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Review authors' views on the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Statement: a cross-sectional online survey

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Title:

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Running Head:

Review authors' views on PRISMA

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Abstract

Objective: The PRISMA Statement, a 27-item checklist, was developed in 2005 as guidelines for reporting results of systematic reviews and meta-analyses. Despite the prevalent use of PRISMA, no study have been conducted to examine the perception of authors of systematic reviews towards it. The purpose of this study is to explore how authors of systematic reviews rate the overall importance of PRISMA Statement and the individual items.

Design: A cross-sectional descriptive study.

Methods: An online survey was conducted in Jan 2018 among authors of systematic reviews or meta-analyses published in nursing journals. The authors' names and email addresses were extracted from PUBMED. A 37-item questionnaire was used to elicit responses from authors of reviews and meta-analyses regarding their demographic information, previous experiences in conducting reviews, and their ratings of PRISMA.

Results: A total of 1,960 emails were sent out, from which 181 completed questionnaire were received (response rate: 11.7%). The overall importance of PRISMA was rated as 8.66 (SD = 1.35) while the ratings for the individual items ranged from 7.74 to 9.32. The ratings of six items were significantly higher than the overall rating, whereas that of one item was significantly lower.

Conclusion: Most of the respondents felt that the PRISMA Statement was important. Items related to the information sources, selection, presentation of the search flow,

summary of findings, limitations, and interpretation of systematic reviews were deemed more important while the registration was deemed less so.

Keywords: PRISMA; Publication policy; Quality of reporting; Research reporting; Systematic reviews

Strengths and limitations of this study

Strengths

- First study to examine the view of review authors towards the PRISMA statement
- The sampling frame, generated from PUBMED, covered most of the eligible subjects

Limitations

- The response rate of the survey is low

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Competing interest: None declared

Introduction

Systematic reviews and meta-analyses aid healthcare professionals in evaluating the effectiveness of existing medical interventions, providing them with the basis for revision and development of clinical practice guidelines [1]. However, considerable variations in the quality of methodologies and reports in systematic reviews compromise their scientific soundness, reliability and usefulness. Despite the copious evaluation of the methodological and reporting qualities of systematic reviews in the literature, varying results among them have been present [2-6]. For example, in terms of the reporting quality, Panic et al. (2013)[3] reported that an average of 86.3% of the systematic reviews published in gastroenterology and hepatology journals complied with the reporting guidelines whereas only 57.1% of the those published in nursing journals did so[4].

To ensure the quality of systematic reviews, journal editors have suggested the necessity of a shared responsibility between the researchers and the journal's editorial board [7]. It is the obligation of the researchers to conduct and report their studies according to international standards and guidelines whenever possible, whereas it is the prerogative of journal editors and contributors to set stringent criteria and adhere to them when considering manuscripts for publication. Several research reporting guidelines are available that can be used when conducting and reporting various types of studies in health sciences, such as the CONsolidated Standards Of Reporting Trials

(CONSORT) [8] for randomised controlled trials and Strengthening the Reporting of OBservational studies in Epidemiology (STROBE) [9] for observational studies. For systematic reviews of interventional studies and meta-analyses, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement [10] is a considered the gold standard among reporting guidelines.

The PRISMA statement was developed in 2005 during a three-day meeting in Canada by a group of review authors, methodologists, clinicians, medical editors, and consumers [10]. A 27-item checklist in 7 sub-sections was created through a consensus process informed by evidence [1]. PRISMA can be used by authors to ensure the completeness of studies and reduce reporting biases when conducting and reporting systematic reviews and meta-analyses. PRISMA can also be used by journal reviewers and editors to evaluate the reporting quality of manuscripts in consideration. Although it focuses on reporting systematic reviews and meta-analyses of randomized controlled trials, PRISMA can also be used for systematic reviews and meta-analyses of other types of studies.

As of February 2018, 177 academic journals have endorsed the PRISMA statement, indicating that they support its use and recommend contributors to adhere to it when conducting and reporting systematic reviews or meta-analyses. Although journals such as the *International Journal of Nursing Studies* and *Journal of Clinical Nursing* do not

formally endorse the PRISMA statement, they do recommend that contributors follow it when reporting their systematic reviews.

Despite the prevalent use of PRISMA, no studies have been conducted to examine the perception of authors of systematic reviews towards it. Thus, the aim of this study is to explore how such authors from nursing journals rate the overall importance of the PRISMA statement and the individual items in the statement.

Methods

Study design

A cross-sectional online survey was conducted in order to gather views on PRISMA from authors of systematic reviews or meta-analyses in nursing journals.

Participants

Any authors who published systematic reviews or meta-analyses in nursing journals from 2011 to 2017 were invited to participate in the online survey regarding their views on the PRISMA statement.

Participants sampling strategy

A total of 116 nursing journals were identified from the Nursing category from the Journal Citation Reports, Science Edition 2016 version

(https://clarivate.com/products/journal-citation-reports/). A search was conducted on the PubMed database for reviews and meta-analyses published between 1 January 2011 and 15 December 2017 within these 116 nursing journals. The PubMed query used in the database search is included in Appendix 1 (Supplementary file 1). A total of 3,877 articles were identified in the search, for each of which the article summary record was retrieved and downloaded from the PubMed database in the Extensible Markup Language (XML) format. A Python script was then written to process the XML file, extracting the PMID, article titles, authors and their email addresses from each record into the Common-Separated Values (CSV) format.

Sample size estimation

The responses to the questions regarding the views on PRISMA ranged from 1 to 10. According to normal approximation, 6*SD would cover 99% of the data; the standard deviation was thus approximately 1.67 (=10/6). To achieve a 95% CI with a margin of error 0.2, 270 responses would be needed from the authors in nursing journal [11]. As the response rate from e-surveys is usually low, if the response rate is assumed to be around 10-20% among university staff and health educators [12], approximately 2,700 invitations would be needed.

2.4 Questionnaire

Of the 37 items in the questionnaire, five items focused on the authors' demographic information, five on their experience in conducting reviews and using PRISMA, and 27 on their views on the importance of the items within the 7 sections of PRISMA using a 10-point Likert-scale. Open-ended questions were included in each sub-section to gather the reasons for their ratings.

An electronic questionnaire was created using the eSurvey platform developed by the Information Technology (IT) department of the authors' university [13]. After pilot testing by the authors' colleagues, a unique URL was generated.

2.5 Data collection

Invitation emails, including the description of the study and the URL to the questionnaire, were sent to the email addresses between 3 and 7 Jan 2018. A reminder was sent two weeks later (i.e. 17 Jan 2018) and the survey was closed on 31 Jan 2018. Completed e-questionnaires were stored in the server of the IT department.

2.6 Data analysis

Descriptive statistics, including frequencies and percentages, were used to summarize the results. One-sample t-test was used to examine the differences between the overall and individual item rating. Bonferroni's method was used to adjust the level of significance due to multiple comparisons. All the analyses were conducted using IBM SPSS 22.0 for Windows [14]. Content analysis was used to analyse the open-ended responses with NVivo 11 for Windows [15]. The responses were read line by line for initial coding. Codes with similar meanings were then grouped into the same category [16].

2.7 Ethical consideration

The study was approved by the University Institutional Review Committee on 23 Nov 2017 (Ref No. S-17-342E). Data in this study were collected anonymously.

3. Results

A total of 2,565 email addresses were identified from 1,832 articles (out of the 3,877 identified from the PubMed search). Upon removal of duplicates and incomplete email

addresses, 2,310 distinct email addresses remained, to each of which an email invitation was sent. Of these, 350 were invalid email addresses with undeliverable messages returned by the email servers, whereas 1,960 were valid email addresses with successful delivery. A total of 230 authors attempted the questionnaire, 181 of whom completed it. Accordingly, the response rate is 11.7% (230/1,960) and the completion rate is 9.2% (181/1,960).

The respondents' demographic information is summarized in **Table 1**: 135 (74.6%) respondents were females, and 138 (76.3%) were aged 41 or above. In terms of their disciplines, 125 (69.1%) respondents specialized in nursing, followed by eight (4.4%) in public health and six (3.3%) in psychiatry.

All the 181 respondents knew what a systematic review is. Of them, 160 (88.4%) had published systematic review(s) and 166 (91.7%) were aware of the PRISMA guidelines. For the latter 166 respondents, they were then asked to rate the overall importance of following the PRISMA guidelines in conducting and reporting systematic reviews based on a 10-point Likert-scale where an average score of 8.66 (SD = 1.35) was reported (**Table 2**).

The respondents also rated the importance of each of the 27 items in the PRISMA

guidelines, of which the results are shown in **Table 3**. The mean scores ranged from 7.74 (Item 5) to 9.32 (Item 17) with a median of 8.71 (Item 21). The rating for Item 5 was significantly lower than the overall rating (i.e. 8.66). Conversely, the ratings for six items from different sections were significantly higher than the overall rating, namely Items 7 and 9 from the Methods, Item 17 from the Results, and Item 24, Items 25 and 26 from the Discussion.

For the open-ended questions, the respondents were asked to share the reason for their rating for each section. Of the 166 responses, 62 valid open-ended responses were received. Their perceptions of the importance of the items in the seven sections of the PRISMA guidelines are summarized in Appendix 2 (Supplementary file 2).

When asked to explain the importance of Item 1 (Title), the prevailing view was that compliance to it would ensure that the title provided clear information about the study (32 codes) and helped readers locate the work (25 codes). Item 2 (Abstract) was likewise deemed important since a well-written abstract would help readers quickly ascertain the purpose of the paper (28 codes). Nonetheless, some respondents found it unnecessary to provide a registration number for the systematic review in the Abstract. Furthermore, the respondents believed that adhering to Item 3 (Introduction) was important as the Introduction would acquaint the readers with the context of the study (12 codes) but some respondents felt that the PICO framework (Item 4 – Introduction)

was inflexible and had its limitations (12 codes).

The respondents also felt that abiding by Items 5 to 16 (Methods) were vital to ensure the quality, rigor and trustworthiness of the study (17 codes). However, a few respondents commented that not all items were applicable to some types of systematic reviews (5 codes). For instance, regarding Items 13 to 16, one respondent opined that "the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design… [For] a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information" (Response 15).

When asked about the importance of Items 17 to 23 (Results), the respondents agreed that they were critical to research reporting (11 codes), but remarked that not all items could be complied with (13 codes), and that some might be less applicable to reviews that undertook narrative synthesis. They also regarded Items 24 to 26 (Discussion) as essential components when reporting research (9 codes) as it would inform readers of knowledge gaps, future practice and implications (14 codes). As for Item 27 (Funding), the respondents felt that it was vital in systematic reviews as it would reveal potential areas for bias (10 codes) and allow authors to declare any conflicts of interest.

4. Discussion

Most of the respondents felt that the PRISMA statement was important and reported a

mean overall rating of 8.66 (SD=1.35), indicating its importance. In terms of the individual items, all but one of them was associated with an average score of over 8.0. Item 5 – "Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide" – has a mean score of 7.75, which is significantly lower than the overall rating.

For published systematic reviews, compliance of Item 5 to the PRISMA statement was often low. Panic et al. [3] reported that only four out of 90 systematic reviews (4.4%) published in the gastroenterology and hepatology journals adhered to this item, while Tam et al. [4] reported that two out of 74 (2.7%) systematic reviews in nursing journals did so. A plausible explanation for the low adherence and the comparatively low rating of the item lies in the low awareness of the platform to publish or register the protocol. One of the commonly-used registration databases for systematic reviews, PROSPERO, was established in 2011 while the journal, *Systematic Reviews*, which publishes protocols for systematic reviews, was established in 2012. Moreover, a protocol is not a prerequisite for publishing systematic reviews in the majority of medical and nursing journals, though it is a requirement for publishing randomized controlled trials, as mandated by many journals [17]. Sideri et al. [18] suggested that protocol registration of systematic reviews should be encouraged to improve the quality of published systematic reviews.

There are six items with mean scores significantly higher than the overall rating: two from the Methods, one from the Results, and three from the Discussion. The three items from the Methods and Results include:

- Item 7 – "Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched,"
- Item 9 – "State the process for selecting studies (i.e., screening, eligibility, inclusion in systematic review, and, if applicable, inclusion in the meta- analysis)," and
- Item 17 – "Give numbers of studies screened, those assessed for eligibility, and those included in the review, with reasons for exclusions at each stage, ideally with a flow diagram".

These three items relate to the unique ways in data collection and evaluation of the systematic reviews [19] which constitute the major differences between systematic reviews and traditional literature reviews. When conducting a systematic review, the authors clearly identify the inclusion criteria for the review before the literature is selected, and they must demonstrate that these criteria are consistently adhered to [20]. Therefore, a clear description of the sources for searching and selection procedure is essential. A recent study reported that all systematic reviews published in nursing journals mentioned the databases used and at least 85.1% provided the last searched

date [21]. Tam et al. [4] further reported that the rates of compliance to Item 7, Item 9 and Item 17 were 98.6%, 97.3% and 91.9% respectively among systematic reviews published in nursing journals.

The scores of all three items from the discussion and the subtotal scores of the section were significantly higher than the overall score. These three items are:

- Item 24 – "Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers),"
- Item 25 – "Discuss limitations at the study and outcome levels (e.g., risk of bias), and at the review level (e.g., incomplete retrieval of identified research, and reporting bias)," and
- Item 26 – "Provide a general interpretation of the results in the context of other evidence, and implications for future research".

The purpose of the Discussion is to summarize the findings in a research context and to explain their meaning and importance [22]. Traditionally, the discussion has served to convince readers of the rightness of the authors' data interpretation and speculation, and has been deemed as the most important part in a research paper [23]. It is suggested that the discussion for scientific papers should include the principal findings, strengths and weaknesses, discussion of any differences in results, meanings of the study such as

possible mechanisms and implications for clinicians or policymakers, unanswered questions, and future research [24]. These points jointly constitute the content of the three items. In fact, this can be observed from the responses to this section in our survey, e.g., "An essential component of reporting research", "Informs knowledge gaps, future practice and implications", "Provides overall results", et cetera.

The current research represents the pioneering study in seeking the views of authors of systematic reviews on the PRISMA statement. We have attempted to include all the authors who had published systematic reviews or meta-analyses in any of the nursing journals from 2011 to 2017 as the participants for the study. Several limitations of the study are noteworthy. Firstly, the completion of the questionnaire by only 181 respondents led to a completion rate of only 9.2%, which therefore limits the representativeness of the sample. Secondly, although all the email addresses were extracted from the included articles, they mainly belonged to the corresponding authors who were usually the senior authors [25 26]; hence, this may constitute selection bias. Thirdly, 350 out of 2,310 (15.1%) email addresses were not valid during the time of the study. It was reported that on an average most doctoral prepared nursing faculty member are in their early 50s and with an average retirement age for a nurse educator was 62.5 years old [27]; therefore, some of the authors might have retired. Reporting guidelines are useful tools for authors, reviewers, and editors to ensure appropriate content for manuscripts. It has been suggested that introduction to these guidelines should be included when teaching evidence-based practice [28 29]. In this study, we found

that authors of systematic reviews published in nursing journals deem it important to follow the PRISMA statement to conduct and report their reviews. Currently, only 3 out of the 116 nursing journals, namely *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *Journal of the American Academy of Nurse Practitioners*, and *Nursing Research*, endorsed the PRISMA statement. Future studies may focus on journal editors to determine not only whether their views coincide with those the authors of systematic reviews, but also whether they will formally endorse PRISMA in their journals.

Conflicts of interest

None.

Ethical approval

National University of Singapore Institutional Review Board (Ref No. S-17-342E).

Table 1: Demographic of the respondents (n = 181)

Variables	n (%)
Gender	
• Male	46 (25.4%)
• Female	135 (74.6%)
Age	
• 21-30	7 (3.9%)
• 31-40	36 (19.9%)
• 41-50	45 (24.9%)
• 50-60	62 (34.3%)
• 61 or above	31 (17.1%)
Specialty	
• Nursing	125 (69.1%)
• Dentistry	1 (0.6%)
• Medicine	1 (0.6%)
• Microbiology	1 (0.6%)
• Obstetrics & Gynecology	4 (2.2%)
• Paediatrics	5 (2.8%)
• Pharmacology	2 (1.1%)
• Physiology	2 (1.1%)
• Psychiatry	6 (3.3%)
• Psychology	2 (1.1%)
• Public Health	8 (4.4%)
• Surgery	4 (2.2%)
• Others	20 (11.0%)

Table 2: Respondents' background knowledge on systematic reviews

Question	Yes
Do you know what is systematic review?	
• Yes	181 (100.0%)
• No	0 (0.0%)
Have you published any systematic review before?	
• Yes	160 (88.4%)
• No	21 (11.6%)
Are you aware of the PRISMA guidelines?	
• Yes	166 (91.7%)
• No	15 (8.3%)
Do you follow the PRISMA guidelines when conducting and reporting your systematic review?	
• Yes	140 (77.3%)
• No (Not required by journals)	10 (5.5%)
• No (Other reasons)	3 (1.7%)
• Not applicable (did not conduct any systematic reviews)	13 (7.2%)
Importance of following PRISMA guidelines in conducting and reporting systematic review. (1-10)	8.66 (1.35)

Table 3: Respondents' rating to the 27 items of PRISMA

Item	Mean (SD)	p #
Title		
1. Identify the report as a systematic review, meta-analysis, or both	8.95 (1.59)	0.018
Abstract		
2. Provide a structured summary including	8.85 (1.59)	0.121
Introduction		
3. Describe the rationale for the review	8.79 (1.45)	0.241
4. Provide an explicit statement of questions being addressed with reference to PICOS.	8.65 (1.61)	0.966
Method		
5. Indicate if a review protocol exists	7.74 (2.16)	<0.001*
6. Specify study and report characteristics used as criteria for eligibility.	8.88 (1.44)	0.048
7. Describe all information sources in the search and date last searched.	9.05 (1.26)	<0.001*
8. Present full electronic search strategy for at least one database	8.60 (1.72)	0.659
9. State the process for selecting studies	9.14 (1.30)	<0.001*
10. Describe method of data extraction from reports and any processes for obtaining and confirming data from investigators	8.80 (1.53)	0.247
11. List and define all variables for which data were sought and any assumptions and simplifications made.	8.69 (1.48)	0.790
12. Describe methods used for assessing risk of bias of individual studies and how this information is to be used in any data synthesis.	8.61 (1.67)	0.682
13. State the principal summary measures	8.58 (1.65)	0.516
14. Describe the methods of handling data and combining results of studies.	8.86 (1.44)	0.070
15. Specify any assessment of risk of bias that may affect the cumulative evidence.	8.70 (1.44)	0.744

16. Describe methods of additional analyses	8.57 (1.60)	0.444
Results		
17. Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9.32 (1.03)	<0.001*
18. For each study, present characteristics for which data were extracted and provide the citations.	8.99 (1.40)	0.002
19. Present data on risk of bias of each study and, if available, any outcome level assessment	8.43 (1.78)	0.103
20. For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8.51 (1.63)	0.224
21. Present results of each meta-analysis done, including confidence intervals and measures of consistency.	8.71 (1.51)	0.641
22. Present results of any assessment of risk of bias across studies.	8.49 (1.65)	0.179
23. Give results of additional analyses	8.46 (1.60)	0.114
Discussion		
24. Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups	9.18 (1.06)	<0.001*
25. Discuss limitations at study and outcome level, and at review-level.	9.06 (1.32)	<0.001*
26. Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9.24 (1.00)	<0.001*
Funding		
27. Describe sources of funding for the systematic review and other support; role of funders for the systematic review.	8.42 (2.03)	0.132

#: Compare with 8.66 the overall rating for PRISMA

*: Significant at 5% level of significant after the Bonferroni's adjustment

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Authors contribution:

Study design: WT, AT, BW, SG

Data collection: WT, AT, BW

Data analysis: WT, BW

Manuscript drafting: WT, AT, BW, SG

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Appendix 1: The search query used in PUBMED

((("Int J Nurs Stud"[Journal] OR "Eur J Cardiovasc Nurs"[Journal] OR "J Fam Nurs"[Journal] OR "Nurse Educ Today"[Journal] OR "J Nurs Scholarsh"[Journal] OR "Nurs Outlook"[Journal] OR "Women Birth"[Journal] OR "J Cardiovasc Nurs"[Journal] OR "Eur J Cancer Care (Engl)"[Journal] OR "Worldviews Evid Based Nurs"[Journal] OR "J Hum Lact"[Journal] OR "J Adv Nurs"[Journal] OR "Midwifery"[Journal] OR "Nurs Res"[Journal] OR "Aust Crit Care"[Journal] OR "J Nurs Manag"[Journal] OR "Am J Crit Care"[Journal] OR "Int J Ment Health Nurs"[Journal] OR "Eur J Oncol Nurs"[Journal] OR "Rehabil Nurs"[Journal] OR "Oncol Nurs Forum"[Journal] OR "Nurs Ethics"[Journal] OR "Res Nurs Health"[Journal] OR "Cancer Nurs"[Journal] OR "Am J Nurs"[Journal] OR "Heart Lung"[Journal] OR "Crit Care Nurse"[Journal] OR "Biol Res Nurs"[Journal] OR "Int Nurs Rev"[Journal] OR "J Midwifery Womens Health"[Journal] OR "Nurs Crit Care"[Journal] OR "J Pediatr Health Care"[Journal] OR "Collegian"[Journal] OR "J Nurs Adm"[Journal] OR "Appl Nurs Res"[Journal] OR "Nurse Educ"[Journal] OR "J Wound Ostomy Continence Nurs"[Journal] OR "Intensive Crit Care Nurs"[Journal] OR "J Assoc Nurses AIDS Care"[Journal] OR "Nurse Educ Pract"[Journal] OR "West J Nurs Res"[Journal] OR "Clin Nurs Res"[Journal] OR "Comput Inform Nurs"[Journal] OR "Int Emerg Nurs"[Journal] OR "Pain Manag Nurs"[Journal] OR "J Child Health Care"[Journal] OR "Adv Neonatal Care"[Journal] OR "Clin Simul Nurs"[Journal] OR "J Tissue Viability"[Journal] OR "J Transcult Nurs"[Journal] OR "J Obstet Gynecol Neonatal Nurs"[Journal] OR "Nurs Philos"[Journal] OR "J Nurs Care Qual"[Journal] OR "J Clin Nurs"[Journal] OR "Arch Psychiatr Nurs"[Journal] OR "Nurs Health Sci"[Journal] OR "J Pediatr Nurs"[Journal] OR "J Prof Nurs"[Journal] OR "J Sch Nurs"[Journal] OR "Nurs Inq"[Journal] OR "Geriatr Nurs"[Journal] OR "J Psychiatr Ment Health Nurs"[Journal] OR "Perspect Psychiatr Care"[Journal] OR "Adv Skin Wound Care"[Journal] OR "Nurs Econ"[Journal] OR "Int J Nurs Pract"[Journal] OR "Aust J Rural Health"[Journal] OR "J Spec Pediatr Nurs"[Journal] OR "J Pediatr Oncol Nurs"[Journal] OR "J Nurs Educ"[Journal] OR "J Nurs Res"[Journal] OR "MCN Am J Matern Child Nurs"[Journal] OR "J Perinat Neonatal Nurs"[Journal] OR "J Am Assoc Nurse Pract"[Journal] OR "Int J Nurs Knowl"[Journal] OR "J Contin Educ Nurs"[Journal] OR "Issues Ment Health Nurs"[Journal] OR "J Trauma Nurs"[Journal] OR "Contemp Nurse"[Journal] OR "J Gerontol Nurs"[Journal] OR "J Emerg Nurs"[Journal] OR "Public Health Nurs"[Journal] OR "J Am Psychiatr Nurses Assoc"[Journal] OR "Asian nursing research"[Journal] OR "Clin Nurse Spec"[Journal] OR "J Perianesth Nurs"[Journal] OR "AORN J"[Journal] OR "Holist Nurs Pract"[Journal] OR "Res Gerontol Nurs"[Journal] OR "J Psychosoc Nurs Ment Health Serv"[Journal] OR "Workplace Health Saf."[Journal] OR "ANS Adv Nurs Sci"[Journal] OR "J Hosp Palliat Nurs"[Journal] OR "Gastroenterol Nurs"[Journal] OR "J Neurosci Nurs"[Journal] OR "Rev Lat Am Enfermagem"[Journal] OR "Clin J Oncol Nurs"[Journal] OR "J Forensic Nurs"[Journal] OR "Nurs Clin North Am"[Journal] OR "Rev Esc Enferm USP"[Journal] OR "Jpn J Nurs Sci"[Journal] OR "Nephrol Nurs J"[Journal] OR "J Korean Acad Nurs"[Journal] OR "Nurs Sci Q"[Journal] OR "Res Theory Nurs Pract"[Journal] OR "J Nurse Pract"[Journal] OR "J Addict Nurs"[Journal] OR "Crit Care Nurs Clin North Am"[Journal] OR "Orthop Nurs"[Journal] OR "Aust J Adv Nurs"[Journal] OR "Bariatr Surg Pract Patient Care"[Journal] OR "J Community Health Nurs"[Journal] OR "Assist Inferm Ric"[Journal] OR "Pflege"[Journal])) AND (review[Title] OR meta-analysis[Title])) AND ("2011/01/01"[Date - Publication] : "2017/12/15"[Date - Publication])

Appendix 2: Respondents' open-ended responses

Perspective towards items related to the *Title* (Section 1) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Provides clear information about the study	32	"It makes the content of the paper very clear from the beginning" (Response 39) "essential for selecting appropriate material in search databases and provides first indication of inclusion or exclusion" (Response 18)
Help readers locate the work	25	"Title needs to be explicit to help with data searching using boolean parameters" (Response 55) "for indexing purposes" (Response 8)
Miscellaneous	11	"Data credence and integrity" (Response 13) "First thing reviewers/editors read is the title" (Response 20) "I am not only an author I am editor of a journal - a minority of authors continue to evidence confusion about the type of review they are doing - sometimes using systematic as an adjective rather than a noun which encapsulates a certain type of review" (Response 26) "Important to state as establishes understanding between author & reader but not essential as it becomes clear from methods anyway" (Response 30) "Many articles reported in the literature are title systematic

		reviews, but they are no more than literature reviews without a systematic process. Journal editors need to do more to ensure this term is only used for a systematic review that meet the PRISMA" (Response 43) "Systematic reviews carry more weight in my mind. Nice to know from the beginning whether the review is systematic" (Response 53)
Perspective towards items related to the *Abstract* (Section 2) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Helps readers quickly ascertain the purpose of the paper	28	"A clear abstract helps a user rapidly determine if they need to refer to the document at all" (Response 1) "Allows the reader to determine relevance of the research to thier priorities" (Response 7)
Standardises reporting of research	8	"A structured reporting ensures methodological rigor & standardizes reporting--this way important items aren't overlooked" (Response 2) "Having an organized method of reporting data improves the public's understanding of what they are reading" (Response 22)
Summarises the key content of the systematic review	8	"Succinctly recaps key elements and findings of research article" (Response 43) "Data display matrix- similarity and differences are evident" (Response 16)

Necessary component of systematic review reporting	5	"Essential for all publications - often the only part read so must include essential components" (Response 18)
Not necessary to provide systematic review registration number in abstract	4	"not always necessary to register the systematic review. Not all systematic reviews are registered" (Response 37)
Limitations of abstracts	2	"I'm in favour of a structured abstract but the word limits of such is prohibitive to cover all aspects." (Response 8)
Perspective towards items related to the *Introduction* (Section 3) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Introduces readers about the context	12	"Provides history, background, significance, and lays the foundation for the purpose of the review" (Response 34) "aids in logical presentation and helps the reader" (Response 1)
Limitations and inflexibility of PICO	12	"I find the PICO format to be cumbersome in the development of the research question. It is useful as a new scientist but perhaps less necessary for more experienced researchers." (Response 19) "I believe that could be interesting a new approach or a dismemberment of the PICOS question since revision studies do not always refer to intervention studies, for example" (Response 18)
Frames the research questions	10	"The reader needs a problem statement and background information to compare with the study results and decide where they fit in overall with what is known." (Response 42) "Clarity on the gap and the question provides the

		foundation for the work" (Response 10)
Provides clarity	7	"Precision and transparency" (Response 33)
Reduces duplication of research through description of research gaps	3	"In some disciplines there is a plethora of systematic reviews conducted on the same topic in a very short time frame. A strong rationale for why a review is being conducted is important" (Response 22)
Essential information in reporting research	3	"Part and parcel of sound research" (Response 28)
Miscellaneous	6	"In an era of evidence-based medicine/practice anything other than a systematic review process is of little value to the reader" (Response 21) "Systematic reviews are being used as 'citation generators' - the rationale shows if the SR is actually needed - purpose of the review may actually be scant because their motivation is to select a topic that will generate citations" (Response 39) "These issues are too often superficially described and weak performance in nursing" (Response 46) "Transparency is important in SR" (Response 47)
Perspective towards items related to the *Methods* (Section 4) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Ensures quality, rigor and trustworthiness	17	"These items are essential to assuring the internal validity of the review" (Response 38) "All tried and tested methods of ensuring quality and

		avoiding bias" (Response 5)
Allows replication of systematic review	9	"Reporting of methods to allow for transparency and reproducibly is very important in a systematic review" (Response 26)
Essential component of reporting research	8	"A systematic review is often regarded as research of research - all of the above are components of a well-developed research study and are applicable to systematic reviews as well." (Response 1)
Not all items are necessary for different types of systematic reviews	5	"I think the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design. If I conduct e.g. a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information." (Response 13)
Differentiates the good reviews from the bad	2	"Important for the reader to be able to evaluate the quality of the review" (Response 15)
Miscellaneous	9	"These helps identify the rigour - a systematic review can look superficially good, but if items 9,10,11, 14 are vague, then it shows the authors have not recognised the subjective component in the review process - thus it is weaker" (Response 36) "item 12 - assessment of bias is crucial, however, limitations of the tools used to assess the risk of bias should be understood" (Response 18) "SR protocols are not always published - time constraints, e.g. for Masters or PhD students undertaking a SR or

		where the SR is part of a time-constrained funded study, can be the limiting factor. Some journals do not review protocols quickly." (Response 28) "heterogeneity need to be explored" (Response 12)
Perspective towards items related to the *Results* (Section 5) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Important component in research reporting	11	"All of the above are components of a well-designed research study and are applicable to systematic reviews as well" (Response 7) "These are all essential elements of rigor in SR" (Response 30)
Not all criteria of Results are necessary to report	9	"Not always feasible, in a publication, to include all the details - especially if different for each publication and/or high number of studies in review" (Response 19) "See 14b, the items does not cover very well these types of reviews, where a narrative synthesis is the only option to present the results" (Response 24)
Not all details can be presented	6	"I believe that if we think in terms of publication of the review we have a certain number of words and tables and that in general for the detailed description of each study, which is descriptive or meta-analysis may not be possible." (Response 5)
Necessary for rigor and trustworthiness	5	"These items demonstrate the rigour of data collection and assure the reader that the results can be trusted." (Response

		31)
Miscellaneous	5	"heterogeneity need to be explored" (Response 14) "Precision" (Response 21)
Perspective towards items related to the *Discussion* (Section 6) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Informs knowledge gaps, future practice and implications	14	"Important because it places into context, the findings and helps users of the information identify how it relates to their practice." (Response 13) "this section is the translational piece and what gives the evidence power" (Response 26)
An essential component of reporting research	9	"An essential component of reporting research" (Response 19) "This is not specific to systematic reviews but to all research reported on - Prisma should focus on systematic review specifics" (Response 25)
Shortfalls of the discussion in some systematic reviews	3	"Discussion sometimes simply repeats the results data and weakens the discussion section if not supported with other literature" (Response 8)
Provides overall results	2	"Discussion includes overall results" (Response 7)
Discussion may not be as important as the rigour of the systematic review	2	"I prefer to let the results 'speak for themselves' so while I find interpretation (Item 26) useful I see it as a colleague opinion but the responsibility is on me to interpret what they present - hence the need for transparency and

		demonstration of rigour" (Response 11)
Part of evidence appraisal	1	"All of the above items are components of evidence appraisal and must be conducted in a detailed and rigorous manner" (Response 3)
Perspective towards items related to the *Funding* (Section 7) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Reveals potential for bias	10	"To indicate to the reader the possibility of external influence to the study findings" (Response 24) "To make clear any conflicts of interest and how these have either impacted on the study, been eliminated or have not had any influence on the study outcome" (Response 25)
Allows declaration of conflict of interests	9	"Conflicts of interest need to be announced" (Response 8) "identify any perceived or real conflict of interest" (Response 14)
Allows transparency	5	"In general, all these questions should be rated 10, due to a requirement for a transparent, accurate and systematic approach in systematic reviews." (Response 16)
Necessary component	4	"Required for all research published/reports" (Response 20)
Miscellaneous	3	"none of the studies I have done required any funding" (Response 19)

		“Unless the risk of bias is caused by external funding, there should never be such risk as there is no new data added” (Response 27)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	*NA*
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	NA
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	14
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	3

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Author's Perception on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses PRISMA Statement from Reviews Authors in Nursing Journals: A Cross-Sectional Online Survey

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Title:

Author's Perception on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses PRISMA Statement from Reviews Authors in Nursing Journals: A Cross-Sectional Online Survey

Running Head:

Nursing review authors' perception on PRISMA

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Abstract: 248/300 words; Main Text: 2876/4000 words

Abstract

Objective: The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Statement was developed as guidelines for reporting systematic reviews and meta-analyses. Despite its prevalent use in the medical and nursing field, no study have been conducted to examine authors' perception towards the PRISMA Statement. The purpose of this study is to explore authors' perception on the PRISMA Statement from authors who published review and/or meta-analysis articles in nursing journals.

Design: Cross-sectional descriptive study.

Methods: An online survey was conducted among authors who published review and/or meta-analysis articles in nursing journals between 2011 to 2017. A Email addresses of the targeted authors were extracted from the PUBMED database. A questionnaire was developed to elicit responses from the target authors regarding their overall perception on the PRISMA statement, and their perception on each individual items of the PRISMA statement using a 10-point Likert-scale (1 – Not important at all to 10 – Very important).

Results: Invitations were sent to 1,960 valid email addresses identified, with 230 responses (response rate: 11.7%) and 181 completed responses (completion rate: 9.2%). The average perceived importance of the PRISMA statement was 8.66 (SD=1.35), while

the perceived importance for individual items ranged from 7.74 to 9.32. Six items were rated significantly higher than the average rating, whereas one item was rated significantly lower.

Conclusion: Most respondents perceived the PRISMA Statement as important. Items related to information sources, selection, search flow presentation, summary of findings, limitations, and interpretation were deemed more important while the registration was deemed less so.

Keywords: PRISMA; Publication policy; Quality of reporting; Research reporting; Systematic reviews

Strengths and limitations of this study

Strengths

- First study to examine authors' perception towards the PRISMA statement
- The sampling frame, generated from PubMed, covered most of the eligible subjects in nursing

Limitations

- The response rate of the survey is relatively low

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Introduction

Systematic reviews and meta-analyses are essential tools for healthcare professionals in evaluating the effectiveness of existing medical interventions. Information synthesized from systematic reviews and meta-analyses are frequently served as the basis for the development and revision of clinical practice guidelines.[1] The reliability, usefulness and scientific soundness of systematic reviews and meta-analyses are highly dependable upon their methodologies and reporting quality. To ensure good quality of systematic reviews and meta-analyses, journal editors have suggested that it is a shared responsibility between contributing researchers and journals' editorial boards.[2] It is the obligation of researchers to conduct and report their studies according to international standards and guidelines whenever possible, whereas it is the prerogative of journal editors and contributors to set stringent criteria and adhere to them when considering manuscripts for publication.

Several research reporting guidelines are available for conducting and reporting of various types of studies in health sciences, such as the CONsolidated Standards Of Reporting Trials (CONSORT)[3] for randomised controlled trials and Strengthening the Reporting of OBservational studies in Epidemiology (STROBE)[4] for observational studies. For systematic reviews and meta-analyses of interventional studies, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement [5] is the most commonly used reporting guidelines.

The PRISMA statement was developed in 2005 during a three-day meeting in Canada by a group of review authors, methodologists, clinicians, medical editors, and consumers [5]. A 27-item checklist in 7 sub-sections was created through a consensus process informed by evidence.[1] The PRISMA statement can be used by authors as guidelines to ensure the completeness of studies and to reduce reporting biases when conducting and reporting systematic reviews and meta-analyses. The PRISMA statement can also be used by journal reviewers and editors to evaluate reporting quality of manuscripts in consideration. Although the PRISMA statement focuses on reporting systematic reviews and meta-analyses of randomized controlled trials, it can also be used for systematic reviews and meta-analyses of other types of studies. It was reported that the PRISMA statement was cited over 19,000 times up till July 2017. [6]

Several research studies evaluated methodological and reporting qualities of systematic reviews and meta-analyses. [7-11] For example, in terms of reporting quality, It was reported that an average of 86.3% of systematic reviews published in gastroenterology and herpetology journals complied with the PRISMA guidelines [8], whereas only 57.1% of the those published in nursing journals did so.[9]

As of February 2018, 177 academic journals have endorsed the PRISMA statement

(http://www.prisma-statement.org/), indicating these journals recommend research contributors to adhere to the PRISMA guidelines when conducting and reporting systematic reviews or meta-analyses.

Despite high number of citation for the PRISMA statement in academic articles over the years, the adherence of the items in PRISMA statement was suboptimal. Nine items of PRISMA were adhered to by fewer than 67% of the 2,382 systematic reviews publlished after 2009. [6] For systematic reviews published in nursing journals, the median adherence rate were lower than 60%.[9] Currently, only 3 out of the 116 nursing journals endorsed the PRISMA statement (http://www.prisma-statement.org/), namely *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *Journal of the American Academy of Nurse Practitioners*, and *Nursing Research*. Although journals such as the *International Journal of Nursing Studies* and *Journal of Clinical Nursing* do not formally endorse the PRISMA statement, they do recommend that contributors follow it when reporting their systematic reviews and meta analyses. Therefore, it is interesting to examine the perception of authors towards the importance of the items in PRISMA statement. To our best knowledge, no studies have been conducted to examine the perception of towards PRISMA. Thus, the aim of this study to address this issue by exploring how such authors from nursing journals perceive the overall importance of the PRISMA statement and the individual items in the statement.

Methods

Study design

A cross-sectional online survey was conducted in order to collect authors' perceptions on the PRISMA statement from authors of systematic reviews or meta-analyses in nursing journals.

Participants

Any authors who published review and/or meta-analysis articles in nursing journals from 2011 to 2017 were invited to participate in the online survey regarding their perception on the PRISMA statement.

Participants sampling strategy

A total of 116 nursing journals were identified from the Nursing category of the Journal Citation Reports, Science Edition 2016 version (https://clarivate.com/products/journal-citation-reports/). A search was conducted on the PubMed database for articles published between 1 January 2011 and 15 December 2017 with "review" or "meta-analysis" in the title of these 116 nursing journals. We used "review" rather than "systematic review" as the searching term to be more inclusive in the search because prior study indicated that some systematic review(s) published in nursing journals may use other terms such as "systematic literature review" in the title. [12] We search for articles that was published after 2011 to avoid email addresses that were too old and became

invalid. The PubMed query used in the database search is included in Appendix 1 (Supplementary file 1). A total of 3,877 articles were identified in the search. Article summary record was retrieved and downloaded from the PubMed database in the Extensible Markup Language (XML) file format. A Python script was then written to process the XML file, extracting the PMID, article titles, authors and their email addresses from each record into the Common-Separated Values (CSV) format.

Sample size estimation

Authors' perception on the PRISMA statement and its individual items were measured using likert scale ranged from 1 to 10. According to normal approximation, 6x standard deivation (SD) would cover 99% of the data; the SD was thus approximated to 1.67 (10/6). To achieve a 95% confidence interval (CI) with a margin of error of 0.2, 270 responses would be needed. [13] Based on prior research [14], response rate for university staff and health educators is estimated to be around 10-20%. We assume a low response rate from e-survey, and estimated that 2,700 invitations would be needed if a response rate of 10% is assumed.

Questionnaire

Of the 37 items in the questionnaire, five items focused on authors' demographic information, four items on their experience in conducting reviews and using the PRISMA guidelines, one item evaluated the overall evaluation of the importance to follow the PRISMA guidelines in conducting and reporting of systematic reviews using a 10-point

Likert-scale (1 –Not importance at all to 10 Extremely important), and 27 on their perception on the importance of each individual item in the 7 sections of the PRISMA guidelines using a 10-point Likert-scale (1 – Not important at all to 10 – Very important). Open-ended questions were included in each sub-section to gather qualitative data about their responses.

An electronic questionnaire was created using the eSurvey platform developed by the Information Technology (IT) department of the authors' university. [15] After pilot testing by peers of the authors, a unique URL for the electronic questionnaire was generated.

Data collection

Invitation emails, including a description of the study and the URL to the questionnaire, were sent to the target email addresses between 3-7 January 2018. A reminder was sent on 17 January 2018. The survey was closed on 31 January 2018. Completed e-questionnaires were stored in the server of the IT department of the authors' university.

Data analysis

Descriptive statistics, including frequencies and percentages, were used to summarize the results. Paired-sample t-test was used to examine the differences between the overall and individual item rating. Bonferroni's method was used to adjust the level of significance due to multiple comparisons. All the analyses were conducted using IBM

SPSS 22.0 for Windows.[16] Content analysis was conducted to analyse the qualitative responses using NVivo 11 for Windows. [17] The open-ended responses were analysed for initial coding. Codes with similar meanings were then grouped into the same category.[18]

Ethical consideration

The study was approved by the University Institutional Review Committee on 23 Nov 2017 (Ref No. S-17-342E). Data in this study were collected anonymously.

Patient and Public Involvement

No patient was involved in this study, only authors from nursing journals were involved.

Results

A total of 2,565 email addresses were identified from 1,832 articles (out of the 3,877 articles identified from the PubMed search). Upon removal of duplicates and invalid email addresses, 2,310 distinct email addresses remained, to each of which an email invitation was sent. Of these 2,310 email addresses, 350 were undeliverable and returned, whereas 1,960 were valid email addresses with successful delivery. A total of 230 authors attempted the questionnaire, 181 of whom completed it. Accordingly, the response rate is 11.7% (230/1,960) and the completion rate is 9.2% (181/1,960).

Respondents' demographic information is summarized in **Table 1**: 135 (74.6%)

respondents were females, and 138 (76.3%) were aged 41 or above. In terms of respondents' disciplines, 125 (69.1%) respondents specialized in nursing, followed by eight (4.4%) in public health and six (3.3%) in psychiatry.

All of the 181 respondents knew what a systematic review is. 160 (88.4%) had published systematic review(s) and 166 (91.7%) were aware of the PRISMA guidelines. The 166 respondents who were aware of the PRISMA guidelines were then asked to rate the overall importance of following the PRISMA guidelines in conducting and reporting systematic reviews based on a 10-point Likert-scale where an average score of 8.66 (SD = 1.40) was reported (**Table 2**). The respondents also rated the importance of each of the 27 items in the PRISMA guidelines, of which the results are shown in **Table 3**. The mean scores ranged from 7.75 (Item 5) to 9.35 (Item 17) with a median of 8.73 (Item 21). The rating for Item 5 was significantly lower than the overall rating. Conversely, the ratings for six items from different sections were significantly higher than the overall rating, namely Items 7 and 9 from the Methods section, Item 17 from the Results section, and Item 24, 25 and 26 from the Discussion section.

For the open-ended questions, the respondents were asked to share the reason for their rating for each section. Of the 166 responses, 62 valid open-ended responses were received. Their perceptions of the importance of the items in the seven sections of the PRISMA guidelines are summarized in Appendix 2 (Supplementary file 2).

When asked to explain the importance of Item 1 (Title), the prevailing view was that compliance to it would ensure that the title provided clear information about the study (32 codes) and helped readers locate the work (25 codes). Item 2 (Abstract) was likewise deemed important since a well-written abstract would help readers quickly ascertain the purpose of the paper (28 codes). Nonetheless, some respondents found it unnecessary to provide a registration number for the systematic review in the Abstract. Furthermore, the respondents believed that adhering to Item 3 (Introduction) was important as the Introduction would acquaint the readers with the context of the study (12 codes) but some respondents felt that the PICO framework (Item 4 – Introduction) was inflexible and had its limitations (12 codes). The PICO framework has been advocated for interventional studies [19],. However, in nursing research, there may be other types of systematic reviews such as systematic reviews of prevalence studies [20],and psychological properties of instruments [21];. Therefore, the PICO framework may not be directly applicable in their cases.

The respondents also felt that abiding by Items 5 to 16 (Methods) were vital to ensure the quality, rigor and trustworthiness of the study (17 codes). However, a few respondents commented that not all items were applicable to some types of systematic reviews (5 codes). For instance, one respondent opined that "*the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design… [For] a systematic*

review of cross-sectional surveys or a meta-synthesis I do not need this information" (Response 15).

When asked about the importance of Items 17 to 23 (Results), the respondents agreed that they were critical to research reporting (11 codes) but remarked that not all items could be complied with (13 codes), and that some might be less applicable to reviews that undertook narrative synthesis. They also regarded Items 24 to 26 (Discussion) as essential components when reporting research (9 codes) as it would inform readers of knowledge gaps, future practice and implications (14 codes). As for Item 27 (Funding), the respondents felt that the item was vital in systematic reviews as it would reveal potential areas for bias (10 codes) and allow authors to declare any conflicts of interest.

Discussion

Most of the respondents felt that the PRISMA statement was important and reported a mean overall rating of 8.66 (SD=1.40). In terms of the individual items, all but item 5 was associated with an average score of over 8.0, implying most of the respondents perceived the items in PRISMA statement were important. Item 5 – "Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide" – has a mean score of 7.75, which is significantly lower than the overall rating.

For published systematic reviews, compliance of Item 5 to the PRISMA statement was

often low. Panic et al. [8] reported that only four out of 90 systematic reviews (4.4%) published in the gastroenterology and hepatology journals adhered to this item, while Tam et al. [9] reported that two out of 74 (2.7%) systematic reviews in nursing journals did so. Sideri et al. [22] suggested that protocol registration of systematic reviews should be encouraged to improve the quality of published systematic reviews. A plausible explanation for the low adherence and the comparatively low rating of the item lies in the low awareness of the platform to publish or register the protocol. Moreover, protocol is not a prerequisite for publishing systematic reviews in the majority of medical and nursing journals, though it is a requirement for publishing randomized controlled trials, as mandated by many journals. [23]

Six items were rated significantly higher than the overall rating: two from the Methods section, one from the Results section, and three from the Discussion section. The three items from the Methods and Results sections include:

- Item 7 – "*Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched*"
- Item 9 – "*State the process for selecting studies (i.e., screening, eligibility, inclusion in systematic review, and, if applicable, inclusion in the meta- analysis)*" and
- Item 17 – "*Give numbers of studies screened, those assessed for eligibility, and those included in the review, with reasons for exclusions at each stage, ideally with a flow diagram*".

These three items relate to the unique ways in data collection and evaluation of the systematic reviews. [24] which constitute the major differences between systematic reviews and traditional literature reviews. When conducting a systematic review, the authors clearly identify the inclusion criteria for the review before the literature is selected, and they must demonstrate that these criteria are consistently adhered to. [25] Therefore, a clear description of the sources for searching and selection procedure is essential. A recent study reported that all systematic reviews published in nursing journals mentioned the databases used and at least 85.1% provided the last searched date.[12] Tam et al.[12] further reported that the rates of compliance to Item 7, Item 9 and Item 17 were 98.6%, 97.3% and 91.9% respectively among systematic reviews published in nursing journals.

The scores of all three items from the discussion and the subtotal scores of the section were significantly higher than the overall score. These three items are:

- Item 24 – "Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers),"
- Item 25 – "Discuss limitations at the study and outcome levels (e.g., risk of bias), and at the review level (e.g., incomplete retrieval of identified research, and reporting bias)," and
- Item 26 – "Provide a general interpretation of the results in the context of other

evidence, and implications for future research".

The purpose of the Discussion is to summarize the findings in a research context and to explain their meaning and importance. [26] Traditionally, the discussion has served to convince readers of the rightness of the authors' data interpretation and speculation, and has been deemed as the most important part in a research article (Borja, 2014). It is suggested that the discussion for scientific articles should include the principal findings, strengths and weaknesses, discussion of any differences in results, meanings of the study such as possible mechanisms and implications for clinicians or policymakers, unanswered questions, and future research.[27] These points jointly constitute the content of the three items. In fact, this opinion can be observed from some the open-ended responses to this section in our survey. Some of the examples of the responses include "*An essential component of reporting research*", "*Informs knowledge gaps, future practice and implications*" and "*Provides overall results*".

The current research represents the pioneering study in seeking the perception of authors of systematic reviews and meta-analyses towards the PRISMA statement. We have attempted to include all the authors who had published systematic reviews or meta-analyses articles in nursing journals from 2011 to 2017 as the participants for the study. The results reflected that most of the respondents perceive items in the PRISMA statement as important. It implies that authors of systematic reviews or meta-analyses

generally agree that following the PRISMA statement when writing their manuscripts is beneficial. The advantage of following such guidelines is not only to have a standard format but also avoid missing important information thereby diminishing the usefulness of the reviews. [1 5] Several limitations of the study are noteworthy. Firstly, the completion of the questionnaire by 181 respondents, leading to a completion rate of only 9.2%, limits the representativeness of the sample. Secondly, although all the email addresses were extracted from the included articles, they mainly belonged to the corresponding authors who were usually the senior authors [28]; hence, this may constitute selection bias. Thirdly, 350 out of 2,310 (15.1%) email addresses were not valid during the time of the study. It was reported that most doctoral prepared nursing faculty member are in their early 50s, and the average retirement age for a nurse educator was 62.5 years old (NACNEP, 2010); therefore, some of the authors might have retired. Fourthly, we did not try to search the email addresses from other sources so as to increase the number of valid email addresses.

Reporting guidelines are useful tools for authors, reviewers, and editors to ensure appropriate content for manuscripts. It has been suggested that the introduction to these guidelines should be included when teaching evidence-based practice. [29 30] In this study, we found that authors of systematic reviews and meta-analyses published in nursing journals deem it important to follow the PRISMA statement to conduct and report their reviews. Future studies may focus on journal editors and peer reviewers to determine not only whether their views coincide with those the authors of reviews and meta-analysis, but also whether they will formally endorse PRISMA in their journals.

Conflicts of interest

None.

Ethical approval

National University of Singapore Institutional Review Board (Ref No. S-17-342E).

Table 1: Demographic of the respondents (n = 181)

Variables	n (%)
Gender	
• Male	46 (25.4%)
• Female	135 (74.6%)
Age	
• 21-30	7 (3.9%)
• 31-40	36 (19.9%)
• 41-50	45 (24.9%)
• 50-60	62 (34.3%)
• 61 or above	31 (17.1%)
Specialty	
• Nursing	125 (69.1%)
• Dentistry	1 (0.6%)
• Medicine	1 (0.6%)
• Microbiology	1 (0.6%)
• Obstetrics & Gynecology	4 (2.2%)
• Paediatrics	5 (2.8%)
• Pharmacology	2 (1.1%)
• Physiology	2 (1.1%)
• Psychiatry	6 (3.3%)
• Psychology	2 (1.1%)
• Public Health	8 (4.4%)
• Surgery	4 (2.2%)
• Others	20 (11.0%)

Table 2: Respondents' background knowledge on systematic reviews

Question	Yes
Do you know what is systematic review?	
• Yes	181 (100.0%)
• No	0 (0.0%)
Have you published any systematic review before?	
• Yes	160 (88.4%)
• No	21 (11.6%)
Are you aware of the PRISMA guidelines?	
• Yes	166 (91.7%)
• No	15 (8.3%)
Do you follow the PRISMA guidelines when conducting and reporting your systematic review?	
• Yes	140 (77.3%)
• No (Not required by journals)	10 (5.5%)
• No (Other reasons)	3 (1.7%)
• Not applicable (did not conduct any systematic reviews)	13 (7.2%)
• No response	15 (8.3%)
Importance of following PRISMA guidelines in conducting and reporting systematic review. (1-10)	8.66 (1.40) 95%CI: (8.45, 8.88)

Table 3: Respondents' rating to the 27 items of PRISMA (possible score from 1 to 10)

Item	Mean (SD)	95% CI	p #
Title			
1. Identify the report as a systematic review, meta-analysis, or both	8.98 (1.58)	(8.73, 9.22)	0.015
Abstract			
2. Provide a structured summary including	8.87 (1.59)	(8.62, 9.11)	0.051
Introduction			
3. Describe the rationale for the review	8.81 (1.45)	(8.58, 9.03)	0.223
4. Provide an explicit statement of questions being addressed with reference to PICOS.	8.67 (1.61)	(8.42, 8.92)	0.962
Method			
5. Indicate if a review protocol exists	7.75 (2.18)	(7.41, 8.08)	<0.001*
6. Specify study and report characteristics used as criteria for eligibility.	8.90 (1.44)	(8.68, 9.12)	0.022
7. Describe all information sources in the search and date last searched.	9.07 (1.26)	(8.87, 9.26)	<0.001*
8. Present full electronic search strategy for at least one database	8.61 (1.73)	(8.34, 8.87)	0.690
9. State the process for selecting studies	9.16 (1.30)	(8.96, 9.36)	<0.001*
10. Describe method of data extraction from reports and any processes for obtaining and confirming data from investigators	8.81 (1.54)	(8.57, 9.04)	0.247
11. List and define all variables for which data were sought and any assumptions and simplifications made.	8.70 (1.49)	(8.47, 8.93)	0.748
12. Describe methods used for assessing risk of bias of individual studies and how this information is to be used in any data synthesis.	8.64 (1.64)	(8.39, 8.89)	0.833

13. State the principal summary measures	8.58 (1.66)	(8.33, 8.84)	0.509
14. Describe the methods of handling data and combining results of studies.	8.87 (1.45)	(8.65, 9.10)	0.089
15. Specify any assessment of risk of bias that may affect the cumulative evidence.	8.71 (1.44)	(8.49, 8.93)	0.697
16. Describe methods of additional analyses	8.57 (1.60)	(8.33, 8.82)	0.455
Results			
17. Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9.35 (1.00)	(9.20, 9.50)	<0.001*
18. For each study, present characteristics for which data were extracted and provide the citations.	9.01 (1.40)	(8.80, 9.23)	0.007
19. Present data on risk of bias of each study and, if available, any outcome level assessment	8.45 (1.79)	(8.17, 8.72)	0.075
20. For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8.52 (1.64)	(8.27, 8.77)	0.231
21. Present results of each meta-analysis done, including confidence intervals and measures of consistency.	8.73 (1.50)	(8.51, 8.96)	0.556
22. Present results of any assessment of risk of bias across studies.	8.51 (1.65)	(8.25, 8.76)	0.202
23. Give results of additional analyses	8.48 (1.59)	(8.24, 8.73)	0.101
Discussion			
24. Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups	9.20 (1.03)	(9.05, 9.36)	<0.001*
25. Discuss limitations at study and outcome level, and at review-level.	9.08 (1.30)	(8.89, 9.28)	<0.001*
26. Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9.27 (0.99)	(9.11, 9.42)	<0.001*

Funding			
27. Describe sources of funding for the systematic review and other support; role of funders for the systematic review.	8.43 (2.04)	(8.12, 8.75)	0.149

#: p-values were computed using paired sample t-test comparing each item with the overall rating
*: Significant at 5% level of significant after the Bonferroni's adjustment

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Authors contribution:

Study design: WT, AT, BW, SG

Data collection: WT, AT, BW

Data analysis: WT, BW

Manuscript drafting: WT, AT, BW, SG

Data Sharing Statement:
No data are available: No additional data available

Appendix 1: The search query used in PUBMED

((("Int J Nurs Stud"[Journal] OR "Eur J Cardiovasc Nurs"[Journal] OR "J Fam Nurs"[Journal] OR "Nurse Educ Today"[Journal] OR "J Nurs Scholarsh"[Journal] OR "Nurs Outlook"[Journal] OR "Women Birth"[Journal] OR "J Cardiovasc Nurs"[Journal] OR "Eur J Cancer Care (Engl)"[Journal] OR "Worldviews Evid Based Nurs"[Journal] OR "J Hum Lact"[Journal] OR "J Adv Nurs"[Journal] OR "Midwifery"[Journal] OR "Nurs Res"[Journal] OR "Aust Crit Care"[Journal] OR "J Nurs Manag"[Journal] OR "Am J Crit Care"[Journal] OR "Int J Ment Health Nurs"[Journal] OR "Eur J Oncol Nurs"[Journal] OR "Rehabil Nurs"[Journal] OR "Oncol Nurs Forum"[Journal] OR "Nurs Ethics"[Journal] OR "Res Nurs Health"[Journal] OR "Cancer Nurs"[Journal] OR "Am J Nurs"[Journal] OR "Heart Lung"[Journal] OR "Crit Care Nurse"[Journal] OR "Biol Res Nurs"[Journal] OR "Int Nurs Rev"[Journal] OR "J Midwifery Womens Health"[Journal] OR "Nurs Crit Care"[Journal] OR "J Pediatr Health Care"[Journal] OR "Collegian"[Journal] OR "J Nurs Adm"[Journal] OR "Appl Nurs Res"[Journal] OR "Nurse Educ"[Journal] OR "J Wound Ostomy Continence Nurs"[Journal] OR "Intensive Crit Care Nurs"[Journal] OR "J Assoc Nurses AIDS Care"[Journal] OR "Nurse Educ Pract"[Journal] OR "West J Nurs Res"[Journal] OR "Clin Nurs Res"[Journal] OR "Comput Inform Nurs"[Journal] OR "Int Emerg Nurs"[Journal] OR "Pain Manag Nurs"[Journal] OR "J Child Health Care"[Journal] OR "Adv Neonatal Care"[Journal] OR "Clin Simul Nurs"[Journal] OR "J Tissue Viability"[Journal] OR "J Transcult Nurs"[Journal] OR "J Obstet Gynecol Neonatal Nurs"[Journal] OR "Nurs Philos"[Journal] OR "J Nurs Care Qual"[Journal] OR "J Clin Nurs"[Journal] OR "Arch Psychiatr Nurs"[Journal] OR "Nurs Health Sci"[Journal] OR "J Pediatr Nurs"[Journal] OR "J Prof Nurs"[Journal] OR "J Sch Nurs"[Journal] OR "Nurs Inq"[Journal] OR "Geriatr Nurs"[Journal] OR "J Psychiatr Ment Health Nurs"[Journal] OR "Perspect Psychiatr Care"[Journal] OR "Adv Skin Wound Care"[Journal] OR "Nurs Econ"[Journal] OR "Int J Nurs Pract"[Journal] OR "Aust J Rural Health"[Journal] OR "J Spec Pediatr Nurs"[Journal] OR "J Pediatr Oncol Nurs"[Journal] OR "J Nurs Educ"[Journal] OR "J Nurs Res"[Journal] OR "MCN Am J Matern Child Nurs"[Journal] OR "J Perinat Neonatal Nurs"[Journal] OR "J Am Assoc Nurse Pract"[Journal] OR "Int J Nurs Knowl"[Journal] OR "J Contin Educ Nurs"[Journal] OR "Issues Ment Health Nurs"[Journal] OR "J Trauma Nurs"[Journal] OR "Contemp Nurse"[Journal] OR "J Gerontol Nurs"[Journal] OR "J Emerg Nurs"[Journal] OR "Public Health Nurs"[Journal] OR "J Am Psychiatr Nurses Assoc"[Journal] OR "Asian nursing research"[Journal] OR "Clin Nurse Spec"[Journal] OR "J Perianesth Nurs"[Journal] OR "AORN J"[Journal] OR "Holist Nurs Pract"[Journal] OR "Res Gerontol Nurs"[Journal] OR "J Psychosoc Nurs Ment Health Serv"[Journal] OR "Workplace Health Saf."[Journal] OR "ANS Adv Nurs Sci"[Journal] OR "J Hosp Palliat Nurs"[Journal] OR "Gastroenterol Nurs"[Journal] OR "J Neurosci Nurs"[Journal] OR "Rev Lat Am Enfermagem"[Journal] OR "Clin J Oncol Nurs"[Journal] OR "J Forensic Nurs"[Journal] OR "Nurs Clin North Am"[Journal] OR "Rev Esc Enferm USP"[Journal] OR "Jpn J Nurs Sci"[Journal] OR "Nephrol Nurs J"[Journal] OR "J Korean Acad Nurs"[Journal] OR "Nurs Sci Q"[Journal] OR "Res Theory Nurs Pract"[Journal] OR "J Nurse Pract"[Journal] OR "J Addict Nurs"[Journal] OR "Crit Care Nurs Clin North Am"[Journal] OR "Orthop Nurs"[Journal] OR "Aust J Adv Nurs"[Journal] OR "Bariatr Surg Pract Patient Care"[Journal] OR "J Community Health Nurs"[Journal] OR "Assist Inferm Ric"[Journal] OR "Pflege"[Journal])) AND (review[Title] OR meta-analysis[Title])) AND ("2011/01/01"[Date - Publication] : "2017/12/15"[Date - Publication])

Appendix 2: Respondents' open-ended responses

Perspective towards items related to the *Title* (Section 1) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Provides clear information about the study	32	"It makes the content of the paper very clear from the beginning" (Response 39) "essential for selecting appropriate material in search databases and provides first indication of inclusion or exclusion" (Response 18)
Help readers locate the work	25	"Title needs to be explicit to help with data searching using boolean parameters" (Response 55) "for indexing purposes" (Response 8)
Miscellaneous	11	"Data credence and integrity" (Response 13) "First thing reviewers/editors read is the title" (Response 20) "I am not only an author I am editor of a journal - a minority of authors continue to evidence confusion about the type of review they are doing - sometimes using systematic as an adjective rather than a noun which encapsulates a certain type of review" (Response 26) "Important to state as establishes understanding between author & reader but not essential as it becomes clear from methods anyway" (Response 30) "Many articles reported in the literature are title systematic

		reviews, but they are no more than literature reviews without a systematic process. Journal editors need to do more to ensure this term is only used for a systematic review that meet the PRISMA" (Response 43) "Systematic reviews carry more weight in my mind. Nice to know from the beginning whether the review is systematic" (Response 53)
Perspective towards items related to the *Abstract* (Section 2) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Helps readers quickly ascertain the purpose of the paper	28	"A clear abstract helps a user rapidly determine if they need to refer to the document at all" (Response 1) "Allows the reader to determine relevance of the research to thier priorities" (Response 7)
Standardises reporting of research	8	"A structured reporting ensures methodological rigor & standardizes reporting--this way important items aren't overlooked" (Response 2) "Having an organized method of reporting data improves the public's understanding of what they are reading" (Response 22)
Summarises the key content of the systematic review	8	"Succinctly recaps key elements and findings of research article" (Response 43) "Data display matrix- similarity and differences are evident" (Response 16)

Necessary component of systematic review reporting	5	"Essential for all publications - often the only part read so must include essential components" (Response 18)
Not necessary to provide systematic review registration number in abstract	4	"not always necessary to register the systematic review. Not all systematic reviews are registered" (Response 37)
Limitations of abstracts	2	"I'm in favour of a structured abstract but the word limits of such is prohibitive to cover all aspects." (Response 8)
Perspective towards items related to the *Introduction* (Section 3) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Introduces readers about the context	12	"Provides history, background, significance, and lays the foundation for the purpose of the review" (Response 34) "aids in logical presentation and helps the reader" (Response 1)
Limitations and inflexibility of PICO	12	"I find the PICO format to be cumbersome in the development of the research question. It is useful as a new scientist but perhaps less necessary for more experienced researchers." (Response 19) "I believe that could be interesting a new approach or a dismemberment of the PICOS question since revision studies do not always refer to intervention studies, for example" (Response 18)
Frames the research questions	10	"The reader needs a problem statement and background information to compare with the study results and decide where they fit in overall with what is known." (Response 42) "Clarity on the gap and the question provides the

		foundation for the work" (Response 10)
Provides clarity	7	"Precision and transparency" (Response 33)
Reduces duplication of research through description of research gaps	3	"In some disciplines there is a plethora of systematic reviews conducted on the same topic in a very short time frame. A strong rationale for why a review is being conducted is important" (Response 22)
Essential information in reporting research	3	"Part and parcel of sound research" (Response 28)
Miscellaneous	6	"In an era of evidence-based medicine/practice anything other than a systematic review process is of little value to the reader" (Response 21) "Systematic reviews are being used as 'citation generators' - the rationale shows if the SR is actually needed - purpose of the review may actually be scant because their motivation is to select a topic that will generate citations" (Response 39) "These issues are too often superficially described and weak performance in nursing" (Response 46) "Transparency is important in SR" (Response 47)
Perspective towards items related to the *Methods* (Section 4) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Ensures quality, rigor and trustworthiness	17	"These items are essential to assuring the internal validity of the review" (Response 38) "All tried and tested methods of ensuring quality and

		avoiding bias" (Response 5)
Allows replication of systematic review	9	"Reporting of methods to allow for transparency and reproducibly is very important in a systematic review" (Response 26)
Essential component of reporting research	8	"A systematic review is often regarded as research of research - all of the above are components of a well-developed research study and are applicable to systematic reviews as well." (Response 1)
Not all items are necessary for different types of systematic reviews	5	"I think the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design. If I conduct e.g. a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information." (Response 13)
Differentiates the good reviews from the bad	2	"Important for the reader to be able to evaluate the quality of the review" (Response 15)
Miscellaneous	9	"These helps identify the rigour - a systematic review can look superficially good, but if items 9,10,11, 14 are vague, then it shows the authors have not recognised the subjective component in the review process - thus it is weaker" (Response 36) "item 12 - assessment of bias is crucial, however, limitations of the tools used to assess the risk of bias should be understood" (Response 18) "SR protocols are not always published - time constraints, e.g. for Masters or PhD students undertaking a SR or

		where the SR is part of a time-constrained funded study, can be the limiting factor. Some journals do not review protocols quickly." (Response 28) "heterogeneity need to be explored" (Response 12)
Perspective towards items related to the *Results* (Section 5) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Important component in research reporting	11	"All of the above are components of a well-designed research study and are applicable to systematic reviews as well" (Response 7) "These are all essential elements of rigor in SR" (Response 30)
Not all criteria of Results are necessary to report	9	"Not always feasible, in a publication, to include all the details - especially if different for each publication and/or high number of studies in review" (Response 19) "See 14b, the items does not cover very well these types of reviews, where a narrative synthesis is the only option to present the results" (Response 24)
Not all details can be presented	6	"I believe that if we think in terms of publication of the review we have a certain number of words and tables and that in general for the detailed description of each study, which is descriptive or meta-analysis may not be possible." (Response 5)
Necessary for rigor and trustworthiness	5	"These items demonstrate the rigour of data collection and assure the reader that the results can be trusted." (Response

		31)
Miscellaneous	5	"heterogeneity need to be explored" (Response 14) "Precision" (Response 21)
Perspective towards items related to the *Discussion* (Section 6) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Informs knowledge gaps, future practice and implications	14	"Important because it places into context, the findings and helps users of the information identify how it relates to their practice." (Response 13) "this section is the translational piece and what gives the evidence power" (Response 26)
An essential component of reporting research	9	"An essential component of reporting research" (Response 19) "This is not specific to systematic reviews but to all research reported on - Prisma should focus on systematic review specifics" (Response 25)
Shortfalls of the discussion in some systematic reviews	3	"Discussion sometimes simply repeats the results data and weakens the discussion section if not supported with other literature" (Response 8)
Provides overall results	2	"Discussion includes overall results" (Response 7)
Discussion may not be as important as the rigour of the systematic review	2	"I prefer to let the results 'speak for themselves' so while I find interpretation (Item 26) useful I see it as a colleague opinion but the responsibility is on me to interpret what they present - hence the need for transparency and

		demonstration of rigour" (Response 11)
Part of evidence appraisal	1	"All of the above items are components of evidence appraisal and must be conducted in a detailed and rigorous manner" (Response 3)
Perspective towards items related to the *Funding* (Section 7) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Reveals potential for bias	10	"To indicate to the reader the possibility of external influence to the study findings" (Response 24) "To make clear any conflicts of interest and how these have either impacted on the study, been eliminated or have not had any influence on the study outcome" (Response 25)
Allows declaration of conflict of interests	9	"Conflicts of interest need to be announced" (Response 8) "identify any perceived or real conflict of interest" (Response 14)
Allows transparency	5	"In general, all these questions should be rated 10, due to a requirement for a transparent, accurate and systematic approach in systematic reviews." (Response 16)
Necessary component	4	"Required for all research published/reports" (Response 20)
Miscellaneous	3	"none of the studies I have done required any funding" (Response 19)

		“Unless the risk of bias is caused by external funding, there should never be such risk as there is no new data added” (Response 27)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	*NA*
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	NA
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	14
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	3

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Perception of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement of Authors Publishing Reviews in Nursing Journals: A Cross-Sectional Online Survey

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Title:

Perception of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement of Authors Publishing Reviews in Nursing Journals: A Cross-Sectional Online Survey

Running Head:

Nursing-review authors' perception of PRISMA

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Abstract: 248/300 words; Main Text: 2876/4000 words

Abstract

Objective: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement has been developed as guidelines for reporting systematic reviews and meta-analyses. Despite the prevalent use of the PRISMA Statement in medicine and nursing, no studies have examined authors' perception of it. The purpose of this study is to explore the perception of the PRISMA Statement of authors who published reviews, meta-analyses, or both in nursing journals.

Design: Cross-sectional descriptive study.

Methods: An online survey was conducted among authors who published reviews, meta-analyses, or both in nursing journals between 2011 and 2017. The selected authors' email addresses were extracted from the PUBMED database. A questionnaire – with a 10-point Likert-scale (1 – *Not important at all* to 10 – *Very important*) – was developed to elicit their responses regarding their perception of not only the PRISMA statement as a whole, but also the individual items therein.

Results: Invitations were sent to 1,960 valid email addresses identified, with 230 responses (response rate: 11.7%) and 181 completed responses (completion rate: 9.2%). The average perceived importance of the PRISMA statement was 8.66 (SD=1.35), while the perceived importance for the individual items ranged from 7.74 to 9.32. Six items were

rated significantly higher than the average rating, whereas one item was rated significantly lower.

Conclusion: Most respondents perceived the PRISMA Statement as important. Items related to information sources, selection, search-flow presentation, summary of findings, limitations, and interpretation were deemed more important while the registration was deemed less so.

Keywords: PRISMA; Publication policy; Quality of reporting; Research reporting; Systematic reviews

Strengths and limitations of this study

Strengths

- This pioneering study is the first to examine authors' perception of the PRISMA statement.
- The sampling frame, generated from PubMed, covered most of the eligible subjects in nursing.

Limitations

- The response rate of the survey is somewhat low.

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Competing interest: None declared

Introduction

Systematic reviews and meta-analyses are essential tools for healthcare professionals in evaluating the effectiveness of existing medical interventions. Information synthesized from systematic reviews and meta-analyses are frequently used as the basis for the development and revision of clinical practice guidelines.[1] The reliability, usefulness, and scientific soundness of systematic reviews and meta-analyses depend critically upon their methodologies and reporting quality. In this regard, journal editors have suggested that both contributing researchers and editorial boards of the journals are jointly responsible for ensuring the high quality of systematic reviews and meta-analyses,.[2] It is the obligation of researchers to conduct and report their findings according to international standards and guidelines where possible, whereas it is the prerogative of journal editors and contributors to set stringent criteria and adhere to them when considering manuscripts for publication.

Several research-reporting guidelines are available for conducting and reporting various types of studies in health sciences, such as the CONsolidated Standards Of Reporting Trials (CONSORT)[3] for randomized controlled trials and the Strengthening the Reporting of OBservational studies in Epidemiology (STROBE)[4] for observational studies. For systematic reviews and meta-analyses of interventional studies, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement [5] is the most commonly-used reporting guidelines.

The PRISMA statement was developed in 2005 during a three-day meeting in Canada by an assemblage of review authors, methodologists, clinicians, medical editors, and consumers [5]. A 27-item checklist in 7 sub-sections was created through a consensual process informed by evidence.[1] The PRISMA statement can be used by authors as guidelines to ensure the completeness of studies and to reduce reporting biases when conducting and reporting systematic reviews and meta-analyses. The statement can also be used by journal reviewers and editors to evaluate the reporting quality of manuscripts in consideration. Although it focuses on reporting systematic reviews and meta-analyses of randomized controlled trials, the PRISMA statement can also be used for systematic reviews and meta-analyses of other types of studies. The practical value of the PRISMA statement can be demonstrated by its having been cited for over 19,000 times up to July 2017. [6]

Several research studies evaluated methodological and reporting qualities of systematic reviews and meta-analyses. [7-11] For example, in terms of the reporting quality, it has been reported that an average of 86.3% of systematic reviews published in gastroenterology and hepatology journals complied with the PRISMA guidelines [8], whereas only 57.1% of the those published in nursing journals did so.[9]

As of December 2018, 179 academic journals have endorsed the PRISMA statement (http://www.prisma-statement.org/), reflecting their recommendation for research contributors to adhere to the PRISMA guidelines when conducting and reporting systematic reviews or meta-analyses.

Despite the sizeable number of citations of the PRISMA statement in academic articles over the years, adherence amongst researchers to the items in PRISMA statement was suboptimal. Nine items of PRISMA were adhered to by fewer than 67% of the 2,382 systematic reviews published after 2009.[6] For systematic reviews published in nursing journals, the median adherence rate were lower than 60%.[9] Currently, only 3 out of the 116 nursing journals in Journal Citation Reports endorsed the PRISMA statement (http://www.prisma-statement.org/), namely *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *Journal of the American Academy of Nurse Practitioners*, and *Nursing Research*. Although journals such as the *International Journal of Nursing Studies* and *Journal of Clinical Nursing* do not formally endorse the PRISMA statement, they do recommend that contributors follow it when reporting their systematic reviews and meta analyses. Therefore, it is important to examine authors' perception of the importance of the items in the PRISMA statement. To the best of our knowledge, no studies have examined authors' perception of PRISMA. Thus, the aim of this study to address this academic gap by exploring how such authors from nursing journals perceive the importance of not only the PRISMA statement as a whole, but also the individual items therein.

Methods

Study design

A cross-sectional online survey was conducted to collect perception of the PRISMA statement of authors publishing systematic reviews or meta-analyses in nursing journals.

Participants

Any authors who published reviews, meta-analyses, or both in nursing journals between 2011 and 2017 were invited to participate in the online survey regarding their perception of the PRISMA statement.

Strategic sampling of participants

A total of 116 nursing journals were identified from the Nursing category of the Journal Citation Reports, Science Edition 2016 version (https://clarivate.com/products/journal-citation-reports/). A search was conducted on the PubMed database for articles published in these 116 journals between 1 January 2011 and 15 December 2017 with "review" or "meta-analysis" in their titles. We used "review" rather than "systematic review" as the searching term to be more inclusive in the search because prior studies have indicated that some systematic reviews published in nursing journals might use other terms such as "systematic literature review" in the title. [12] A noteworthy difference between systematic reviews and traditional literature/narrative reviews is that the

former requires pre-defined criteria for eligibility, systematic search strategy, quality assessment, and synthesis of results, whereas the latter does not. We searched for articles published after 2011 to avoid obsolete and therefore invalid email addresses. The PubMed query used in the database search is included in Appendix 1 (Supplementary file 1). A total of 3,877 articles were identified in the search. Article summary records were retrieved and downloaded from the PubMed database in the Extensible Markup Language (XML) file format. A Python script was then written to process the XML file, extracting the PMID, article titles, authors, and their email addresses from each record into the Common-Separated Values (CSV) format.

Sample-size estimation

The authors' perception of the PRISMA statement and its individual items was measured with a 10-point Likert scale. According to normal approximation, 6× standard deviations (SDs) would cover 99% of the data; the SD was thus approximated to 1.67 (10/6). To achieve a 95% confidence interval (CI) with a margin of error of 0.2, 270 responses would be needed. [13] Based on prior research [14], the response rates for university staff and health educators are estimated to range from 10 to 20%. We assumed a low response rate from the eSurvey and estimated that 2,700 invitations would be needed, given an assumed response rate of 10%.

Questionnaire

The 37 items in the questionnaire concerned different aspects: five focused on the authors'

demographic information; four on their experiences in conducting reviews and using the PRISMA guidelines; one on the overall evaluation of the importance to follow the PRISMA guidelines in conducting and reporting of systematic reviews using a 10-point Likert-scale (1 – *Not importance at all* to 10 – *Extremely important*);and 27 on their perception of the importance of each individual item in the seven sections of the PRISMA guidelines using a 10-point Likert-scale (1 – *Not important at all* to 10 – *Very important*). Open-ended questions were included in each sub-section to gather qualitative data about their responses.

An electronic questionnaire was created using the eSurvey platform developed by the Information Technology (IT) department of the authors' university. [15] After pilot testing by the authors' peers, a unique URL for the electronic questionnaire was generated. The questionnaire is attached as supplementary file 2.

Data collection

Invitation emails, including a description of the study and the URL to the questionnaire, were sent to the target email addresses between 3 and 7 January 2018. A reminder was sent on 17 January 2018. The survey was closed on 31 January 2018. Completed e-questionnaires were stored in the server of the IT department of the authors' university.

Data analyses

Descriptive statistics, including frequencies and percentages, were used to summarize the results. Paired-sample t-test was used to examine differences between the overall and individual item ratings. Bonferroni's method was used to adjust the level of significance due to multiple comparisons. All the analyses were conducted using IBM SPSS 22.0 for Windows.[16] Content analysis was conducted to analyze the qualitative responses using NVivo 11 for Windows. [17] The open-ended responses were analyzed for initial coding; codes with similar meanings were then grouped into the same category.[18]

Ethical consideration

The study was approved by the University Institutional Review Committee on 23 Nov 2017 (Ref No. S-17-342E). Data in this study were collected anonymously.

Patient and Public Involvement

No patients participated in this study; only authors from nursing journals were involved.

Results

A total of 2,565 email addresses were identified from 1,832 articles (out of the 3,877 articles identified from the PubMed search as many of them did not include email addresses). Upon removal of duplicates and invalid email addresses, 2,310 distinct email addresses remained, to each of which an email invitation was sent. Of these 2,310 email addresses, 350 were invalid ones to which the invitation was undeliverable and bounced

back, whereas 1,960 were valid ones to which delivery was successful. A total of 230 authors attempted the questionnaire, 181 of whom completed it. Accordingly, the response rate was 11.7% (230/1,960) and the completion rate was 9.2% (181/1,960).

The respondents' demographic information is summarized in **Table 1**: 135 (74.6%) respondents were females, and 138 (76.3%) were aged 41 or above. In terms of medical disciplines, 125 (69.1%) respondents specialized in nursing, followed by eight (4.4%) in public health and six (3.3%) in psychiatry.

All of the 181 respondents knew what a systematic review was. Among them, 160 (88.4%) had published systematic reviews and 166 (91.7%) were aware of the PRISMA guidelines. The 166 respondents aware of the PRISMA guidelines were then asked to rate the overall importance of following the PRISMA guidelines in conducting and reporting systematic reviews based on a 10-point Likert-scale, for which an average score of 8.66 (SD = 1.40) was reported (**Table 2**). The respondents also rated the importance of each of the 27 items in the PRISMA guidelines, of which the results are shown in **Table 3**. The mean scores ranged from 7.75 (Item 5) to 9.35 (Item 17) with a median of 8.73 (Item 21). The rating for Item 5 was significantly lower than the overall rating. Conversely, the ratings for six items from different sections were significantly higher than the overall rating, namely Items 7 and 9 from the Methods section, Item 17 from the Results section, and Items 24, 25 and 26 from the Discussion section.

For the open-ended questions, the respondents were asked to share the reason for their rating for each section. For the 166 respondents, 62 valid open-ended responses were received. Their perceptions of the importance of the items in the seven sections of the PRISMA guidelines are summarized in Supplementary file 3.

When asked to explain the importance of Item 1 (Title), the prevailing view was that compliance to it would ensure that the title provided clear information about the study (32 codes) and helped readers locate the work (25 codes). Item 2 (Abstract) was likewise deemed important since a well-written abstract would help readers quickly ascertain the purpose of the paper (28 codes). Nonetheless, some respondents found it unnecessary to provide a registration number for the systematic review in the Abstract. Furthermore, the respondents believed that adhering to Item 3 (Introduction) was important as the Introduction would acquaint the readers with the context of the study (12 codes) but some felt that the PICO framework (Item 4 – Introduction) was inflexible and had its limitations (12 codes). The PICO framework has been advocated for interventional studies[19]. However, in nursing research, there may be other types of systematic reviews such as those of prevalence studies [20], and psychological properties of instruments [21]. Therefore, the PICO framework may not be directly applicable in those cases.

The respondents also felt that abiding by Items 5 to 16 (Methods) was vital to ensuring

the quality, rigor, and trustworthiness of the study (17 codes). However, a few respondents commented that not all items were applicable to some types of systematic reviews (5 codes). For instance, one respondent opined that "*the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design… [For] a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information*" (Response 15).

When asked about the importance of Items 17 to 23 (Results), the respondents agreed that they were critical to research reporting (11 codes), but remarked that not all items could be complied with (13 codes), and that some might be less applicable to reviews that undertook narrative synthesis. They also regarded Items 24 to 26 (Discussion) as essential components when reporting research (9 codes) as it would inform readers of knowledge gaps, future practices, and implications (14 codes). As for Item 27 (Funding), the respondents felt that it was vital in systematic reviews as it would reveal potential areas for bias (10 codes) and allow authors to declare any conflicts of interest.

Discussion

Most respondents felt that the PRISMA statement was important and reported a mean overall rating of 8.66 (SD=1.40). In terms of the individual items, all but Item 5 were associated with an average score above 8.0, implying the perceived importance of those items among most respondents. Item 5 – "Indicate if a review protocol exists, if and where

it can be accessed (e.g., Web address), and, if available, provide" – registered a mean score of 7.75, which is significantly lower than the overall rating.

For published systematic reviews, compliance of Item 5 to the PRISMA statement was often low. Panic et al. [8] reported that only four out of 90 systematic reviews (4.4%) published in the gastroenterology and hepatology journals adhered to this item, while Tam et al. [9] reported that only two out of 74 (2.7%) systematic reviews in nursing journals did so. Sideri et al. [22] suggested that protocol registration of systematic reviews should be encouraged to improve the quality of published systematic reviews. A plausible explanation for the inadequate adherence and the comparatively low rating of the item lies in the low awareness of the platform to publish or register the protocol. Moreover, the protocol is not a prerequisite for publishing systematic reviews in most medical and nursing journals, though it is a requirement for publishing randomized controlled trials, as mandated by many journals. [23]

Six items were rated significantly higher than the overall rating: two from the Methods section, one from the Results section, and three from the Discussion section. The three items from the Methods and Results sections include:

- Item 7 – "*Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched*"
- Item 9 – "*State the process for selecting studies (i.e., screening, eligibility, inclusion in*

systematic review, and, if applicable, inclusion in the meta- analysis)" and

- Item 17 – "*Give numbers of studies screened, those assessed for eligibility, and those included in the review, with reasons for exclusions at each stage, ideally with a flow diagram*".

These three items relate to the uniqueness in data collection and evaluation of the systematic reviews. [24] which constitute the major differences between systematic reviews and traditional literature reviews. When conducting a systematic review, the authors stipulate inclusion criteria for the review before the literature is selected, and they must demonstrate that these criteria are consistently adhered to. [25] Therefore, a clear description of the sources for searching and selection procedure is essential. A recent study reported that all systematic reviews published in nursing journals revealed the databases used and at least 85.1% provided the last searched date.[12] Tam et al.[12] further reported that the rates of compliance to Items 7, 9, and 17 were 98.6%, 97.3% and 91.9% respectively among systematic reviews published in nursing journals.

The scores of all three items from the discussion and the subtotal scores of the section were significantly higher than the overall score. These three items are:

- Item 24 – "Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers),"
- Item 25 – "Discuss limitations at the study and outcome levels (e.g., risk of bias),

and at the review level (e.g., incomplete retrieval of identified research, and reporting bias)," and

- Item 26 – "Provide a general interpretation of the results in the context of other evidence, and implications for future research".

The purpose of the discussion is to summarize the findings in a research context and to explain their meaning and importance.[26] Traditionally, the discussion serves to convince readers of the rightness of the authors' data interpretation and speculation, and has been deemed as the most important part in a research article.[27] For scientific articles, the discussion should include the principal findings, strengths and weaknesses, differences in results, meanings of the study such as possible mechanisms and implications for clinicians or policymakers, unanswered questions, and future research.[28] These points jointly constitute the content of the three items. In fact, this opinion can be observed from some open-ended responses to this section in our survey, as exemplified by "*An essential component of reporting research*", "*Informs knowledge gaps, future practice and implications*" and "*Provides overall results*".

The current research represents the pioneering study in elucidating the perception of the PRISMA statement of authors who published systematic reviews and meta-analyses. We have attempted to include all the authors who had published systematic reviews, meta-analyses, or both in nursing journals between 2011 and 2017 as the participants for the

study. The results reflected that most respondents perceived items in the PRISMA statement as important, implying their agreement in general that adherence to the statement when writing their manuscripts is beneficial. The advantages of such adherence include not only the establishment of a standard format but also the assured inclusion of all important information, the accidental omission of which will diminish the usefulness of the reviews.[1 5] Several limitations of the study are noteworthy. Firstly, the completion of the questionnaire by 181 respondents, leading to a completion rate of only 9.2%, limits the representativeness of the sample. Secondly, although all the email addresses were extracted from the included articles, they mainly belonged to the corresponding authors who were usually the senior authors[29]; hence, this might have constituted selection bias. Thirdly, 350 out of 2,310 (15.1%) email addresses were not valid during the time of the study. It has been reported that most nursing faculty member with doctoral degree are in their early 50s, and the average retirement age for a nurse educator was 62.5 years old (NACNEP, 2010); therefore, some of the authors might have retired. Fourthly, we did not attempt to search for email addresses from other sources so as to increase the number of valid email addresses.

Reporting guidelines are useful tools for authors, reviewers, and editors to ensure the appropriateness of the content for manuscripts. It has been advocated that introduction to these guidelines should be included when teaching evidence-based practice.[30 31] In this study, we found that authors publishing systematic reviews and meta-analyses in nursing journals deemed it important to follow the PRISMA statement to conduct and

report their reviews. Future studies may focus on journal editors and peer reviewers to determine not only whether their views coincide with those of the authors of reviews and meta-analyses, but also whether they will formally endorse PRISMA in their journals.

Conflicts of interest

None.

Ethical approval

National University of Singapore Institutional Review Board (Ref No. S-17-342E).

Table 1: Demographic of the respondents (n = 181)

Variables	n (%)
Gender	
• Male	46 (25.4%)
• Female	135 (74.6%)
Age	
• 21-30	7 (3.9%)
• 31-40	36 (19.9%)
• 41-50	45 (24.9%)
• 50-60	62 (34.3%)
• 61 or above	31 (17.1%)
Specialty	
• Nursing	125 (69.1%)
• Dentistry	1 (0.6%)
• Medicine	1 (0.6%)
• Microbiology	1 (0.6%)
• Obstetrics & Gynecology	4 (2.2%)
• Paediatrics	5 (2.8%)
• Pharmacology	2 (1.1%)
• Physiology	2 (1.1%)
• Psychiatry	6 (3.3%)
• Psychology	2 (1.1%)
• Public Health	8 (4.4%)
• Surgery	4 (2.2%)
• Others	20 (11.0%)

Table 2: Respondents' background knowledge on systematic reviews

Question	Yes
Do you know what is systematic review?	
• Yes	181 (100.0%)
• No	0 (0.0%)
Have you published any systematic review before?	
• Yes	160 (88.4%)
• No	21 (11.6%)
Are you aware of the PRISMA guidelines?	
• Yes	166 (91.7%)
• No	15 (8.3%)
Do you follow the PRISMA guidelines when conducting and reporting your systematic review?	
• Yes	140 (77.3%)
• No (Not required by journals)	10 (5.5%)
• No (Other reasons)	3 (1.7%)
• Not applicable (did not conduct any systematic reviews)	13 (7.2%)
• No response	15 (8.3%)
Importance of following PRISMA guidelines in conducting and reporting systematic review. (1-10)	8.66 (1.40) 95%CI: (8.45, 8.88)

Table 3: Respondents' rating to the 27 items of PRISMA (possible score from 1 to 10)

Item	Mean (SD)	95% CI	p #
Title			
1. Identify the report as a systematic review, meta-analysis, or both	8.98 (1.58)	(8.73, 9.22)	0.015
Abstract			
2. Provide a structured summary including	8.87 (1.59)	(8.62, 9.11)	0.051
Introduction			
3. Describe the rationale for the review	8.81 (1.45)	(8.58, 9.03)	0.223
4. Provide an explicit statement of questions being addressed with reference to PICOS.	8.67 (1.61)	(8.42, 8.92)	0.962
Method			
5. Indicate if a review protocol exists	7.75 (2.18)	(7.41, 8.08)	<0.001*
6. Specify study and report characteristics used as criteria for eligibility.	8.90 (1.44)	(8.68, 9.12)	0.022
7. Describe all information sources in the search and date last searched.	9.07 (1.26)	(8.87, 9.26)	<0.001*
8. Present full electronic search strategy for at least one database	8.61 (1.73)	(8.34, 8.87)	0.690
9. State the process for selecting studies	9.16 (1.30)	(8.96, 9.36)	<0.001*
10. Describe method of data extraction from reports and any processes for obtaining and confirming data from investigators	8.81 (1.54)	(8.57, 9.04)	0.247
11. List and define all variables for which data were sought and any assumptions and simplifications made.	8.70 (1.49)	(8.47, 8.93)	0.748
12. Describe methods used for assessing risk of bias of individual studies and how this information is to be used in any data synthesis.	8.64 (1.64)	(8.39, 8.89)	0.833

13. State the principal summary measures	8.58 (1.66)	(8.33, 8.84)	0.509
14. Describe the methods of handling data and combining results of studies.	8.87 (1.45)	(8.65, 9.10)	0.089
15. Specify any assessment of risk of bias that may affect the cumulative evidence.	8.71 (1.44)	(8.49, 8.93)	0.697
16. Describe methods of additional analyses	8.57 (1.60)	(8.33, 8.82)	0.455
Results			
17. Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9.35 (1.00)	(9.20, 9.50)	<0.001*
18. For each study, present characteristics for which data were extracted and provide the citations.	9.01 (1.40)	(8.80, 9.23)	0.007
19. Present data on risk of bias of each study and, if available, any outcome level assessment	8.45 (1.79)	(8.17, 8.72)	0.075
20. For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8.52 (1.64)	(8.27, 8.77)	0.231
21. Present results of each meta-analysis done, including confidence intervals and measures of consistency.	8.73 (1.50)	(8.51, 8.96)	0.556
22. Present results of any assessment of risk of bias across studies.	8.51 (1.65)	(8.25, 8.76)	0.202
23. Give results of additional analyses	8.48 (1.59)	(8.24, 8.73)	0.101
Discussion			
24. Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups	9.20 (1.03)	(9.05, 9.36)	<0.001*
25. Discuss limitations at study and outcome level, and at review-level.	9.08 (1.30)	(8.89, 9.28)	<0.001*
26. Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9.27 (0.99)	(9.11, 9.42)	<0.001*

Funding			
27. Describe sources of funding for the systematic review and other support; role of funders for the systematic review.	8.43 (2.04)	(8.12, 8.75)	0.149

#: p-values were computed using paired sample t-test comparing each item with the overall rating
*: Significant at 5% level of significant after the Bonferroni's adjustment

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Authors contribution:

Study design: WT, AT, BW, SG

Data collection: WT, AT, BW

Data analysis: WT, BW

Manuscript drafting: WT, AT, BW, SG

Data Sharing Statement:
No data are available: No additional data available

Supplementary file 1: The search query used in PUBMED

((("Int J Nurs Stud"[Journal] OR "Eur J Cardiovasc Nurs"[Journal] OR "J Fam Nurs"[Journal] OR "Nurse Educ Today"[Journal] OR "J Nurs Scholarsh"[Journal] OR "Nurs Outlook"[Journal] OR "Women Birth"[Journal] OR "J Cardiovasc Nurs"[Journal] OR "Eur J Cancer Care (Engl)"[Journal] OR "Worldviews Evid Based Nurs"[Journal] OR "J Hum Lact"[Journal] OR "J Adv Nurs"[Journal] OR "Midwifery"[Journal] OR "Nurs Res"[Journal] OR "Aust Crit Care"[Journal] OR "J Nurs Manag"[Journal] OR "Am J Crit Care"[Journal] OR "Int J Ment Health Nurs"[Journal] OR "Eur J Oncol Nurs"[Journal] OR "Rehabil Nurs"[Journal] OR "Oncol Nurs Forum"[Journal] OR "Nurs Ethics"[Journal] OR "Res Nurs Health"[Journal] OR "Cancer Nurs"[Journal] OR "Am J Nurs"[Journal] OR "Heart Lung"[Journal] OR "Crit Care Nurse"[Journal] OR "Biol Res Nurs"[Journal] OR "Int Nurs Rev"[Journal] OR "J Midwifery Womens Health"[Journal] OR "Nurs Crit Care"[Journal] OR "J Pediatr Health Care"[Journal] OR "Collegian"[Journal] OR "J Nurs Adm"[Journal] OR "Appl Nurs Res"[Journal] OR "Nurse Educ"[Journal] OR "J Wound Ostomy Continence Nurs"[Journal] OR "Intensive Crit Care Nurs"[Journal] OR "J Assoc Nurses AIDS Care"[Journal] OR "Nurse Educ Pract"[Journal] OR "West J Nurs Res"[Journal] OR "Clin Nurs Res"[Journal] OR "Comput Inform Nurs"[Journal] OR "Int Emerg Nurs"[Journal] OR "Pain Manag Nurs"[Journal] OR "J Child Health Care"[Journal] OR "Adv Neonatal Care"[Journal] OR "Clin Simul Nurs"[Journal] OR "J Tissue Viability"[Journal] OR "J Transcult Nurs"[Journal] OR "J Obstet Gynecol Neonatal Nurs"[Journal] OR "Nurs Philos"[Journal] OR "J Nurs Care Qual"[Journal] OR "J Clin Nurs"[Journal] OR "Arch Psychiatr Nurs"[Journal] OR "Nurs Health Sci"[Journal] OR "J Pediatr Nurs"[Journal] OR "J Prof Nurs"[Journal] OR "J Sch Nurs"[Journal] OR "Nurs Inq"[Journal] OR "Geriatr Nurs"[Journal] OR "J Psychiatr Ment Health Nurs"[Journal] OR "Perspect Psychiatr Care"[Journal] OR "Adv Skin Wound Care"[Journal] OR "Nurs Econ"[Journal] OR "Int J Nurs Pract"[Journal] OR "Aust J Rural Health"[Journal] OR "J Spec Pediatr Nurs"[Journal] OR "J Pediatr Oncol Nurs"[Journal] OR "J Nurs Educ"[Journal] OR "J Nurs Res"[Journal] OR "MCN Am J Matern Child Nurs"[Journal] OR "J Perinat Neonatal Nurs"[Journal] OR "J Am Assoc Nurse Pract"[Journal] OR "Int J Nurs Knowl"[Journal] OR "J Contin Educ Nurs"[Journal] OR "Issues Ment Health Nurs"[Journal] OR "J Trauma Nurs"[Journal] OR "Contemp Nurse"[Journal] OR "J Gerontol Nurs"[Journal] OR "J Emerg Nurs"[Journal] OR "Public Health Nurs"[Journal] OR "J Am Psychiatr Nurses Assoc"[Journal] OR "Asian nursing research"[Journal] OR "Clin Nurse Spec"[Journal] OR "J Perianesth Nurs"[Journal] OR "AORN J"[Journal] OR "Holist Nurs Pract"[Journal] OR "Res Gerontol Nurs"[Journal] OR "J Psychosoc Nurs Ment Health Serv"[Journal] OR "Workplace Health Saf."[Journal] OR "ANS Adv Nurs Sci"[Journal] OR "J Hosp Palliat Nurs"[Journal] OR "Gastroenterol Nurs"[Journal] OR "J Neurosci Nurs"[Journal] OR "Rev Lat Am Enfermagem"[Journal] OR "Clin J Oncol Nurs"[Journal] OR "J Forensic Nurs"[Journal] OR "Nurs Clin North Am"[Journal] OR "Rev Esc Enferm USP"[Journal] OR "Jpn J Nurs Sci"[Journal] OR "Nephrol Nurs J"[Journal] OR "J Korean Acad Nurs"[Journal] OR "Nurs Sci Q"[Journal] OR "Res Theory Nurs Pract"[Journal] OR "J Nurse Pract"[Journal] OR "J Addict Nurs"[Journal] OR "Crit Care Nurs Clin North Am"[Journal] OR "Orthop Nurs"[Journal] OR "Aust J Adv Nurs"[Journal] OR "Bariatr Surg Pract Patient Care"[Journal] OR "J Community Health Nurs"[Journal] OR "Assist Inferm Ric"[Journal] OR "Pflege"[Journal])) AND (review[Title] OR meta-analysis[Title])) AND ("2011/01/01"[Date - Publication] : "2017/12/15"[Date - Publication])

Perspectives of Authors in General Medical and Nursing Journals towards the PRISMA

1. **Country of affliation (i.e. where you are based at now):** Afghanistan

2. **What is your specialty (i.e. area of specialty)?**

- Anaesthesia
- Anatomy
- Biochemistry
- Dentistry
- Orthopaedic
- Otolaryngology
- Paediatrics
- Pathology

3. **Age group (years)**

- 21-30
- 31-40
- 41-50
- 51-60
- 61 or above

4. **Gender**

- Female
- Male

5. **Your years of experience in conducting academic research (years):**

Text

6. **Do you know what is systematic review?**

- Yes
- No

7. **Have you published any systematic review?**

- Yes
- No

8. **Are you aware of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline?**

- Yes
- No

9. Do you follow the PRISMA guideline whenconducting and reporting your systematic review?

- Yes
- No (not required by journals or organisations)
- No (other reasons)
- Not applicable (did not conduct any systematic review)
- Not applicable (others)

10. Rate the importance to follow the PRISMA guideline in conducting and reporting of systematic reviews in journals:

1: Not important, ..., 10: Very important

N/A 1 2 3 4 5 6 7 8 9 10

In the following, we would like you to rate the importance of each item in the PRISMA guideline (1: Not important, …, 10: Very important) and the reason of your rating if any.

11a. Item related to the *Title*

Item 1: Identify the report as a systematic review, meta-analysis, or both.

N/A 1 2 3 4 5 6 7 8 9 10

11b . Reason for your rating (optional):

Text

12a. Item related to the *Abstract*

Item 2: Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.

N/A 1 2 3 4 5 6 7 8 9 10

12b. Reason for your rating (optional):

Text

13a. Items related to the *Introduction*

Item 3: Describe the rationale for the review in the context of what is already known.

N/A 1 2 3 4 5 6 7 8 9 10

Item 4: Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).

N/A 1 2 3 4 5 6 7 8 9 10

13b. Reason for your rating (optional):

Text

14a. **Items related to the *Methods***

Item 5: Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.

N/A 1 2 3 4 5 6 7 8 9 10

Item 6: Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.

N/A 1 2 3 4 5 6 7 8 9 10

Item 7: Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.

N/A 1 2 3 4 5 6 7 8 9 10

Item 8: Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated

N/A 1 2 3 4 5 6 7 8 9 10

Item 9: State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).

N/A 1 2 3 4 5 6 7 8 9 10

Item 10: Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.

N/A 1 2 3 4 5 6 7 8 9 10

Item 11: List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.

N/A 1 2 3 4 5 6 7 8 9 10

Item 12: Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.

N/A 1 2 3 4 5 6 7 8 9 10

Item 13: State the principal summary measures (e.g., risk ratio, difference in means).

N/A 1 2 3 4 5 6 7 8 9 10

Item 14: Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.

N/A 1 2 3 4 5 6 7 8 9 10

Item 15: Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).

N/A 1 2 3 4 5 6 7 8 9 10

Item 16: Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.

N/A 1 2 3 4 5 6 7 8 9 10

14b. **Reason for your rating (optional):**

Text

15a. **Items related to the *Results***

Item 17: Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.

N/A 1 2 3 4 5 6 7 8 9 10

Item 18: For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.

N/A 1 2 3 4 5 6 7 8 9 10

Item 19: Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).

N/A 1 2 3 4 5 6 7 8 9 10

Item 20: For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.

N/A 1 2 3 4 5 6 7 8 9 10

Item 21: Present results of each meta-analysis done, including confidence intervals and measures of consistency.

N/A 1 2 3 4 5 6 7 8 9 10

Item 22: Present results of any assessment of risk of bias across studies (see Item 15).

N/A 1 2 3 4 5 6 7 8 9 10

Item 23: Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).

N/A 1 2 3 4 5 6 7 8 9 10

15b. **Reason for your rating (optional):**

Text

16a. **Items related to the *Discussion***

Item 24: Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).

N/A 1 2 3 4 5 6 7 8 9 10

Item 25: Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).

N/A 1 2 3 4 5 6 7 8 9 10

Item 26: Provide a general interpretation of the results in the context of other evidence, and implications for future research.

N/A 1 2 3 4 5 6 7 8 9 10

16b. **Reason for your rating (optional):**

Text

17a. **Items related to the *Funding***

Item 27: Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.

N/A 1 2 3 4 5 6 7 8 9 10

17b. **Reason for your rating (optional):**

Text

Supplementary file 3: Respondents' open-ended responses

Perspective towards items related to the *Title* (Section 1) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Provides clear information about the study	32	"It makes the content of the paper very clear from the beginning" (Response 39) "essential for selecting appropriate material in search databases and provides first indication of inclusion or exclusion" (Response 18)
Help readers locate the work	25	"Title needs to be explicit to help with data searching using boolean parameters" (Response 55) "for indexing purposes" (Response 8)
Miscellaneous	11	"Data credence and integrity" (Response 13) "First thing reviewers/editors read is the title" (Response 20) "I am not only an author I am editor of a journal - a minority of authors continue to evidence confusion about the type of review they are doing - sometimes using systematic as an adjective rather than a noun which encapsulates a certain type of review" (Response 26) "Important to state as establishes understanding between author & reader but not essential as it becomes clear from methods anyway" (Response 30) "Many articles reported in the literature are title systematic

		reviews, but they are no more than literature reviews without a systematic process. Journal editors need to do more to ensure this term is only used for a systematic review that meet the PRISMA" (Response 43) "Systematic reviews carry more weight in my mind. Nice to know from the beginning whether the review is systematic" (Response 53)
Perspective towards items related to the *Abstract* (Section 2) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Helps readers quickly ascertain the purpose of the paper	28	"A clear abstract helps a user rapidly determine if they need to refer to the document at all" (Response 1) "Allows the reader to determine relevance of the research to thier priorities" (Response 7)
Standardises reporting of research	8	"A structured reporting ensures methodological rigor & standardizes reporting--this way important items aren't overlooked" (Response 2) "Having an organized method of reporting data improves the public's understanding of what they are reading" (Response 22)
Summarises the key content of the systematic review	8	"Succinctly recaps key elements and findings of research article" (Response 43) "Data display matrix- similarity and differences are evident" (Response 16)

Necessary component of systematic review reporting	5	"Essential for all publications - often the only part read so must include essential components" (Response 18)
Not necessary to provide systematic review registration number in abstract	4	"not always necessary to register the systematic review. Not all systematic reviews are registered" (Response 37)
Limitations of abstracts	2	"I'm in favour of a structured abstract but the word limits of such is prohibitive to cover all aspects." (Response 8)
Perspective towards items related to the *Introduction* (Section 3) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Introduces readers about the context	12	"Provides history, background, significance, and lays the foundation for the purpose of the review" (Response 34) "aids in logical presentation and helps the reader" (Response 1)
Limitations and inflexibility of PICO	12	"I find the PICO format to be cumbersome in the development of the research question. It is useful as a new scientist but perhaps less necessary for more experienced researchers." (Response 19) "I believe that could be interesting a new approach or a dismemberment of the PICOS question since revision studies do not always refer to intervention studies, for example" (Response 18)
Frames the research questions	10	"The reader needs a problem statement and background information to compare with the study results and decide where they fit in overall with what is known." (Response 42) "Clarity on the gap and the question provides the

		foundation for the work" (Response 10)
Provides clarity	7	"Precision and transparency" (Response 33)
Reduces duplication of research through description of research gaps	3	"In some disciplines there is a plethora of systematic reviews conducted on the same topic in a very short time frame. A strong rationale for why a review is being conducted is important" (Response 22)
Essential information in reporting research	3	"Part and parcel of sound research" (Response 28)
Miscellaneous	6	"In an era of evidence-based medicine/practice anything other than a systematic review process is of little value to the reader" (Response 21) "Systematic reviews are being used as 'citation generators' - the rationale shows if the SR is actually needed - purpose of the review may actually be scant because their motivation is to select a topic that will generate citations" (Response 39) "These issues are too often superficially described and weak performance in nursing" (Response 46) "Transparency is important in SR" (Response 47)
Perspective towards items related to the *Methods* (Section 4) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Ensures quality, rigor and trustworthiness	17	"These items are essential to assuring the internal validity of the review" (Response 38) "All tried and tested methods of ensuring quality and

		avoiding bias" (Response 5)
Allows replication of systematic review	9	"Reporting of methods to allow for transparency and reproducibly is very important in a systematic review" (Response 26)
Essential component of reporting research	8	"A systematic review is often regarded as research of research - all of the above are components of a well-developed research study and are applicable to systematic reviews as well." (Response 1)
Not all items are necessary for different types of systematic reviews	5	"I think the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design. If I conduct e.g. a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information." (Response 13)
Differentiates the good reviews from the bad	2	"Important for the reader to be able to evaluate the quality of the review" (Response 15)
Miscellaneous	9	"These helps identify the rigour - a systematic review can look superficially good, but if items 9,10,11, 14 are vague, then it shows the authors have not recognised the subjective component in the review process - thus it is weaker" (Response 36) "item 12 - assessment of bias is crucial, however, limitations of the tools used to assess the risk of bias should be understood" (Response 18) "SR protocols are not always published - time constraints, e.g. for Masters or PhD students undertaking a SR or

		where the SR is part of a time-constrained funded study, can be the limiting factor. Some journals do not review protocols quickly." (Response 28) "heterogeneity need to be explored" (Response 12)
Perspective towards items related to the *Results* (Section 5) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Important component in research reporting	11	"All of the above are components of a well-designed research study and are applicable to systematic reviews as well" (Response 7) "These are all essential elements of rigor in SR" (Response 30)
Not all criteria of Results are necessary to report	9	"Not always feasible, in a publication, to include all the details - especially if different for each publication and/or high number of studies in review" (Response 19) "See 14b, the items does not cover very well these types of reviews, where a narrative synthesis is the only option to present the results" (Response 24)
Not all details can be presented	6	"I believe that if we think in terms of publication of the review we have a certain number of words and tables and that in general for the detailed description of each study, which is descriptive or meta-analysis may not be possible." (Response 5)
Necessary for rigor and trustworthiness	5	"These items demonstrate the rigour of data collection and assure the reader that the results can be trusted." (Response

		31)
Miscellaneous	5	"heterogeneity need to be explored" (Response 14) "Precision" (Response 21)
Perspective towards items related to the *Discussion* (Section 6) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Informs knowledge gaps, future practice and implications	14	"Important because it places into context, the findings and helps users of the information identify how it relates to their practice." (Response 13) "this section is the translational piece and what gives the evidence power" (Response 26)
An essential component of reporting research	9	"An essential component of reporting research" (Response 19) "This is not specific to systematic reviews but to all research reported on - Prisma should focus on systematic review specifics" (Response 25)
Shortfalls of the discussion in some systematic reviews	3	"Discussion sometimes simply repeats the results data and weakens the discussion section if not supported with other literature" (Response 8)
Provides overall results	2	"Discussion includes overall results" (Response 7)
Discussion may not be as important as the rigour of the systematic review	2	"I prefer to let the results 'speak for themselves' so while I find interpretation (Item 26) useful I see it as a colleague opinion but the responsibility is on me to interpret what they present - hence the need for transparency and

		demonstration of rigour" (Response 11)
Part of evidence appraisal	1	"All of the above items are components of evidence appraisal and must be conducted in a detailed and rigorous manner" (Response 3)
Perspective towards items related to the *Funding* (Section 7) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Reveals potential for bias	10	"To indicate to the reader the possibility of external influence to the study findings" (Response 24) "To make clear any conflicts of interest and how these have either impacted on the study, been eliminated or have not had any influence on the study outcome" (Response 25)
Allows declaration of conflict of interests	9	"Conflicts of interest need to be announced" (Response 8) "identify any perceived or real conflict of interest" (Response 14)
Allows transparency	5	"In general, all these questions should be rated 10, due to a requirement for a transparent, accurate and systematic approach in systematic reviews." (Response 16)
Necessary component	4	"Required for all research published/reports" (Response 20)
Miscellaneous	3	"none of the studies I have done required any funding" (Response 19)

		“Unless the risk of bias is caused by external funding, there should never be such risk as there is no new data added” (Response 27)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	*NA*
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	NA
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	14
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	3

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Perception of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement of Authors Publishing Reviews in Nursing Journals: A Cross-Sectional Online Survey

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Title:

Perception of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement of Authors Publishing Reviews in Nursing Journals: A Cross-Sectional Online Survey

Running Head:

Nursing-review authors' perception of PRISMA

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Abstract: 248/300 words; Main Text: 2876/4000 words

Abstract

Objective: The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement has been developed as a guideline for reporting systematic reviews and meta-analyses. Despite the prevalent use of the PRISMA Statement in medicine and nursing, no studies have examined authors' perception of it. The purpose of this study is to explore the perception of the PRISMA Statement of authors who published reviews, meta-analyses, or both in nursing journals.

Design: Cross-sectional descriptive study.

Methods: An online survey was conducted among authors who published reviews, meta-analyses, or both in nursing journals between 2011 and 2017. The selected authors' email addresses were extracted from the PUBMED database. A questionnaire – with a 10-point Likert-scale (1 – *Not important at all* to 10 – *Very important*) – was developed to elicit their responses regarding their perception of not only the PRISMA statement as a whole, but also the individual items therein.

Results: Invitations were sent to 1,960 valid email addresses identified, with 230 responses (response rate: 11.7%) and 181 completed responses (completion rate: 9.2%). The average perceived importance of the PRISMA statement was 8.66 (SD=1.35), while the perceived importance for the individual items ranged from 7.74 to 9.32. Six items were

rated significantly higher than the average rating, whereas one item was rated significantly lower.

Conclusion: Most respondents perceived the PRISMA Statement as important. Items related to information sources, selection, search-flow presentation, summary of findings, limitations, and interpretation were deemed more important while the registration was deemed less so.

Keywords: PRISMA; Publication policy; Quality of reporting; Research reporting; Systematic reviews

Strengths and limitations of this study

Strengths

- This pioneering study is the first to examine authors' perception of the PRISMA statement.
- The sampling frame, generated from PubMed, covered most of the eligible subjects in nursing.

Limitations

- The response rate of the survey is somewhat low.

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Competing interest: None declared

Introduction

Systematic reviews and meta-analyses are essential tools for healthcare professionals in evaluating the effectiveness of existing medical interventions. Information synthesized from systematic reviews and meta-analyses are frequently used as the basis for the development and revision of clinical practice guidelines.[1] The reliability, usefulness, and scientific soundness of systematic reviews and meta-analyses depend upon their methodologies and reporting quality. In this regard, journal editors have suggested that both contributing researchers and editorial boards of the journals are jointly responsible for ensuring the high quality of systematic reviews and meta-analyses.[2] It is the obligation of researchers to conduct and report their findings according to international standards and guidelines where possible, whereas it is the prerogative of journal editors and contributors to set stringent criteria and adhere to them when considering manuscripts for publication.

Several research-reporting guidelines are available for conducting and reporting various types of studies in health sciences, such as the CONsolidated Standards Of Reporting Trials (CONSORT)[3] for randomized controlled trials and the Strengthening the Reporting of OBservational studies in Epidemiology (STROBE)[4] for observational studies. For systematic reviews and meta-analyses of interventional studies, the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement [5] is the most commonly-used reporting guideline.

The PRISMA statement was developed in 2005 during a three-day meeting in Canada by an assemblage of review authors, methodologists, clinicians, medical editors, and consumers [5]. A 27-item checklist in 7 sub-sections was created through a consensual process informed by evidence.[1] The PRISMA statement can be used by authors as a guideline to ensure the completeness of studies and to reduce reporting biases when conducting and reporting systematic reviews and meta-analyses. The statement can also be used by journal reviewers and editors to evaluate the reporting quality of manuscripts in consideration. Although it focuses on reporting systematic reviews and meta-analyses of randomized controlled trials, the PRISMA statement can also be used for systematic reviews and meta-analyses of other types of studies. The practical value of the PRISMA statement can be demonstrated by its having been cited for over 19,000 times up to July 2017. [6]

Several research studies evaluated methodological and reporting qualities of systematic reviews and meta-analyses. [7-11] For example, in terms of the reporting quality, it has been reported that an average of 86.3% of systematic reviews published in gastroenterology and hepatology journals complied with the PRISMA guidelines [8], whereas only 57.1% of the those published in nursing journals did so.[9]

As of February 2018, 177 academic journals have endorsed the PRISMA statement (http://www.prisma-statement.org/), reflecting their recommendation for research contributors to adhere to the PRISMA guidelines when conducting and reporting systematic reviews or meta-analyses.

Despite the sizeable number of citations of the PRISMA statement in academic articles over the years, adherence amongst researchers to the items in the PRISMA statement was suboptimal. Nine PRISMA items were adhered to by fewer than 67% of the 2,382 systematic reviews published after 2009. [6] For systematic reviews published in nursing journals, the median adherence rate was lower than 60%.[9] Currently, only 3 out of the 116 nursing journals endorse the PRISMA statement (http://www.prisma-statement.org/), namely *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *Journal of the American Academy of Nurse Practitioners*, and *Nursing Research*. Although journals such as the *International Journal of Nursing Studies* and *Journal of Clinical Nursing* do not formally endorse the PRISMA statement, they do recommend that contributors follow it when reporting their systematic reviews and meta analyses. Therefore, it is important to examine authors' perception of the importance of the items in the PRISMA statement. To the best of our knowledge, no studies have examined authors' perception of PRISMA. Thus, the aim of this study to address this academic gap by exploring how such authors from nursing journals perceive the importance of not only the PRISMA statement as a whole, but also the individual items therein.

Methods

Study design

A cross-sectional online survey was conducted to collect perception of the PRISMA statement of authors publishing reviews or meta-analyses in nursing journals.

Participants

Any authors who published reviews, meta-analyses, or both in nursing journals between 2011 and 2017 were invited to participate in the online survey regarding their perception of the PRISMA statement.

Strategic sampling of participants

A total of 116 nursing journals were identified from the Nursing category of the Journal Citation Reports, Science Edition 2016 version (https://clarivate.com/products/journal-citation-reports/). A search was conducted on the PubMed database for articles published in these 116 journals between 1 January 2011 and 15 December 2017 with "review" or "meta-analysis" in their titles. We used "review" rather than "systematic review" as the searching term to be more inclusive because prior studies have indicated that some systematic reviews published in nursing journals might use other terms such as "systematic literature review" in the title. [12] A noteworthy difference between systematic reviews and traditional literature/narrative reviews is that the former

requires pre-defined criteria for eligibility, systematic search strategy, quality assessment, and synthesis of results, whereas the latter does not. We searched for articles published after 2011 to avoid obsolete and therefore invalid email addresses. The PubMed query used in the database search is included in Supplementary file 1. A total of 3,877 articles were identified in the search. Article summary records were retrieved and downloaded from the PubMed database in the Extensible Markup Language (XML) file format. A Python script was then written to process the XML file, extracting the PMID, article titles, authors, and their email addresses from each record into the Common-Separated Values (CSV) format.

Sample-size estimation

The authors' perceptions of the PRISMA statement and its individual items were measured with a 10-point Likert scale. According to normal approximation, 6× standard deviations (SDs) would cover 99% of the data; the SD was thus approximated to 1.67 (10/6). To achieve a 95% confidence interval (CI) with a margin of error of 0.2, 270 responses would be needed. [13] Based on prior research [14], the response rates for university staff and health educators are estimated to range from 10 to 20%. We assumed a low response rate from the eSurvey and estimated that 2,700 invitations would be needed, given an assumed response rate of 10%.

Questionnaire

The 37 items in the questionnaire concerned different aspects: five focused on the authors'

demographic information; four on their experiences in conducting reviews and using the PRISMA guidelines; one on the overall evaluation of the importance to follow the PRISMA guidelines in conducting and reporting of systematic reviews using a 10-point Likert-scale (1 – *Not importance at all* to 10 – *Extremely important*);and 27 on their perception of the importance of each individual item in the seven sections of the PRISMA guidelines using a 10-point Likert-scale (1 – *Not important at all* to 10 – *Very important*). Open-ended questions were included in each sub-section to gather qualitative data about their responses.

An electronic questionnaire was created using the eSurvey platform developed by the Information Technology (IT) department of the authors' university. [15] After pilot testing by the authors' peers, a unique URL for the electronic questionnaire was generated. The questionnaire is attached as supplementary file 2.

Data collection

Invitation emails, including a description of the study and the URL to the questionnaire, were sent to the target email addresses between 3 and 7 January 2018. A reminder was sent on 17 January 2018. The survey was closed on 31 January 2018. Completed e-questionnaires were stored in the server of the IT department of the authors' university.

Data analyses

Descriptive statistics, including frequencies and percentages, were used to summarize the results. Paired-sample t-test was used to examine differences between the overall and individual item ratings. Bonferroni's method was used to adjust the level of significance due to multiple comparisons. All the analyses were conducted using IBM SPSS 22.0 for Windows.[16] Content analysis was conducted to analyze the qualitative responses using NVivo 11 for Windows. [17] The open-ended responses were analyzed for initial coding; codes with similar meanings were then grouped into the same category.[18]

Ethical consideration

The study was approved by the University Institutional Review Committee on 23 Nov 2017 (Ref No. S-17-342E). Data in this study were collected anonymously.

Patient and Public Involvement

No patients participated in this study; only authors from nursing journals were involved.

Results

A total of 2,565 email addresses were identified from 1,832 articles (out of the 3,877 articles identified from the PubMed search as many of them did not include email addresses). Upon removal of duplicates and invalid email addresses, 2,310 distinct email addresses remained, to each of which an email invitation was sent. Of these 2,310 email addresses, 350 were invalid ones to which the invitation was undeliverable and bounced

back, whereas 1,960 were valid ones to which delivery was successful. A total of 230 authors attempted the questionnaire, 181 of whom completed it. Accordingly, the response rate was 11.7% (230/1,960) and the completion rate was 9.2% (181/1,960).

The respondents' demographic information is summarized in **Table 1**: 135 (74.6%) respondents were females, and 138 (76.3%) were aged 41 or above. In terms of disciplines, 125 (69.1%) respondents specialized in nursing, followed by eight (4.4%) in public health and six (3.3%) in psychiatry.

All of the 181 respondents knew what a systematic review was. Among them, 160 (88.4%) had published systematic reviews and 166 (91.7%) were aware of the PRISMA guidelines. The 166 respondents aware of the PRISMA guidelines were then asked to rate the overall importance of following the PRISMA guidelines in conducting and reporting systematic reviews based on a 10-point Likert-scale, for which an average score of 8.66 (SD = 1.40) was reported (**Table 2**). The respondents also rated the importance of each of the 27 items in the PRISMA guidelines, of which the results are shown in **Table 3**. The mean scores ranged from 7.75 (Item 5) to 9.35 (Item 17) with a median of 8.73 (Item 21). The rating for Item 5 was significantly lower than the overall rating. Conversely, the ratings for six items from different sections were significantly higher than the overall rating, namely Items 7 and 9 from the Methods section, Item 17 from the Results section, and Items 24, 25 and 26 from the Discussion section.

For the open-ended questions, the respondents were asked to share the reasons for their rating for each section. For the 166 respondents, 62 valid open-ended responses were received. Their perceptions of the importance of the items in the seven sections of the PRISMA guidelines are summarized in Supplementary file 3.

When asked to explain the importance of Item 1 (Title), the prevailing view was that compliance to it would ensure that the title provided clear information about the study (32 codes) and helped readers locate the work (25 codes). Item 2 (Abstract) was likewise deemed important since a well-written abstract would help readers quickly ascertain the purpose of the paper (28 codes). Nonetheless, some respondents found it unnecessary to provide a registration number for the systematic review in the Abstract. Furthermore, the respondents believed that adhering to Item 3 (Introduction) was important as the Introduction would acquaint the readers with the context of the study (12 codes) but some felt that the PICO framework (Item 4 – Introduction) was inflexible and had its limitations (12 codes). The PICO framework has been advocated for interventional studies[19]. However, in nursing research, there may be other types of systematic reviews such as those of prevalence studies [20], and psychological properties of instruments [21]. Therefore, the PICO framework may not be directly applicable in those cases.

The respondents also felt that abiding by Items 5 to 16 (Methods) was vital to ensuring

the quality, rigor, and trustworthiness of the study (17 codes). However, a few respondents commented that not all items were applicable to some types of systematic reviews (5 codes). For instance, one respondent opined that "*the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design… [For] a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information*" (Response 15).

When asked about the importance of Items 17 to 23 (Results), the respondents agreed that they were critical to research reporting (11 codes), but remarked that not all items could be complied with (13 codes), and that some might be less applicable to reviews that undertook narrative synthesis. They also regarded Items 24 to 26 (Discussion) as essential components when reporting research (9 codes) as it would inform readers of knowledge gaps, future practices, and implications (14 codes). As for Item 27 (Funding), the respondents felt that it was vital in systematic reviews as it would reveal potential areas for bias (10 codes) and allow authors to declare any conflicts of interest.

Discussion

Most respondents felt that the PRISMA statement was important and reported a mean overall rating of 8.66 (SD=1.40). In terms of the individual items, all but Item 5 were associated with an average score above 8.0, implying the perceived importance of those items among most respondents. Item 5 – "Indicate if a review protocol exists, if and where

it can be accessed (e.g., Web address), and, if available, provide" – registered a mean score of 7.75, which is significantly lower than the overall rating.

For published systematic reviews, compliance of Item 5 to the PRISMA statement was often low. Panic et al. [8] reported that only four out of 90 systematic reviews (4.4%) published in the gastroenterology and hepatology journals adhered to this item, while Tam et al. [9] reported that only two out of 74 (2.7%) systematic reviews in nursing journals did so. Sideri et al. [22] suggested that protocol registration of systematic reviews should be encouraged to improve the quality of published systematic reviews. A plausible explanation for the inadequate adherence and the comparatively low rating of the item lies in the low awareness of the platform to publish or register the protocol. Moreover, the protocol is not a prerequisite for publishing systematic reviews in most medical and nursing journals, though it is a requirement for publishing randomized controlled trials, as mandated by many journals. [23]

Six items were rated significantly higher than the overall rating: two from the Methods section, one from the Results section, and three from the Discussion section. The three items from the Methods and Results sections include:

- Item 7 – "*Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched*"
- Item 9 – "*State the process for selecting studies (i.e., screening, eligibility, inclusion in*

systematic review, and, if applicable, inclusion in the meta- analysis)" and

- Item 17 – "*Give numbers of studies screened, those assessed for eligibility, and those included in the review, with reasons for exclusions at each stage, ideally with a flow diagram*".

These three items relate to the uniqueness in data collection and evaluation of the systematic reviews. [24] which constitute the major differences between systematic reviews and traditional literature reviews. When conducting a systematic review, the authors stipulate inclusion criteria for the review before the literature is selected, and they must demonstrate that these criteria are consistently adhered to. [25] Therefore, a clear description of the sources for searching and selection procedure is essential. A recent study reported that all systematic reviews published in nursing journals revealed the databases used and at least 85.1% provided the last searched date.[12] Tam et al.[12] further reported that the rates of compliance to Items 7, 9, and 17 were 98.6%, 97.3% and 91.9% respectively among systematic reviews published in nursing journals.

The scores of all three items from the Discussion and the subtotal scores of the section were significantly higher than the overall score. These three items are:

- Item 24 – "Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers),"
- Item 25 – "Discuss limitations at the study and outcome levels (e.g., risk of bias),

and at the review level (e.g., incomplete retrieval of identified research, and reporting bias)," and

- Item 26 – "Provide a general interpretation of the results in the context of other evidence, and implications for future research".

The purpose of the Discussion is to summarize the findings in a research context and to explain their meaning and importance.[26] Traditionally, the discussion serves to convince readers of the rightness of the authors' data interpretation and speculation, and has been deemed as the most important part in a research article (Borja, 2014). For scientific articles, the discussion should include the principal findings, strengths and weaknesses, differences in results, meanings of the study such as possible mechanisms and implications for clinicians or policymakers, unanswered questions, and future research.[27] These points jointly constitute the content of the three items. In fact, this opinion can be observed from some open-ended responses to this section in our survey, as exemplified by "*An essential component of reporting research*", "*Informs knowledge gaps, future practice and implications*" and "*Provides overall results*".

The current research represents the pioneering study in elucidating the perception of the PRISMA statement of authors who published systematic reviews and meta-analyses. We have attempted to include all the authors who had published systematic reviews, meta-analyses, or both in nursing journals between 2011 and 2017 as the participants for the

study. The results reflected that most respondents perceived items in the PRISMA statement as important, implying their agreement in general that adherence to the statement when writing their manuscripts is beneficial. The advantages of such adherence include not only the establishment of a standard format but also the assured inclusion of all important information, the omission of which will diminish the usefulness of the reviews.[1 5] Several limitations of the study are noteworthy. Firstly, the completion of the questionnaire by 181 respondents, leading to a completion rate of only 9.2%, limits the representativeness of the sample. Secondly, although all the email addresses were extracted from the included articles, they mainly belonged to the corresponding authors who were usually the senior authors[28]; hence, this might have constituted selection bias. Thirdly, 350 out of 2,310 (15.1%) email addresses were not valid during the time of the study. It has been reported that most nursing faculty members with doctoral degrees are in their early 50s, and the average retirement age for a nurse educator is 62.5 years old (NACNEP, 2010); therefore, some of the authors might have retired. Fourthly, we did not attempt to search for email addresses from other sources so as to increase the number of valid email addresses.

Reporting guidelines are useful tools for authors, reviewers, and editors to ensure the appropriateness of the content for manuscripts. It has been advocated that introduction to these guidelines should be included when teaching evidence-based practice.[29 30] In this study, we found that authors publishing systematic reviews and meta-analyses in nursing journals deemed it important to follow the PRISMA statement to conduct and

report their reviews. Future studies may focus on journal editors and peer reviewers to determine not only whether their views coincide with those of the authors of reviews and meta-analyses, but also whether they will formally endorse PRISMA in their journals.

Conflicts of interest

None.

Ethical approval

National University of Singapore Institutional Review Board (Ref No. S-17-342E).

Table 1: Demographic of the respondents (n = 181)

Variables	n (%)
Gender	
• Male	46 (25.4%)
• Female	135 (74.6%)
Age	
• 21-30	7 (3.9%)
• 31-40	36 (19.9%)
• 41-50	45 (24.9%)
• 50-60	62 (34.3%)
• 61 or above	31 (17.1%)
Specialty	
• Nursing	125 (69.1%)
• Dentistry	1 (0.6%)
• Medicine	1 (0.6%)
• Microbiology	1 (0.6%)
• Obstetrics & Gynecology	4 (2.2%)
• Paediatrics	5 (2.8%)
• Pharmacology	2 (1.1%)
• Physiology	2 (1.1%)
• Psychiatry	6 (3.3%)
• Psychology	2 (1.1%)
• Public Health	8 (4.4%)
• Surgery	4 (2.2%)
• Others	20 (11.0%)

Table 2: Respondents' background knowledge on systematic reviews

Question	Yes
Do you know what is systematic review?	
• Yes	181 (100.0%)
• No	0 (0.0%)
Have you published any systematic review before?	
• Yes	160 (88.4%)
• No	21 (11.6%)
Are you aware of the PRISMA guidelines?	
• Yes	166 (91.7%)
• No	15 (8.3%)
Do you follow the PRISMA guidelines when conducting and reporting your systematic review?	
• Yes	140 (77.3%)
• No (Not required by journals)	10 (5.5%)
• No (Other reasons)	3 (1.7%)
• Not applicable (did not conduct any systematic reviews)	13 (7.2%)
• No response	15 (8.3%)
Importance of following PRISMA guidelines in conducting and reporting systematic review. (1-10)	8.66 (1.40) 95%CI: (8.45, 8.88)

Table 3: Respondents' rating to the 27 items of PRISMA (possible score from 1 to 10)

Item	Mean (SD)	95% CI	p #
Title			
1. Identify the report as a systematic review, meta-analysis, or both	8.98 (1.58)	(8.73, 9.22)	0.015
Abstract			
2. Provide a structured summary including	8.87 (1.59)	(8.62, 9.11)	0.051
Introduction			
3. Describe the rationale for the review	8.81 (1.45)	(8.58, 9.03)	0.223
4. Provide an explicit statement of questions being addressed with reference to PICOS.	8.67 (1.61)	(8.42, 8.92)	0.962
Method			
5. Indicate if a review protocol exists	7.75 (2.18)	(7.41, 8.08)	<0.001*
6. Specify study and report characteristics used as criteria for eligibility.	8.90 (1.44)	(8.68, 9.12)	0.022
7. Describe all information sources in the search and date last searched.	9.07 (1.26)	(8.87, 9.26)	<0.001*
8. Present full electronic search strategy for at least one database	8.61 (1.73)	(8.34, 8.87)	0.690
9. State the process for selecting studies	9.16 (1.30)	(8.96, 9.36)	<0.001*
10. Describe method of data extraction from reports and any processes for obtaining and confirming data from investigators	8.81 (1.54)	(8.57, 9.04)	0.247
11. List and define all variables for which data were sought and any assumptions and simplifications made.	8.70 (1.49)	(8.47, 8.93)	0.748
12. Describe methods used for assessing risk of bias of individual studies and how this information is to be used in any data synthesis.	8.64 (1.64)	(8.39, 8.89)	0.833

13. State the principal summary measures	8.58 (1.66)	(8.33, 8.84)	0.509
14. Describe the methods of handling data and combining results of studies.	8.87 (1.45)	(8.65, 9.10)	0.089
15. Specify any assessment of risk of bias that may affect the cumulative evidence.	8.71 (1.44)	(8.49, 8.93)	0.697
16. Describe methods of additional analyses	8.57 (1.60)	(8.33, 8.82)	0.455
Results			
17. Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9.35 (1.00)	(9.20, 9.50)	<0.001*
18. For each study, present characteristics for which data were extracted and provide the citations.	9.01 (1.40)	(8.80, 9.23)	0.007
19. Present data on risk of bias of each study and, if available, any outcome level assessment	8.45 (1.79)	(8.17, 8.72)	0.075
20. For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	8.52 (1.64)	(8.27, 8.77)	0.231
21. Present results of each meta-analysis done, including confidence intervals and measures of consistency.	8.73 (1.50)	(8.51, 8.96)	0.556
22. Present results of any assessment of risk of bias across studies.	8.51 (1.65)	(8.25, 8.76)	0.202
23. Give results of additional analyses	8.48 (1.59)	(8.24, 8.73)	0.101
Discussion			
24. Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups	9.20 (1.03)	(9.05, 9.36)	<0.001*
25. Discuss limitations at study and outcome level, and at review-level.	9.08 (1.30)	(8.89, 9.28)	<0.001*
26. Provide a general interpretation of the results in the context of other evidence, and implications for future research.	9.27 (0.99)	(9.11, 9.42)	<0.001*

Funding			
27. Describe sources of funding for the systematic review and other support; role of funders for the systematic review.	8.43 (2.04)	(8.12, 8.75)	0.149

#: p-values were computed using paired sample t-test comparing each item with the overall rating

*: Significant at 5% level of significant after the Bonferroni's adjustment

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Authors contribution:

Study design: WT, AT, BW, SG

Data collection: WT, AT, BW

Data analysis: WT, BW

Manuscript drafting: WT, AT, BW, SG

Data Sharing Statement:
No data are available: No additional data available

Supplementary file 1: The search query used in PUBMED

((("Int J Nurs Stud"[Journal] OR "Eur J Cardiovasc Nurs"[Journal] OR "J Fam Nurs"[Journal] OR "Nurse Educ Today"[Journal] OR "J Nurs Scholarsh"[Journal] OR "Nurs Outlook"[Journal] OR "Women Birth"[Journal] OR "J Cardiovasc Nurs"[Journal] OR "Eur J Cancer Care (Engl)"[Journal] OR "Worldviews Evid Based Nurs"[Journal] OR "J Hum Lact"[Journal] OR "J Adv Nurs"[Journal] OR "Midwifery"[Journal] OR "Nurs Res"[Journal] OR "Aust Crit Care"[Journal] OR "J Nurs Manag"[Journal] OR "Am J Crit Care"[Journal] OR "Int J Ment Health Nurs"[Journal] OR "Eur J Oncol Nurs"[Journal] OR "Rehabil Nurs"[Journal] OR "Oncol Nurs Forum"[Journal] OR "Nurs Ethics"[Journal] OR "Res Nurs Health"[Journal] OR "Cancer Nurs"[Journal] OR "Am J Nurs"[Journal] OR "Heart Lung"[Journal] OR "Crit Care Nurse"[Journal] OR "Biol Res Nurs"[Journal] OR "Int Nurs Rev"[Journal] OR "J Midwifery Womens Health"[Journal] OR "Nurs Crit Care"[Journal] OR "J Pediatr Health Care"[Journal] OR "Collegian"[Journal] OR "J Nurs Adm"[Journal] OR "Appl Nurs Res"[Journal] OR "Nurse Educ"[Journal] OR "J Wound Ostomy Continence Nurs"[Journal] OR "Intensive Crit Care Nurs"[Journal] OR "J Assoc Nurses AIDS Care"[Journal] OR "Nurse Educ Pract"[Journal] OR "West J Nurs Res"[Journal] OR "Clin Nurs Res"[Journal] OR "Comput Inform Nurs"[Journal] OR "Int Emerg Nurs"[Journal] OR "Pain Manag Nurs"[Journal] OR "J Child Health Care"[Journal] OR "Adv Neonatal Care"[Journal] OR "Clin Simul Nurs"[Journal] OR "J Tissue Viability"[Journal] OR "J Transcult Nurs"[Journal] OR "J Obstet Gynecol Neonatal Nurs"[Journal] OR "Nurs Philos"[Journal] OR "J Nurs Care Qual"[Journal] OR "J Clin Nurs"[Journal] OR "Arch Psychiatr Nurs"[Journal] OR "Nurs Health Sci"[Journal] OR "J Pediatr Nurs"[Journal] OR "J Prof Nurs"[Journal] OR "J Sch Nurs"[Journal] OR "Nurs Inq"[Journal] OR "Geriatr Nurs"[Journal] OR "J Psychiatr Ment Health Nurs"[Journal] OR "Perspect Psychiatr Care"[Journal] OR "Adv Skin Wound Care"[Journal] OR "Nurs Econ"[Journal] OR "Int J Nurs Pract"[Journal] OR "Aust J Rural Health"[Journal] OR "J Spec Pediatr Nurs"[Journal] OR "J Pediatr Oncol Nurs"[Journal] OR "J Nurs Educ"[Journal] OR "J Nurs Res"[Journal] OR "MCN Am J Matern Child Nurs"[Journal] OR "J Perinat Neonatal Nurs"[Journal] OR "J Am Assoc Nurse Pract"[Journal] OR "Int J Nurs Knowl"[Journal] OR "J Contin Educ Nurs"[Journal] OR "Issues Ment Health Nurs"[Journal] OR "J Trauma Nurs"[Journal] OR "Contemp Nurse"[Journal] OR "J Gerontol Nurs"[Journal] OR "J Emerg Nurs"[Journal] OR "Public Health Nurs"[Journal] OR "J Am Psychiatr Nurses Assoc"[Journal] OR "Asian nursing research"[Journal] OR "Clin Nurse Spec"[Journal] OR "J Perianesth Nurs"[Journal] OR "AORN J"[Journal] OR "Holist Nurs Pract"[Journal] OR "Res Gerontol Nurs"[Journal] OR "J Psychosoc Nurs Ment Health Serv"[Journal] OR "Workplace Health Saf."[Journal] OR "ANS Adv Nurs Sci"[Journal] OR "J Hosp Palliat Nurs"[Journal] OR "Gastroenterol Nurs"[Journal] OR "J Neurosci Nurs"[Journal] OR "Rev Lat Am Enfermagem"[Journal] OR "Clin J Oncol Nurs"[Journal] OR "J Forensic Nurs"[Journal] OR "Nurs Clin North Am"[Journal] OR "Rev Esc Enferm USP"[Journal] OR "Jpn J Nurs Sci"[Journal] OR "Nephrol Nurs J"[Journal] OR "J Korean Acad Nurs"[Journal] OR "Nurs Sci Q"[Journal] OR "Res Theory Nurs Pract"[Journal] OR "J Nurse Pract"[Journal] OR "J Addict Nurs"[Journal] OR "Crit Care Nurs Clin North Am"[Journal] OR "Orthop Nurs"[Journal] OR "Aust J Adv Nurs"[Journal] OR "Bariatr Surg Pract Patient Care"[Journal] OR "J Community Health Nurs"[Journal] OR "Assist Inferm Ric"[Journal] OR "Pflege"[Journal])) AND (review[Title] OR meta-analysis[Title])) AND ("2011/01/01"[Date - Publication] : "2017/12/15"[Date - Publication])

Perspectives of Authors in General Medical and Nursing Journals towards the PRISMA

1. **Country of affliation (i.e. where you are based at now):** Afghanistan

2. **What is your specialty (i.e. area of specialty)?**

- Anaesthesia
- Anatomy
- Biochemistry
- Dentistry
- Orthopaedic
- Otolaryngology
- Paediatrics
- Pathology

3. **Age group (years)**

- 21-30
- 31-40
- 41-50
- 51-60
- 61 or above

4. **Gender**

- Female
- Male

5. **Your years of experience in conducting academic research (years):**

Text

6. **Do you know what is systematic review?**

- Yes
- No

7. **Have you published any systematic review?**

- Yes
- No

8. **Are you aware of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline?**

- Yes
- No

9. Do you follow the PRISMA guideline whenconducting and reporting your systematic review?

- Yes
- No (not required by journals or organisations)
- No (other reasons)
- Not applicable (did not conduct any systematic review)
- Not applicable (others)

10. Rate the importance to follow the PRISMA guideline in conducting and reporting of systematic reviews in journals:

1: Not important, ..., 10: Very important

N/A 1 2 3 4 5 6 7 8 9 10

In the following, we would like you to rate the importance of each item in the PRISMA guideline (1: Not important, …, 10: Very important) and the reason of your rating if any.

11a. Item related to the *Title*

Item 1: Identify the report as a systematic review, meta-analysis, or both.

N/A 1 2 3 4 5 6 7 8 9 10

11b . Reason for your rating (optional):

Text

12a. Item related to the *Abstract*

Item 2: Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.

N/A 1 2 3 4 5 6 7 8 9 10

12b. Reason for your rating (optional):

Text

13a. Items related to the *Introduction*

Item 3: Describe the rationale for the review in the context of what is already known.

N/A 1 2 3 4 5 6 7 8 9 10

Item 4: Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).

N/A 1 2 3 4 5 6 7 8 9 10

13b. Reason for your rating (optional):

Text

14a. **Items related to the *Methods***

Item 5: Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.

N/A 1 2 3 4 5 6 7 8 9 10

Item 6: Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.

N/A 1 2 3 4 5 6 7 8 9 10

Item 7: Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.

N/A 1 2 3 4 5 6 7 8 9 10

Item 8: Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated

N/A 1 2 3 4 5 6 7 8 9 10

Item 9: State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).

N/A 1 2 3 4 5 6 7 8 9 10

Item 10: Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.

N/A 1 2 3 4 5 6 7 8 9 10

Item 11: List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.

N/A 1 2 3 4 5 6 7 8 9 10

Item 12: Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.

N/A 1 2 3 4 5 6 7 8 9 10

Item 13: State the principal summary measures (e.g., risk ratio, difference in means).

N/A 1 2 3 4 5 6 7 8 9 10

Item 14: Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.

N/A 1 2 3 4 5 6 7 8 9 10

Item 15: Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).

N/A 1 2 3 4 5 6 7 8 9 10

Item 16: Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.

N/A 1 2 3 4 5 6 7 8 9 10

14b. **Reason for your rating (optional):**

Text

15a. **Items related to the *Results***

Item 17: Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.

N/A 1 2 3 4 5 6 7 8 9 10

Item 18: For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.

N/A 1 2 3 4 5 6 7 8 9 10

Item 19: Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).

N/A 1 2 3 4 5 6 7 8 9 10

Item 20: For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.

N/A 1 2 3 4 5 6 7 8 9 10

Item 21: Present results of each meta-analysis done, including confidence intervals and measures of consistency.

N/A 1 2 3 4 5 6 7 8 9 10

Item 22: Present results of any assessment of risk of bias across studies (see Item 15).

N/A 1 2 3 4 5 6 7 8 9 10

Item 23: Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).

N/A 1 2 3 4 5 6 7 8 9 10

15b. **Reason for your rating (optional):**

Text

16a. **Items related to the *Discussion***

Item 24: Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).

N/A 1 2 3 4 5 6 7 8 9 10

Item 25: Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).

N/A 1 2 3 4 5 6 7 8 9 10

Item 26: Provide a general interpretation of the results in the context of other evidence, and implications for future research.

N/A 1 2 3 4 5 6 7 8 9 10

16b. **Reason for your rating (optional):**

Text

17a. **Items related to the *Funding***

Item 27: Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.

N/A 1 2 3 4 5 6 7 8 9 10

17b. **Reason for your rating (optional):**

Text

Supplementary file 3: Respondents' open-ended responses

Perspective towards items related to the *Title* (Section 1) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Provides clear information about the study	32	"It makes the content of the paper very clear from the beginning" (Response 39) "essential for selecting appropriate material in search databases and provides first indication of inclusion or exclusion" (Response 18)
Help readers locate the work	25	"Title needs to be explicit to help with data searching using boolean parameters" (Response 55) "for indexing purposes" (Response 8)
Miscellaneous	11	"Data credence and integrity" (Response 13) "First thing reviewers/editors read is the title" (Response 20) "I am not only an author I am editor of a journal - a minority of authors continue to evidence confusion about the type of review they are doing - sometimes using systematic as an adjective rather than a noun which encapsulates a certain type of review" (Response 26) "Important to state as establishes understanding between author & reader but not essential as it becomes clear from methods anyway" (Response 30) "Many articles reported in the literature are title systematic

		reviews, but they are no more than literature reviews without a systematic process. Journal editors need to do more to ensure this term is only used for a systematic review that meet the PRISMA" (Response 43) "Systematic reviews carry more weight in my mind. Nice to know from the beginning whether the review is systematic" (Response 53)
Perspective towards items related to the *Abstract* (Section 2) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Helps readers quickly ascertain the purpose of the paper	28	"A clear abstract helps a user rapidly determine if they need to refer to the document at all" (Response 1) "Allows the reader to determine relevance of the research to thier priorities" (Response 7)
Standardises reporting of research	8	"A structured reporting ensures methodological rigor & standardizes reporting--this way important items aren't overlooked" (Response 2) "Having an organized method of reporting data improves the public's understanding of what they are reading" (Response 22)
Summarises the key content of the systematic review	8	"Succinctly recaps key elements and findings of research article" (Response 43) "Data display matrix- similarity and differences are evident" (Response 16)

Necessary component of systematic review reporting	5	"Essential for all publications - often the only part read so must include essential components" (Response 18)
Not necessary to provide systematic review registration number in abstract	4	"not always necessary to register the systematic review. Not all systematic reviews are registered" (Response 37)
Limitations of abstracts	2	"I'm in favour of a structured abstract but the word limits of such is prohibitive to cover all aspects." (Response 8)
Perspective towards items related to the *Introduction* (Section 3) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Introduces readers about the context	12	"Provides history, background, significance, and lays the foundation for the purpose of the review" (Response 34) "aids in logical presentation and helps the reader" (Response 1)
Limitations and inflexibility of PICO	12	"I find the PICO format to be cumbersome in the development of the research question. It is useful as a new scientist but perhaps less necessary for more experienced researchers." (Response 19) "I believe that could be interesting a new approach or a dismemberment of the PICOS question since revision studies do not always refer to intervention studies, for example" (Response 18)
Frames the research questions	10	"The reader needs a problem statement and background information to compare with the study results and decide where they fit in overall with what is known." (Response 42) "Clarity on the gap and the question provides the

		foundation for the work" (Response 10)
Provides clarity	7	"Precision and transparency" (Response 33)
Reduces duplication of research through description of research gaps	3	"In some disciplines there is a plethora of systematic reviews conducted on the same topic in a very short time frame. A strong rationale for why a review is being conducted is important" (Response 22)
Essential information in reporting research	3	"Part and parcel of sound research" (Response 28)
Miscellaneous	6	"In an era of evidence-based medicine/practice anything other than a systematic review process is of little value to the reader" (Response 21) "Systematic reviews are being used as 'citation generators' - the rationale shows if the SR is actually needed - purpose of the review may actually be scant because their motivation is to select a topic that will generate citations" (Response 39) "These issues are too often superficially described and weak performance in nursing" (Response 46) "Transparency is important in SR" (Response 47)
Perspective towards items related to the *Methods* (Section 4) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Ensures quality, rigor and trustworthiness	17	"These items are essential to assuring the internal validity of the review" (Response 38) "All tried and tested methods of ensuring quality and

		avoiding bias" (Response 5)
Allows replication of systematic review	9	"Reporting of methods to allow for transparency and reproducibly is very important in a systematic review" (Response 26)
Essential component of reporting research	8	"A systematic review is often regarded as research of research - all of the above are components of a well-developed research study and are applicable to systematic reviews as well." (Response 1)
Not all items are necessary for different types of systematic reviews	5	"I think the assessment of risk of bias, statement of risk ratio and explaining additional analyses depend on the study design. If I conduct e.g. a systematic review of cross-sectional surveys or a meta-synthesis I do not need this information." (Response 13)
Differentiates the good reviews from the bad	2	"Important for the reader to be able to evaluate the quality of the review" (Response 15)
Miscellaneous	9	"These helps identify the rigour - a systematic review can look superficially good, but if items 9,10,11, 14 are vague, then it shows the authors have not recognised the subjective component in the review process - thus it is weaker" (Response 36) "item 12 - assessment of bias is crucial, however, limitations of the tools used to assess the risk of bias should be understood" (Response 18) "SR protocols are not always published - time constraints, e.g. for Masters or PhD students undertaking a SR or

		where the SR is part of a time-constrained funded study, can be the limiting factor. Some journals do not review protocols quickly." (Response 28) "heterogeneity need to be explored" (Response 12)
Perspective towards items related to the *Results* (Section 5) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Important component in research reporting	11	"All of the above are components of a well-designed research study and are applicable to systematic reviews as well" (Response 7) "These are all essential elements of rigor in SR" (Response 30)
Not all criteria of Results are necessary to report	9	"Not always feasible, in a publication, to include all the details - especially if different for each publication and/or high number of studies in review" (Response 19) "See 14b, the items does not cover very well these types of reviews, where a narrative synthesis is the only option to present the results" (Response 24)
Not all details can be presented	6	"I believe that if we think in terms of publication of the review we have a certain number of words and tables and that in general for the detailed description of each study, which is descriptive or meta-analysis may not be possible." (Response 5)
Necessary for rigor and trustworthiness	5	"These items demonstrate the rigour of data collection and assure the reader that the results can be trusted." (Response

		31)
Miscellaneous	5	"heterogeneity need to be explored" (Response 14) "Precision" (Response 21)
Perspective towards items related to the *Discussion* (Section 6) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Informs knowledge gaps, future practice and implications	14	"Important because it places into context, the findings and helps users of the information identify how it relates to their practice." (Response 13) "this section is the translational piece and what gives the evidence power" (Response 26)
An essential component of reporting research	9	"An essential component of reporting research" (Response 19) "This is not specific to systematic reviews but to all research reported on - Prisma should focus on systematic review specifics" (Response 25)
Shortfalls of the discussion in some systematic reviews	3	"Discussion sometimes simply repeats the results data and weakens the discussion section if not supported with other literature" (Response 8)
Provides overall results	2	"Discussion includes overall results" (Response 7)
Discussion may not be as important as the rigour of the systematic review	2	"I prefer to let the results 'speak for themselves' so while I find interpretation (Item 26) useful I see it as a colleague opinion but the responsibility is on me to interpret what they present - hence the need for transparency and

		demonstration of rigour" (Response 11)
Part of evidence appraisal	1	"All of the above items are components of evidence appraisal and must be conducted in a detailed and rigorous manner" (Response 3)
Perspective towards items related to the *Funding* (Section 7) No. of valid responses, n = 62		
Categories	**No. of codes**	**Example**
Reveals potential for bias	10	"To indicate to the reader the possibility of external influence to the study findings" (Response 24) "To make clear any conflicts of interest and how these have either impacted on the study, been eliminated or have not had any influence on the study outcome" (Response 25)
Allows declaration of conflict of interests	9	"Conflicts of interest need to be announced" (Response 8) "identify any perceived or real conflict of interest" (Response 14)
Allows transparency	5	"In general, all these questions should be rated 10, due to a requirement for a transparent, accurate and systematic approach in systematic reviews." (Response 16)
Necessary component	4	"Required for all research published/reports" (Response 20)
Miscellaneous	3	"none of the studies I have done required any funding" (Response 19)

		“Unless the risk of bias is caused by external funding, there should never be such risk as there is no new data added” (Response 27)

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4-5
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	6
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	6
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	7
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	7
Bias	9	Describe any efforts to address potential sources of bias	*NA*
Study size	10	Explain how the study size was arrived at	7
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	8
		(*b*) Describe any methods used to examine subgroups and interactions	NA
		(*c*) Explain how missing data were addressed	NA
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	NA
		(*e*) Describe any sensitivity analyses	NA
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8
		(b) Give reasons for non-participation at each stage	NA
		(c) Consider use of a flow diagram	NA
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8-9
		(b) Indicate number of participants with missing data for each variable of interest	NA
Outcome data	15*	Report numbers of outcome events or summary measures	9
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	NA
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	NA
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	NA
Discussion			
Key results	18	Summarise key results with reference to study objectives	11
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	14
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	11-13
Generalisability	21	Discuss the generalisability (external validity) of the study results	13
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	3

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.