Critical Appraisal of Research Evidence at a Glance

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Each year, hundreds of medical journals publish thousands of reports of research studies (1). As the medical profession evolves and studies on the prevention, diagnosis and treatment of diseases are published, it is crucial to be able to recognize and differentiate the best available evidence (2). When reading any research, it is important to remember that there are "three broad areas to be considered: validity, results and relevance" (3). Health care professionals are increasingly required to base clinical decisions on the best available evidence (4). The term "best evidence" emphasizes the fact that it is the quality and not the quantity of evidence that is of crucial significance (5).

The concept of evidence based medicine (EBM), defined as the "integration of best research evidence with clinical expertise and patient values" (4). It brings together relevant and robust data by systematically obtaining, analyzing, and transforming research findings into clinical, management, and policy grounds (6). The five steps of EBM are formulating a clinical question using PICO tools, searching for evidence, critical appraisal of the literature, applicability of evidence and finally evaluating the new or amended practice (4, 7). In other words, eevidence based medicine includes appraising studies critically, synthesizing research findings and applying rigorous scientific evidence in practice (8).

The critical appraisal of research studies involves a watchful, systematic, unbiased, careful examination of all aspects of a study to judge its meaning, merits, significance and limitations as well as its trustworthiness, value and relevance in a particular context (2, 6), in order to direct professionals in their critical clinical decision making (9). Critical appraisal is a crucial step in the process of putting research into practice. Asking questions about the methodology of a study, scrutinizing its procedures of data collection and analysis, and assessing the way of its findings' presentation will help researchers to determine whether the conclusions should influence practical decision-making (5).

The advantages of critical appraisal is to battle information overload, identifying research studies that are clinically important and continuing professional development (CPD) (7). A few of the instances in which using critical appraisal is important include conducting literature reviews for research proposals; evaluating the costs and benefits as well as effectiveness of health programs; designing new health programs; implementing health policies; and public health decision making, especially at the senior management level (5).

To conduct a critical appraisal it is required to have a previous research experience, knowledge of the topic, asking good searching questions, careful examination of the research process, a background in analysis and the skills in logical reasoning to examine the credibility of the study (8). Conducting critical appraisal can occur through a non-structured approach where the study is critically appraised when it is being studied, or through a structured approach by using a series of critical appraisal tools (CATs). CATs are structured checklists that allow individuals to check the methodological excellence of a study against

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agreed criteria. An advantage of using CATs is that a level of consistency could be applied through reviewing a number of studies. However, a potential disadvantage is that they may not ask about the potential sources of bias which is significant for the specific research questions (10).

To critically appraise a journal article, it is required to start by assessing the research methods used in the study. This could be carried out using critical appraisal checklists which are specific to the study designs. The checklists which are commonly used to appraise various quantitative and qualitative designs could be retrieved through on-line resources including CASP (The Critical Appraisal Skills Programme), CEBM (Centre for Evidence Based Medicine), SIGN (Scottish Intercollegiate Guidelines Network), EQUATOR (Enhancing the Quality and Transparency Of health Research), SURE (Specialist Unit for Review Evidence), best BETs (Best Evidence Topics), JBI (Joanna Briggs Institute), NIH (National Heart, Lung and Blood Institute), Gate CAT (Graphic Appraisal tools for Epidemiological studies), NICE (The National Institute for Health and Care Excellence), EBM Toolkit (Alberta University Evidence Based Medicine Toolkit), SCHARR (The School of Health and Related Research) at the University of Sheffield, CLIST (Clinical Librarians Information Skills Trainers) Resources for Critical Appraisal, McMaster Critical Review Form, and HCPRDU (Health Care Practice Research & Development Unit) (7, 11).

Some other checklist are used just for one purpose for instance CONSORT, JADAD, EPOC and PEDro for randomized clinical trials; PRIZMA, AMSTAR, Cochrane and ROBIS to assess systematic reviews, STROBE and Newcastle-Ottawa for cross-sectional, cases-control and cohort studies; STARD and QUADAS for Diagnostic research; MOOS for meta-analysis, COREC for qualitative studies, MMAT for mixed methods**,** AGREE and RIGHT for guidelines, CARE for case reports and SPIRIT for study protocols (7, 10, 11).

To sum up, critical appraisal is an essential skill to assess the merit of clinical research and to identify potential threats to the validity of the research findings through following a systematic approach. Such evidence could be applied to clinical practice, which itself could enhance the quality of care and provide optimum clinical care for the patients.

References

1. Bootland D, Coughlan E, Galloway R, Goubet S. Critical appraisal for FCEM. Florida: CRC Press; 2018 .
2. Al-Jundi A, Sakka S. Critical appraisal of clinical research. Journal of Clinical and Diagnostic Research. 2017; 11(5):JE01.
3. Burls A. What is critical appraisal? London: Hayward Medical Communications; 2014 .
4. Akobeng AK. Principles of evidence based medicine. Archives of Disease in Childhood. 2005; 90(8):837-840.
5. Critical appraisal of research evidence. Ontario Public Health Libraries Association (OPHLA). Available at: URL: http://www.sign.ac.uk/methodology/checklists.html; 2008 .
6. Manchikanti L. Evidence-based medicine, systematic reviews, and guidelines in interventional pain management, part I: introduction and general considerations. Pain Physician. 2008; 11(2):161-186 .
7. Training and clinical information support. University College London (UCL). Available at: URL: https://www.ucl.ac.uk/child-health/support-services/library/training-and-clinical-information-support; 2018 .
8. Drozd M. Burn's and Grove's the practice of nursing research. Appraisal, synthesis and generation of evidence. 8th ed. Philadelphia: Saunders; 2017.
9. MacInnes A, Lamont T. Critical appraisal of a research paper. Scottish Universities Medical Journal. 2014; 3(1):10-17 .
10. Critical Appraisal Tools. University of South Australia. Available at: URL: https://www.unisa.edu.au/research/Health-Research/Research/Allied-Health-Evidence/Resources/CAT/; 2018 .
11. Network EQ. Enhancing the quality and transparency of health research. Available at: URL: www.equator-network.org; 2014.