Reviewer’s report

Title: Teleradiology in general practice has a positive impact on fracture diagnostics and treatment: a retrospective observational study

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Reviewer: Anne G. Ekeland

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Re: ‘Teleradiology in general practice has a positive impact on fracture diagnostics and treatment: a retrospective observational study’

Jac. JWM Jacobs, Jan PAM Jacobs, Eric van Sonderen, Thys van der Molen and Robbert Sanderman BMC Family Practice Research article

Reviewer Dr Anne Granstrøm Ekeland

This is a research paper. In general it has merit, but it needs to be more stringent and clear about what was investigated, how the investigation was carried out and what the discussion themes were. The coherence between research questions, discussion and conclusion needs to be tightened.

I have considered and responded to the points below and divided my comments into the following categories:

Discretionary Revisions (DR) (which are recommendations for improvement but which the author can choose to ignore)

- Minor Essential Revisions (MER) (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

- Major Compulsory Revisions (MCR) (which the author must respond to before a decision on publication can be reached)

1. Is the question posed by the authors well defined? (MER)

The study is designed to include documentation of certain outcome measures in 2006 and 2009, and to compare differences after the introduction of teleradiology in general practice. There is not a specified research question. The word impact is used in the abstract, and outcome is used in the introduction. It is important to use concepts in a consistent way. The paper could profit from posing a clear research question which also would help structure the discussion according to main question and sub questions.

2. Are the methods appropriate and well described? (MCR)

In the Methods section under the headline Study design, the investigation is described as a retrospective observational study. I do not think these concepts cover what was done. What exactly was observed in this study? If these concepts are to be used in the article, they have to be defined and explained. In my view, this is rather a pragmatic study of certain intervention and outcome data
as entered in, and extracted from a patient database, compared in time before and after the introduction of teleradiology to a GP practice. It is thus secondary data that were used and not direct observations.

The following headline in the Methods section: “Diagnosis and treatment” might be replaced by for instance: “Study population, data collection and material”. The number of patients who were phoned should be presented, as well as the questions they were asked.

There is confusion as to whether informed consent was necessary or not. In the Methods section, under the headline Study design, the authors state that informed consent was not necessary. Under the headline Diagnosis and treatment in section three, they state: after informed consent….

3. Are the data sound? (MCR)
The data are the teleradiology facility and its use, as well as information extracted from the patient database in 2006 and 2009, complemented with telephone interviews of patients in cases where data had not been entered into the database. The data per se might be sound, but the soundness is not evident from the description. What does the use of secondary data imply? Why is it called an observational study? What is observed?

The differences in outcome run parallel with the introduction of teleradiology. In order to be able to judge whether the introduction of teleradiology was the reason for the differences in outcome, the study should ideally have been designed as a controlled study where the interventions were very clearly specified and confounding variables also were examined and discussed. Confounding variables might for instance be: were the GP(s) the same person(s) both times, did he/she undergo training or have more experience the second time, were there other changes occurring at the same time which might have influenced the outcome? How can the authors decide that the differences in outcome were caused by the use of teleradiology? These issues are not adequately addressed in the paper.

4. Do the figures appear to be genuine, i.e. without evidence of manipulation?
Yes

5. Does the manuscript adhere to the relevant standards for reporting and data deposition?
The reporting is structured according to standards for reporting.

6. Are the discussion and conclusions well balanced and adequately supported by the data? (MER)
I think the discussion could be more focused and better defined. What are the main subject areas? Do the research questions include a comparison of the positive diagnoses, treatment, number of x-rays, missed fractures and unnecessary hospital referrals before and after the introduction of teleradiology? As it appears, the two latter are not investigated per se. Nevertheless these
variables are highlighted in the summary and in the conclusion. In the conclusion, a point is also made about the relatively larger number of x-rays used in teleradiology. This issue should either be discussed as an unexpected finding or included in the research question. What do the authors make of this finding?

7. Are limitations of the work clearly stated? (MER)
   The discussion of the strengths of a controlled study versus a pragmatic study could be stronger.

8. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished? (MER)
   Yes, partly. It is a weakness that the authors have not specified search criteria and databases for the literature used to compare their findings.

9. Do the title and abstract accurately convey what has been found? (MER)
   I think the title could be improved, that is, it could be more precise according to the content of the paper. For instance: fracture diagnostics, travel and treatment: a comparative study before and after the introduction of Teleradiology in general practice. In the introduction, these issues could be specified, for instance: fracture diagnostics include: number of positive fractures, missed fractures etc…

10. Is the writing acceptable? I am not a native English speaker, but the language seemed fine.

   **Level of interest:** An article whose findings are important to those with closely related research interests

   **Quality of written English:** Acceptable

   **Statistical review:** No, the manuscript does not need to be seen by a statistician.

   **Declaration of competing interests:**

   I declare that I have no competing interests