Pacific Rim International Journal of Nursing Research

Editorial: Steps in Conducting Systematic Review: It is Simple but Not That Easy

In the last editorial of this Journal I emphasized the importance of conducting a systematic review before one wants to start to do research, develop practice guidelines or interventions, or undertake policy making. The characteristics of a systematic review were also addressed. The systematic approach is quite different from other types of literature reviews such as traditional or integrative reviews. The purpose of this editorial is to keep the reader learning more about how to do a systematic review in standardized and practical way.

At least two reviewers are required to conduct systematic reviews and one of these needs to be specially trained since training to do systematic reviews is a "must" for anyone who wants to produce a good, high standard review. Although it can sometimes be tedious work, the effort required helps to produce a review that could be serve as a good resource for researchers, practitioners, educators, clinicians, and policy makers. There are organizations that devoted themselves to develop software to ease this process, that is, the Joanna Briggs Institute (JBI)[1], and the Cochrane Collaboration[2]. However, a reviewer needs to be trained comprehensively before using such software.

The steps in doing systematic reviews are quite similar among these organizations. Some may state that it is consisted of only 5 steps[3], but some may elaborate more in terms of the detail of action steps[4]. A good systematic review is protocol driven, that is, to make the review explicit and audible, a protocol needs to be developed beforehand it. This protocol will be serve as a basis for the research proposal and will guide reviewers step-by-step in the review. What protocol differs from the completed review is that there is not yet the result and interpretation of the result. Therefore, steps in doing the systematic review should be identical between the protocol and review report.

To make it simpler for the novice reviewer to follow each step, a practical example will be given. The steps in conducting systematic review, can involve: 1) formulating the review question, 2) defining inclusion and exclusion criteria, 3) locating and selecting the study, 4) appraising the quality of the studies under review, 6) extracting data, 7) analyzing data, and 8) presenting result, interpreting and making recommendations. This editorial will address the first 4 steps, and in next issue the remaining steps will be described.

1. Formulating the review question

This is a very first important step when one starts to write the protocol of systematic review. A good review question can lead to a clear protocol and good review. The review question can be formulated using the so-called PICO/ or PICo[5]. This mnemonic stands for population (P); the intervention that you want to evaluate (I); the phenomenon of interest for the qualitative evidence, or comparative outcome that you want to compare with for the quantitative evidence (C); and the outcome that you focused on (O). If it is the review of qualitative evidence, "Co" stands for context of the phenomenon of interest.

An example of a review question for the quantitative evidence that reflects PICO could be: "What is the effectiveness of family intervention compared with standard care for psychological well-being of caregivers of persons with schizophrenia?" The population (P) is the caregivers of persons with schizophrenia. The intervention (I) is family intervention, and the comparable (C) is standard care. The outcome (O) is psychological well-being. An example of a review question for qualitative evidence that reflects PICo could be: "What is the caregiver's experience of living with and caring for a person with schizophrenia in the home setting?" The population (P) is caregiver. The phenomenon of interest (I) is the experience of living with and caring for person with schizophrenia. The context (Co) is the home setting.

2. Defining inclusion and exclusion criteria

The next step is to define the inclusion and exclusion criteria for the review. If reviewers have a clear review question that reflects PICO/PICo at the beginning, inclusion and exclusion criteria are easier to identify. The aim of the review is to pull all homogenous studies together to produce the effect size or the measure of intervention to the outcome for quantitative evidence, or to synthesis the data to get the synthesis statement for qualitative evidence. Therefore, PICO/PICo reflects the inclusion criteria of the review, which refers to those primary research studies that were conducted with similar populations and interventions and so outcomes that can be compared. For qualitative evidence, inclusion criteria refer to analyzing and comparing those studies that explored similar population, phenomenon of interest, and context under study. The year of publication and the languages as well as type of study should also be stated in the inclusion criteria. The exclusion criteria are that which the reviewers define at the beginning to exclude the primary research that might meet PICO or PICo but contain some nuances. Using the example of review question above, those studies that were conducted with caregivers of persons with diverse diagnosis rather than schizophrenia would be excluded. The exclusion criteria are very important to ensure that homogenous studies are compared, helping to produce a highly valid review.

3. Locating and selecting the study

The search for evidence or primary study should be as extensive and comprehensive as possible. In this step the reviewers need to decide which data bases will be searched for primary research or evidence, and the keywords for searching. The located resources should reflect the journals or other literature sources that published on the relevant topic. The publication time, length and language of the publication need to be identified as well. Generally, 10 years is the time period recommended, however, this could be flexible if a good reason is identified. For example, there might be a limit to the number of primary studies related to specific topic so that the year of publication can be extended beyond 10 years. The two data basis that are good to begin with for health science literature are MEDLINE and CINAHL. Other databases need to be added to make the searching comprehensive. Hand searching needs to be done for unpublished literature or 'grey' literature. Once the reviewers obtain the relevant studies identified by the keywords based on PICO/PICo, it is a time to look at the list of the studies by title and abstract. Two reviewers need to select study the located literature independently to avoid bias. Duplicated studies need to be identified and deleted from the list before going to the next step of study selection, which must be done systematically. Duplicated studies are normally found when reviewers search from many databases, for instance, when searching MEDLINE and EMBASE one may find these normally contain of 60% of studies duplicated[6], and so the reviewers need to select the studies based on the inclusion/exclusion criteria. For all studies selected, the reasons for inclusion or exclusion need to be documented. The final study selection is then used to track down the full document to prepare for the next very important step of critical appraisal of the quality of the studies.

4. Appraising the quality of the studies

Critical appraisal of the quality of the studies selected to be included in the review is crucial for a good systematic review. Presently, there is tremendous amount of research study/evidence, especially when one includes searching of on-line and open access journals in a review, however, not all of this literature is of high quality[6]. Combining the results of poor quality research may lead to biased or misleading estimates of effectiveness of the research result. Therefore, papers that are selected based on the inclusion criteria need to be appraised of their quality independently by at least two members of review team. To do this, reviewers need to apply a standardized tool for appraisal, such as JBI-appraisal checklists and Cochrane risk of bias tools. The reviewers need to practice using these prior to engaging with them on the review, and agree on those studies that are to be included. The aim is to include only studies that are high quality and exclude those not meeting the review standards and are of poor quality.

To achieve this process professionally, the reviewers must have a strong background in research design, otherwise, they will not be able to evaluate good from poor research and it will be difficult for them to make decisions when going through the questions or criteria posed by the appraisal checklists/tools accurately and with confidence. Nowadays, there some reviews are conducted by students. In this case, close supervision by a professor or mentor must be undertaken to ensure a good background and understanding of relevant research design and a quality review.

In conclusion, the four first steps of a systematic review are really critical and involve decisions made by the reviewers regarding what studies to include or exclude based on explicit review questions, the data sources where reviewers can search for studies thoroughly, and the process of study selection and quality appraisal. These decisions are fundamental to the outcome of the production of a high quality systematic review. In the next issue, data extraction, interpretation and analysis will be addressed.

Patraporn Tungpunkom, RN, Dip. APPMHN, PhD, Director, Thailand Centre for Evidence Based Nursing, Midwifery and Health Science, Faculty of Nursing, Chiang Mai University, Chiang Mai, Thailand, 50200 Email: patraporn.t@cmu.ac.th

Reference

1. Joanna Briggs Institute. Home page. (cited November 22, 2014). Available from: http://joannabriggs.org/
2. The Cochrane Collaboration. Home page. (cited November 22, 2014). Available from: http://www.cochrane.org/
3. Khan, K., S., Kunz, R., Kleijnen, J., & Antes, G. Five steps to conducting a systematic review. *Journal of the Royal Society of Medicine.* 2003 96 (3): 118-121.
4. Pearson, A., Weeks, S., &Stern, C. *The JBI Model of Evidence Based Healthcare.* Philadelphia, Lippincott, Williams and Wilkins; 2011 pp 1-96.
5. Janna Briggs Institute*Joanna Briggs Institute Reviewers' Manual: 2014 edition.* The Joanna Briggs Institute. The University of Adelaide South Australia; 2014 pp. 1-189.