An Introduction to Research for Primary Dental Care Clinicians
Part 9: Stage 10. Writing Up and Disseminating the Results
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Introduction
This paper, the ninth and final one in the series, will address the tenth and final stage of a research project suggested in the first paper. The ten suggested stages are:
1. The initial idea (asking a research question).
2. Searching the literature.
3. Refining the research question.
4. Planning the study.
5. Writing a protocol.
6. Obtaining ethical approval and funding.
7. Piloting the methodology and project management.
8. Collecting data.
9. Analysing the data.
10. Writing up and disseminating the results.

These steps represent the final stage in the research process.

Stage 10. Writing up and Disseminating the Results

This paper is divided into the following sections:
A. Introduction.
B. Steps to take before starting to write.
C. Writing the paper or papers.
D. Submitting the paper and the editorial process.
E. Presenting results at meetings and conferences.
F. Further resources.

A. Introduction
Having performed research, it is the duty of the researchers to disseminate the results and inform the scientific world and general population of the findings. Traditionally this has been done via presentations at scientific conferences and by publishing in peer-reviewed journals. Of late, it has become possible to publish in online journals such as BioMed Central® as well as traditional ‘hard copy’ journals. Most journals now publish papers both online and in hard copy. This article includes advice on how to structure a research paper and describes the stages in the publication process. Although the structure of research papers is different, many of the steps are identical for other types of scientific paper, such as reports of systematic reviews and case reports. In biomedicine, research methodology may be applied to research that seeks to identify answers to a new problem. It may also be used to confirm the results of a previous study or studies, clinical audit, or service evaluation.

B. Steps to take before starting to write
B1. Identify the target readership and journal
The study concerned has been completed and the results analysed. It is now time to report them in a paper or papers. Before starting to write the paper(s), three questions should be asked. They are:
• What message should the paper convey? Ideally, this should be summed up in one sentence.
• What effect will the research have? Apply the ‘so what?’ test to the message.
• Who is likely to want to read the paper? Apply the ‘who cares?’ test.

All editors have a very clear idea of their journal’s readership and will apply their own versions of these tests to all manuscripts that they receive. If a paper is to be considered, its topic will not only have to be within the journal’s scope but also will need to match the journal’s audience. It is therefore very wise to review the contents of recent editions of the selected journal. An editor may be reluctant to publish yet another paper on a specific topic that has been covered comprehensively in recent issues.

Some editors welcome enquiries and the
Primary Dental Care peer reviewer’s check-list and report form for research papers

MS 421 – GDPs’ Views of Preformed Metal Crowns – Report of a Clinical Trial

General
1. Is the topic of the paper appropriate for the journal? yes
2. Does the paper conform to the published guidelines for authors of the journal? yes
3. Is it on an important or significant topic? yes
4. Does the study add to the existing knowledge-base? yes

Presentation
5. Does the title accurately reflect the content of the paper? yes
6. Does the paper have a logical construction? yes
7. Does the length of the paper need adjusting (too long or short)? no
8. Is the paper written in a clear and easily understandable style? yes
9. Is the paper free of grammatical or typographical errors? yes

Abstract
10. Is there an abstract that conforms to the journal’s published guidelines for authors? yes
11. Does the abstract present an accurate synopsis of the paper? yes
12. Are there key words and do they seem to be appropriate? yes

Introduction and Aims
13. Is the introduction appropriate to the paper’s subject? yes
14. Is the literature that has been reviewed relevant and is it comprehensive? Not entirely, in the last six months three relevant papers on the Halit science have been published. However, they are not referred to in the introduction or in the discussion

Results
32. Are the results and any statistical tests presented in a clear and unambiguous manner (tables, figures, graphs, etc)? yes

Discussion
15. From the introduction does the study seem original in concept? yes
16. Do the aims of the study follow logically from the literature review and are they clearly stated? yes
17. If appropriate, is a null hypothesis stated? Not applicable

Methods
18. Is the design of the study consistent with its aims? yes
19. If applicable, was a pilot study performed to test the methodology? No, the authors should explain why this was not done
20. Is the sample representative of the population in question? yes
21. Are controls needed and used in the study? no
22. If controls are used, are they appropriate? Not applicable
23. Is the method of selecting the sample/cases and controls clearly described? yes
24. Are other details such as numbers, time periods, statistical tests used clearly described and consistent? yes
25. If relevant, have examiners been trained and calibrated? Calibration and training are not mentioned in the methods section, they should be
26. Are details of such training and calibration given? See 25 above
27. If questionnaires and pro formas have been used, have they been tested, are they relevant to the study and are they presented either as figures in the paper or via a link to a website? yes
28. Could there be ethical objections to the study? I don’t think so
29. Does the paper include a clear statement on whether or not ethical approval was sought and if so, who from? yes
30. If ethical approval was not sought, is there a clear explanation why? yes
31. If applicable, has patient/parental consent been sought? yes

Conclusion
33. Is the conclusion relevant to the aims of the study? yes
34. Do the conclusions follow logically from the discussion? yes
35. Does the conclusion appear to be drawn from a clear and comprehensive presentation of results? yes
36. Are any limitations of the study mentioned and discussed? yes
37. Does the conclusion mention any limitations of the study? yes
38. Does the conclusion mention any limitations of the study? no

Appendix
39. Are all necessary appendices included? Yes
40. Are they clearly marked? Yes

References
41. Are the references complete? yes
42. Are they correctly formatted? yes
43. Are they correctly cited? yes

Figure 1 Example of a review using the check-list for research papers (continued over).
such problems, it is essential to obtain the advice of a biostatistician when designing a study, and to refer any queries that may arise to him/her during the study and while writing a paper or an abstract for a conference presentation.

If the paper contains illustrations or any material that is copyright protected, it is necessary to obtain permission from the copyright holders to reproduce the material in the paper. If a letter or an unpublished paper is cited in the paper, it is necessary to obtain permission from its author. It is also necessary to confirm with anyone who is acknowledged for their help that they are happy to be associated with the paper. It is possible that they may not wish to be associated publicly with the paper or wish the readers to infer that they have endorsed it.

C. Writing the paper or papers

C1. The first draft

It is usual to produce a number of drafts of the paper, each of which is checked and commented on and corrected by co-authors (if there are any). It is very wise to add a date at the top of the first page of the first and all subsequent drafts and to save the paper to a hard drive with the date in the file name, such as ‘Draft 4, Paper 12 at 27 December 2011’. This facilitates easy identification of the latest version of the paper when retrieving it for further work.

The structure of the paper should follow the standard format for scientific papers and be written under the headings:

• Abstract (with key words).
• Introduction.
• Aim(s).
• Methods.
• Results.
• Discussion.

• Conclusions.
• Acknowledgements.
• References.

C2. The title and the authors

Begin the first draft by devising a title, which should clearly state the paper’s message. In effect, the title is a summary of the abstract and the abstract is a summary of the full paper. It may be the case that the final version of the title is not agreed at the first draft stage, and it may be revised in subsequent drafts. Abbreviations should not be used in the title, and it should not imply more than the study shows. For example, a title such as ‘A study of dentists’ use of washer-disinfectors’ would be inappropriate if the study concerned involved general dental practitioners in just one area. A better title would be ‘The use of washer-disinfectors in 2009 by general dental practitioners in Yorkshire’.

Some journals require the full names, quali-
C 3. The abstract
The abstract should summarise the paper. It should not contain information not found within the paper. Abstracts reporting the results of research should be written under the subheadings Aim(s), Methods, Results, and Conclusion(s). Some journals use the sub-heading Objectives instead of Aim(s). The Aims section may include a brief introduction as well as the aim(s). Each section should be one paragraph. References should not normally be cited in abstracts. Some journals have a word limit for the length of an abstract; it is usually 250-300 words.

C 4. Key words/medical subject headings
At the end of the abstract, key words should be listed. These should be chosen carefully because they will be used by electronic databases, such as Medline, as one of the means of identifying the paper when people perform online searches. A good starting point is to select words contained in the National Library of Medicine’s controlled vocabulary thesaurus. These Medical Subject Headings (MeSH) are arranged in an alphabetic and a hierarchical structure. When choosing key words, authors should refer to the MeSH web site at www.nlm.nih.gov/mesh. This is the central access point for additional information about MeSH and for obtaining MeSH in electronic form.

C 5. Referencing
References are not normally cited in the abstract but they should be cited elsewhere throughout the paper and listed at the end of the paper. Many biomedical journals, including Primary Dental Care, use the Vancouver style, in which references are numbered in the order in which they are first cited in the text. The Vancouver style resulted from a conference of the International Committee of Medical Editors, which took place in Vancouver in 1978. This committee has also produced Uniform Requirements for Manuscripts Submitted to Biomedical Journals. Virtually all Medline-listed biomedical journals, including Primary Dental Care, follow these requirements and they form the basis for the guidelines or instructions to authors. The other commonly used system is the Harvard style. In Harvard, the authors’ names and the year of publication appear in the text instead of a number. Whichever system the journal uses, it is wise to use the Harvard style until the final draft of the paper. This is because, should further references be added or deleted during revisions to earlier drafts, it is easier to replace names and dates with numbers in the final draft rather than to use numbers in all drafts. This problem can also be solved by the use of reference manager software, such as Endnote.

C 6. Introduction (Why was the research necessary?)
Along with the abstract, this is the most important part of the paper to the editor of a journal. When a paper arrives in an editorial office, the editor is unlikely to read it through in detail in the first instance. Many editors read the abstract in detail to obtain an overall picture of the paper and then read the introduction to obtain an impression of the author’s skills as an investigator and writer. By the end of the abstract, the editor (and readers) should know why the research was started and what gap in the existing knowledge it has tried to fill. An introduction should set the scene for the rest of the paper, commencing with a paragraph on the broad area in which the research has been performed and describing previous work relevant to the topic, before leading to the reason why the author(s) were prompted to carry out the study. When planning and designing the study, it is essential to perform a literature search (using a database such as Medline) to help find previous key papers on the topic of the research. These key papers should be cited in the introduction. Too few citations in the introduction may lead to a suspicion by the editor (and discerning readers) that the relevant literature was not fully investigated before the project was started. On the other hand, too many citations may suggest that they have been copied from a dissertation or thesis and that there has been no attempt to cite only the key ones.

C 7. Aims
The introduction must lead on to a clear statement of the aim or aims of the research. This can be linked to the introduction by the use of such words as ‘Against this background…’ or ‘In the light of previous work, the aim of this study was…’.

C 8. Methods (What was done?)
The quality of research is determined by the quality of the methodology used. Good research design is crucial to the success of a study/project. The methodology used therefore needs to be fully described in the Methods section, so that anyone could verify the research by following the same methodology to repeat the study. If the reader cannot understand exactly what was done, then the Methods section is inadequate. The author(s) must not assume that readers have the same knowledge of the topic as he/she does and it is therefore necessary to give a detailed explanation. The following points should be covered in the Methods section:

- A full description of the subjects and/or materials that were used.
- How and why the sample was selected, including details of random sampling methods, or if applicable, why random sampling was not used.
- The numbers involved and details of a power calculation to justify the size of the sample.
- How and why those chosen were truly representative of the population that was studied.
- A full explanation of the methodology used.
- If a pilot study was required, a description of how the methodology was piloted to test it before commencing the study.
- Details of ethical approval, or if this was not sought, the reason why.
- If relevant, details of patient consent and how it was obtained.
- A description of how data were collected.
- Copies of any questionnaire(s) used, together with a copy of the explanatory letter to subjects/patients, if this was not included in the questionnaire.
- A full description of any drugs, chemicals and other materials that were used, includ-
C10. Discussion (Of all aspects of the study that is being reported)
The section should start with a discussion and critique of the methodology that was used, including an explanation of why it was used and a comparison with the methodologies used previously in other similar studies. The results should then be discussed and compared with those from previous studies, indicating where they confirmed or differed from those obtained in these studies and suggesting why this might have happened. The section should end with a brief summary outlining what the study has shown and a statement of the clinical relevance of the study.

C11. Conclusions
Conclusions may be listed in the summary at the end of the Discussion. However, it is often wise to list the key findings as bullet points in a separate section headed ‘Conclusions’, as this makes it easier for a reader to identify them. Nevertheless, some journals do not like bullet points so once again it is essential to see if the journal’s instructions/guidelines give advice on this point. They should reflect the results accurately and not draw inferences over and above the results.

C12. Acknowledgements
This section should:
• Thank anyone who has helped in the production of the paper or the study that it reports.
• Identify any sources of funding for the study.
• Include a statement of conflict of interests, should any of the authors have them.
• If the journal requires it (Primary Dental Care does) state exactly what each author contributed to the paper.

C13. Reference list
All references, including electronic sources, cited in the paper should be listed in this section and numbered at the final draft stage. Personal communications or abstracts from posters and oral presentations at conferences are not generally included in the reference list; details of these should be included at the point within the text where they are cited. As mentioned previously, the style of the references is likely to be either Vancouver or Harvard.

C14. Revising drafts
If time permits, it is wise to leave drafts for some days before revising them. This helps the author(s) to take an objective view when looking for errors. These may be in the content and structure, or in the style. Look for disparities between statements in the text and data presented in tables or figures. Ensure that there is continuity in the use of terms and that the full version of all abbreviations is given when they are first used; for example, ‘General Dental Council (GDC)’ should appear when first used in a paper, and then the abbreviation ‘GDC’ throughout the rest of the paper. As mentioned previously, to ensure an objective style, check that the third person and simple past tense are used consistently throughout the paper. The use of the first person suggests a degree of subjectivity and the second person one of descension, which should be avoided.

If reference manager software has not been used, the references should remain in the Harvard style, both in the text and in the list of references, until the final stage. If the journal to which the paper is submitted requires it, they should then be converted to Vancouver style.

If the journal to which the paper is submitted publishes a check-list for reviewers, the author(s) should go through the draft with the check-list to help identify any errors or omissions.

When the author(s) are happy with the final draft, it is wise to ask a colleague who is knowledgeable in the field of the paper to read it before it is submitted.

C15. The final manuscript
Having completed any revisions, the last stage before submitting the paper is the preparation of the final manuscript. This involves:
• Reviewing the manuscript requirements of the journal (as detailed in the guidelines/information for authors).
• Checking that the final version contains all the essential sections, such as title page, abstract, key words, references, and that they conform to the journal’s requirements.
• Printing out a copy to check that the width of the page margins conforms to the journal’s requirements. These typically require that the lines are double-spaced, that each page is numbered, that all tables and figures are numbered, and that each one appears on a separate page.
D. Submitting the paper and the editorial process

D1. Submitting the paper
Most journals (Primary Dental Care included) require papers to be submitted electronically, either as e-mail attachments or via the journal’s or publisher’s website. A covering letter from all the authors should accompany the manuscript. Photographs may be sent electronically with the manuscript, tables, figures and the covering letter. However, in order to obtain high-quality reproduction, some journals also require photographs to be sent to the editor as hard copy by surface mail.

D2. The covering letter
The contents of the covering letter may vary from journal to journal. However, most (Primary Dental Care included) require it to include a list of all the authors’ names, the address and the contact details (e-mail, postal addresses and telephone number/s) of the corresponding author; together with a statement that the paper is not being submitted to another journal and has not been published or accepted by another journal. An example of a covering letter is given in Figure 2. Some journals require all the authors to sign the covering letter. However, others (including Primary Dental Care) do not require this as long as the e-mail that accompanies the manuscript and covering letter is copied to all the authors.

D3. The editorial process (What happens next)
When a paper arrives at an editorial office it is given an identification number and then forwarded to the journal’s editor, who decides whether or not it is on a topic that falls within the scope of the journal concerned and should be sent out for peer review. If the paper does not fall within the scope of the journal, an e-mail or letter is sent to the author(s) to explain this.

D4. Peer review
The editor nominates two or more colleagues who have particular knowledge of the topic of the paper to peer review it. This process may be performed blind, in which case the author details are removed before the paper is sent to the reviewers. Most journals provide a check-list of points for the reviewers to assess the paper against. Reviewers are given a deadline by which they should return their reviews to the editor. Apart from commenting on specific points, reviewers are also asked to recommend whether a paper should be accepted without revision, accepted following revisions, or rejected.

D5. The editorial letter
The editor considers both reviews and then decides whether or not to accept or reject the paper. Very few papers are accepted without revision; some are rejected; most are accepted subject to revision. The editor writes to the author(s) with a decision on the paper. Authors are free to disagree with the comments made by the reviewers, and can challenge any of them. However, if they do so, they must provide evidence to support their challenge. Generally, authors do not challenge comments made by reviewers and requests made by editors. A typical editorial letter is at Figure 3 and a typical review, using a check-list, of a research paper is at Figure 1.

D6. Revisions made by the author(s)
The authors are given a deadline by which to make revisions and resubmit the paper to the editor. A revised manuscript should be accompanied by a list of the revisions, which should be highlighted in the revised manuscript.

D7. Editing
If it meets the editor’s requirements, the manuscript is then edited, either by the editor or by a sub-editor. This involves ensuring that the paper is written in the house style of the journal, that it is consistent and unambiguous, that illustrative material meets the required standard, and that the references are accurate. Many journals will immediately return manuscripts to the authors where references either are...
Dear Margaret,

Re MS 421 – GDPs’ Views of Preformed Metal Crowns – Report of a Clinical Trial

Thank you for submitting the above paper to Primary Dental Care. I have now received reports from its two reviewers. They are attached to this letter. As you will see one review was extremely brief. However, you will be pleased to see that both reviewers liked the paper and have recommended that I accept it.

I am happy to do so subject to you and your co-authors agreeing to the following minor revisions or additions, as well as those suggested by the second reviewer:

- Add the words ‘A Group of’ at the beginning of the title.
- Revise the section currently headed ‘Objectives’ such that it is headed ‘Aims’.
- Add a brief explanation of why you did not seek ethics approval for the study.
- Add more detail to the methods section including where the interviews took place, how many sessions there were, how many interviewers were used.
- If there was more than one interviewer, please explain how you ensured consistency.

I am sure that the second reviewer meant to write ‘Care Index’ and not ‘Core Index’ in the suggested amendments section of her report.

Could you please send me a revised manuscript by 31 December 2011.

Best wishes,
Ken

Professor Kenneth A. Eaton
cc: David O’Malley

Figure 3 Example of an editorial letter to the authors.

incomplete or do not conform to the house style, and it is the responsibility of the author(s) to rectify these. For some journals, including Primary Dental Care, it may also involve revising the text to make it easier to read or to emphasise important points. Depending on the extent of revisions, the edited version may then be returned to authors for their approval.

D8. Production of a proof and publication

Once the author(s) has/have given their approval, the paper is laid out in the graphic style of the journal and a proof of all its pages is produced. The proof is checked by the editorial team and a copy is also sent to the author(s) for proof reading. Authors are provided with instructions as to how to submit corrections (this varies from journal to journal) and a deadline for receipt of these. Substantial changes are not generally permitted at this stage and the journal may levy a charge if the author deems such changes necessary. Any errors are reported and rectified. The corresponding author is generally sent a copyright form requiring the corresponding author to assign copyright to the publishing journal. Once this completed form has been returned to the editorial office, the final copy of the paper can be printed. After publication, most journals (including Primary Dental Care) send the corresponding author a PDF file of the paper in its published form. PDF files are provided to ensure rapid dissemination of scholarly work, on the understanding that it should only be distributed in small numbers, by the author(s), for educational purposes and at no cost to those receiving it. The publishers hold the copyright of the paper(s). It is understood that the PDF files will only be used in a manner consistent with the fair use provisions of the relevant copyright laws. Authors may not use them for any commercial enterprise.

E. Presenting results at meetings and conferences

Prior to publishing the results of research, it is usual to present them at a national or international scientific meeting that is relevant to the topic of the research. This is not compulsory but is another method for disseminating results. The convention is that only results that have not been published should be presented at such meetings or conferences. Authors must bear this in mind when seeking to publish their results. Such presentations at meetings or conferences, usually present only the ‘highlights’ of the research, either through a poster or a short (no more than 15 minutes, including questions from the audience) oral presentation. Abstracts of such presentations are published in the meeting/conference programme book and often in the journal(s) of the organising society or association.

F. Further resources


References

3. Faculty of General Dental Practice (UK). Primary Dental Care check-list for research papers. Accessed (2011 Dec 22) at: www.rcseng.ac.uk/assets/pdf/pdchck-list-forresearch.pdf

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