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Editorial comment

Systematic reviews—Great gains and significant pitfalls

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1. Systematic reviews are important

Systematic reviews have become very popular and productive form of publishing within medical science. They are considered the top of hierarchy of medical evidence. Systematic reviews provide clinicians with tools for evidence-based practice. They are utilized in producing national and international clinical guidelines, decision-making of reimbursement policies and other health care decisions. This places a severe responsibility to all involved in production and publication of systematic reviews since they do not come without problems and they do not provide us with the final truth – for several reasons.

2. Many problems with systematic reviews

There may be significant problems with the primary studies e.g. they may be small, few in number, clinically heterogeneous, of poor quality, or lacking in internal and external validity. In addition, the review process carries its possible problems. Search strategy, study selection, assessment of study quality and bias, selection of outcomes and decisions on data pooling are all points where the authors will have to make choices between alternatives and therefore there is always the possibility of bias. Rarely is a result from a clinical study or systematic review so clear that it does not need any interpretation. The results need to be evaluated in light of study population, design and limitations, and previous information on the topic. This goes for both clinical trials and systematic reviews. We all are human and therefore more or less susceptible to *confirmation bias*, or in other words, we like studies and conclusions that support our own views, we do not like those papers that go against our own convictions.

3. Performing a systematic review is labor-intensive

A systematic review is an exhaustive summary of literature relevant to the topic in question. Performing a good quality systematic review is demanding and time consuming. A systematic review should always be based on a rigorous protocol that is followed and the progress of the process documented with equivalent rigorousness and transparency. It is important that authors conducting a systematic review have in-depth knowledge on the clinical problem and methodology of systematic reviews. Several guidelines and checklists have been developed in order to improve the quality of performing and reporting of systematic reviews and meta-analyses, e.g. the *PRISMA* statement and the *Cochrane Handbook for Systematic Reviews of Interventions* [1–3].

4. Systematic reviews of adverse effects are unreliable due to poor reporting

Adverse effects are the other side of the coin of any treatment. In most analgesic studies, analgesic efficacy is the main outcome and it is also used for power calculation. Adverse effects typically occur less frequently than analgesia and their true incidence is difficult to calculate reliably. Systematic reviews can be used to pool large amounts of data to partly overcome this problem. However, the incidence and severity of adverse effects are often poorly studied and reported in clinical trials [4,5], and even systematic reviews cannot overcome the problem in absence of reliable original data.

5. Systematic reviews provide ideas for research projects

In addition to generating evidence for clinical and administrative purposes, systematic reviews have their place also in providing ideas and material for future clinical trials and developing trial methodology. Sometimes a systematic review concludes that more randomized trials are needed in order to make firm conclusions about efficacy of a particular treatment. As such, this conclusion does not take medicine much further. However, if we look at the systematic review as an overview what has been tried and what is known about a particular condition or treatment modality, we can use this information to develop a research question and a protocol for new clinical trial. In fact, it has been suggested that a systematic review should form the basis or starting point of new Ph.D. projects and large grant applications. It is a suggestion that I warmly support. Performing a systematic review is also excellent training in planning and reporting own clinical trials.

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6. Systematic reviews of methodology, on average data, or on individual patient data

Systematic reviews that do not aim in directly evaluating clinical efficacy of a given treatment but concentrate in exploring methodological aspects of studies are important for evolution of trial methodology and reporting [6–8]. One significant problem with existing systematic reviews is that they are often based on available average data retrieved from original clinical trials. However, clinical responses in pain are often skewed and using individual patient data instead of mean data in systematic reviews will give more reliable and useful results [9,10].

7. Evaluation of qualities of systematic reviews

There are also checklists for structured evaluation of published systematic reviews [11]. These may be useful especially for those readers who are not yet familiar with the methodology of systematic reviews. A lazy reader may skip the paragraphs describing the methodology of the review at hand and thereby may be in grave danger of making false conclusions on the results and generalization of the findings. Therefore, there are responsibilities also for users of systematic reviews.

8. How to read a systematic review

Important aspects to consider while reading a systematic review include selection of the databases and search strategy, inclusion and exclusion criteria, estimation of bias, evaluation of study quality, pooling of data. The results and conclusions of a systematic review must always be interpreted with respect of the data they were produced from. One of the challenges in reporting systematic reviews is to provide the readers enough transparency and information on these important steps in a concise and informative way.

9. Systematic reviews can be used as one of several tools to find the truth

Systematic reviews offer one tool alongside other research tools to increase our knowledge in medicine. They do not give us the final truth – for several reasons listed above – nor are they an automat for easy answers but they can be valuable tools in developing clinical management of patients and also by moving trial methodology forward. In optimal situation, clinical trials and systematic reviews support each other by giving ideas and knowledge to the next step of research.

10. A well-done systematic review in this issue: treatment of chronic pelvic pain

In this issue of the *Scandinavian Journal of Pain* Loving et al. [12] report their systematic review on efficacy of various physiotherapeutic treatments of female chronic pelvic pain. They found ten studies with highly variable outcomes. Their review provides an overview of the literature available on the topic. The conclusions from this review are limited. Based on the review there is no really proven intervention for this condition but clinicians have the available data presented and can make their own judgment what treatments they might want to consider to try for their patients. In addition, interventions investigated so far are nicely outlined and provide a good starting point for planning next clinical trial(s) on this problematic pain condition. I sincerely hope that clinicians and researchers will take up the challenge from this review and start planning future studies on this still very little investigated problem.

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