

A PRISMA assessment of reporting the quality of published dental systematic reviews in Iran, up to 2017

Nader Navabi DDS, MD¹, Arash Shahravan DDS, MD²,
Ehsan Haj-Esmaeilzadeh DDS³

Original Article

Abstract

BACKGROUND AND AIM: Proper scientific reporting is necessary to ensure correct interpretation of study results by readers. Systematic reviews (SRs) are of critical importance in evidence-based dentistry. This study assessed the reporting quality of published dental SRs in Iran.

METHODS: The PubMed and ISI electronic databases were searched to collect published Iranian dental SRs up to the end of 2016. A 17-item checklist, based on the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) Statement, was used to analyze the completeness of SRs reporting.

RESULTS: 42 SRs were included in this study. The majority were published in the two fields of endodontics and oral and maxillofacial surgery (38.0%). The mean overall reporting quality score was 18.48 ± 5.03 out of 30 for meta-analyses and 24 for SRs. Inadequate reporting of PICO question (Problem/Patient/Population, Intervention/Indicator, Comparison, Outcome) (73.8%), level of strength (57.1%), and financial supporter (52.4%) were observed.

CONCLUSION: The results of this study suggest that the reporting quality of Iranian dental SRs should be further improved.

KEYWORDS: Systematic Review; Dentistry; Iran

Citation: Navabi N, Shahravan A, Haj-Esmaeilzadeh E. **A PRISMA assessment of reporting the quality of published dental systematic reviews in Iran, up to 2017.** *J Oral Health Oral Epidemiol* 2018; 7(4): 191-7.

Systematic reviews (SRs) are considered as the standard references for the synthesis of evidence in health care systems and these studies are widely used to support clinical guidelines and provide information for clinical decision-making processes. Data acquired from SRs have the highest validity and reliability in the evidence-based pyramid and are in fact the most reliable level of evidence.¹⁻³ The ever-increasing publication of SRs has resulted in their daily publication since 2010-2011.⁴ The quality of design and the methods used to carry out SRs significantly affect the validity of their results, and a SR with a poor methodology results in nonfactual report of the results of therapeutic

interventions. The consequences of these wrong reports will have negative effects on the treatments provided for the patients.⁵

Critical appraisal of the results of collected studies is an important part of evidence-based approach. To this end, some guidelines have been suggested for critical evaluation of SRs. These standard guidelines are available in the form of checklists. An increase in the number of SRs and meta-analyses published in recent years has necessitated the use of such guidelines more than ever, so that these reports can be more easily interpreted and used. Use of these protocols gives rise to a decrease in potential problems such as preferred decision-making by researchers during the study procedures and also

1- Associate Professor, Oral and Dental Diseases Research Center AND Kerman Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences, Kerman, Iran

2- Professor, Department of Endodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran

3- Dentist, Private Practice, Kerman, Iran

Correspondence to: Nader Navabi DDS, MD

Email: n_navabi@kmu.ac.ir

avoiding bias which is a serious problem in clinical trials and SRs. Preferred Reporting Items for Systematic Review and Meta-analysis Protocol (PRISMA-P) is one of the most accurate and most reliable tools for appraisal of SRs. Use of PRISMA-P is considered a standard to promote the quality of meta-analysis reports, and its application increases the validity and applicability of SR and meta-analysis reports.⁴⁻⁷

A literature review in relation to similar studies around the world in the field of dentistry revealed 19 studies to date.⁸⁻²⁶ Therefore, considering the interest of Iranian researchers in undertaking SRs in the field of dentistry, the necessity of using this standard tool by Iranian researchers, and lack of a similar Iranian study to date, the present study was undertaken to critically appraise the SRs carried out and published in the field of dentistry in Iran with the use of PRISMA-P tool.

Methods

In the present cross-sectional study, first the full texts of all the SRs carried out in Iran, which had been indexed in PubMed and ISI databases up to the end of 2016, were collected. To this end, the key words 'systematic review' and 'meta-analysis' were joined to 'dentistry', 'dental', 'oral', and 'Iran' with the use of 'AND', and searched in PubMed and ISI databases. Then the list of all the articles brought up with the use of this search was prepared and their full texts were collected through the free facilities of ISI and PubMed databases, by direct requests from the authors through email and procuring the articles from private institutions. In the next stage, the full text of each article was checked with the PRISMA-P 2015 checklist (the latest version) by two researchers separately and their agreement was assessed in two stages. Before the main evaluations, the items of the PRISMA-P tool were reviewed in a session by the two researchers and their opinions were calibrated as far as possible. Then 10 articles were selected randomly, which were

evaluated by the two researchers separately. Intraclass correlation (ICC) coefficient was used to estimate agreement rate between the two observers, which yielded a coefficient of 0.88 [95% confidence interval (CI): 0.80-0.93] for the 10 articles, considered as an acceptable level. In the third and main step, the articles were randomly (using odd and even numbers) divided between the two researchers and each critically evaluated half of the articles separately and recorded the results of the evaluation in datasheets which had already been prepared for each article. The PRISMA-P 2015 checklist consists of 17 general items in three sections related to the operator, introduction, and methods. The items in each section are as follows:

5 items for the first section (title, registration, data on the authors, correction of the previous protocol, and financial supporters)

2 items for the second section (the main reason, aim)

10 items for the third section (inclusion and exclusion criteria, search databases, search strategy, the mechanism of article selection, extraction and simplification of data, taking into account all the primary and secondary outcomes, evaluation of the risk of bias, meta-analysis, consideration of meta-bias, and evaluation of the power of evidence).

Observation of all the 17 items above in the full texts of the articles was checked and its conformity with the PRISMA-P tool was recorded. For each item of each article three options (yes, no, incomplete) were considered and 'yes' received a score of 2, 'incomplete' received a score of 1, and 'no' received a score of zero. The two reviewers had been calibrated to assign a score of 2 to the 'complete observation' of the relevant items, a score of 1 to the 'incomplete observation' of the item, and a score of zero to 'not observing' the item.

Since it is not always possible to carry out a meta-analysis in all the SRs, and the items 14 to 16 of the checklist used in the present study are specifically used for the evaluation of meta-analyses, a score range of 0-34 was

considered for studies with meta-analysis and a range of 0-28 (for 4 items) for studies without meta-analyses.⁴⁻⁷

For each article, data on its title, the year of publication, the title of the journal, and the specialty field of the article were recorded. Data were recorded in data sheets and analyzed with the latest version of SPSS software. Descriptive statistics were used to estimate distribution of data. The authors' names were not reported and the scores of each article were kept confidential.

Results

In the present study after running a search for the relevant articles, finally 42 articles were included for the final analysis; 25 of which were SRs (59.5%) and the rest (17 articles) were meta-analyses. Table 1 presents the frequency distributions of the collected articles in terms of the year of publication and the specialty field. As shown in table 1, the articles were published in 2006-2016 and 50% of the articles were published in 2015 and 2016. In addition, the majority of the articles were in the fields of endodontics and oral and maxillofacial surgery (each with 19 articles, comprising 38% of all the articles).

Table 2 presents the frequencies of the items of the protocol for 42 articles in the present study. As shown in the table, item 3 (registration of the names of all the authors in

the articles) had been observed in all the articles, followed by mentioning the type of study in its title (97.6% of the articles) and the databases used for carrying out the search (73.8% of the articles); however, in 73.0% of the studies PICO question (Problem/Patient/Population, Intervention/Indicator, Comparison, Outcome) had not been explained. In more than half of the articles (57.1%) the power of the evidence collected had not been evaluated and in 52.4% of the articles the functional support had not been mentioned.

Table 1. Main characteristics of studied papers

Year	n (%)	Field	n (%)
2006	1 (2.4)	Dental material	1 (2.4)
2007	1 (2.4)	Periodontics	4 (9.5)
2008	1 (2.4)	Endodontics	8 (19.0)
2009	1 (2.4)	Pediatric dentistry	2 (4.9)
2011	5 (11.9)	Oral pathology	3 (7.1)
2012	1 (2.4)	Community dentistry	3 (7.1)
2013	7 (16.7)	Maxillofacial surgery	8 (19.0)
2014	4 (9.5)	Oral medicine and laser	8 (19.0)
2015	10 (23.7)	Orthodontics	3 (7.1)
2016	11 (26.2)	Prosthodontics	2 (4.9)

In evaluation of the article scores using the PRISMA-P, first the items 2 and 4 (indexing of the articles in a valid database and a mentioning of changes or revision of the previous protocol) were eliminated from the score evaluation step, because they had not been mentioned in any of the articles.

Table 2. Frequency of 17 modified Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) items observed among 42 articles

No	Item	Acceptable (%)	Incomplete (%)	Missed (%)
1	Stipulation of study type in the title	97.6	2.4	0
3	Stipulation of authors' information	100	0	0
5	Mentioning financial support	42.9	4.7	52.4
6	Justification of the necessity of the study	61.9	38.1	0
7	Mentioning the main purposes	33.3	64.3	2.4
8	Illustration of the question of the study (PICO)	16.7	9.5	73.8
9	Mentioning the databases	73.8	26.2	0
10	Illustration of the search strategy	40.5	45.2	14.3
11	Illustration of the process of paper selection	57.1	21.4	21.5
12	Illustration of the data simplification	69.0	11.9	19.1
13	Considering the outcomes	69.0	26.2	4.8
14	Assessment of the level of evidence	38.1	4.8	57.1
15	Assessment of the risk of bias	58.8	23.5	17.7
16	Accomplishing meta-analysis	100	0	0
17	Considering the publication bias	47.0	0	53.0

Then items 14 and 16 were taken into account only for the evaluation of meta-analysis studies; therefore, 12 items (items 1, 3, 5-13, and 17) were used for the evaluation of SRs. The mean score of the modified PRISMA-P for all the articles was 18.48 ± 5.03 , with a range of 7-28 (the maximum achievable scores for SRs and meta-analyses were 24 and 30, respectively). Separate calculation of the score for SRs and meta-analyses yielded mean scores of 15.72 ± 4.22 and 22.53 ± 2.98 , respectively. The mean score of the articles based on modified PRISMA-P exhibited a relative increase from 2013 up to the present.

Discussion

The present study is the first Iranian study to critically evaluate the SR reports in the field of dentistry, indexed in valid databases. Currently, considering the special position of SRs in evidence-based dentistry, it is necessary, more than ever, to more seriously and critically evaluate these studies, and lack of interest of researchers in the dental field in Iran in this field to date has raised some concerns. In this context, Brito et al. also expressed this concern in the field of endocrinology, reporting that only a small number of clinical guidelines in this branch of medicine have been founded on valid SRs and the quality of the relevant SRs was poor.²⁷

The most principal finding of the present study indicated significant defects in relation to the correct definition of the research question, evaluation of the validity of the collected evidence, and reporting of financial supporters in the SR reports. However, Lang and Teich believe that lack of standardization of the reported data, non-standard definition of outcomes, and the effect of the duration of the study are some of the main problems that should be taken into account in order to promote the quality of SRs in dentistry.²⁸

In the present study, finally, 42 articles were critically evaluated. The number of articles evaluated in the present study was somehow at a mean level of studies carried

out all over the world. Some similar studies have only critically evaluated the abstracts of SRs, of which studies by Kiriakou et al.,⁸ Faggion and Giannakopoulos,¹⁰ and Polychronopoulou¹³ can be mentioned that evaluated SRs in the fields of implant and periodontology. In the study by Faggion et al., 146 abstracts were evaluated;¹² however, it appears that evaluation of the full texts of articles is more accurate than the evaluation of abstracts only.

PRISMA-P 2015 was used for critical evaluation of SRs in the present study; the majority of researchers believe that it is the most valid tool for such evaluations.^{4,7} In similar dental studies, Pidgeon et al.¹⁵ and Fleming et al.²⁴ used PRISMA-P; however, the majority of researchers have used the Assessment of Multiple Systematic Reviews (AMSTAR) protocol for this end.⁸⁻²⁶ As discussed above, currently different protocols are available for critical evaluation of SRs; however, it appears that it is necessary to take into account the comprehensive nature of these protocols in order to select a more appropriate protocol. In this context, it has been reported that AMSTAR is a valid tool for the evaluation of the quality of the methodology of interventional SRs, and it appears that since the majority of SRs in dentistry are related to therapeutic interventions, AMSTAR is selected for the evaluation of these studies. In this context, a tool referred to as MOOSE (Meta-analysis of Observational Studies in Epidemiology), is mostly used for the evaluation of epidemiological reviews, and a tool referred to as Quality Assessment of Diagnostic Accuracy Studies (QUADAS) is mostly used for the evaluation of the methodology of diagnostic reviews. However, the dominant opinion at present is that the most comprehensive protocol for the evaluation of SRs in which meta-analyses have been carried out is PRISMA.^{4,7} It appears that researchers should use similar protocols as far as possible in order to facilitate comparison of the results of different studies

around the world; multiplicity of protocols somehow makes such comparisons difficult.

The results of the present study showed that in all the articles the names of all the authors had been mentioned in a proper manner. It should be pointed out that this item is considered in a standard format by journals for accepting articles for publication. In some cases, no separate space has been allocated in journal formats to mentioning the financial supporters of the study, which is the reason why in half of the SRs there was no mention of the financial supporters. Pidgeon et al. reported that in only 37.1% of the articles evaluated the financial supporters had been mentioned.¹⁵ It is also possible that SRs might not require any financial support due to the nature of their methodology.

In the present study, the mean scores of the articles based on modified PRISMA-P for both SRs and meta-analyses were > 50% of the whole achievable score. In relation to the report of the general quality level of the articles, there are great diversities in similar studies and such levels have been reported qualitatively in some studies. In this context, Kiriakou et al.⁸ and Polychronopoulou¹³ reported that the quality of the studies should improve. Papageorgiou et al.¹⁹ reported that the overall quality of the studies was moderate, and Atieh et al.¹⁶ reported a high quality for the SRs that they evaluated. Faggion et al. reported that the quality of 35 studies out of 54 studies was poor.²⁰ Elangovan et al.,¹¹ Pidgeon et al.,¹⁵ and Fleming et al.²⁴ used scores for the assessment of the quality of articles that they evaluated, similar to the method used in the present study. Another similarity between the methods used in studies by Pidgeon et al.¹⁵ and Fleming et al.²⁴ and the present study was the use of PRISMA-P; however, Pidgeon et al. evaluated only SRs in the field of craniofacial surgeries and Fleming et al. evaluated SRs in the field of orthodontics. In the present study, SRs in all the specialty fields of dentistry were evaluated.²⁴ In the study by Elangovan et al.,¹¹ the scores of 6

studies out of 10 studies were ≤ 4 . In the study by Pidgeon et al.,¹⁵ the mean score of the articles was reported to be 72.5%, and in the study by Fleming et al.,²⁴ the mean PRISMA-P score was 64.1%. Therefore, the mean score of the articles in the present study was higher than that in the study by Pidgeon et al.¹⁵ and almost similar to that in the study by Fleming et al.²⁴

A lack of explanation of the research question (PICO) and no evaluation of the validity score of the evidence collected with standard tools such as Grading of Recommendations, Assessment, Development, and Evaluation (GRADE), both being related to the methodology of the articles, are the most important shortcomings of the articles that were evaluated in the present study. This is different from the results of a study by Alarcon et al.,¹⁷ because they reported that in all the studies evaluated the research question had been explained. Flores-Mir et al.¹⁸ reported important shortcomings such as an unacceptable search strategy, inadequate search in databases, and unacceptable review of the evidence collected in the articles they evaluated; however, all these three items were almost acceptable in the evaluations carried out in the present study. Aziz et al.²¹ and Schmitter et al.²² also reported significant shortcomings in relation to publication bias and announcement of search in grey sources. In the present study, publication bias had been evaluated in almost half of the meta-analysis studies; however, similar to the two studies above, almost none of the studies completely explained the mechanisms of search in grey sources. Faggion et al. reported that comprehensive search and evaluation of publication bias were unacceptable.²⁰ We know that a lot of reviews were carried out in Iran, but the derived articles are published in journals belonging to the other countries; therefore, it is numbered as a kind of limitation, because we may miss some of the mentioned data indeed. In this context, for example no mention has been made of the financial

supporters in an acceptable way, and this is a shortcoming in terms of the ethics principles in research.²⁹

Conclusion

The results of the present study showed that although the rate of acceptability in the majority of the items of the protocol used was ≥ 50 , there is still a long way to go before it can be claimed that the SR reports in the field of dentistry in Iran have a completely

favorable quality.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

This study was financially supported by Social Determinants on Oral Health Research Center, Kerman University of Medical Sciences (Research No: 95/160). This paper has been based on thesis #987 in Kerman Dental School.

References

1. Navabi N, Shahravan A, Pourmonajem S, Hashemipour MA. Knowledge and Use of Evidence-based Dentistry among Iranian Dentists. *Sultan Qaboos Univ Med J* 2014; 14(2): e223-e230.
2. Navabi N, Shahravan A. The status of evidence-based dentistry in Iran. *Journal of Research in Dental and Maxillofacial Sciences* 2016; 1(1): 1-3.
3. Habib Agahi R, Navabi N, Shahravan A, Ghassemi A. Critical appraisal of reporting randomized clinical trials published in Iranian dental journals during 2003-2010. *J Dent (Tehran)* 2014; 11(3): 310-8.
4. Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015; 4: 1.
5. Fleming PS, Koletsi D, Pandis N. Blinded by PRISMA: Are systematic reviewers focusing on PRISMA and ignoring other guidelines? *PLoS One* 2014; 9(5): e96407.
6. Shamseer L, Moher D, Clarke M, Ghersi D, Liberati A, Petticrew M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ* 2015; 350: g7647.
7. Willis BH, Quigley M. The assessment of the quality of reporting of meta-analyses in diagnostic research: a systematic review. *BMC Med Res Methodol* 2011; 11: 163.
8. Kiriakou J, Pandis N, Fleming PS, Madianos P, Polychronopoulou A. Reporting quality of systematic review abstracts in leading oral implantology journals. *J Dent* 2013; 41(12): 1181-7.
9. Elangovan S, Mawardi HH, Karimbux NY. Quality assessment of systematic reviews on short dental implants. *J Periodontol* 2013; 84(6): 758-67.
10. Faggion CM Jr, Giannakopoulos NN. Critical appraisal of systematic reviews on the effect of a history of periodontitis on dental implant loss. *J Clin Periodontol* 2013; 40(5): 542-52.
11. Elangovan S, Avila-Ortiz G, Johnson GK, Karimbux N, Allareddy V. Quality assessment of systematic reviews on periodontal regeneration in humans. *J Periodontol* 2013; 84(2): 176-85.
12. Faggion CM Jr, Liu J, Huda F, Atieh M. Assessment of the quality of reporting in abstracts of systematic reviews with meta-analyses in periodontology and implant dentistry. *J Periodontol Res* 2014; 49(2): 137-42.
13. Polychronopoulou A. The reporting quality of meta-analysis results of systematic review abstracts in periodontology and implant dentistry is suboptimal. *J Evid Based Dent Pract* 2014; 14(4): 209-10.
14. Monje A, Pommer B. The concept of platform switching to preserve peri-implant bone level: Assessment of methodologic quality of systematic reviews. *Int J Oral Maxillofac Implants* 2015; 30(5): 1084-92.
15. Pidgeon TE, Wellstead G, Sagoo H, Jafree DJ, Fowler AJ, Agha RA. An assessment of the compliance of systematic review articles published in craniofacial surgery with the PRISMA statement guidelines: A systematic review. *J Craniomaxillofac Surg* 2016; 44(10): 1522-30.
16. Atieh MA, Duncan WJ, Faggion CM Jr. Quality assessment of systematic reviews on oral implants placed immediately into fresh extraction sockets. *Int J Oral Maxillofac Implants* 2016; 31(2): 338-51.
17. Alarcon MA, Diaz KT, Aranda L, Cafferata EA, Faggion CM Jr, Monje A. Use of biologic agents to promote bone formation in implant dentistry: A critical assessment of systematic reviews. *Int J Oral Maxillofac Implants* 2017; 32(2): 271-81.
18. Flores-Mir C, Major MP, Major PW. Search and selection methodology of systematic reviews in orthodontics (2000-2004). *Am J Orthod Dentofacial Orthop* 2006; 130(2): 214-7.
19. Papageorgiou SN, Papadopoulos MA, Athanasiou AE. Evaluation of methodology and quality characteristics of systematic reviews in orthodontics. *Orthod Craniofac Res* 2011; 14(3): 116-37.

20. Faggion CM Jr, Listl S, Giannakopoulos NN. The methodological quality of systematic reviews of animal studies in dentistry. *Vet J* 2012; 192(2): 140-7.
21. Aziz T, Compton S, Nassar U, Matthews D, Ansari K, Flores-Mir C. Methodological quality and descriptive characteristics of prosthodontic-related systematic reviews. *J Oral Rehabil* 2013; 40(4): 263-78.
22. Schmitter M, Sterzenbach G, Faggion CM Jr, Krastl G. A flood tide of systematic reviews on endodontic posts: Methodological assessment using of R-AMSTAR. *Clin Oral Investig* 2013; 17(5): 1287-94.
23. Kelly JT, Avila-Ortiz G, Allareddy V, Johnson GK, Elangovan S. The association between periodontitis and coronary heart disease: A quality assessment of systematic reviews. *J Am Dent Assoc* 2013; 144(4): 371-9.
24. Fleming PS, Seehra J, Polychronopoulou A, Fedorowicz Z, Pandis N. A PRISMA assessment of the reporting quality of systematic reviews in orthodontics. *Angle Orthod* 2013; 83(1): 158-63.
25. Lang LA, Teich ST. A critical appraisal of the systematic review process: Systematic reviews of zirconia single crowns. *J Prosthet Dent* 2014; 111(6): 476-84.
26. Schiegnitz E, Kammerer P, Al-Nawas B. Quality assessment of systematic reviews and meta-analyses on biomarkers in oral squamous cell carcinoma. *Oral Health Prev Dent* 2017; 15(1): 13-21.
27. Brito JP, Tsapas A, Griebeler ML, Wang Z, Prutsky GJ, Domecq JP, et al. Systematic reviews supporting practice guideline recommendations lack protection against bias. *J Clin Epidemiol* 2013; 66(6): 633-8.
28. Lang LA, Teich ST. A critical appraisal of evidence-based dentistry: The best available evidence. *J Prosthet Dent* 2014; 111(6): 485-92.
29. Navabi N, Shahravan A, Modaberi A. Reporting of ethical considerations associated with clinical trials published in Iranian dental journals between 2001 and 2011. *Iran J Public Health* 2013; 42(6): 594-601.