

# Evidence Based Practice - What is Evidence?

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**Abstract:** *Evidence based practice provides clinicians a method to implement scientifically proven and appraised evidence in making clinical decisions during healthcare delivery. Findings from research, knowledge from basic science, clinical knowledge and expert opinion are all regarded as evidence. In line with evidence based hierarchy there has been extreme emphasis on clinical controlled trials. However, observational studies can make a great contribution in evidence based practice especially in palliative setting. This article briefly discusses evidence based practice and considers research evidence in nursing practice and palliative care.*

**Keywords:** evidence based practice, observational studies, clinical trials, clinical judgement, research questions, finding the evidence, improving practice

## 1. Introduction

Evidence based practice is the integration of clinical expertise, patient values and the best research evidence into the decision making process for the care of the patient. Clinical expertise refers to the clinician's cumulated experience, education and clinical skills (Sackett, 2002). The patient brings to the encounter preferences and unique concerns, expectations and values. Mostly, the best research evidence is usually found in clinically relevant research that has been conducted with the appropriate method.

Since evidence based practice is patient centred, the onus lies on the clinician to interpret best current evidence from systematic research in relation to an individual patient, including the patient's preferences, environment, culture and values regarding health and well-being. How to ask the appropriate research question, how and where to look for and appraise the evidence, implement the evidence bearing in mind the patient's preferences and clinician's experience and evaluating outcome of implementation is of critical importance to quality healthcare delivery. Thus, as clinicians it is imperative that every effort must be made to understand and appreciate the essence of evidence based practice during healthcare delivery.

## 2. Evidence-Based Practice

Sackett, Strauss, Richardson et al. (2000) stress that evidence-based practice (EBP) is the integration of best research evidence with clinical expertise and patients' values to optimize clinical outcomes and quality of life. EBP also allows the scrutinising of practice for effectiveness and often results in practice changes that allow significant cost savings or justify necessary additional expenditure (Courtney and McCutcheon, 2010). With increasing demand for quality healthcare and accountability by consumers, EBP is a necessity (Evans and Pearson, 2001).

Practitioners' interest in changing practice and EBP may be stimulated by awareness of patients' preferences and dissatisfaction, quality improvement data, practitioner queries, evaluation data or new research data (Rosswurm and Larrabee, 1999). In order to find the evidence, it is emphasized by Courtney and McCutcheon (2010) that practitioners first need to know the type of question to ask.

The PICO (Patient population, Intervention, Comparator, Outcome) framework has been suggested to be useful in developing answerable research question (Stone, 2002; Fineout-Overholt, Melynck, and Schultz, 2005). However, in questions that do not have explicit comparison, the PIO can be used (Polit and Beck, 2010). The next part of the EBP process involves searching for the best clinical evidence; critically appraising that evidence in terms of its validity, clinical significance and usefulness; integrating the evidence with clinicians' expertise, patient preferences and local circumstances and finally, evaluating outcome after implementation of the evidence (Fineout-Overholt et al., 2005).

At the core of EBM is an evidence hierarchy (fig 1) which reflects the methodological strength of scientific studies (Borgerson, 2009). The Oxford Centre for Evidenced-Based Medicine (2001) places systematic reviews of relevant randomised controlled trials (RCTs) and individual RCTs above cohort studies which are in turn ranked above case control studies and case series. These approaches are in turn positioned above expert opinion and bench research. Thus evidence provided by systematic reviewing relevant RCT's provides the highest quality of evidence on the hierarchy.

However, as Timmermans and Berg (2003) have argued, too much emphasis on experimental evidence could devalue the tacit but important knowledge that is accumulated with clinical experience. They also questioned whether findings from average results in clinical studies could inform decisions about real patients who may differ from those included in research trials. Khan, Kunz, Kleijnen, et al., (2003) note that randomised controlled trials may not have been conducted for an issue of clinical interest, meaning that if other research designs are ignored, then little or no evidence may be generated to enhance clinical decision making.

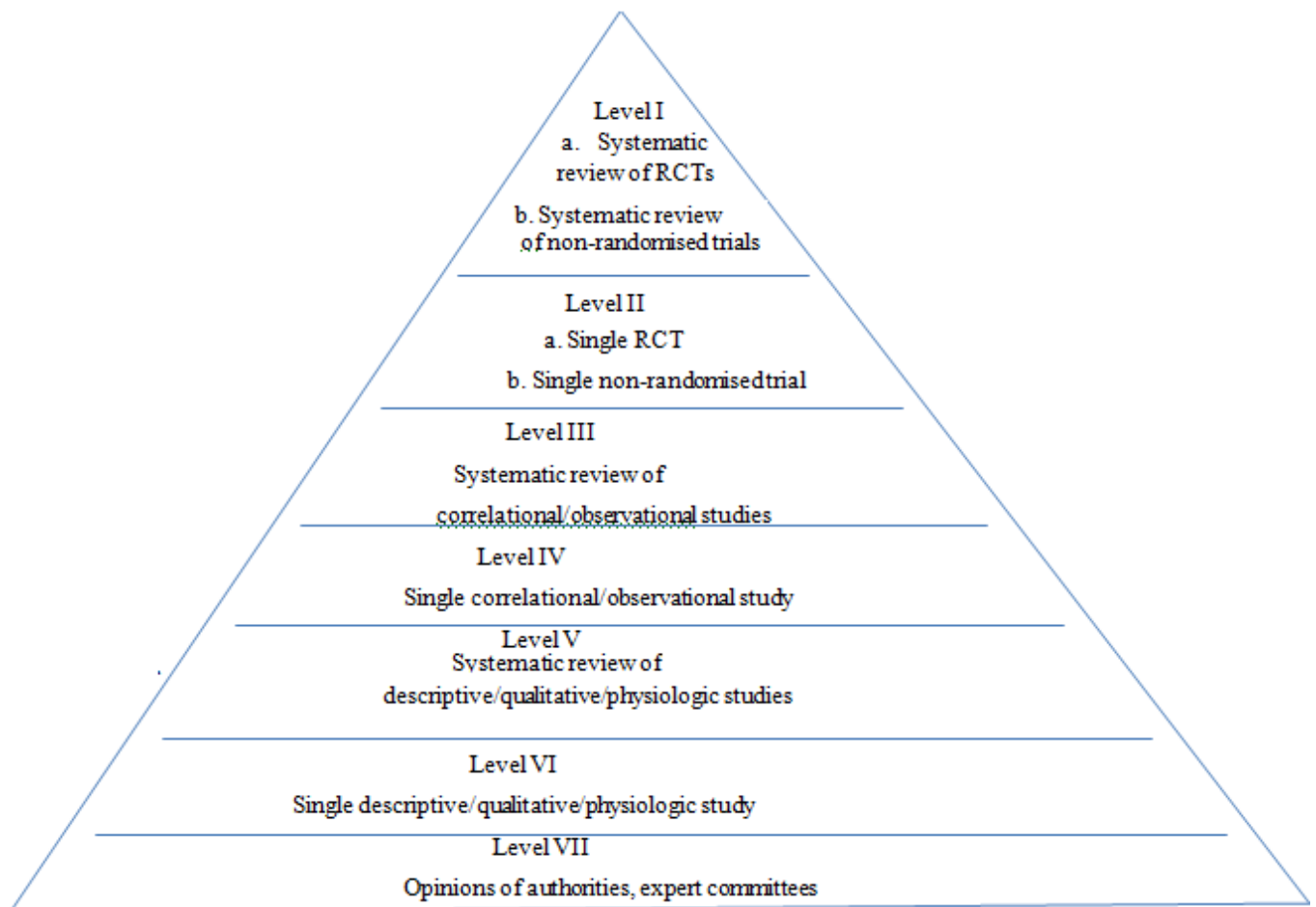
For instance, in the field of palliative care, the gold standard research design, RCT, may not be appropriate, adequate or even possible (Carlson and Morrison, 2008) and or unethical. The difficulties in conducting RCTs in palliative care include obstacles to recruiting patients and family members, gate-keeping by physicians, cross-over contamination, high attrition rates, small sample sizes and limited survival time (Carlson and Morrison, 2008). These

are perhaps some of the contributors to previous reviewers' findings that no RCT's in malignant ascites palliative drainage interventions have been conducted (Keen et al., 2010; Fleming et al., 2009).

In such circumstances, the inclusion of observational research e.g. cohort studies, case-control studies and case series within reviews is vital to building the evidence base and identifying the best practice in the field of palliative care. However, since observational studies draw inferences about the effect of an 'exposure' or intervention on subjects who usually receive an intervention based on individual preferences and practice patterns (Mamdani, Sykora, Normand et al., 2005), there could be an alternative explanations for study results (Carlson and Morrison, 2008). The reason is that in observational studies, there are potential confounding and selection bias that results from lack of randomization of participants to intervention (Carlson and Morrison, 2008). Therefore, differences in

outcome observed cannot be assumed to result from the intervention.

Nevertheless, although RCTs may reveal effectiveness of an intervention in a given context, they are limited in providing explanations as to why the intervention has been effective (O'Halloran, Porter and Blackwood (2010) whereas observational studies may offer some explanations. It is worth noting that observational studies have thus been included productively within prior systematic reviews. For example, a review investigated the effectiveness of bicycle helmets in reducing head, brain and facial injuries and finding no RCT's, included case-control studies in the review (Thompson, Rivara and Thompson, 1999). The five included studies showed a significantly decreased likelihood of head and brain injury during a bicycle crash with helmet use (Thompson et al., 1999). Thus, Thompson and colleagues' review, although from observational studies, provided evidence that helmet use has a protective association for head and brain injury.



**Figure 1:** Evidence Hierarchy: levels of evidence regarding effectiveness of an intervention (Polit and Beck, 2008)

## 2.2 Systematic Review in Evidence-Based Practice

The continuous and cumulative growth of knowledge developed through research and the current demands for EBP have resulted in the need to collect, analyse and summarize knowledge about previous research. Several methods can be used to review research evidence depending on the focus of interest in the collection and assessment of this research knowledge and systematic review is one of

such methods (Urta Medina and Pailaquilen, 2010). Systematic review involves systematic and comprehensive search for, and critical assessment and synthesis of all relevant studies on a specific topic (Greener and Grimshaw, 1996). Thus, the designs and characteristics of primary studies are evaluated, data is synthesized, results are interpreted and conclusions are made based on rigorous critical appraisal system. Systematic review is therefore regarded as core to facilitating EBP. A robust and credible

systematic review is rated as the highest form of evidence for decision making in clinical practice (Australian National Health and Medical Research Council 2009).

Systematic reviews differ from traditional reviews in that they involve a formal process that is transparent and reproducible. Traditional reviews on the other hand lack this explicit method, strict definitions and or standardized techniques (Egger and Smith, 2001). It has therefore been argued that traditional literature reviews are more subjective, making them liable to bias (Egger and Smith, 2001).

By comprehensively summarising multiple studies, systematic reviews provide health personnel with up to date summaries of existing and new research findings for clinical practice. They also inform production of practice guidelines by health policy makers (Egger, Smith and O'Rourke, 2001). In addition to providing reliable and relevant knowledge, systematic reviews encourage learning among trainee health professionals because they reduce the time and effort that may be involved in reading the many proliferated primary studies (Badget, O'Keefe and Henderson (1997). Researchers can also identify, justify and refine hypothesis as well as avoid drawbacks of previous studies through systematic reviews (Mulrow, 1994).

There are, however, significant drawbacks to systematic reviews. For example, they are time-consuming and require expertise in both the subject area and review methods without which inaccurate conclusions may be reached. Also, since quality and reliability of evidence generated from systematic reviews are dependent on quality of results from contributing primary studies (Garg, Hackam and Tonelli, 2008), poor quality of primary studies and publication bias may produce unreliable results for systematic reviews (Egger, Dickersin and Smith, 2001).

Perhaps a more significant pitfall is that in healthcare, most systematic reviews have concentrated on trials, preferably RCTs with much emphasis on efficacy of interventions. On the other hand, descriptive observational studies have not found much room in systematic reviews. This means that for domains of healthcare such as nursing, where few relevant RCTs exist to inform practice, many conventional systematic review approaches and completed reviews have little relevance (Urta Medina and Pailaquilen, 2010).

This suggests that to answer many of the questions relevant to nursing and indeed palliative care, alternatives to conventional Cochrane type systematic reviews of RCTs can afford some of the benefits of systematic reviews.

### 2.2.1 Steps in undertaking systematic review

The steps in the systematic review process involve formulating the question, defining inclusion and exclusion criteria, searching literature, assessing the data, analysing the data and presenting the results (Holopainen, Hakulinen-Viitanen and Tossavainen, 2008; Egger and Smith, 2001). The formulation of the question starts the systematic review (Egger and Smith, 2001). A good clinical question should include the type of patients investigated, the intervention under analysis, comparative interventions and outcomes of interest (Urta Medina and Pailaquilen, 2010). These

components direct the subsequent steps of the review process and give focus to the selection process.

After clarification of the elements that appropriately reflect the research question, detailed criteria to select the research studies are articulated (Egger and Smith, 2001). Ideally, two independent reviewers should select studies, appraise them and extract data from those that meet the set criteria with standardised data extraction form in order to avoid errors or biases (Egger and Smith, 2001). However, one researcher may extract the data, with independent verification by a second researcher for accuracy completeness (Centre for Reviews and Dissemination, 2009). Also, it may be necessary to tailor the data extraction form to the focus of the review (CRD, 2009).

After data is extracted from included studies, primary results are condensed for the sake of additional analysis. This stage involves organizing, categorizing and combining data obtained to respond to the problems or questions (Urta Medina and Pailaquilen, 2010). Meta-analyses are, sometimes, used in the analysis and presentation of results in systematic reviews (Polit and Beck, 2008). Meta-analysis refers to statistical analysis of results from individual studies with a view to integrating findings into one simple and generalizable finding (Lynn, 1989). Hence, meta-analysis can be used to combine the results of small studies, individually lacking statistical power, but which produce conclusive results when combined. However, when the best evidence available does not come from RCTs or studies cannot be combined in a meta-analysis, then a broader narrative analysis may be an alternative (Urta Medina and Pailaquilen, 2010).

In conclusion, systematic reviews play a fundamental role in informing healthcare, policy and practice, substituting primary studies as a source of evidence to support decision making (Petticrew and Roberts, 2005). Since systematic reviews represent the gold standard of research summaries, it is important that they are capable of representing all types of health research. Reviews of RCTs and quasi-experimental designs are optimal in relation to the standard of evidence. However, in their absence, a narrative synthesis of existing evidence can be valuable to EBP (Urta Medina and Pailaquilen, 2010).

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