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Feature Article

The process of evidence-based practice in occupational therapy: Informing clinical decisions

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As we move into the 21st century, there are increasing demands placed on occupational therapists to ensure their practice is based on sound evidence. Evidence-based practice is an approach to clinical decision making that has gained considerable interest and influence during the last decade. This article describes and explains the process of evidence-based practice and its application to clinical occupational therapy practice. Directions for resources that may assist therapists' self-directed learning are also provided. As health care becomes more evidence-based, awareness of the principles, skills, and resources for evidence-based practice is of relevance to all occupational therapists.

Key Words *clinical decision making, evidence-based practice.*

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INTRODUCTION

The demand for maximum quality of care, combined with the need for prudent use of resources has increased pressure on health care professionals to ensure that clinical practice is based on sound evidence. Changes in treatments, an exponentially increasing volume of research information, and increasing expectations from clients to provide the best care possible, place high demands on therapists to maintain a service that is based on current best evidence. This article outlines the process of evidence-based practice as a means for informing the clinical decisions made by occupational therapists.

The phrase 'evidence-based medicine' originated in the 1980s as a way of describing

the problem-based learning approach initiated at McMaster University medical school (Bennett, Sackett, Haynes, Neufeld, Tugwell & Roberts, 1987). 'Evidence-based practice' and 'evidence-based health care' are phrases that have since been used to represent the concepts and principles encompassed by evidence-based medicine, but are applicable to the broader health care context.

Evidence-based practice has been defined as 'the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients' (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996; p. 7). It has been described as a process that synthesizes clinical expertise, with the best evidence available from systematic research, and the values and preferences of patients. Sackett, Richardson, Rosenberg and Haynes (1997) emphasized that it should build on and reinforce, but not replace, clinical judgement and experience. In this sense, research evidence is just one factor informing clinical decision making.

A FRAMEWORK FOR EVIDENCE-BASED OCCUPATIONAL THERAPY PRACTICE

The process of evidence-based practice is essentially the same for occupational therapy as for other health disciplines. However, some differences in its application arise from the differing practice domains and theoretical models used. A framework for the use of evidence-based practice in occupational therapy is presented in Fig. 1, drawing on concepts presented by Bennett and Glasziou (1997), Law *et al.* (1996), and Sackett, Richardson, Rosenberg & Haynes, (1997). This framework presents evidence-based practice as a process that follows a cycle stemming from clinical decisions that need to be made in all stages of the occupational therapy treatment process. Clinical questions are identified that reflect the information needed to make clinical decisions, and which take into account the specific client or group of clients being treated, as well as the context in which treatment occurs.

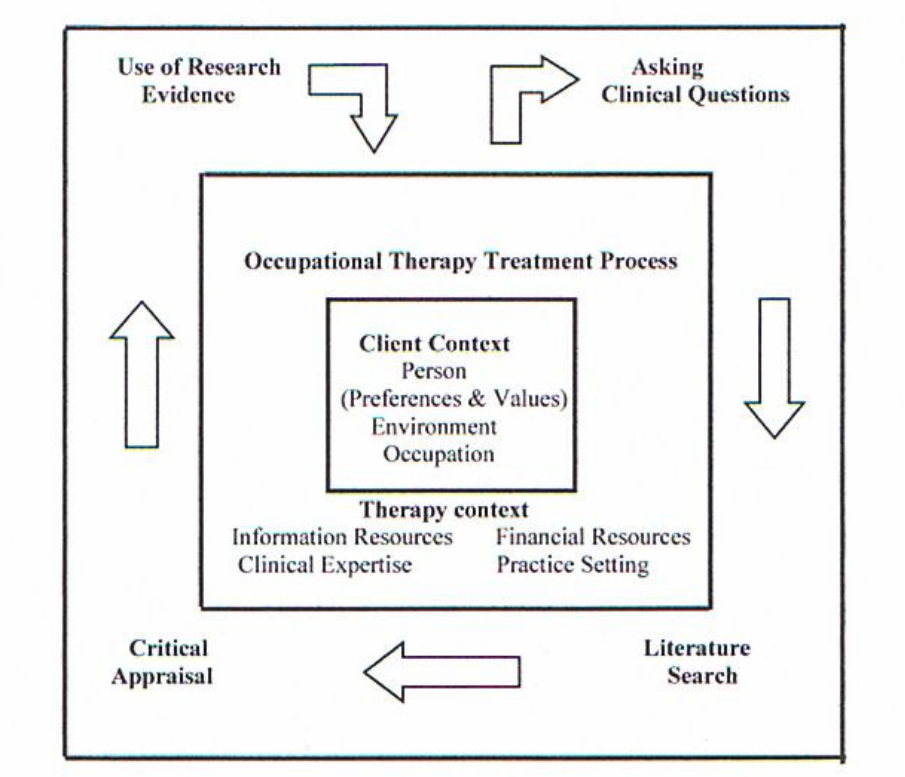


Figure 1. A framework for evidence-based occupational therapy practice.

A literature search is undertaken to identify the best research evidence available to answer the question. As not all studies are well performed, a critical appraisal of the article for its validity and clinical usefulness is important. Perhaps the most crucial aspect of the evidence-based practice process is the use of evidence with the client. Clinical reasoning is used to determine whether the evidence 'fits' with each feature of the client's context (person, occupation and environment). Particular attention should be given to the preferences and values of the client. Consideration must also be given to the practice setting, clinical expertise, and resources available to the therapist. Clients, and where appropriate families or carers, are actively engaged in the decision making process to determine the action to be taken. Although not represented in the framework, evaluation of this process is undertaken to determine improvement in relevant outcomes and to identify factors that will make the process more efficient (Sackett *et al.*, 1997).

ASKING CLINICAL QUESTIONS

Types of questions

There are many times that new information is required when seeing clients in order to resolve clinical problems and make treatment decisions. These questions may relate to a specific client or groups of clients. The types of questions that arise reflect the core clinical tasks of occupational therapy practice. Categories of clinical questions classified by proponents of evidence-based medicine include, but are not limited to, questions concerning diagnosis, treatment/prevention, and prognosis (Sackett *et al.*, 1997). There is some debate over the relevance of these categories to occupational therapy practice (Egan, Dubouloz, von Zweck, & Vallerand, 1998). While these are not always the common labels occupational therapists use to describe elements of practice they are, by and large, still applicable to occupational therapy practice.

Questions commonly emerge concerning the effectiveness and choices of occupational therapy treatments, how treatments are best implemented, and whether there are any associated difficulties. Research evidence can also be used to answer 'prognostic' questions, such as what the likely clinical course, complications, or consequences of a disease, injury or disability may be. Occupational therapists can use this sort of research evidence to help clients understand, plan and cope with their situation.

Questions concerning diagnosis are also relevant for occupational therapists although there are significant conceptual differences to traditional medical diagnosis. Rogers and Holm (1991) refer to an occupational therapy diagnosis as a problem statement that describes occupational status deficits amenable to therapy. Rather than arriving at a label or classification of a disease, as is often the case in medicine, occupational therapists identify deficits in performance components, occupational performance or role performance. Therapists use a range of assessment processes to arrive at an occupational therapy diagnosis including history taking, physical examination and standardized assessment tools. Many questions concerning diagnosis can be answered by dialogue with the client, observation and clinical reasoning. However, there are other diagnostic questions that may be answered by evidence from research that has been performed with similar groups of patients or clients. Such questions include what the most likely occupational diagnoses might be for clients presenting with a particular constellation of problems, or which assessment measures have the highest accuracy.

Questions about what the most common occupational issues are likely to be for specific client populations can be informed by descriptive research, and knowing what the likely concerns or experiences clients may have can be answered by qualitative and descriptive research (Tickle-Degnen, 1999). Although the emphasis of this paper is on the use of evidence-based practice in clinical care, therapists also participate in questions of a non-clinical nature, such as economic or policy issues. Examples of clinical questions relevant to occupational therapy are provided in Table 1. Discussion about what 'categories' of clinical questions are most relevant and reflect the core clinical tasks of occupational therapy practice may help to clarify the process further.

Question formation

When there is a knowledge gap or uncertainty, the need for information can be converted into a clinical question. Explicitly framing a question not only clarifies what to focus on, but it can also expedite the search for answers. Sackett *et al*. (1997) point out that the identification of relevant information for answering a particular clinical question may be facilitated by breaking the question into components including:

1. A client or a problem being considered.
2. A treatment or indicator being considered.
3. An outcome or outcomes of interest you would like to measure or achieve.
4. A comparison (where relevant).

For example, if a therapist was interested in the effectiveness of cognitive behaviour therapy with patients with chronic fatigue syndrome, the question could be phrased:

'Does cognitive behaviour therapy (intervention) improve function (outcomes) in adults with chronic fatigue syndrome (client) compared with standard care?'

When a specific client is being considered, the question can take into consideration the client's context. Aspects of the person, such as the client's values and preferences, knowledge about their environmental context and occupational factors can further influence what information is sought.

Based on the clinical question formulated, a literature search strategy can then be formulated that includes search terms reflecting each component of the question. As it is impractical to search the literature to find answers for every clinical question that arose, a logical approach would be to focus efforts on issues that arise frequently or that fit with the client and therapy context.

SEARCHING THE LITERATURE FOR EVIDENCE

Types of evidence to focus on

The next phase in the evidence-based practice process is to search the literature for evidence that may assist in answering the question posed. The literature search will be focused by the clinical question that has been identified, as well as by the goal of finding the best evidence available to address this question. This raises two important questions that are starting to be debated in the occupational therapy literature. First, what constitutes evidence? Second, what is meant by 'best' evidence?

While evidence for informing clinical decisions may come from various sources including clinical experience, education, textbooks, discussion amongst colleagues and from clients, evidence from well-performed research may be less prone to bias or to the tendency to believe what we want to believe (Tickle-Degnen, 1999). Additionally, information from textbooks or undergraduate training can

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Table 1. Clinical Questions and hierarchies of evidence

Question type (generic questions)	Question examples	Hierarchies of evidence (in descending order for each question type)
Diagnostic tests/ assessments (Which is the best diagnostic test/ assessment to use and how should it be interpreted? What is the sensitivity and specificity of the test?)	§ What is the accuracy of the Beck Depression Inventory for detecting major depression in the elderly?	§ Systematic review of diagnostic studies § Comparison of diagnostic test and reference standard in random or consecutive sample of patients § Diagnostic study without reference standard § Expert opinion
Treatment (Which treatment is the most effective, and will do more good than harm? When is the optimum time to commence treatment? How long should treatment continue for? What are the possible complications of treatment?)	§ For people having chemotherapy, is relaxation training in addition to anti-emetic medication more effective in reducing anticipatory nausea, compared with anti-emetic medication alone?	§ Systematic review of well-designed RCTs OR N-of-1 studies § Properly designed RCT/s § Non-randomized trials, single group pre-post, time series, or cohort study* § Case-control study* § Well designed non-experimental descriptive studies § Expert opinions
Prevention (How can risk factors for a disease/complication/occupational status dysfunction be modified?)	§ Are occupational therapy groups effective for maintaining health and quality of life in independent elderly adults compared with regular social groups?	§ Same as treatment
Prognosis (What is the patient's likely clinical course and possible complications of the condition?)	§ What are the stongest predictors of return to work following mild to moderate traumatic brain injury	§ Systematic review of inception cohort studies § Cohort studies § Case series § Expert opinion
Patients concerns/ issues/ feelings (What are the likely issues, concerns, feelings of this patient group?)	§ What are the major concerns likely to be for an adolescent undergoing dialysis?	§ Systematic review of qualitative studies § Qualitative or survey study design § Expert opinion, including consumers, based on report of expert committees or experience
Economic Evaluation (What is the cost effectiveness, cost-benefit, or cost-utility of various treatments?)	• In clients receiving education following myocardial infarction is group or individual occupational therapy most cost effective?	§ Systematic review of high quality economic studies § Individual economic study comparing all outcomes against costs § Analysis comparing limited outcomes with cost § Analysis without accurate cost measurement § Expert opinion

*Systematic reviews of these study types provide stronger evidence than single studies of the same type.

become outdated. Hence the focus of 'evidence' within the evidence-based practice framework has most commonly been on clinically relevant research evidence, whether it is quantitative or qualitative in nature (Sackett, Richardson, Rosenberg & Haynes, 2000).

Research evidence is most frequently found in peer-reviewed journals as this is where results are first published and where enough detail on methodology exists to make informed judgements on the validity and clinical relevance of the findings (Bury & Jerosch-Herold, 1998). Evidence-based practice focuses on those papers that are clinically relevant, and that use the best methods for each clinical question (Bennett & Glasziou, 1997).

Importantly, the recent position statement of the Canadian Association of Occupational Therapists regarding evidence-based practice highlighted the need to integrate research

information with information from the client and from clinical experience (Canadian Association of Occupational Therapists (CAOT), the Association of Canadian Occupational Therapy University Programs (ACOTUP), the Association of Canadian Occupational Therapy Regulatory Organizations (ACOTRO) and the Presidents Advisory Committee (PAC), 1999).

Hierarchies of evidence

The second issue is what constitutes 'best' evidence. Hierarchies of scientific evidence are available, formulated with respect to the ability of various methodologies to reduce bias (Ball, Sackett, Phillips, Haynes & Straus, 1999). The type of clinical question being asked will determine which research methodology can provide the best evidence, and hence what type of studies to search for (Bennett & Glasziou, 1997). Research using the strongest and most appropriate study design for the question being studied, will provide the best evidence. Hierarchies of evidence are commonly presented for questions concerning treatment alone; however, different hierarchies of evidence exist for other types of clinical questions. Table 1 presents study designs in descending order of methodological rigour, for different types of clinical questions. This has been summarized from a number of sources (Ball *et al.*, 1999; Bennett & Glasziou, 1997; Bury, 1998; Sackett *et al.*, 1997). A more complete collection of levels of evidence that considers different types of questions can be accessed from the following web address: http://www.cebm.net/levels_of_evidence.asp (Ball *et al.*, 1999).

Systematic reviews use rigorous methods to locate, assess, and summarize the results of many individual studies (Glanville & Lefebvre, 2000). When available, appropriate and well performed, systematic reviews can provide the best evidence (Oxman, Cook & Guyatt, 1994).

Considerable emphasis has been placed on randomized controlled trials (RCT) as they can minimize the likelihood of bias in the conclusions of studies addressing treatment effectiveness. However, RCT are not appropriate for answering all types of clinical questions, and other research methodologies may need to be considered, depending on the question concerned (Sackett *et al.*, 1997). For example, while RCT provide strong evidence for the effectiveness of treatments, cohort studies are more appropriate for 'prognostic' questions.

The commonly cited hierarchy of treatment effectiveness, such as that used in the National Health and Medical Research Council (NHMRC) clinical practice guidelines, places systematic reviews and RCT at the top of the hierarchy (NHMRC, 1999). Any adherence to this hierarchy as a dictum for 'best evidence' by external stake-holders can pose a problem for the rehabilitation disciplines. Due to the highly individualized nature of the treatments that are often delivered by occupational therapists, and heterogeneity in the client groups examined, RCT may not always be appropriate (Ottenbacher,1990). Many questions concerning the effectiveness of occupational therapy treatments are more suited to quasi-experimental or single case experimental designs (Johnston, Ottenbacher & Reichardt, 1995). Additionally, in many cases it is simply not feasible to carry out RCT (Guyatt *et al.*, 1986). However, there are biases in these other study designs that should be recognized, and that limit the certainty with which one can state that effects were due to the treatment (Johnston *et al.*, 1995). These biases need to be considered and conveyed in clinical decision making. While such hierarchies can provide useful guidelines, continued discussion within the occupational therapy profession and with external stake-holders regarding the applicability of the 'treatment' hierarchy to occupational therapy is warranted. This issue

has been picked up by the NHMRC who have recognized that in many health disciplines, RCT are often not appropriate, and that these disciplines 'should not be disadvantaged by the rigid application of a hierarchy of evidence' (NHMRC, 1999; p. 14).

Although there is a substantial focus on well-performed quantitative research methodologies as sources of strong evidence, qualitative research is suitable for answering questions concerning how patients experience different illnesses and treatments, or for gaining understanding about the workings of health services (Gray, 1997). Qualitative research can also play an important role in understanding how evidence for treatment effectiveness might be applied to, or received by, particular patient groups (Taylor, 2000).

In summary, 'best' evidence comes from studies with the strongest and most appropriate methodologies for the specific clinical question under consideration.

How to search for evidence

Sources of information are growing rapidly. With millions of new health research articles published each year, methods for focusing on the most relevant information are important. A useful starting point is the use of specialist databases or journals that only include articles that meet a minimum entry standard. Examples of these databases, journals and web sites are listed in Table 2.

One of the most helpful resources is the Cochrane Library, established as part of the Cochrane Collaboration. The Cochrane Collaboration is an international effort that aims to carry out high quality systematic reviews, and to locate existing systematic reviews and RCT. It contains the Cochrane Database of Systematic Reviews (CDSR), the Database of Abstracts of Reviews of Effectiveness (DARE), the Cochrane Review Methodology Database, and the Cochrane Controlled Trials Register (CCTR)

(Australasian Cochrane Centre, 1999). In 2000, CDSR contained 795 completed systematic reviews, with 738 protocols. DARE is maintained by the National Health Service Centre for Reviews and Dissemination at the University of York, UK, and contains hundreds of abstracts, and references to over 1000 systematic reviews not covered by the CDSR. There are many reviews pertinent to occupational therapy practice contained on these databases; however, they are not always identified by the term 'occupational therapy' as many of the reviews are a result of multidisciplinary collaboration.

Journals such as *Evidence-Based Medicine*, *Evidence-Based Mental Health* and *Evidence-Based Nursing*, contain structured abstracts that give a clinical commentary and a 'bottom-line' conclusion about the clinical practices reviewed. Although the majority of the reviews are directly related to medicine and nursing, there are a number that also apply to occupational therapy practice. Notably, the *Evidence-Based Nursing* journal also contains brief abstracts of clinically relevant qualitative research.

If relevant information is not available in this type of source, traditional databases can be searched (see Table 2). Many of these databases are available through the internet, and others are available at institutional libraries.

When high quality research on the effectiveness of occupational therapy interventions is lacking, this does not preclude therapists from taking an evidence-based approach. What is important is to seek and utilize the best *available* evidence (Sackett *et al.*, 1997).

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Table 2. Evidence-based practice resources

Journals	Databases	Organisations and internet sites
Evidence Based Medicine Evidence-Based Mental Health Evidence-Based Health Care Journal of Clinical Effectiveness Effective Health Care Bulletins	**Cochrane Library:** www.thecochranelibrary.com/ The Cochrane Database of Systematic Reviews Database of Abstracts of Reviews of Effectiveness The Cochrane Controlled Trials Register The Cochrane Review Methodology Database **PEDro** www.pedro.fhs.usyd.edu.au/index.html **OTseeker** www.OTseeker.com **Bibliographic Databases** *MEDLINE* , PubMed, Embase, *CINAHL, CURRENT CONTENTS, SCIENCE CITATION INDEX, ASSIA, CANCERLIT, HealthSTAR, DISSERTATION ABSTRACTS, PROCEEDINGS.*	**Centre for Evidence-Based Medicine** www.cebm.net/ **Centre for Evidence-Based Child Health** www.ich.ucl.ac.uk/ebm/ebm.htm **Centre for Evidence-Based Mental Health** www.cebmh.com **Centre for Clinical Effectiveness** www.med.monash.edu.au/healthservices/cce **Critical Appraisal Skills Programme** www.phru.nhs.uk/casp/casp.htm **The Canadian Centres For Health Evidence** www.cche.net

Access to information resources is an important factor influencing the feasibility of evidence-based occupational therapy practice, as indicated in the framework. Concise summaries of clinical research relevant to occupational therapy is one approach that could make evidence-based practice more achievable.

CRITICAL APPRAISAL

Once relevant articles have been retrieved, the information needs to be critically appraised in order to extract the clinical information of value. Sackett *et al.* (1997) describe two important steps in critical appraisal:

1. Deciding whether the information is valid (how close to the truth is it?).

2. Deciding how significant the information is (is it clinically important?).

Validity

Determining the *validity* of the findings in an article requires consideration of many aspects of a study, and will depend on the type of study used. A study that is flawed will not provide high quality evidence, even if the study design used was the most appropriate type. The ability to critically appraise research is an essential skill for occupational therapists to develop and this has obvious implications for undergraduate and postgraduate training and continuing education.

Critical appraisal checklists provide a series of key questions that can help the clinician establish the validity and clinical usefulness of an article's results. Checklists for critical appraisal of quantitative and qualitative studies exist and include those developed by the Critical Appraisal Skills Programme (CASP) and the McMaster University Occupational Therapy Evidence-Based Practice Research Group (Law *et al.*, 1999a, 1999b). Many of these checklists can be accessed through the Internet (see Table 2).

Clinical importance

Whether the evidence located is clinically important entails determining the clinical significance of the results through statistics, such as effect sizes. Clinical significance should not be confused with statistical significance, which indicates the probability of the results being due to chance. Studies can be statistically significant yet clinically insignificant. Clinical significance represents the magnitude of an effect, or the level of benefit (Gray, 1997).

Databases, such as the CDSR and journals, such as *Evidence-Based Mental Health*, are increasingly using summary statistics, such as 'numbers needed to treat', 'absolute benefit increase' and 'relative risk reduction' to convey whether a treatment is clinically significant or 'worth the effort' (Sackett *et al.*, 1997). A comprehensive explanation of these statistics can be found in the glossary of the *Evidence-Based Medicine* journal.

USING THE EVIDENCE FOR INDIVIDUAL CLINICAL DECISIONS

Following appraisal, consideration needs to be given to how the information may be applied, taking into account the clients' context. This is where the main challenge of evidence-based practice lies: What does all this mean for the client? Sackett *et al.* (1997) stress that evidence needs to be integrated with clinical expertise when deciding if valid, potentially useful results apply to an individual client. Questions that can guide the application of evidence include:

1. Do these results apply to my client? (i.e. is my client so different from those in the study that its results cannot help me?)
2. Does the treatment fit in with my client's values and preferences?
3. Are there resources available to implement the treatment?

As indicated in the framework, research information that has been appraised and distilled is integrated into the occupational therapy treatment process, with careful consideration of the context of therapy and the client's context. Even if the treatment appears to be effective, factors such as the environment in which the client lives, their cultural beliefs, their priorities, preferences and values will determine the final decision regarding the course of action to be taken (Bury, 1998; Sackett *et al.*, 1997; Tickle-Degnen, 1998). Therefore, it is important to communicate the information to the client in a straightforward manner, and engage them in the decision making process (Tickle-Degnen, 1998).

In many cases, the answer will not be clear or be only partially answered, possibly because the research is inclusive or conflicting, or because there is insufficient research pertaining to that question. In such cases, the best available evidence is used and the client can be advised of the biases or limitations inherent in the evidence. Known advantages and disadvantages of the various options are then carefully explained and explored with the client. Where research evidence is lacking there needs to be greater use of expert clinical opinion and clinical reasoning skills (Naylor, 1995).

EVALUATION

Although not represented in the framework, evaluation of the evidence-based practice process can help therapists identify gaps in skills and available research that can be fed back to the profession. This can inform the development of strategies to support evidence-based practice, including establishing a more directed research agenda and providing training in evidence-based practice skills to ensure that the process itself becomes more efficient.

Additionally, evaluating the effectiveness of the treatment or clinical practices implemented, in terms of improvement in relevant outcomes, makes it possible to determine if the evidence-based decision-making process has been successful. Evaluation leads to asking more questions and so the cycle continues (Bennett & Glasziou, 1997).

ACTION TOWARDS EVIDENCE-BASED PRACTICE

Commonly cited barriers to the use of an evidence-based practice approach by health professionals include limited time, information overload, lack of skills in interpreting research results, or lack of research evidence (Rosenberg & Donald, 1995). Although this research was not carried out with occupational therapists, these issues may well be similar. Some of the ways in which occupational therapists can overcome these barriers and promote an evidence-based practice approach include the following:

1. Seek continuing education to develop skills for accessing information resources, understanding research methodologies and summary statistics, and critical appraisal.
2. Make use of evidence-based practice resources such as the web sites listed in Table 2
3. Participate in research evaluating occupational therapy interventions.
4. Participate in or establish a journal club that provides a supportive structure for finding and appraising clinically relevant research.
5. Seek out or contribute to evidence-based clinical practice guidelines.
6. Negotiate protected work time to locate and appraise research.

As a profession, Occupational Therapy needs to continue to encourage well-performed research regarding the effectiveness of treatments or clinical practices, and to provide undergraduate, postgraduate and continuing education to develop evidence-based practice skills. Equally high on the agenda should be the development of succinct, clinically relevant summaries of evidence to enable clinicians to rapidly access pre-appraised evidence. Models for such resources already exist in the medical and nursing professions. This is likely to require a continued international effort involving both clinicians and academics.

CONCLUSION

The framework presented in this paper is offered as a means of helping clinicians move from 'paper to practice'. As indicated in the framework, central to the evidence-based practice process are the client and the context of therapy. These factors determine how research evidence is used in making decisions. Clearly, the use of research evidence is only one part of the picture. Integration of research evidence, information from clients, and clinicians' experience are essential to sound clinical decision making.

The benefits of an evidence-based practice approach lie in improvements to patient care, integration of research and practice, and informed decision-making with respect to patient care, management and policy (Rosenberg & Donald, 1995). Evidence-based practice has implications for individual clinical practice, curriculum development, and policy decisions. While this paper has provided some directions for evidence-based practice in clinical settings, in reality, all those who are involved in health care whether clinicians, educators, managers, providers, purchasers or policy-makers need to consider the integration of best evidence into their decision making (Bury, 1998). Understanding the principles involved and incorporating these into practice is of relevance to all occupational therapists as health care moves to become more evidence-based.

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