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Adherence to Preferred Reporting Items for Systematic Reviews and Meta-analysis Protocols (PRISMA-P) guidelines: A cross-sectional analysis from Medical Databases

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Abstract

Aims: Guidelines have been designed to prepare best quality systematic review and meta-analysis reports to provide rational concise predictions about elaborate and complex of clinical trial data. Latest update in these guidelines is given by PRISMA-P 2015, which we wish to analyze for predicting its acceptability over the old PRISMA 2009.

Methods: We studied 287 articles from 143 Journals listed in Pubmed and sorted them on the basis of inclusion and exclusion criteria to predict the number of articles published in 2015 which followed the latest PRISMA-P checklist.

Results: Out of 287 articles 208 relevant articles were selected from which 182 (87.5%) followed the old PRISMA 2009 statement, 4(1.9%) did not follow PRISMA guideline, while 14 (6.7%) partially followed the same. Only 8 (3.8%) of the articles published in 2015 after February, followed the updated PRISMA-P statement.

Conclusion: Results of the present study predicts probable apprehension of authors towards PRISMA-P 2015 statement.

Keywords: *Meta-analysis, Systematic reviews, PRISMA, PRISMA-P.*

1. Introduction

Systematic reviews and/or Meta-analyses have gained immense popularity in the field of medicine in last 15 years. The results of meta-analyses are of utmost importance to decide guideline of future medicine practice, to identify gaps in present clinical knowledge and to formulate directions for upcoming research. Recognizing the overall significance of these reports and expansion in publication of reports with similar or duplicate data with reporting bias in recent past presented an urgent need to design an approach for methodical planning and documentation prior to performance of meta-analysis. Synthesis of proper protocol for performing systematic reviews and meta-analyses demands the construction of extensive and rigorous schema. Previously, data collection and analysis was subjected to author's discretion, which certainly added a huge risk of bias. Therefore, as an effort to streamline and to add consistency in synthesis of data for performing the said analysis a checklist was designed to provide a guideline to authors performing meta-analysis. This checklist which was referred as *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses (PRISMA)(1) also made the process of authoring meta-analysis articles

more transparent, providing readers complete access to clinical trail data included or excluded in the systematic review. Despite the said guidelines, excessive duplication of reviews on the same or similar topics continued accumulating which directed the PRISMA group to create a guideline to improve the transparency, accuracy, completeness, and frequency of documented systematic review and meta-analysis protocols- the PRISMA-P(2-3) 2015. The present study is an effort to analyze the published systematic reviews and meta-analyses articles to estimate the degree of implementation of this proposed protocol since its constitution.

2. Methods

2.1. Search Parameters

We conducted an online search using Medline and the Cochrane Library from February 2015 to October 2015 without language restrictions. The search was limited to meta-analysis/systematic reviews. The terms used for this search were, “Meta-analysis”, “Meta-analysis, PRISMA”, “Meta-analysis, PRISMA-P”, “Systematic Review”,” Systematic Review PRISMA”, “Systematic Review PRISMA-P”. The search results were imported in CSV format sorted by publication date from the Medline database. The lists of review articles were then analyzed using a manual approach. Only the published protocols in the meta analysis were reviewed in this study.

2.2. Study Analysis

Reports with guidelines to improve current meta-analysis criteria, duplicate studies, non-clinical meta-analysis, extension of PRISMA statement were excluded. Articles were retrieved from 143 journals listed in PubMed.

The quality of the review articles was decided on the basis of their compliance to the PRISMA guidelines/check list.

2.3. Statistical analysis

The associations between time of publication and frequency of compliance to guideline recommendations by journals were calculated using Pearson's chi-squared test (with three degrees of freedom), with subgroup analyses calculated using post hoc z-tests for proportions. The adherence to PRISMA-P guidelines for different articles was determined using Chi-square test. All statistical analyses were performed using SPSS (v18, IBM, Chicago).

3. Results and discussion

The Medline article search gave a result of 287 articles while the Cochrane Library could retrieve only 3 articles from the available database when searched from February 2015 to October 2015. Out of the 287 articles of Medline database only 221 articles were the ones published between February 2015 and October 2015. 1 out of the three articles obtained from the Cochrane Library was also published before 2015 and hence excluded. The remaining two articles were already included in the Medline search result and hence discarded as duplicates. The 221 articles thus obtained were manually scrutinized for duplication of data and other listed exclusion criteria. 13 of 221 articles were excluded from the study since these were either extension to PRISMA guidelines, or non-clinical meta-analysis reports. Finally the remaining 208 articles were scrutinized for their compliance to PRISMA/the latest PRISMA-P checklist.

The articles which showed strict compliance to the PRISMA 2009 checklist were 182 out of the 208 (87.5%) retrieved meta-analysis articles. The highest amongst these belonged to the PloS ONE journal (16/182)(4-19) followed by BMJ OPEN journal (12/182)(20-31). All the articles of

these journals also included the PRISMA 2009 checklist in their supplementary information maintaining the transparency in data synthesis.

Table 1. Quality assessment of meta-analysis reports published February to October 2015. The table depicts the percentage of reports published which followed the PRISMA-P 2015 statement. Most percentage of review articles however appear to follow the old PRISMA 2009 statement.

	Total Count	Percentage (%)
No. Articles Published Between February to October 2015	208	100.00
No. Articles following PRISMA 2009	182	87.50
No. Articles NOT following PRISMA-P/PRISMA-2009	4	1.92
No. Articles following PRISMA without compliance	14	6.73
No. of Articles following PRISMA-P	8	3.85
Study Exclusions	13	6.25

Out of all the sorted articles there were a few articles which did not comply with PRISMA 2009 guidelines. Some of these did not even mention about the PRISMA checklist while some restricted themselves to the PRISMA flow sheet. Precisely, 4 out of 208 (1.9%)(32-35) articles did not mention and/or followed PRISMA checklist (Sup. Table. 1) while 14 out of 208 (6.7%)(36-49) articles failed to critically comply with the PRISMA statement. Inclusion of PRISMA checklist at least in the supplementary material of the article becomes inevitable for those abiding the guidelines laid down by PRISMA group 2009. Therefore, journals publishing the articles without the checklist even though might recommend formatting the meta-analysis articles according to the PRISMA guideline do not appear to strictly comply with the said schema (Sup. Table. 2). Finally of all the systematic review articles selected for the study only 8 articles(27-29, 50-54) were found to follow the most updated PRISMA-P checklist which implies that only 3.8% of the articles published in 2015 after February followed the updated PRISMA-P statement. Distribution of all these article categories is depicted in Table 1, which indicates that despite publication of PRISMA-P statement in January 2015, 33 of 37 articles published in September 2015 continued to follow the old PRISMA 2009 statement.

4. Discussion

In this study, we analyzed the articles published in indexed Medicine journals to determine the current rate of endorsement of guidelines for meta-analysis and systematic reviews (PRISMA, PRIMSA-P, review registration) in literature. After going through the search results retrieved from popular medicine database it was noticed that overall, the endorsement of these guidelines has increased throughout 2015, although rates of endorsement are still far below ideal. We found that journals with a higher impact factor were more likely to enforce reporting guidelines. This adherence to recommended guidelines only by journals of high repute could on one hand potentially decrease the rate of appearance of meta-analysis reports while on the other it may divert some authors towards the journals showing flexibility in following the guidelines. This perhaps is the reason for formulation of PRISMA-P statement which provides a schematic explanation for designing the protocol necessary to perform a genuine meta-analysis without potential conflict. Apart from PRISMA-P which is one of the latest guidelines, in 2011, a prospective registry of systematic reviews in health and social care - PROSPERO - was created by the Centre for Reviews and Dissemination (CRD). This is an international database of prospectively registered systematic reviews to help address problems with transparency, reporting bias and the duplication of reports. It is hoped that the complementary use of PRISMA and PROSPERO in the conduct and publication of systematic reviews and meta-analyses will

ensure good reporting in the medical literature (55). Although checking PROSPERO registry was not the primary aim of our study, while going through the articles it was found that systematic review registration was the least widely followed guideline (data not shown).

Only 3.8% of the total articles published in 2015 appeared to strictly comply with PRISMA-P statement. A noticeable fact about articles following PRISMA-P statement was 3 of these 8 articles was published in BMJ OPEN. Apart from BMJ OPEN, PLOS ONE was also found to critically enforce the PRISMA guideline, but the later appeared a bit flexible about PRISMA-P. One probable reason for this negligence could be attributed to the time taken by the articles for publication. It was observed that many articles published throughout 2015 where either prepared on the basis of records published till December 2014 or were communicated before January 2015. It seems likely that many of these article manuscripts might have been written in 2014 which took much longer to appear in the print or online. Despite this argument the fact remains that all throughout 2015 the articles following updated PRISMA-P statement continued to appear almost in every month.

The most appealing reason for less popularity of the PRISMA-P statement appears to be its 17 items considered to be minimum essential components of a systematic review or meta-analysis protocol. PRISMA 2009 although contain a more elaborate 27 item checklist many authors seem to restrict themselves to the 11 basic items and/or the flow diagram. Therefore it seems most likely that adapting to the new more rigorous checklist of PRISMA-P would require more time and effort. Moreover there does not seem to be any stringent rule to follow the recently laid guideline to publish articles in most reputed journals. Authors may therefore continue to follow PRISMA 2009 to get their results published which certainly highlights their apprehension towards PRISMA-P.

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Supplementary Table 1. List of 4 articles which completely failed to with the PRISMA statement

S.No	Article Title	Authors	Journal and Article identifier	Pubmed ID	Gaps Identified
1.	Efficacy of technology-delivered cognitive behavioural therapy for OCD versus control conditions, and in comparison with therapist-administered CBT: meta-analysis of randomized controlled trials.	DÃ¨ttore D, Pozza A, Andersson G.	Cogn Behav Ther. 2015;44(3):190-211. doi: 10.1080/16506073.2015.1005660. Epub 2015 Feb 23.	PMID:25705787	PRISMA 2009 checklist not included in the article or in supplementary information. ONLY FLOW-CHART INCLUDED
2.	Lung ultrasound for the diagnosis of pneumonia in children: a meta-analysis.	Pereda MA, Chavez MA, Hooper-Miele CC, Gilman RH, Steinhoff MC, Ellington LE, Gross M, Price C, Tielsch JM, Checkley W.	Pediatrics. 2015 Apr;135(4):714-22. doi: 10.1542/peds.2014-2833. Epub 2015 Mar 16. Review.	PMID:25780071	No mention of PRISMA 2009/PRISMA-P guidelines in Abstract or in the article text. PRISMA 2009 checklist not included in the article or in supplementary information. ONLY FLOW-CHART INCLUDED
3.	Meta-analyses of pain studies: What we have learned.	HÃ¤user W, TÃ¶lle TR.	Best Pract Res Clin Rheumatol. 2015 Feb;29(1):131-46. doi: 10.1016/j.berh.2015.04.021. Epub 2015 May 23. Review.	PMID:26267007	PRISMA 2009 checklist not included in the article or in supplementary information. ONLY FLOW-CHART INCLUDED

4.	Population, Epidemiological, and Functional Genetics of Gastric Cancer Candidate Genes in Peruvians with Predominant Amerindian Ancestry.	Zamudio R, Pereira L, Rocha CD, Berg DE, Muniz-Queiroz T, Sant Anna HP, Cabrera L, Combe JM, Herrera P, Jahuira MH, LeÃ£o FB, Lyon F, Prado WA, Rodrigues MR, Rodrigues-Soares F, Santolalla ML, Zolini C, Silva AM, Gilman RH, Tarazona-Santos E, Kehdy FS.	Dig Dis Sci. 2015 Sep 21. [Epub ahead of print]	PMID:26391267	No mention of PRISMA 2009/PRISMA-P guidelines in Abstract or in the article text. PRISMA 2009 checklist/flow-chart not included in the article or in supplementary information.

Supplementary Table 2. List of 14 articles which failed to critically comply with the PRISMA statement

S.No.	Article Title	Authors	Journal and Article identifier	Pubmed ID	Gaps Identified
1.	Residential environment and breast cancer incidence and mortality: a systematic review and meta-analysis.	Akinyemiju TF, Genkinger JM, Farhat M, Wilson A, Gary-Webb TL, Tehranifar P.	BMC Cancer. 2015 Mar 28;15:191. doi: 10.1186/s12885-015-1098-z.	PMID:25885593 PMCID:PMC4396806	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist

2.	Time-lapse systems for embryo incubation and assessment in assisted reproduction.	Armstrong S, Arroll N, Cree LM, Jordan V, Farquhar C.	Cochrane Database Syst Rev. 2015 Feb 27;2:CD011320. doi: 10.1002/14651858.CD011320.pub2. Review.	PMID:25721906	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist
3.	The content, dissemination and effects of case management interventions for informal caregivers of older adults: a systematic review.	Berthelsen CB, Kristensson J.	Int J Nurs Stud. 2015 May;52(5):988-1002. doi: 10.1016/j.ijnurstu.2015.01.006. Epub 2015 Jan 17. Review.	PMID:25661314	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist
4.	Do lower urinary tract symptoms predict cardiovascular diseases in older men? A systematic review and meta-analysis.	Bouwman II, Voskamp MJ, Kollen BJ, Nijman RJ, van der Heide WK, Blanker MH.	World J Urol. 2015 May 14. [Epub ahead of print]	PMID:25971203	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist

5.	A systematic review and meta-analysis of randomized trials on the role of targeted therapy in the management of advanced gastric cancer: Evidence does not translate?	Ciliberto D, Staropoli N, Caglioti F, Gualtieri S, Fiorillo L, Chiellino S, De Angelis AM, Mendicino F, Botta C, Caraglia M, Tassone P, Tagliaferri P.	Cancer Biol Ther. 2015;16(8):1148-59. doi: 10.1080/15384047.2015.1056415. Epub 2015 Jun 10.	PMID:26061272	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist
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7.	Treatments for shoulder impingement syndrome: a PRISMA systematic review and network meta-analysis.	Dong W, Goost H, Lin XB, Burger C, Paul C, Wang ZL, Zhang TY, Jiang ZC, Welle K, Kabir K.	Medicine (Baltimore). 2015 Mar;94(10):e510. doi: 10.1097/MD.0000000000000510. Review.	PMID:25761173	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist

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10.	Improving emergency physician performance using audit and feedback: a systematic review.	Rogers Rle G, Narvaez Y, Venkatesh AK, Fleischman W, Hall MK, Taylor RA, Hersey D, Sette L, Melnick ER.	Am J Emerg Med. 2015 Oct;33(10):1505-14. doi: 10.1016/j.ajem.2015.07 .039. Epub 2015 Jul 23. Review.	PMID:26296903	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist
11.	Bond strength of universal adhesives: A systematic review and meta-analysis.	Rosa WL, Piva E, Silva AF.	J Dent. 2015 Jul;43(7):765-76. doi: 10.1016/j.jdent.2015.04 .003. Epub 2015 Apr 14. Review.	PMID:25882585	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist

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13.	Methodological and reporting quality assessment for Chinese systematic reviews and meta analysis in oral medicine.	Yang SL, Ying K, Wang F, Wang L, Ren XY, Yang QF.	Shanghai Kou Qiang Yi Xue. 2015 Aug;24(4):505-10. Chinese.	PMID:26383582	Mention of compliance to PRISMA 2009 Scale** rather than guideline but article includes only Flow-chart and no PRISMA checklist
14.	Prognostic significance of neutrophil-to-lymphocyte ratio in esophageal cancer: a meta-analysis.	Yang X, Huang Y, Feng JF, Liu JS.	Onco Targets Ther. 2015;8:789-94. doi: 10.2147/OTT.S77099.	PMID:25914549 | PMCID:PMC4401207	Mention of compliance to PRISMA 2009 guidelines but article includes only Flow-chart and no PRISMA checklist