Systematic Reviews

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Methodological and reporting quality assessment of systematic reviews and meta-analyses in the association between sleep duration and hypertension

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Abstract

Objective It is crucial to conduct systematic reviews (SRs) and meta-analyses (MAs) to make causal references, in order to inform the clinical guidelines and decision-making. The high reporting quality of reviews through compliance with the guidelines Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Assessing the Methodological Quality of Systematic Reviews-2 (AMSTAR-2) could promote the consistency and reproducibility across the published articles. The purpose of this meta-epidemiological study is to evaluate the reporting methodological quality of SRs on the association between sleep duration and hypertension.

Methods An electronic search in an online database was performed to retrieve systematic reviews and meta-analyses published up to 31st December 2022. Data screening and extraction were conducted by two investigators. The reporting quality of each included article was measured with reference to the 27-item 2020 PRISMA checklist, and methodological quality was evaluated using the AMSTAR-2. PRISMA evaluation was determined by total scores of individual SR and items scores and AMSTAR-2 assessment was also conducted using four categories.

Results Of 2269 articles captured in the initial search, 15 SRs were included in the final analyses. All SRs had more than one incomplete PRISMA item. The mean of total scores was 20.5 (range 14–25), and the results of the AMSTAR-2 assessment were critically low to low. The reporting quality of "rationale," "objectives," "selection process," "study selection," "discussion," and 'support' was fully reported. SRs that reported registration information and protocol had a higher PRISMA score than articles that reported certain deficiencies. From the results of the AMSTAR-2 assessment, the methodological quality of these SRs and MAs was critically low to low. None of the included literature provided a list of excluded articles, and the report of the search strategy was incomplete; half of the SRs did not use appropriate tools to assess the risk of bias in each included study.

Conclusions Both the reporting and methodological quality of overall studies are less than ideal, with several key items being consistently under-reported. The quality measured by AMSTAR-2 is mainly consistent with the quality

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of reporting. Authors, reviewers, and journal editors should raise awareness and move forward to encourage completeness of SR reporting based on the results, which can aid in enhancing the quality of evidence.

Systematic review registration PROSPERO CRD42023459901.

Keywords Systematic review, Meta-analysis, Reporting quality, PRISMA, AMSTAR-2

Introduction

It is commonly known that abnormal sleep duration could change the blood pressure response and increase the risk of hypertension [1–3]. Numerous studies reported that habitual sleep duration shorter than 7–8 h is related to the evaluated incidence of hypertension, which is more common for people sleeping for less than 6 h per night [4]. There were also some studies focused on the association between increased sleep time and the risk factor of hypertension [5]. Even though a vast number of studies agreed that sleep conditions were associated with hypertension, the results of this relationship were not completely consistent from these studies with different study designs and populations [6]. For instance, short sleep duration was found to be a risk factor in the American population [5], while a significant association was not reported in the Chinese population [6]. To address the issue and draw a clear profile of the relationship between sleep duration and hypertension, many researchers conducted systematic reviews (SRs) including meta-analyses (MAs).

SRs are commonly considered as the powerful and popular tools used to generate a single best estimate and overcome the small sample sizes [7, 8]. High-quality SRs could make causal references and clinical treatment assessments, which has become increasingly important in clinical decision-making and informing clinical guidelines and preventive interventions [9, 10]. However, poorly conducted SRs could lead to inaccurate results, misleading conclusions, and reduced applicability, all of which are a waste of limited resources [11]. As such, SR methodologists have proposed and developed some methodological and reporting guidelines in the past decades to assist in improving the methodological rigor and reporting of SRs. In 2007, a Measurement Tool to Assess Systematic Reviews (AMSTAR) [12] tool was developed for SRs. In 2017, a revised tool (AMSTAR-2) was developed to provide a quantitative scoring method to assess quality [13]. A decade later, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement was developed to address several conceptual and methodological advances in the conduct and reporting of SRs [14].

Presently, there are numerous SRs done on the relationship between sleep and hypertension, and we found that the reporting and methodological quality of these SRs varied considerably. However, the evidence still lacks for comprehensive assessment of the quality and completeness of these SRs, which could raise an important issue regarding how well the authors conducted the SRs and used published guidelines and assessments. Therefore, to provide useful suggestions for preventive and clinical practices and decision-making, we performed this study to summarize and assess data on the reporting and methodological quality of SRs on the association between sleep duration and hypertension using the scales of PRISMA and AMSTAR-2.

Materials and methods

Data sources

We searched the literature from inception to December 31st, 2022 in three main databases, PubMed, Web of Science, and Embase, to identify systematic reviews on the association between sleep duration and hypertension. To minimize the risk of missing the eligible article, we also screened references of all included studies and related citations in PubMed to identify additional publications. This study was registered with the PROSPERO registry: CRD42023459901 and can be viewed at http://www.crd.york.ac.uk/prospero.

Eligibility criteria

Studies that satisfied the below criteria were eligible: (1) were published in a peer-reviewed journal in English; (2) a systematic review assessed the associations between sleep duration and hypertension. The exclusion criteria were as follows: (1) lacked sufficient information; (2) were not published as full research articles, such as comments or letters; (3) were studied with the same data from the same authors.

Search strategy

The terminology used in the search included: ("short sleep duration" OR "long sleep duration" OR "sleep duration" OR "sleep hours") AND ("hypertension" OR "blood pressure" OR "high blood pressure") AND ("systematic review" OR "review" OR 'meta-analysis"). Detailed search strategies are listed in Supplementary 1.

Study selection

Two investigators (Y.QL and X.HD) assessed the eligibility of each study independently. Titles and abstracts were screened for potentially relevant articles, and then full-text screening was completed independently, in which, a 10% random sample of articles was assessed for accuracy. All disagreements were discussed among those two reviewers, with any inconsistent comment was resolved by an independent third reviewer (Z.ZQ).

Data extraction

A standardized form was designed for data extraction of items of interest from the included SRs. Basic characteristics and findings relating to the SRs that were reviewed and extracted by reviewers. The basic characteristics extracted from the SRs were the following: year of publication, study design, sample size, sleep duration, estimates, and other details of adherence of SRs to individual items included in AMSTAR-2 or 2020 PRISMA guidelines.

Assessment of included SRs

AMSTAR guidelines were used to assess the methodological quality of the included SRs. The AMSTAR-2, a new and improved version of AMSTAR, was considered a reliable and valid tool for evaluating the reporting quality of SRs [15]. AMSTAR-2 assessed the quality of SRs using 16 items which concern the following aspects: including the components of PICO, a priori design, study design and data extraction in duplicate, comprehensive literature search, a list of included and excluded studies, and the criteria of inclusion and exclusion, bias assessment, reporting the sources of funding, using appropriate methods for statistical combination of results, assessment of the likelihood of publication bias, and assessment of the potential conflicts of interest. The items are answered with a "yes," "partial yes," "no," and "not applicable." In this study, four categories were divided according to the answers of each SR: "high quality", refers to the SR with no or one non-critical weakness, which means the systematic review could provide an accurate and comprehensive summary of the study question using the results of the available studies; "moderate quality", refers to the SR with more than one non-critical weakness, which means the SR may provide an accurate summary based on the results of the available studies; "low quality", refers to the SR with one critical flaw with or without non-critical weaknesses, which means that the review had a critical flaw and may not provide an accurate and comprehensive summary using the available studies; "critically low" refers to the SR with more than one critical flaw with or without non-critical weaknesses, which means the SR should not be reliable to provide an accurate and comprehensive summary for the study question.

PRISMA checklist was used to evaluate the reporting quality of SRs. The 2020 PRISMA checklist, which is the evidence-based minimum set of items for reporting in SRs and MAs, uses 27 items to check the quality of SRs in seven aspects: title, abstract, introduction, methods, results, discussion, and other information including protocol, support, competing interests, data and code used in analyses. The detailed items of these two guidelines are listed in Supplementary 2.

Agreement of assessment

Three reviewers (Z.ZQ, Y.QL, and X.HD) independently evaluated the methodological quality of these SRs using the 2020 PRISMA checklist and AMSTAR-2. The agreement proportion and Cohen's kappa value (k) for each of the items of AMSTAR-2 were calculated. Good agreement was obtained in this study ($k=0.71$) between the two reviewers.

Results

Characteristics of the included SRs and MAs

Initially, we yielded 2269 potentially relevant articles by searching the three electronic databases and other sources. After the first round of screening, we removed 831 duplicate literatures. Then after identifying duplications and screening the titles and abstracts, 1423 articles were excluded. Finally, after the full-text screening, 15 articles were eligible for the assessment (see Fig. 1 and Supplementary Table S4).

The publication years of the included articles ranged from 2011 to 2022 and the sample size was from 238 to 5,172,710. The study participants were 12 years of age or older. 53.3% of the articles were published in the last 5 years. Among the 15 included eligible SRs, seven were cohort studies, two were cross-sectional studies, and the rest studies included both cohort studies and cross-sectional studies. The characteristics of these SRs and MAs are shown in Table 1.

Methodological quality assessment

From the results of the AMSTAR-2 assessment, all SRs and MAs were of low and critically low quality. The description of 15 articles in four categories "high quality" ($N=0.0\%$), "moderate" ($N=0.0\%$), "low quality" ($N=6$, 40%), and "critically low" ($N=9$, 60%).

The percentage of answers of 16 items was described in Fig. 2 and details were presented in Supplementary Table S1. Among seven critical items, several questions were poor implementation: None of the included literature provided a list of excluded articles, and the report

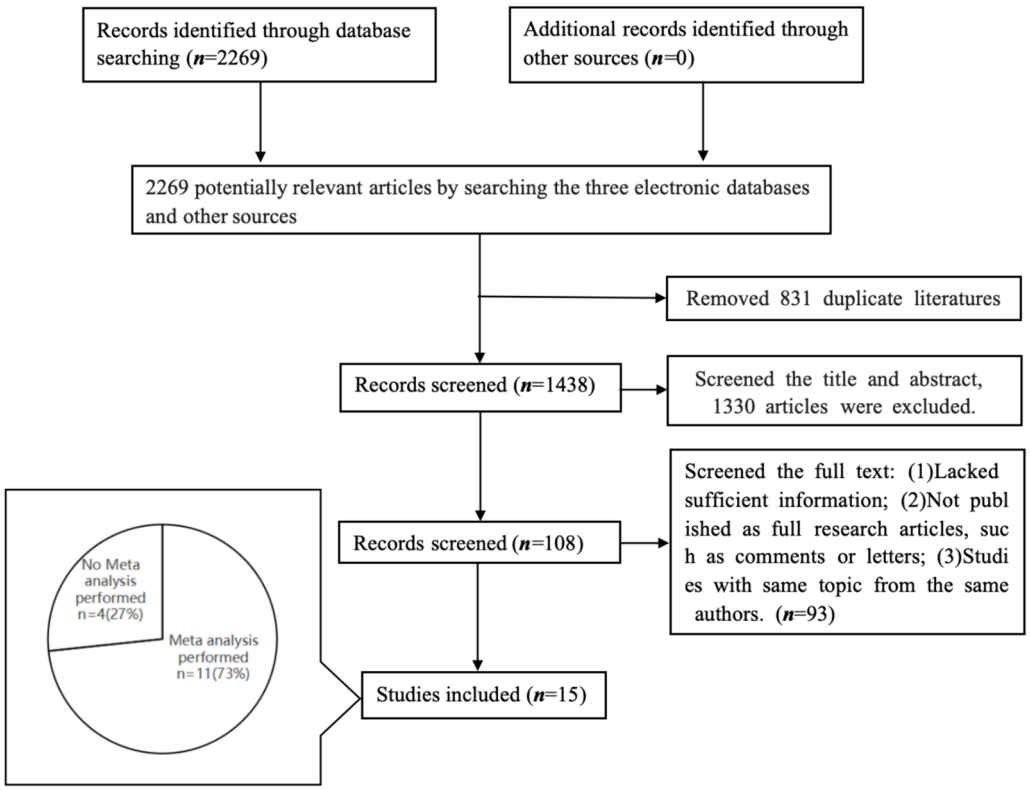

Fig. 1 Flow chart of literature screening

of the search strategy was incomplete; half of the SRs did not use appropriate tools to assess the risk of bias in each included study. For Non-critical questions, two items had good descriptions (Q1, Q11, Q15), and more than 80% of SRs were well reported according to the requirement of AMSTAR-2 (Q5, Q8, Q16).

Reporting quality assessment

The average PRISMA score of the included articles was 20.5 (range 14–25). A total of 15 SRs and MAs were evaluated, and three articles with less than 15 marks (serious defects reported), 4 literature with 15.5–21 marks (certain defects reported), and 8 literature with 21.5–27 marks (relatively complete reports). The overall score quality of the included MAs was relatively high.

All SRs fully reported five items (item3, item4, item8, item16, item23, item25), and more than 90% of SRs reported three items (item1, item17, item26), whereas less than 50% of SRs reported eight items (item 2, item5, item10(b), item 13(b), item13(f), item18, item22, item24, item27). The parts with the best reporting quality were: "rationale," "objectives," "selection process," "study selection," "discussion," and "support." Compared with the relatively complete reports, SRs that reported registration information and protocol had a higher PRISMA scores than articles that reported certain deficiencies. (see Fig. 3 and Supplementary Tables 2 and 3).

Association between sleep duration and hypertension

Conclusions and the number of MAs, case–control (CC)/cohort (CO)/cross-sectional (CS) studies, and patients about the association between sleep duration and hypertension are shown in the table. According to the AMSTAR-2 assessment and the number of patients included in these MAs, the association between sleep duration and hypertension was summarized by showing the relative ratio (RR)/OR/HR/weighted mean difference/standardized mean difference. Regarding the association between sleep duration and hypertension, sleep duration $\leq$ 6.5 h had the highest OR value (2.79) and $\leq$ 8 h had the lowest OR value (0.46). Meanwhile, sleep duration $\geq$ 9 h had the highest RR value (1.54), and > 10 h had the lowest RR value (0.60). The details are shown in Table 1.

Table 1 The results regarding the association between sleep duration and hypertension in included studies

Author (year)	No. of included CC/CO/CS studies	Sample size	Age	Dependent variable	Independent variable	Sleep duration time	RR/HR	OR
Elizabeth et al. (2012)[a]	0/4/10	–	≥ 18 years	hypertension	Sleep duration	–	–	–
Wang et al. (2012)	0/0/17	105,432	≥ 18 years	hypertension	Sleep duration	4 ~ 5 h/ ≤ 5/ ≤ 6/ < 7 h	–	1.20(1.09,1.32)
		90,356				≥ 9 h/10 ~ 15 h	–	1.11(1.05,1.17)
	0/6/0	9959		hypertension	Sleep duration	4 ~ 5 h/ ≤ 5/ ≤ 6/ < 7 h	1.11(0.84,1.47)	–
		9381				≥ 9 h/10 ~ 15 h	0.83(0.52,1.33)	–
Guo et al. (2013)	0/0/21	225,858	≥ 18 years	hypertension	Sleep duration	≤ 5/6	–	1.21(1.09,1.34)
						≥ 9 h	–	1.11(1.04,1.18)
	0/6/0					≤ 5/6	1.23(1.06,1.42)	–
						≥ 9 h	1.02(0.91,1.14)	–
Lin et al. (2013)	0/7/0	22,522	≥ 18 years	hypertension	Sleep duration	< 5/6 h	1.21(1.05,1.40)	–
						> 7/ > 8/ ≥ 9/10 ~ 15 h	0.96(0.76,1.21)	–
Wang et al. (2015)	0/7/6	347,759	≥ 18 years	hypertension	Sleep duration	≤ 5 h vs 7 h	–	1.23(1.01,1.49)
						6 h vs 7 h	–	1.13(1.02,1.25)
						8 h vs 7 h	–	1.06(0.96,1.17)
						≥ 9 h vs 7 h	–	1.18(1.03,1.36)
Osamu et al. (2016)	0/11/0	5,172,710	≥ 20 years	healthy outcomes (including hypertension)	Short sleep duration	< 4 h	0.93(0.47,1.84)	–
						< 5 h	1.17(1.08,1.26)	–
						< 6 h	1.22(0.93,1.60)	–
Maki et al. (2017)	0/8/0	5,134,036	> 20 years	healthy outcomes (including hypertension)	Long sleep duration	> 7 h	1.05 (0.92,1.20)	–
						> 8 h	1.05(0.85,1.30)	–
						> 9 h	1.00(0.95,1.06)	–
						> 10 h	0.60 (0.35,1.03)	–
Aaron et al. (2018)[a]	0/2/7	–	< 21 years	hypertension	Sleep duration	–	–	–
Jiang et al. (2018)	0/0/7	21,150	10 – 18 years	hypertension	Sleep duration	Short sleep duration	–	1.51(1.04,2.19)
					Sleep duration	Long sleep duration	–	1.04(0.78,1.38)
Li et al. (2018)	0/9/0	48,525	≥ 18 years	hypertension		≤ 5 h vs 7 h	1.33(1.04,1.70)	–
					Sleep duration	6 h vs 7 h	1.09(1.05,1.14)	–
						9 h vs 7 h	0.94(0.91,0.97)	–
						> 9 h vs 7 h	0.96(0.75,1.23)	–
Han et al. (2019)	4/24/47	1,074,207	–	hypertension	Sleep duration	≤ 5 h	–	1.448(1.252,1.674)
						≤ 6 h	–	1.138(1.036,1.250)
						≤ 7 h	–	1.196(1.064,1.344)
						≥ 8 h	–	1.129(1.033,1.235)
						≥ 9 h	–	1.162(1.057,1.279)
						≥ 10 h	–	1.411(1.066,1.866)
Emanuela et al. (2020)[a]	0/2/12	4902	15–18 years	hypertension	Sleep duration	–	–	–
		6940	12–15 years					
		1187	12–18 years					
		238	13–16 years					
Wang et al. (2020)	0/11/0	85,838	–	hypertension	Sleep duration	≤ 7 h	1.161(1.058,1.274)	–
						≥ 8 h	1.059(0.951,1.180)	–
Che et al. (2021)	0/13/0	300,202	≥ 18 years	Metabolic disease (including hypertension)	Sleep duration	< 6 h	1.16(1.02,1.31)	–
						> 8 h	1.13(1.04,1.24)	–
Sidhi et al. (2022)[a]	0/10/0	361,041	–	hypertension	Sleep duration	–	–	–

[a] Meta-analysis was not conducted

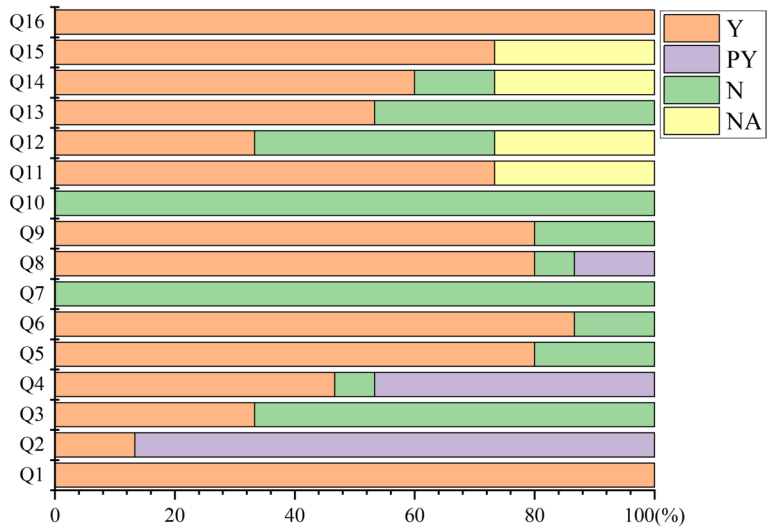

Fig. 2 The percentage of answers of 16 items in the AMSTAR-2 assessment

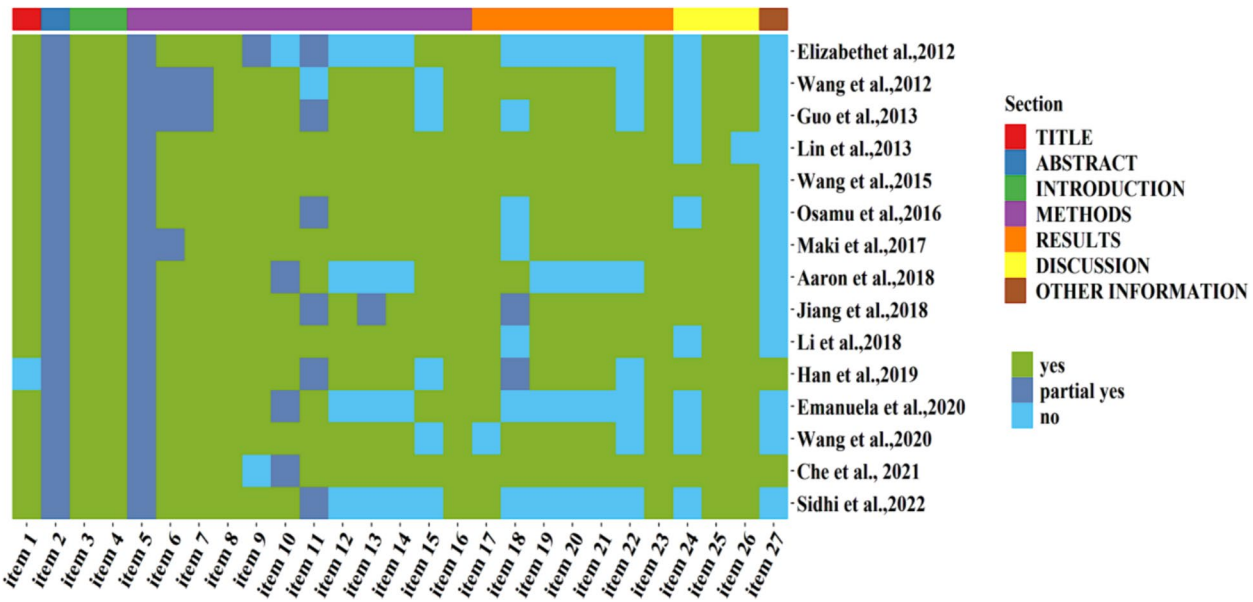

Fig. 3 Distribution of answers to 27 items in 2020 PRISMA checklist

Discussion

The scientific quality of SRs is essential for formulating preventive and clinical interventions and increasing the applicability of those measures. In the past decades, a growing expansion of SRs and MAs was conducted to explore the association between sleep duration and hypertension, while the methodological and reporting quality of them was rarely assessed. To our knowledge, this study is the first to evaluate the quality of SRs in this field using both the PRISMA checklist and AMSTAR assessment.

There are still some flaws regarding the reporting of the results in the process of conducting these SRs according to the 2020 PRISMA checklist. Firstly, research project registration was rarely reported. Of the 15 SRs, only three provided registration information or stated that there was no registration information [16–18]. Secondly, the availability of data, code, and other materials was rarely reported. None of the SRs fully reported the data extraction table template, the data included and used for analysis, the data analysis code, and other data used

in the systematic review. None of the articles completely described any assumptions about missing data or ambiguous information (PRISMA Item 10(b)). Thirdly, the synthesized results of meta-analyses were not adequately provided [19–22]. The 2020 PRISMA guidelines required detailed information including heterogeneity, sensitivity, and subgroup analysis of synthesized results. The poor reporting may reduce the credibility of the survey results.

Based on the results of the AMSTAR-2 assessment, the methodological quality of these SRs and MAs was critically low to low. Several deficiencies were observed regarding the seven critical domains including the critical items and non-critical items.

For the critical items, most of the reviewers' research protocols were not registered before their studies, among these 15 SRs, only two studies presented the links of their registered protocols, which was consistent with the assessment of PRISMA. As we know, the detailed protocols could be essential for conducting prospective and strict SRs [23, 24], and the credibility of an SR would be certainly lessened without the plans. In addition, advanced planning according to the PRISMA checklists will certainly improve the quality of SRs [25]. Therefore, the authors and editors should pay more attention to drafting the protocols. Secondly, the literature search strategy should be more systematic and comprehensive. Fourteen included SRs who searched more than two databases and provided the keywords or search strategies, however, only half of them could consider the relevant grey literature [16, 18, 20, 22, 26–28] which may include some articles with negative outcomes. Including the grey articles could be useful to decrease the selection bias. Thirdly, as the AMSTAR-2 suggested, the authors should provide a list of these excluded articles by full-text screening and explanations. However, none of these SRs provide the list of excluded publications, which may result in restricted page layouts. We suggested the list of both included and excluded articles should be given as supplementary files.

For the non-critical domains, the two most problematic issues should be addressed: the lack of reporting the sources of funding for studies and performing analyses to investigate the possible impact of risk of bias on summary estimates of effect. None of these reviews mentioned the information on funding for individual studies, and less than half reviews analyzed the effects brought by the bias of the included articles [18, 26–29] weaknesses will lead to bias and influence the results of MAs. Different sources of funding might be the cause of observer bias because the investigators could be influenced by the funding provider. For example, some companies might be prone to purchase the outcomes that are beneficial for the profits. Therefore, we suggested that the authors should pay more attention to the explanation of the excluded literature with the potential bias and how it was reflected in the conclusion.

For the association between sleep duration and hypertension, nine SRs confirmed that short sleep duration was significantly associated with hypertension, in which, the results were consistent among cohort studies, case–control studies, and cross-sectional studies. In these nine SRs, three studies were low quality assessed by AMSTAR-2, which considered the bias of the original studies when discussing the results. Seven SRs reported there was no statistical association between long sleep duration and hypertension, three of them were at a low level of high confidence, while four SRs showed long sleep duration was the risk factor for hypertension. These four SRs were critically low quality assessed by AMSTAR-2 and more high-quality evidence was needed to confirm the underlying association.

Strength and limitations

To the best of our knowledge, this study is the first to assess the association between sleep duration and hypertension using both the PRISMA checklist and AMSTAR assessment. Our results could give a comprehensive evaluation of both the reporting and methodology quality of these SRs. The study found the weakness ignored by these authors who conducted the SRs previously and provided suggestions to improve the performance in the future. However, our study also has some limitations. Firstly, the AMSTAR-2 appraisal process was difficult to implement when the reporting quality was poor. Secondly, this study did not use the ROBIS tool, which can assess the RoB in SRs with higher sensitivity, and we believe that it could also be used to better clarify the overall improvement of SRs. Thirdly, in this study, we only evaluated the quality of these SRs, however, further studies should be conducted to verify how that quality affects the outcomes.

Conclusion

Overall, the methodological quality of SRs regarding sleep duration and hypertension were critically low to low which were assessed by the AMSTAR-2. The main deficiencies were in the areas of protocol registration, comprehensive literature search strategies, reporting the funding sources, and accounting for the risk of bias. These findings suggest that more works on methodological education and enlightenment are needed to improve the quality of SRs in the future. In addition, more attention should be paid to journals on the process of conducting SRs, and some measures should be implemented, such as providing guidelines on protocol registrations for authors or methodological reporting checklists for reviewers.

Practice points

1. SRs are commonly considered as the powerful and popular tools used to generate a single best estimate and overcome the small sample sizes.
2. A large number of SRs reported abnormal sleep duration is associated with hypertension, but the results were inconsistent, especially for long sleep duration.
3. To evaluate the quality of SRs using both the 2020 PRISMA checklist and AMSTAR-2 is needed for providing useful suggestions for preventive and clinical practices and decision-making.

Research agenda

1. For better prevention and health improvement, more epidemiological studies with larger and more representative samples and mechanism research were needed to confirm the association between sleep duration and hypertension.
2. Due to the low quality of SRs regarding the association between sleep duration and hypertension, more high-quality SRs were required to provide more credible results.
3. Further studies should be conducted to compare the SR results from different quality levels to unveil the influence of quality on the outcomes.

Abbreviations

AMSTAR-2	Assessing the Methodological Quality of Systematic Reviews-2
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PICO	Participants, Interventions, Comparisons, Outcomes
CC	Case-control
CO	Cohort
CS	Cross-sectional
HR	Hazard ratio
OR	Odds ratio
RR	Relative ratio
SRs	Systematic reviews
MAs	Meta-analyses
ROB	Risk of bias

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13643-024-02622-0.

Supplementary Material 1. Search terms.

Supplementary Material 2. Details of 2020 PRISMA Items.

Supplementary Material 3. The list of included articles.

Supplementary Material 4: Table S1. AMSTAR-2 quality evaluation of included studies

Supplementary Material 5: Table S2. The scores according to 2020 PRISMA quality evaluation of included studies.

Supplementary Material 6: Table S3. PRISMA quality evaluation of included studies.

Supplementary Material 7: Table S4. The lists of exclusive articles (in full-text screening stage).

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Authors' contributions

Y. QL and X. HD contributed equally. Y. QL and X. HD were involved in the tasks including data extraction, data analysis, interpretation, and co-drafting of the manuscript. Z. ZQ and C. WZ were involved in the data analysis and interpretation of the manuscript. W. XM, C. XZ, and M. JY were involved in co-drafting the manuscript. All authors read and approved the final manuscript.

Declarations

Competing interests

The authors declare that they have no competing interests.

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References

1. Bock JM, Vungarala S, Covassin N, Somers VK. Sleep duration and hypertension: epidemiological evidence and underlying mechanisms. Am J Hypertens. 2022;35(1):3–11.
2. Chang X, Chen X, Ji JS, Luo G, Chen X, Sun Q, et al. Association between sleep duration and hypertension in southwest China: a population-based cross-sectional study. BMJ Open. 2022;12(6):e052193.
3. Kim CW, Chang Y, Kang JG, Ryu S. Changes in sleep duration and subsequent risk of hypertension in healthy adults. Sleep. 2018;41(11):zsy159.
4. Li H, Ren Y, Wu Y, Zhao X. Correlation between sleep duration and hypertension: a dose-response meta-analysis. J Hum Hypertens. 2018;33:218–28.
5. Grandner M, Mullington JM, Hashmi SD, Redeker NS, Watson NF, Morgenthaler TI. Sleep duration and hypertension: analysis of >700,000 adults by age and sex. J Clin Sleep Med. 2018;14:1031–9.
6. Song Q, Liu X, Wang X, Wu S. Age- and gender-specific associations between sleep duration and incident hypertension in a Chinese population: the Kailuan study. J Hum Hypertens. 2016;30(8):503–7.
7. Le JT, Qureshi R, Twose C, Rosman L, Han G, Fapohunda K, et al. Evaluation of systematic reviews of interventions for retina and vitreous conditions. JAMA Ophthalmol. 2019;137(12):1399–405.
8. Pussegoda K, Turner L, Garritty C, Mayhew A, Skidmore B, Stevens A, et al. Systematic review adherence to methodological or reporting quality. Syst Rev. 2017;6(1):131.
9. Moher D, Tetzlaff J, Tricco AC, Sampson M, Altman DG. Epidemiology and reporting characteristics of systematic reviews. PLoS Med. 2007;4:e78.
10. Page MJ, Shamseer L, Altman DG, Tetzlaff J, Sampson M, Tricco AC, et al. Epidemiology and reporting characteristics of systematic reviews of biomedical research: a cross-sectional study. PLoS Med. 2016;13:e1002028.
11. Chalmers I, Glasziou P. Avoidable waste in the production and reporting of research evidence. Lancet. 2009;374:86–9.
12. Shea BJ, Grimshaw JM, Wells GA, Boers M, Andersson N, Hamel C, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. BMC Med Res Methodol. 2007;7:10.
13. Shea BJ, Reeves BC, Wells G, Thuku M, Hamel C, Moran J, et al. AMSTAR 2: a critical appraisal tool for systematic reviews that include randomized or non-randomised studies of healthcare interventions, or both. BMJ. 2017;358:j4008.
14. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. Ann Intern Med. 2009;151:W65–94.
15. Lu C, Lu T, Ge L, Yang N, Yan P, Yang K. Use of AMSTAR-2 in the methodological assessment of systematic reviews: protocol for a methodological study. Ann Transl Med. 2020;8(10):652.

16. Wang Y, Mei H, Jiang YR, Sun WQ, Song YJ, Liu SJ, et al. Relationship between duration of sleep and hypertension in adults: a meta-analysis. J Clin Sleep Med. 2015;11(9):1047–56.
17. Jiang W, Hu C, Li F, Hua X, Zhang X. Association between sleep duration and high blood pressure in adolescents: a systematic review and meta-analysis. Ann Hum Biol. 2018;45(6–8):457–62.
18. Jike M, Itani O, Watanabe N, Buysse DJ, Kaneita Y. Long sleep duration and health outcomes: a systematic review, meta-analysis and meta-regression. Sleep Med Rev. 2018;39:25–36.
19. Santos ESGD, Souza OF. Evidence of the association between sleep duration and blood pressure in adolescents: a systematic review. Rev Paul Pediatr. 2021;39:e2019225.
20. Dean E, Bloom A, Cirillo M, Hong Q, Jawl B, Jukes J, et al. Association between habitual sleep duration and blood pressure and clinical implications: a systematic review. Blood Press. 2012;21(1):45–57.
21. Fobian AD, Elliott L, Louie T. A systematic review of sleep, hypertension, and cardiovascular risk in children and adolescents. Curr Hypertens Rep. 2018;20(5):42.
22. Laksono S, Yanni M, Iqbal M, Prawara AS. Abnormal sleep duration as predictor for cardiovascular diseases: a systematic review of prospective studies. Sleep Disord. 2022;2022:9969107.
23. Thompson W, Russell G, Baragwanath G, Matthews J, Vaidya B, Thompson-Coon J. Maternal thyroid hormone insufficiency during pregnancy and risk of neurodevelopmental disorders in offspring: a systematic review and meta-analysis. Clin Endocrinol (Oxf). 2018;88(4):575–84.
24. Jaruvongvanich V, Sanguankeo A, Upala S. Nonalcoholic fatty liver disease is not associated with thyroid hormone levels and hypothyroidism: a systematic review and meta-analysis. Eur Thyroid J. 2017;6:208–15.
25. Kamioka H, Origasa H, Tsutani K, Kitayuguchi J, Yoshizaki T, Shimada M, et al. A cross-sectional study based on forty systematic reviews of Foods with Function Claims (FFC) in Japan: quality assessment using AMSTAR 2. Nutrients. 2023;15(9):2047.
26. Che T, Yan C, Tian D, Zhang X, Liu X, Wu Z. The association between sleep and metabolic syndrome: a systematic review and meta-analysis. Front Endocrinol (Lausanne). 2021;12:773646.
27. Li H, Ren Y, Wu Y, Zhao X. Correlation between sleep duration and hypertension: a dose-response meta-analysis. J Hum Hypertens. 2019;33(3):218–28.
28. Itani O, Jike M, Watanabe N, Kaneita Y. Short sleep duration and health outcomes: a systematic review, meta-analysis, and meta-regression. Sleep Med. 2017;32:246–56.
29. Meng L, Zheng Y, Hui R. The relationship of sleep duration and insomnia to risk of hypertension incidence: a meta-analysis of prospective cohort studies. Hypertens Res. 2013;36(11):985–95.

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