JAAD Int* 2020;1:157-74.
- Peters JP, Hoofst L, Grolman W, Stegeman I. Reporting quality of systematic reviews and meta-analyses of otorhinolaryngologic articles based on the PRISMA statement. *PLoS One* 2015;10:e0136540.
- Park HY, Suh CH, Woo S, Kim PH, Kim KW. Quality reporting of systematic review and meta-analysis according to PRISMA 2020 guidelines: Results from recently published papers in the Korean journal of radiology. *Korean J Radiol* 2022;23:355-69.
- Hopewell S, Boutron I, Altman DG, Ravaut P. Deficiencies in the publication and reporting of the results of systematic reviews presented at scientific medical conferences. *J Clin Epidemiol* 2015;68:1488-95.

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