

Quality Improvement Needed for Rapid Review Reports: a cross-sectional survey based on the evidence-based guidelines for RR methodology

Donghua Yang Yang, Yongjia Zhou Zhou, Xiao Tang Tang, Tianyi Zhang Zhang,
Yiyi Li Li, Jun Zhang Zhang, XiaoTing Ma Ma

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Donghua Yang Yang^{1,2}; Yongjia Zhou Zhou³; Xiao Tang Tang⁴; Tianyi Zhang Zhang⁵; Yiyi Li Li³; Jun Zhang Zhang³; XiaoTing Ma Ma³

¹Evidence-Based Medicine Center School of Basic Medical Sciences Lanzhou University Lanzhou CN

²Qinghai University Affiliated Hospital XiNing CN

³School of Nursing Gansu University of Chinese Medicine Lanzhou CN

⁴The First College for Clinical Medicine Lanzhou University Lanzhou CN

⁵Social Work Major at the School of Sociology Beijing Institute of Technology Beijing CN

Corresponding Author:

Donghua Yang Yang
Evidence-Based Medicine Center
School of Basic Medical Sciences
Lanzhou University
Lanzhou City, Gansu Province, China
No. 199 Donggang West Road
Lanzhou
CN

Abstract

Background: Rapid systematic reviews are vital tools for providing timely evidence to inform healthcare decisions.

Objective: The aim of this study was to assess the reporting quality of rapid review literature against established methodological guidelines to identify areas for improvement.

Methods: A cross-sectional study design was used with thorough searches of PubMed, Cochrane Library, and Web of Science until February 28, 2023. An expert guided the search strategy, and the Cochrane RR Evidence-Based Methodology was used to evaluate the reporting quality of rapid reviews. Subgroup and comparative analyses were performed to explore influencing factors on quality.

Results: Among 112 Rapid Reviews analyzed, less than 50% fully reported on four key items, while over 50% fully reported on four other items. Reports published after 2021 showed slightly higher overall quality than those published before 2020, with significant differences in specific reporting criteria ($P < 0.05$). The included studies were divided into CRR and RR groups. CRR had 100% reporting rates in several items and higher reporting rates in others compared to RR. Overall reporting rates were low for several items, with significant differences between CRR and RR for some items ($P < 0.05$). The included studies were divided into groups A ($IF \leq 5$) and B ($IF > 5$). Literature with an impact factor greater than 5 demonstrated slightly higher report quality compared to lower impact factor literature. Statistically significant differences were observed in specific criteria ($P < 0.05$), with certain items reaching high reporting rates in both subgroups.

Conclusions: This study observes an improvement in report quality. Literature in the Cochrane Library shows better reporting quality. However, overall methodological and report quality still require enhancement.

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Original Manuscript

Quality Improvement Needed for Rapid Review Reports: a cross-sectional survey based on the evidence-based guidelines for RR methodology

Donghua Yang^{1,2}, Yongjia Zhou³, Xiao Tang⁴□ Tianyi Zhang⁵, Yiyi Li³, Jun Zhang³, XiaoTing Ma³, Jinhui Tian^{*1}

1.Evidence-Based Medicine Center, School of Basic Medical Sciences, Lanzhou University, Lanzhou730000, China.

2.Qinghai University Affiliated Hospital, XiNing 810000, China

3.School of Nursing, Gansu University of Chinese Medicine, Lanzhou730000, China.

4.The First College for Clinical Medicine, Lanzhou University, Lanzhou730000, China.

5.Social Work Major at the School of Sociology, Beijing Institute of Technology, Beijing100000, china.

*Corresponding author: Jinhui Tian, Evidence-Based Medicine Center, School of Basic Medical Sciences, Lanzhou University, Lanzhou730000, China.

E-mail: tjh996@163.com.

Abstract

Objectives: The aim of this study was to assess the reporting quality of rapid review literature against established methodological guidelines to identify areas for improvement.

Methods: A cross-sectional study design was used with thorough searches of PubMed, Cochrane Library, and Web of Science until February 28, 2023. An expert guided the search strategy, and the Cochrane RR Evidence-Based Methodology was used to evaluate the reporting quality of rapid reviews. Subgroup and comparative analyses were performed to explore influencing factors on quality.

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Conclusions: This study observes an improvement in report quality. Literature in the Cochrane Library shows better reporting quality. However, overall methodological and report quality still require enhancement.

Keywords: Rapid systematic review, Cochrane RR Evidence-Based Methodology, Quality assessment, Reporting compliance, Evidence-based medicine.

Rapid Review□RR□, as an emerging literature synthesis method, has played a crucial role in newly emerging major infectious disease outbreaks in public health emergencies^[1]. In 2020, the Cochrane Rapid Reviews Methods Group ^[2] aimed to clarify the definition of RR by examining 216 publications on RR from 2017 to 2019. They defined RR as follows: “RR is a literature synthesis method that, based on systematic reviews (SR), simplifies or omits certain methodological steps to efficiently generate evidence while making efficient use of resources. Furthermore, RR possesses eight features: (1) accelerating the process of synthesizing evidence with shorter duration^[3], (2) simplifying methodological steps, (3) efficiently integrating resources, (4) providing evidence support for health-related decision-making^[4], (5) scientific methodology, (6) compensating for the

insufficiencies in system evaluation^[5], (7)limited applicability scope^[6], and (8) potential bias risk in research results^[7].

To promote the development of RR, improve the standardization level of RR, and clarify the definition and main features of RR, the Cochrane Collaboration^[8] has defined and characterized RR and published the world's first evidence-based methodology guidelines for RR. In comparison to other RR methodology guidelines, this guideline provides structured recommendations for each step of RR implementation, enhancing its scientific rigor and practicality. It offers theoretical support for the standardized application of RR methodology.

Therefore, this study aims to classify and evaluate the published Rapid Review literature based on the guidance provided by the Cochrane Rapid Review Methods Group. The literature will be categorized according to the journal's impact factor, publication year, and whether it originates from Cochrane or non-Cochrane sources. Additionally, the adherence to reporting standards will be assessed. Through analysis and synthesis of existing literature, this study aims to provide guidance and recommendations to further enhance the standardization of Cochrane rapid systematic review reporting. The findings of this study suggest that the recommended reporting standards be included as one of the submission requirements for journals accepting rapid systematic review articles, thereby improving the quality and credibility of the literature.

Methods

Search strategy

We performed a comprehensive literature search in PubMed, Cochrane Library, and Web of Science up to February 28, 2023, and Boolean search operators "OR" was used to link search terms. Keywords we used included "Rapid systematic review" OR "Rapid literature review" OR "Rapid reviews" OR "Rapid Systematic Reviews" OR "Rapid Evidence Assessment". The detailed search strategy of PubMed is presented in Appendix 1. The determination of the search strategy is guided and specified by the expert (J.T) with expertise in library and information retrieval.

Study selection

Initially searched records were imported into EndNote X9 (Thomson Reuters Corporation, Stanford, USA) literature management software. Two reviewers (D.H.Y. and Y.J.Z.) independently selected studies by reviewing the titles and abstracts to identify possibly relevant studies. Any potential studies would be downloaded the full text, and the same reviewers further assessed the eligibility of each record according to the eligibility criteria. Conflicts were resolved by consulting a third reviewer (J.T.).

Inclusion and exclusion criteria

The study included rapid systematic reviews and had no restrictions on the topic selection, excluding conference papers, research protocols.

Sample sampling and information extraction

We sample the literature pre-screened by the system through random sampling. The sample size estimation is calculated using the following formula:

$$n = (Z^2 * p * (1-p)) / E^2.$$

"n" represents the sample size. "Z" is the standard normal distribution quantile corresponding to a 95% confidence level, which is 1.96. "p" is a conservative estimate of the proportion for this characteristic, set at 0.5. and "E" is the allowable sampling error, set at 0.1.

The review two authors (Y.Y.L and J.Z) independently screened articles in duplicate, with any disagreements resolved by a third author(H.T.J). The article selection process involved several steps: first, we screened out obviously irrelevant articles based on their titles and abstracts; then, we assessed the remaining articles by reading their full texts.

The data extraction was conducted independently and in duplicate by two review authors(D.H.Y and T.X.T), with any disagreements being resolved by a third author(H.T.J), The data extraction form was designed in advance based on the Cochrane RR Evidence-Based Methodology.

Reporting quality assessment

The reporting quality of rapid reviews was assessed independently and in duplicate by two review authors, with any disagreements resolved by a third author. Cochrane RR Evidence-Based Methodology was used to assess the reporting quality of included rapid reviews. The Cochrane RR Methodology Evidence-Based Guidelines^[8] were developed by the Cochrane RR Methodology Group. They include eight topics: specifying research questions, formulating inclusion and exclusion criteria, literature search, literature screening, data extraction, assessing risk of bias, synthesizing evidence, and other considerations. In total, there are 26 items in these guidelines. Based on these 26 items, we evaluated the quality of the selected literature in our report, and each item was assessed as "yes", "partial yes", or "no" based on the degree of compliance with the reporting criteria. We calculated the number of "yes" responses for each literature and defined that the larger the number of "yes" responses, the better the reporting quality of the articles.

Statistical analysis

Excel 2019 was utilized to conduct quantitative analysis and qualitative description of the included Rapid Reviews(RRs). The R software was employed to generate forest plots representing confidence intervals. To analyze categorical variables such as pre-registration (yes or no) and statement (yes or no), frequencies and percentages were employed. Mean, median, standard deviation (SD), and range were utilized to assess variables including the number of "yes" responses for Cochrane RR Evidence-Based Methodology, Impact factor (IF), number of institutions, number of authors, and number of included studies.

Furthermore, a subgroup analysis was performed based on three criteria: publication year (pre-2020 and post-2021 groups), impact factor ($IF \leq 5$ and $IF > 5$), and whether the reviews were published in the Cochrane Library or non-Cochrane Library (CRR and RR groups).

Results

Screening results

In this study, a cross-sectional design was utilized. Two investigators conducted a comprehensive search of three databases, and identified 1,915 articles. After removing duplicates, 1,870 articles remained. Following the review of abstracts, 1,715 articles were deemed relevant and retained for further analysis. The sample size was calculated to be 98 using a formula, but due to the need for improved accuracy, a random sampling method was used to select 150 articles. Two individuals independently screened the full-text articles based on inclusion and exclusion criteria, resulting in the selection of 112 RRs (Appendix2) that met the criteria. Finally, the quality of these 112 RRs was assessed based on each item of the quality assessment method.

Study characteristics

Table 1 summarizes the characteristics of 112 RRs were included. Most RRs were published in Science Citation Index (SCI) journals, with 65% having an IF less than 5, SCI mean IF is 4.37. RRs involved several institutions and authors, with an average of 3.13 institutions and 5.42 authors per RR. The number of included studies in RRs ranged from 0 [0, 201], median of included studies is 21.5. The top three research topics are "COVID-19-related research", "Health policy-related research", and "Therapeutic intervention technique", which account for 27.68%, 19.64%, and 16.96% respectively.

Reporting quality

Figure 2 displays the Cochrane RR Evidence-Based Methodology evaluation results for each item of the RRs, presented as the percentage of "yes" responses. less than 50% of the RRs fully reported 4 items (Topic, Eligibility criteria, Risk of bias assessment, Other considerations), whereas more than 50% fully reported 4 items (Synthesis, Searching, Data extraction, Study selection), among them, the "Synthesis" report was 92.9%. Figure 5 shows a heatmap of the assessment results of each item in the 112 RRs included by the statement. As shown in the chart, overall, the complete reporting rate did not reach 50%. In the "topic" and "other information" categories, there were a significant number of incomplete and non-compliant reports. Specifically, there were numerous non-compliant reports for items 3, 4, 12, 9, 18, and 22.

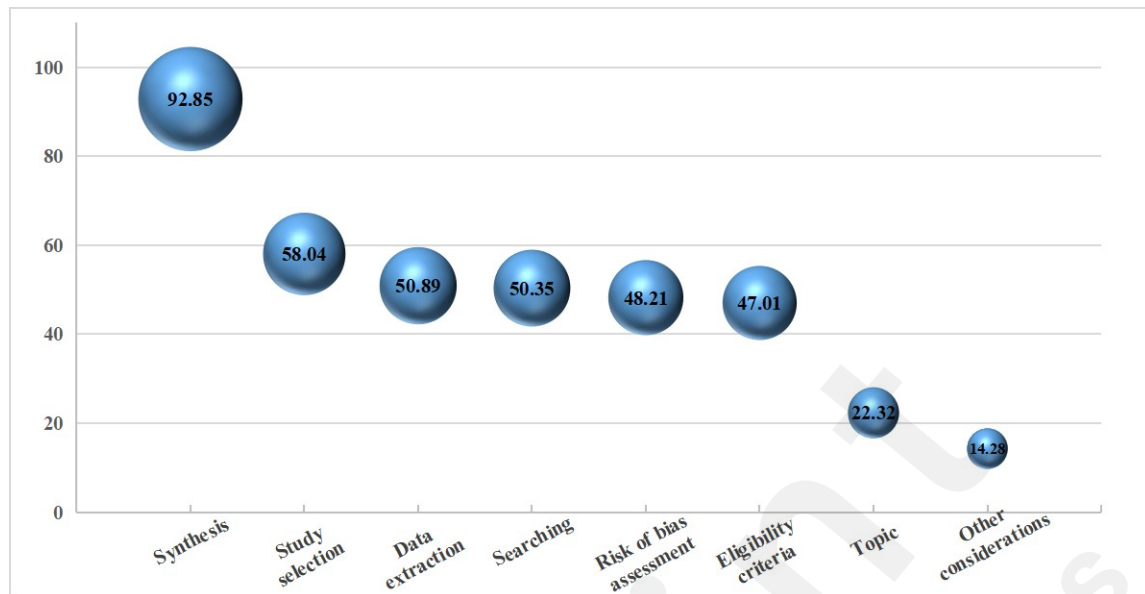


Fig1. Proportion of "yes" for each item in evidence-based guidelines for RR methodology

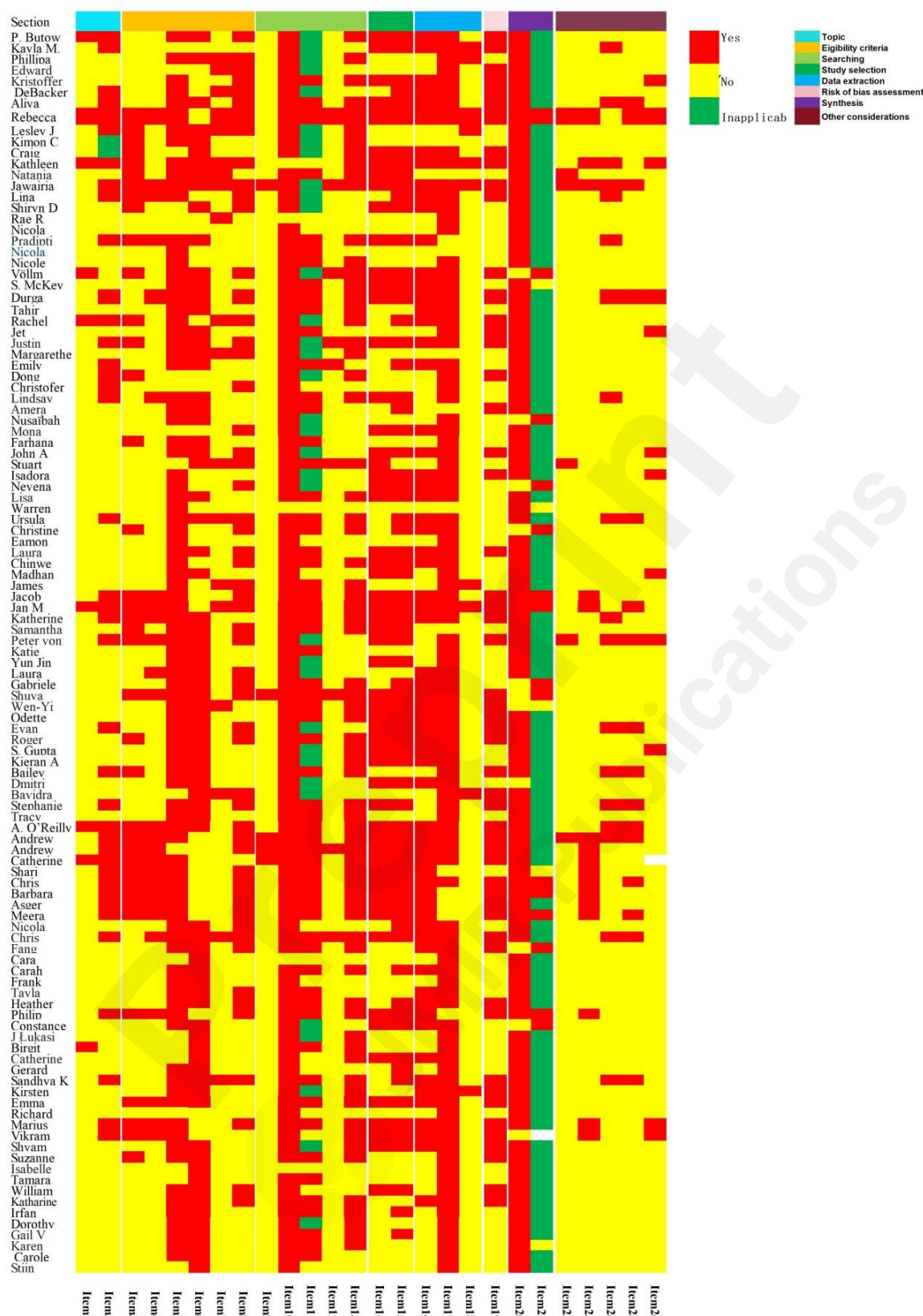
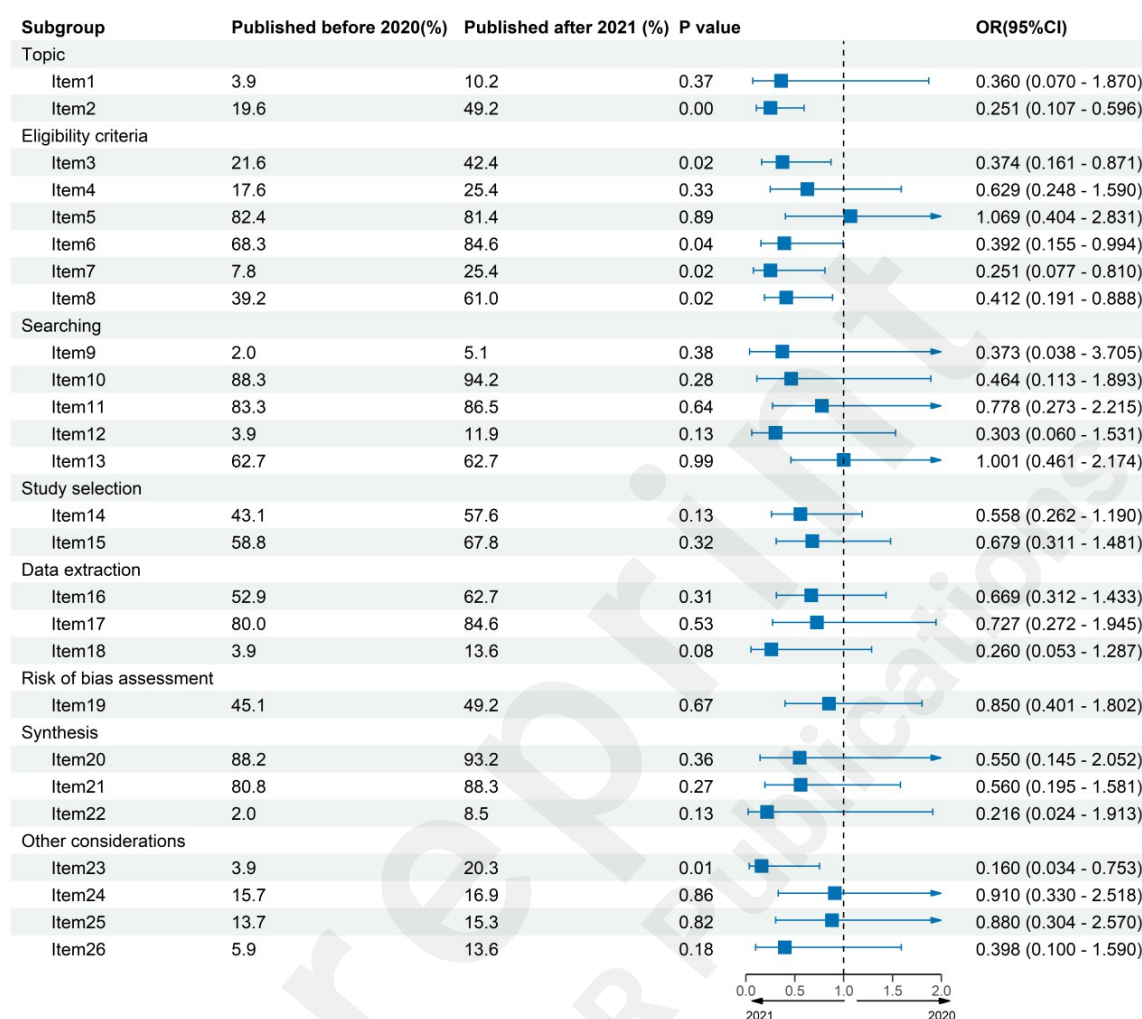


Fig2. Heat map of evidence-based guidelines for RR methodology

“The Cochrane RR Methodology Evidence-Based Guidelines” were published in 2020(**Figure3**). We grouped the included literature according to their publication dates, dividing them into pre-2020(n=60) and post-2021 groups(n=52). We then evaluated and compared the reports using the specified reporting criteria. The results showed that, when assessed by“ Topic, Eligibility criteria, Searching, Study selection, Data extration, Risk of bias assessment,Synthesis,Other considerrations”,

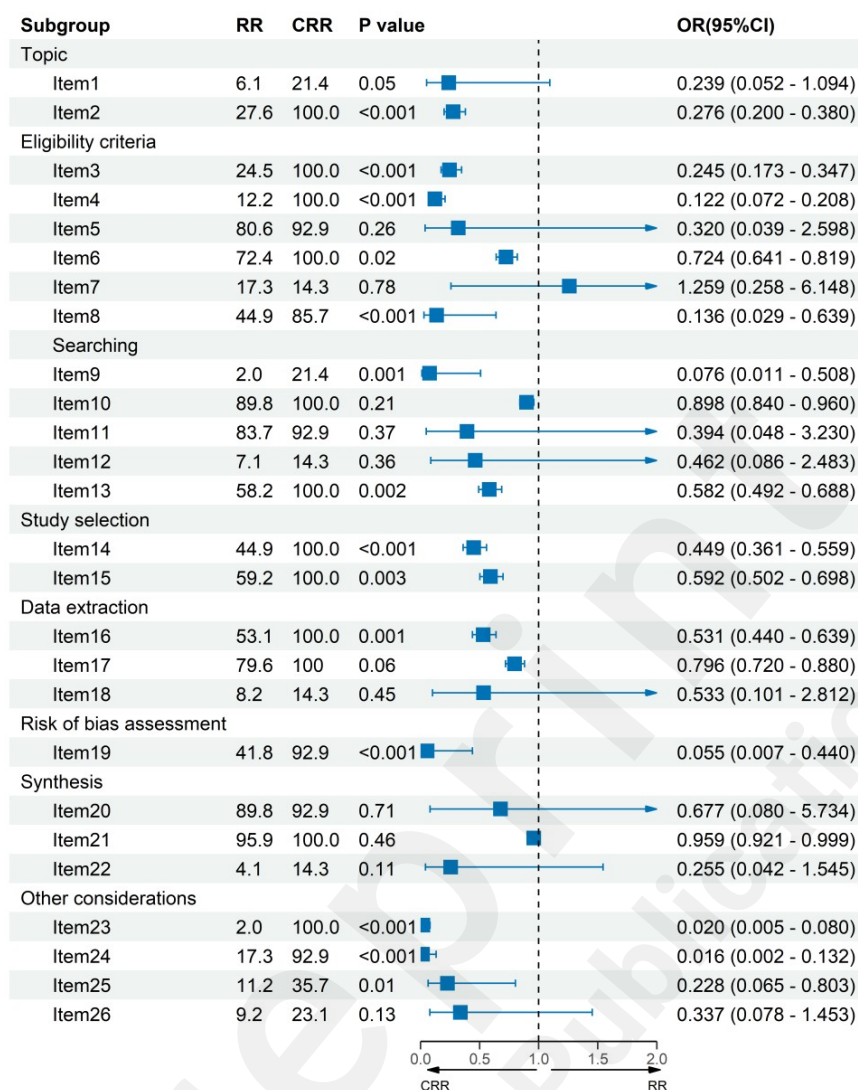
the overall quality of reports published after 2021 was slightly higher than those published before 2020. In terms of statistical comparison, there were significant differences observed, including Item2 ($P<0.001$), Item3($p=0.02$), Item6 ($P=0.02$), Item7 ($P=0.02$), Item8($p= 0.02$) and Item23 ($P=0.01$).



Note: "2021" represents publications from 2021 onwards, including the year 2021 itself. "2020" represents publications from before the year 2020, including the year 2020.

Fig3. Reporting Quality of RRs by Year of Publication

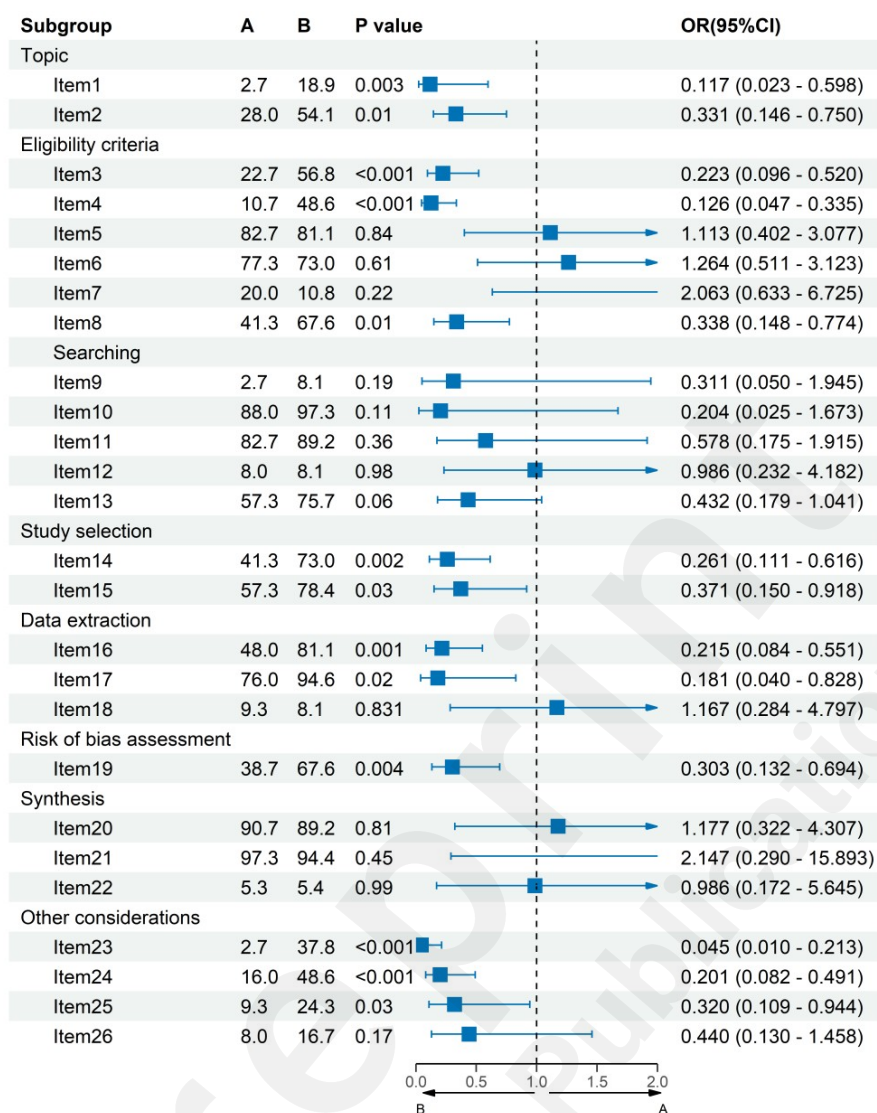
The included studies were divided into two groups: CRR ($n=14$) and RR ($n=98$), based on whether they were published in the Cochrane Library or non-Cochrane Library, respectively (**Figure4**). The results showed that the reporting rates in the C-RR group were 100% for Item2, Item3, Item4, Item6, Item10, Item13, Item14, Item15, Item16, Item17, Item21 and Item23. In addition, the reporting rates reached 90% for Item5, Item11, Item19, Item20, and Item24 ($P<0.001$). Furthermore, the overall reporting rates were relatively low for the following items: Item1 (C-RR=21.4%, RR=6.1%, $P=0.05$), Item7 (C-RR=14.3%, RR=17.3%, $p=0.78$), Item9 (C-RR=21.4%, RR=2%, $P=0.001$), Item12 (C-RR=14.3%, RR=7.1%, $p=0.36$), Item18 (C-RR=14.3%, RR=8.2%, $p=0.45$), Item22 (C-RR=14.3%, RR=4.1%, $p=0.11$), Item25 (C-RR=35.7%, RR=11.2%, $P=0.01$), and Item26 (C-RR=23.1%, RR=9.2%, $P=0.13$).



Note: "CRR" represents published literature from Cochrane Library, "RR" represents non-Cochrane Library literature.

Fig4. Reporting Quality of Literature by RR and C-RR

The included studies were divided into two groups: A (n=75) and B (n=37), based on impact factor ($IF \leq 5$ and $IF > 5$). (**Figure5**). Overall, literature with an impact factor greater than 5 demonstrated slightly higher report quality compared to literature with an impact factor less than or equal to 5. Statistically significant differences were observed in specific criteria, including Item1, Item2, Item3, Item4, Item8, Item14, Item15, Item16, Item17, Item19, Item23, Item24, and Item25. In subgroup A ($IF \leq 5$), the reporting rates for Item20 (90.7%) and Item21 (97.3%) reached 90%. In subgroup B ($IF > 5$), the reporting rates for Item10 (97.3%), Item17 (94.6%), and Item21 (94.4%) reached 90%.



Note: "A" represents journals with impact factors ≤ 5 and non-SCI journals, "B" represents journals with impact factors ≥ 5

Fig5. Reporting Quality of Literature by impact factor

Discussion

Currently, health decision-making organizations such as the World Health Organization (WHO), the UK Department of Public Health, and the German Federal Ministry of Health have all acknowledged the quality and timeliness of evidence from Rapid Reviews (RRs), and have begun to incorporate evidence synthesized through RR^[9]. The Cochrane Rapid Reviews methodological guidelines provide clear and actionable recommendations and minimum standards for RR, marking a milestone in the definition and methodology of RR^[10].

This text applies the guidelines to assess the reporting quality of the included RR literature. The results show an increasing trend in the completeness of reporting guidelines and improvements in reporting quality. However, there are still some shortcomings: In terms of "clearly defining the research question and refining the topic," there is minimal involvement of key users, including patients, medical professionals, healthcare managers, and policymakers, in formulating the research question and study design. The involvement of primary users in establishing inclusion and exclusion criteria for the research is also not mentioned. Research has shown that the involvement of mediators can enhance the clarity of information transmission and elucidate research questions, and methods, ultimately facilitating decision-makers' understanding of the study content^[11].

In the aspects of “literature search” and “literature screening,” most requirements of various databases’ limited searches, limited grey literature searches, and supplementary searches are met. However, the inclusion of literature does not mention involving information specialists and peer review of the search strategy. The peer review of literature search strategies facilitates the retrieval of relevant records, particularly those encompassing nonrandomized studies. Scrutinizing keywords, subject headings, and the interrelation between search concepts constitutes pivotal components within the peer review process^[12]. Although systematic reviews (SR) require two reviewers to independently screen the literature, for RR, using standardized title and abstract forms for screening is more important than independent screening by two individuals^[13,14]. However, the included literature does not mention the use of standardized screening forms for title, abstract, and full-text screening.

Data extraction: The guidelines recommend two parts for RR data extraction: ① Extracting study features, allowing for single or dual extraction (preferably dual); ② Extracting study data, which requires dual extraction^[10]. The completeness reporting rate for this part is 50%.

Assessing the risk of bias: The completeness reporting rate for this part is 41.84%. It was found that most of the literature did not use appropriate tools for assessing the risk of bias, which could amplify the relatively low quality of RR articles. To reduce bias, appropriate tools for evaluation could be chosen, and most of them can meet the requirement for independent evaluation by two reviewers^[19].

Data synthesis: This topic includes two items: “narrative data synthesis” and “considering meta-analysis when studies are homogeneous.” Given the “rapid” nature of RR, researchers often only conduct meta-analysis on the most important research results^[8,15]. The completeness reporting rate for this topic is 92.03%, which is the highest completion rate among all topics. The reason is that most RR literature focuses on sudden events like COVID-19, and the included studies themselves do not meet the requirements for merging. Most of the literature can only be qualitatively synthesized.

Finally, the guidelines propose that an approved research protocol (item 23) is submitted to Cochrane before starting RR. The research protocol should be published (item 24) to minimize duplication of research and ensure the systematic and transparent nature of the study^[2,9]. However, few of the included RR articles in this text meet these two requirements. The Cochrane Collaboration strongly encourages the use of online systematic review software to assist in conducting RR, but there are also few literature sources that meet the requirements. This may be due to the relatively short period since the publication of these guidelines, and it still requires a process for wider adoption.

Meanwhile, we will compare and analyze the included literature based on their publication time (before or after 2020) and whether they were published in the Cochrane Library, categorizing them as C-RR and RR. The results showed that, overall, the quality of reports published after 2020 was slightly higher than those published before. This suggests that although the application time of this guideline is relatively short, it still has a certain range of applicability and there is a trend of further improvement in report quality. In addition, in terms of research protocol development, research question determination, and PICOS and inclusion/exclusion criteria (Item 2, $P < 0.001$), the reporting rate of literature published after 2020 was higher than before, indicating an increased rigor in refining topics. In the C-RR and RR groups, the literature published in the Cochrane Library generally showed significantly higher reporting quality compared to the RR group, especially in the topics of “Topic”, “Eligibility criteria”, “Searching”, “Study selection”, “Data extraction”, and “Risk of bias assessment”, where the reporting rates reached 100%. Additionally, in the topics of “Searching”, “Study selection”, “Data extraction”, and “Risk of bias assessment”, the completeness of reporting exceeded the standard requirements. Furthermore, in Item 6: “Limit the publication language to English”, the C-RR group mostly included literature in languages other than English, indicating that rapid systematic reviews published in the Cochrane Library not only meet the minimum requirements of the reporting standards but also have more stringent requirements in some aspects. After dividing the papers into subgroups based on their impact factor, the overall compliance rate for papers with an impact factor (IF) greater than 5 was higher than that for papers with an

impact factor less than or equal to 5. However, for both subgroups, there were few articles with a compliance rate of over 90%. Among all items, compliance rates for “major databases searched (Item10),” “data extraction (Item17),” and “data merging (Item21)” were higher than 90% for papers with an IF greater than 5, while compliance rates for “narrative synthesis of the evidence (Item20)” and “data merging (Item21)” were higher than 90% for papers with an IF less than or equal to 5. Compliance rates for items such as “refining the topic for evidence users (Item1),” “including the evaluation system design (Item7),” “inviting informatics experts to participate (Item9),” “evaluation of the search strategy by experts (Item12),” “considering the use of data from systematic reviews (Item18),” “assessing and verifying the certainty of evidence (Item22),” “submitting a study plan to Cochrane (Item23),” “allowing revision of study plan (Item25),” and “using online systematic review software (Item26)” were all less than 40% for both subgroups. Therefore, we suggest that this compliance reporting be included in the submission requirements for rapid systematic review papers in academic journals to improve the quality and credibility of the literature.

Strengths and limitations

As far as we are aware, this study represents the first attempt to assess and evaluate the reporting quality of rapid systematic review literature. We conducted a comprehensive assessment of the reporting quality of included rapid systematic review literature, and performed subgroup analyses based on publication year, impact factor, Cochrane and non-Cochrane reviews. However, Our study also has limitations. Firstly, we did not limit our sample to specific topics and focused primarily on examining reporting quality methods. Secondly, although we employed sample size calculations and followed standardized procedures for random sampling in our investigation and evaluation research, it would be ideal to evaluate all relevant literature that meets the retrieval criteria, given sufficient manpower and time. This would provide increased persuasiveness to our findings.

Conclusion

This study focuses on utilizing the Cochrane RR Evidence-Based Methodology Guide to evaluate the quality of reports. It conducts a reevaluation of 112 published RR papers and observes an upward trend in the completeness of report analysis within this category. Furthermore, the literature published in the Cochrane Library demonstrates considerably better reporting quality compared to the RR group, signifying improvements in report quality. However, it is worth noting that both the methodological and report quality are not currently at a high level and would benefit from enhancements in standardization and rigor.

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Table 1 Study characteristics

category	Mean/Median,(Range)	Characteristic	Number(%)
Related Subjects	/	COVID-19-related research	31(27.68)
		Health policy-related research	22(19.64)
		Therapeutic intervention techniques	19(16.96)
		Health treatment intervention technology related research	15(13.39)
		Health promotion and education	7(6.25)
		Psychological-related research	7(6.25)
		Nursing-related research	5(4.46)
		Monkeypox-related research	2(1.79)
		Other infectious diseases-related research	4(3.57)
		Non-SCI	13(11.61)
IF	4.37/3.50,(0—39.2)	IF≤5	64(57.14)
		5<IF≤10	30(26.79)
		IF>10	5(4.46)
		Single institution	26(23.21)
Number of institutions	3.13/2.00,(1-17)	1<Number of institutions≤5	65(58.04)
		5<Number of institutions≤10	18(16.07)
		10<Number of institutions≤15	3(2.68)
		Single author	3(2.68)
Number of authors	5.42/5.00,(1-18)	1<Number of authors≤5	59(52.68)
		5<Number of authors≤10	37(33.04)
		10<Number of authors≤15	8(7.14)
		15<Number of authors	5(4.46)
		Number of included studies=0	1(0.89)
Number of included studies	29.56/21.5,(0-201)	0<Number of included studies≤10	19(16.96)
		10<Number of included studies≤20	34(30.36)
		20<Number of included studies≤50	38(33.93)
		50<Number of included studies≤100	15(13.39)
		100<Number of included studies	3(2.68)