Centre of Interdisciplinary Research in Evidence-Based Practice
Hong Kong Shue Yan University

Evidence-Based Practice

A Basic Guide to Appraisal and Application of Research

Content

Centre of Interdisciplinary Research in Evidence-Based Practice, Hong Kong Shue Yan University

Evidence-Based Practice

Social services now rely so heavily on evidence-based practice (EBP) that it has become integral to the sector.

Social services now rely so heavily on evidence-based practice (EBP) that it has become integral to the sector. In fact, many governments now use evidence-based thinking as a foundation for policy making and social intervention. EBP has recently been used for auditing and governance, which has far reaching significance both nationally and internationally. With a view to increasing transparency through rigorous, standardized evaluations, a great many industries also have started to utilize evidence in the formation of policies and practices. For example, medicine, public management, education, developmental studies, criminology, health care, counselling, and social work.

Why Evidence-Based Practice (EBP)?

EBP models are becoming more widespread.

Both funders and governmental organizations insist on having a greater amount of EBP in social service fields.

The late 20th and early 21st centuries saw a marked improvement in social service providers' ability to gather and analyze evidence. This is due to the vast technological advances that have taken place over this period. As such, EBP models are becoming more widespread. Unfortunately, most social service programs have not been able to produce the desired effects when rigorously evaluated. Moreover, both funders and governmental organizations insist on having a greater amount of EBP in social service fields. For social services workers, it is more important than ever to have a strong background knowledge of EBP models.

What is EBP?

EBP combines well-researched interventions with professional experience and ethics. In addition, client preferences and culture are used to guide and inform the delivery of treatments and services. This involves creating an answerable question, which might be based on the needs of a client or organization, locating the best available evidence to answer the question, evaluating the quality of the evidence as well as its applicability, applying the evidence, and evaluating the effectiveness and efficiency of the solution. In simple terms, EBP is often referred to as the "what works" agenda. This agenda aims at narrowing the gap between research and practice, so that research can be readily applied to practice. EBP research focuses on gathering evidence about what works in particular circumstances, how to achieve the stated targets and deliver the required outcomes, as well as determining why something works (Hargreaves, 1996a, 1996b). This type of evidence is intended to be relevant for practitioners, policymakers, clients, and all relevant personnel. Hence, its purpose is to improve practice and address questions about "what works".

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In simple terms, EBP is often referred to as the "what works" agenda. This agenda aims at narrowing the gap between research and practice.

As accessing information has improved drastically over the past few decades, acquiring evidence is a much simpler process. This has certainly prompted the move towards evidence-based approaches. That said, EBP is not simply just the process of obtaining information. For instance, practitioners, researchers, and clients must work together in order to identify what works, for whom and under what conditions. There are five important steps involved in any EBP model:

EBP is not simply just the process of obtaining information.

EBP models need to always evolve and improve so as to remain effective. As such, step five is crucial. Thus, new cases must be treated as further evidence and analyzed in addition to the pre-existing data. As such, EBP allows social services to keep evolving with an ever-changing world.

The Benefits of EBP

EBP guarantees that the results seen in the research will translate into the most effective treatments and services.

When used correctly, EBP guarantees that the results seen in the research will translate into the most effective treatments and services. Furthermore, it guarantees the wider dissemination of proven social service programs. Thereby benefitting a greater number of people.

The possible outcomes of adopting EBP involve:

- Narrowing the divide between research and practice.
- Encouraging the use of empirically-supported treatments and services.
- Raising the importance of client preferences and population data in the decision-making process.
- More case study research.

We must identify those programs found in rigorous studies to produce sizable, sustained benefits to participants and society. This will allow policy officials etc., to distinguish these programs from others claiming to have similar evidence. The following can help to thoroughly assess program and practice effectiveness:

- A project designed to assist food banks meet the needs of diabetic clients by offering customized meal boxes, on-site blood sugar screenings, and prompt referrals to community health clinics.
- A social service that is provided by the Social Welfare Department to assist families with child abuse and spouse battering issues, to restore normal functioning and to safeguard the interest of children affected by custody disputes and referred by the courts.
- A staff training program that promotes the continuous professional growth and development of staff throughout their careers.
- An evaluation which determines if random health and safety inspections in the workplace help to reduce on-the-job injuries.

What is the Future Direction of EBP?

EBP exists to help policymakers, researchers, and data experts in both the public and private sectors.

Primarily, EBP exists to help policymakers, researchers, and data experts in both the public and private sectors reinforce the infrastructure and processes that support evidence-based decision making. This then encourages governments and non-profit organizations to establish an evidence base for social interventions. This is backed by strong evidence, which can be replicated in important areas such as educational achievement, workforce earnings, criminal arrests, substance abuse, and hospitalization. When reliable evidence is used as a primary tool in the decision-making process, it is more likely that limited resources will be spent on programs that have a long-lasting and positive impact on people's lives.

Dissemination and Translation of Research into EBP

Today's frontline practitioners have a limited understanding of EBP and therefore do not include it in their practice. In order for EBP to become viable to the average practitioner, systems must be established that provide regularly-updated synthesized evidence and decision support. Translating research into actual practice cannot become common without this type of infrastructure. There are a number of important and emerging issues that relate to the translation of evidence-based interventions into practice, and a growing body of literature spells out these key issues (Brownson, 2006; Kerner, 2005). On a more practical level, advances in the evidence-based agenda has raised a number of important issues about the professional status, legitimacy, autonomy, and authority of service sectors.

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Adopting EBP in the social service sector has been rather slow. As such, further work on EBP and its future innovations for social care is necessary. However, adopting both the methodology and language of EBP – as a basis for a comprehensive policy program – means that it will fundamentally alter the sector's working conditions and relationship with service users. EBP has become a powerful movement and has the ability to change the content and structure of service areas and its allied professions.

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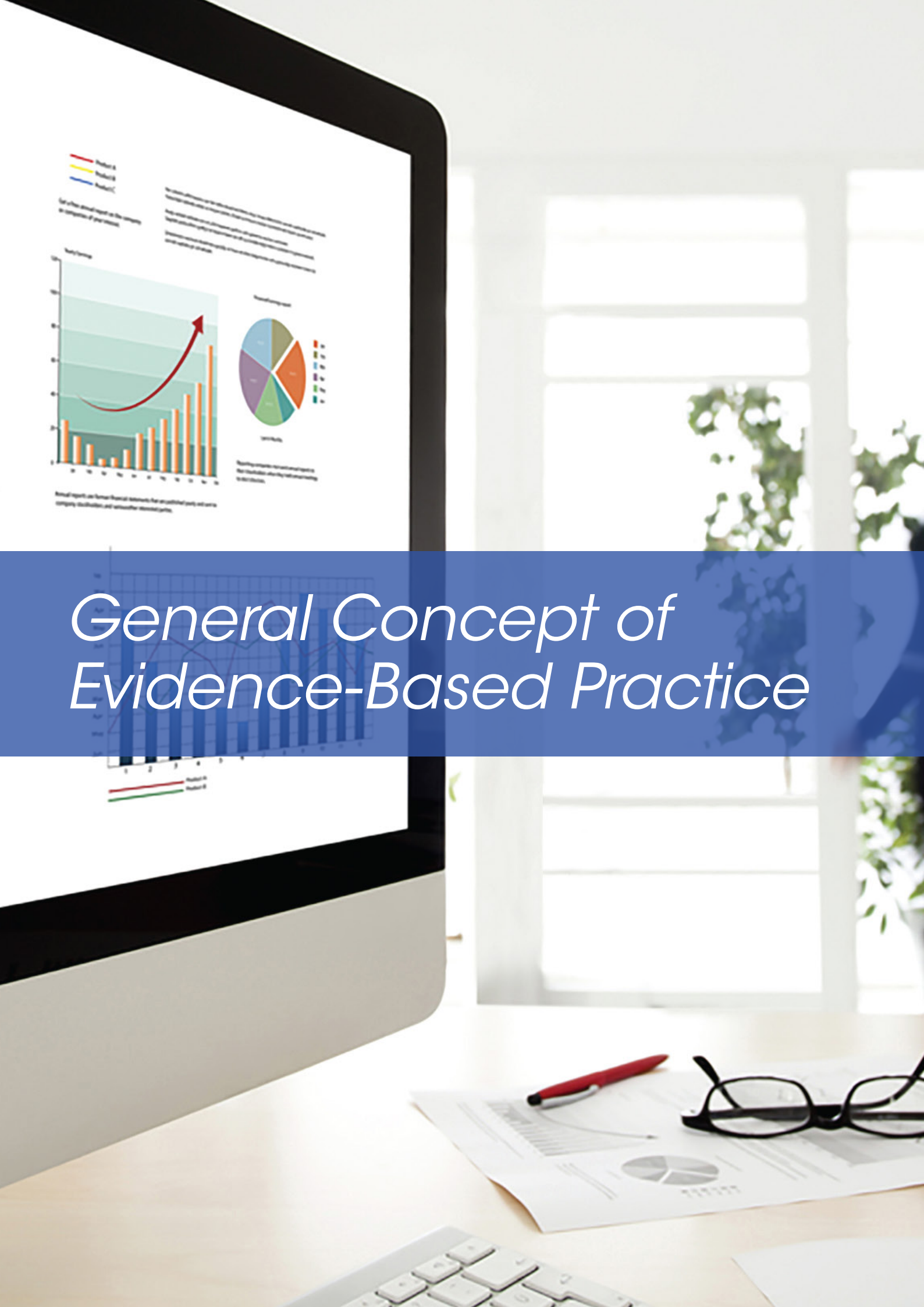
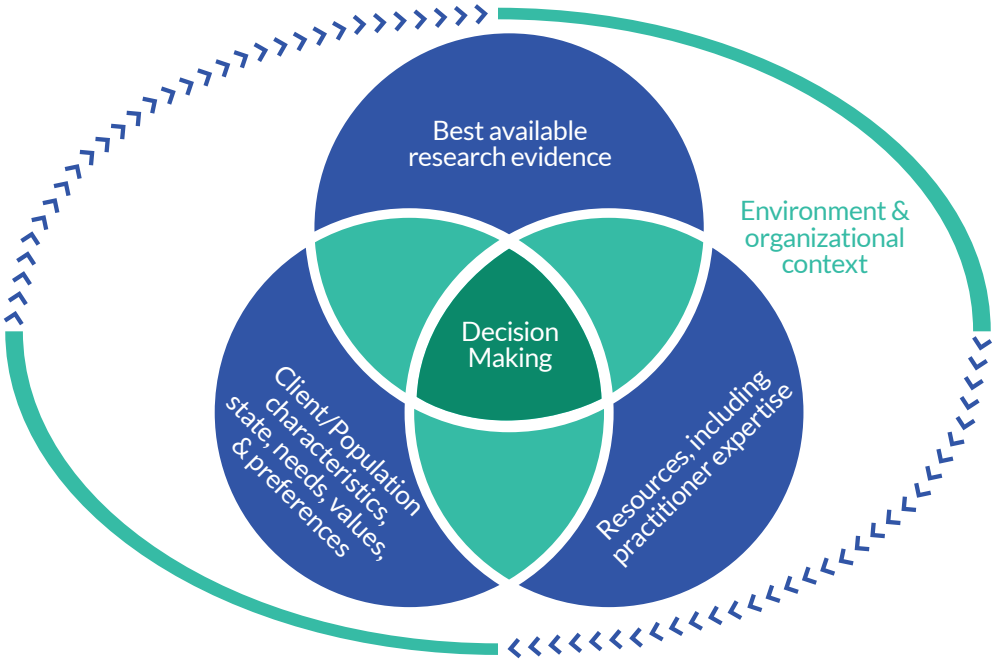


General Concept of Evidence-Based Practice

EBP Framework



Spring, B. & Hitchcock, K. (2009) Evidence-based practice in psychology. In I.B. Weiner & W.E. Craighead (Eds.) Corsini's Encyclopedia of Psychology, 4th edition (pp. 603-607). New York:Wiley

EBP is a framework that guides the decision-making process for the intervention of individuals and populations.

EBP integrates:

Best available research evidence

The most appropriate information available, since 'best possible' is not always what is needed. For example, empirical evidence from randomized controlled trials; evidence from other scientific methods such as descriptive and qualitative research; and the use of information from case reports, scientific principles, and expert opinions.

Client/population characteristics including preferences

Consideration of client/population states, needs, values, religious beliefs, world views, goals, and preferences for decision making, in addition to the practitioner's experience and understanding of the available research.

Resources including practitioner expertise

Practitioner expertise means their competence based on education, training, and experience, resulting in effective practice. Expertise does not refer to extraordinary performance that might characterize an elite group.

EBP should be done in a manner that is compatible with **an environmental and organizational context.**

EBP Process

Spring, B. & Hitchcock, K. (2009) Evidence-based practice in psychology. In I.B. Weiner & W.E. Craighead (Eds.) Corsini's Encyclopedia of Psychology, 4th edition (pp. 603-607). New York:Wiley

In general, there are five steps that are initiated by a client/community: ASK, ACQUIRE, APPRAISE, APPLY, ANALYZE and ADJUST

EBP is an iterative process, but in general, there are five steps that are initiated by a client/community:

ASK client oriented, relevant, and answerable questions about the health status, context, and care of individuals, communities, or populations in the PICO format;

ACQUIRE useful information to answer questions by searching for, and collecting, the most relevant, best evidence;

APPRAISE the evidence critically for validity and applicability to the problem at hand;

APPLY the best evidence by integrating it with one's clinical expertise, client preferences, and values in making a practice decision or change; and then implement the practice;

ANALYZE the new practice and ADJUST accordingly. Evaluate implications for future decision making, disseminate the results, and identify the required evidence.

Before embarking on the well-known steps of EBP, it is critical to cultivate a spirit of inquiry (i.e., a consistently questioning attitude towards practice). Without a culture that supports the spirit of inquiry and EBP, individual and organizational EBP change efforts are not likely to succeed or be sustainable (Fineout-Overholt, Melnyk, & Schultz, 2005; Rycroft-Malone, 2008). A culture that fosters and supports EBP promotes this spirit of inquiry and makes it visible to clinicians by embedding it in its philosophy and mission.

Formulate EBP Question (ASK)

Step 1: Ask Clinical Questions in PICO Format

Questions consider client/population of interest (P), intervention/area of interest (I), comparison intervention/group (C), and outcome (O). This allows for the efficient searching of electronic databases – one designed to retrieve articles relevant only to the inquiry.

There are two types of EBP questions: background and foreground.

Background questions

Background questions are much broader, and provide general knowledge when answered. These types of questions can generally be answered by reading a textbook. A well-formulated background question has two components:

1. A question's root (who, what, how, etc.) including a verb.
2. An issue or matter of interest.

EBP demands explicit attention to client/population characteristics at each step:

Assessment – Addresses ways of measuring, describing, or diagnosing a problem.
Treatment – Covers interventions to prevent, contain, or improve a problem.
Etiology – Concerns influences that cause or contribute to the onset of a problem.
Prognosis – Pertaining to the probable course and outcome of a condition.
Harm – Addressing the potential adverse effects of interventions.
Cost Effectiveness – Expresses the consequences of a procedure in common units.

Background question example: How does additional learning support and improve student achievement? Without this spirit of inquiry, the next steps in the EBP process are unlikely to take place.

Foreground questions

Foreground questions are specific and relevant to the practical issue; and must be asked to determine which two interventions are the most effective in improving service client outcomes. Moreover, to answer these types of questions, the current available literature on existing studies that compare the two interventions must be studied.

PICO stands for:
Patient/Client/Population (P) - The recipients/potential beneficiaries of a service/intervention.
Intervention or Issue of Interest (I) - The service/planned action to be delivered.
Comparison Intervention or Issue of Interest (C) - An alternative service/action that may or may not achieve similar outcomes.
Outcome(s) of Interest (O) - The ways a service/action can be measured, establishing whether it has had the desired effect.

PICO-based questions are an important, consistent, and systematic means of identifying the components of a practical issue. Not only do they clarify these components – helping to direct the search for evidence – but they increase the chances that the best evidence to inform the practice will be determined quickly and efficiently.

Foreground question example: For SYU students directly entering Year 2 (P), how does the provision of a face-to-face English course (I), compared with online teaching (C) in the summer, affect their grades in English Writing ENG 211-212 (O)?.

Evidence in EBP (ACQUIRE)

Step 2: Search for the Best Evidence

PICO helps to identify key words or phrases that, when entered successively and combined, speeds up finding relevant articles in massive research databases.

How to Search for Evidence to Answer the Clinical Question?

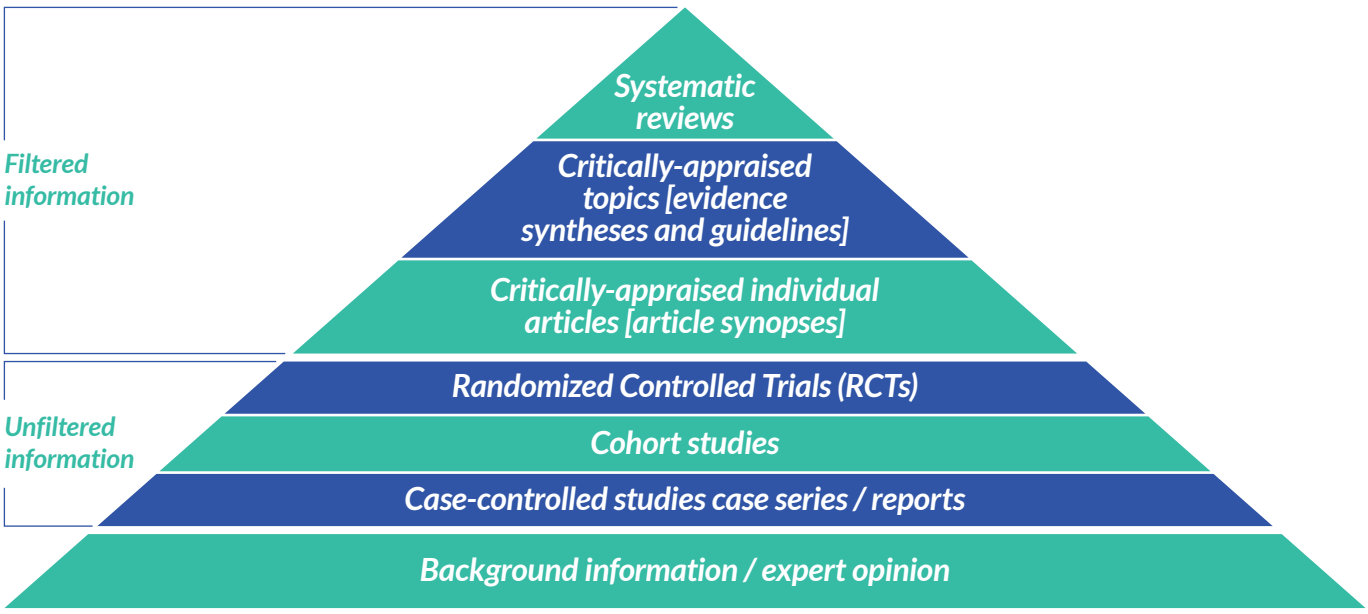
1. Identify the type of PICO question.
2. Determine the level of evidence that best answers the question.
3. Select relevant databases to search (such as the CDSR, DARE, PubMed, CINAHL).

1. Identify the type of PICO question

Types of Studies for Types of Questions:
Understanding the type of PICO question being asked will help in the search to determine the best type of study design. The table below summarizes which type of studies best fit for which kind of questions.

Type of Question	Best Type of Study
Therapy	Randomized controlled trial (RCT), cohort, case control, case series
Diagnosis	Cohort studies with comparison to gold standard test
Prognosis	Cohort studies, case control, case series
Etiology/Harm	RCT, cohort studies, case control, case series
Prevention	RCT, cohort studies, case control, case series
Cost	Economic analysis

2. Determine the level of evidence that best answers the question



University of Canberra (2018). Evidence-Based Practice in Health. Retrieved October 11, 2018, from https://canberra.libguides.com/c.php?g=599346&p=4149721

A hierarchical structure of evidence sees the best and most reliable information at the top, and the least reliable evidence on the bottom. With regards to answering practical questions, while the quantity of research literature decreases the higher up the pyramid one goes, the evidence becomes increasingly relevant. The level and quality of evidence is important to the practitioner as it provides confidence for making relevant decisions. Depending on the question, the research methodology which provides the best evidence will vary. For instance, the best methodology for a question concerning an intervention, is one that includes a systematic review of randomized, controlled trials or a meta-analysis, in which studies are compared through statistical analysis. When properly designed and implemented, these types of study yield the strongest evidence, and therefore provide the most confidence when it comes to decision making. Because the most suitable research design depends on the question, there is not simply a single hierarchy of evidence; rather, each question has its own hierarchy.

The level and quality of evidence is important to the practitioner as it provides confidence for making relevant decisions.

It is vital to take into account not only the quantity, but also the quality of the evidence – in addition to the feasibility of intervention implementation – when deciding whether to use it in support of a change in practice.

Types of evidence

Primary literature (Unfiltered)

This consists of the original data and analysis from the research studies, with no third-party analysis. Peer-reviewed research articles, dissertations, technical reports, or conference proceedings can be classed as primary literature.

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Secondary literature (Filtered)

Secondary sources, such as a narrative review article, provide analysis, synthesis, interpretation, and evaluation of the primary works.

Systematic Reviews

The Cochrane Collaboration, a well-known worldwide EBP organization, defines a systematic review as "a review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research and to collect and analyze data from the studies that are included in the review" (Green et al., 2005).

Meta-Analyses

Using statistical methods to combine data from various individual, independent studies, meta-analysis helps to integrate the findings and synthesize the results. Often evaluating various trials to provide guidance on the effectiveness of different solutions, meta-analysis can also be used for issues such as health care policy. Furthermore, systematic reviews often use this process to examine differences in intervention effects across multiple studies.

Practice Guidelines

Practice guidelines summarize and refine information on interventions, screening or prevention into practical, focused summaries that reflect current recommended practice. It is also important to remember that they are not all created equal. Some guidelines are based on systematic reviews of the literature, while other guidelines are developed by expert consensus. Different groups, including government agencies, professional societies, governing boards and non-profits, develop these guidelines. As expected, evidence-based, systematically researched intervention guidelines are considered key sources.

Structured Abstracts

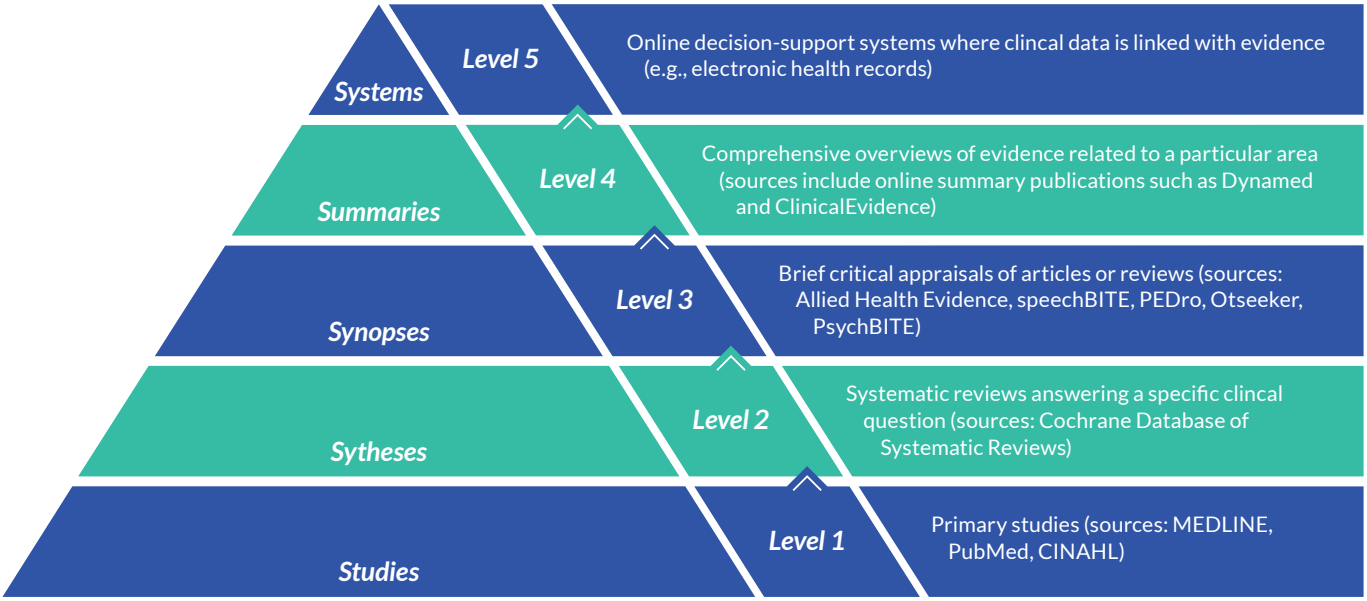
Some evidence-based resources, for example the Journal of Evidence-Based Mental Health, offer expert commentaries in the form of structured abstracts. Articles are selected for not only their quality but also practical relevance. Structured abstracts provide added value by summarizing article findings and discussing the specific criteria used to assess the quality, validity, and practical relevance of the individual research studies.

Textbooks

If textbooks are rigorously reviewed by peers and updated regularly, they provide useful background information in a concise, easy-to-use format.

3. Select Relevant Databases to Search

Finding evidence using the 5S pyramid model of evidence for evidence-based practice



Straus, S., & Haynes, R. B. (2009). Managing evidence-based knowledge: the need for reliable, relevant and readable resources. Canadian Medical Association Journal, 180(9), 942-945.

After formulating a well-defined background question and deciding upon the level of evidence required to best answer it, you then need to determine where to find the relevant information. With a large amount of options available, it is certainly not always clear where to begin. A good start would be to use a modified version of the 5S pyramid model of evidence-based information services.

Ideally, information such as electronic medical records, as well as other forms of client information in a clinical support system, would be linked to the best evidence and practices related to the specific individual.

Unfortunately, this type of system is not very common. Instead, you may want to look for a variety of "filtered" sources in the middle of the pyramid, such as systematic reviews, evidence-based summaries, guidelines, and textbooks.

It might be necessary to search for original journal articles in “unfiltered” databases, such as PubMed or PsycInfo, if the relevant evidence in “filtered” sources cannot be found.

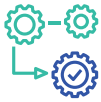
The 5S model

Systems – Computerized decision support systems that search for the best evidence from applicable research, based on a specific service client's information.

Summaries – Compilations of the best evidence from several of the lower layers of the pyramid, which provide a wide range of treatment information instead of one particular type of evidence.

Synopses – Abbreviated descriptions of a wide range of studies or systematic reviews.

Syntheses – Systematic reviews of the literature on a given topic.



Studies – Including randomized controlled trials (RCTs), cohort studies, case-controlled studies, and case reports. (Haynes, 2006)

How can this model guides decision makers in finding the evidence they need, with speed and confidence?

1. Starting from the highest level of the 5S pyramid, search for evidence to guide your decisions. If you already have a computerized decision support system integrated into your electronic record system that reliably links your service client's characteristics with current evidence-based guidelines, you need look no further;
2. If not, or if the system does not provide support for your service client's problems, then look for integrated evidence using a summary service;
3. If the topic is not covered there, look for a synopsis suited to your practice in one of the evidence-based journals;
4. If you have no success there, look for a systematic review in a EBP Library;
5. If that fails, you could look up original studies.

Searching strategies

1. Search at least two relevant databases.
2. Use keywords from your PICO question to search the databases. Search one keyword at a time.
3. Use the database's controlled vocabulary when available.
4. Combine the searches to yield articles that are manageable in number and specifically relate to the PICO question.
5. Place limits on the final combined search to further narrow the results.

Where to find the evidence?

Select relevant databases to search:

Cochrane Collaboration

Cochrane Collaboration helps health professionals, patients, and policymakers with health intervention evidence-based research.

Campbell Collaboration

Campbell Collaboration helps evidence-based research on the effects of social, behavioral, and educational interventions.

What are randomized controlled trials, systematic reviews, and meta-analysis?

Randomized controlled trial (RCT)

- A controlled trial is a study in which participants are assigned to a study group. Study groups are also called study arms or intervention conditions.
- In a randomized controlled trial, participants have an equal probability of being assigned to any group.
- Procedures are controlled to ensure that all participants in all study groups are treated the same, except for the type of intervention unique to their group.
- The primary goal is to test whether an intervention works by comparing it to a control condition. Usually, either no intervention or an alternative intervention.
- Secondary goals may include: identifying factors that influence the effects of the intervention (i.e., moderators); and understanding the processes through which an intervention's influences change (i.e., mediators or change mechanisms that bring about the intervention effect) (Drake et al., 2001).

Why conduct a RCT?

Used to test whether an intervention works, a RCT's involves:

1. Use of a control condition to which the experimental intervention is compared.
2. A random assignment of participants to conditions.

RCT advantages include:

Random assignment guarantees the even distribution of known and unknown people, as well as environmental characteristics, that might affect the outcome. Moreover, it also negates the influence of unimportant, nonspecific processes to the intervention. These might include the effects of participating in the study, being assessed, receiving attention, self-monitoring, and positive expectations, etc.

Random assignment and the use of controlled conditions ensure that any extraneous variations, not as a result of the intervention, are either controlled experimentally or randomized. Results can then be causally attributed to differences between the intervention and control conditions. As such, RCTs allow investigators to state, with confidence, that any outcome variations were caused by the intervention, since it theoretically equalizes all other variables.

How are RCTs used in behavioral sciences?

Commonly, RCTs are used in this field to examine whether an intervention is effective in producing a specific behavioral change, symptom reduction, or an improvement in quality of life. Consistent findings, whereby the intervention surpasses the control after a series of RCTs, often establish the intervention as "evidence-based". In other words, there is sufficient data to support its use.

For instance, cognitive-behavioral therapy (CBT) focuses on altering negative thoughts, feelings, and behavior; and has been studied extensively using RCTs in the treatment of an anxiety disorder.

Evaluation of research on practice interventions

While RCTs are often seen as the benchmark of intervention evaluation, it is worth remembering that in some cases it is not always possible or ethical to conduct RCT in social, health, and human services. As such, this type of research evidence is limited for some interventions provided by social workers. Therefore, qualitative research can not only help in enhancing quantitative research, but it can also be used to better understand context and cultural issues related to interventions.

RCTs are often seen as the benchmark of intervention evaluation.

Although currently no consistent agreement regarding the hierarchy of best available research exists, common examples of evidence include:

- Surveillance data.
- Systematic reviews of multiple intervention research studies.
- Expert opinion/narrative reviews.
- A single intervention research study.
- Program evaluation.
- Word of mouth/media/marketing; and personal experience (Drake et al., 2001).

Systematic reviews

A systematic review aims to provide a comprehensive literature search with pre-defined eligibility criteria.

A systematic review aims to provide a comprehensive literature search with pre-defined eligibility criteria. It focuses on minimizing bias in a literature review so that the literature search is replicable. Combining evidence from multiple RCTs, a systematic review is conducted across a wide-range of settings and among different populations.

When searching for systematic reviews, take note of the following when evaluating quality:

- Is there a clear statement of the question being addressed?
- Does the review include a thorough description of the search strategy used to locate relevant studies?
- Does the review include a clear discussion of the methods used to both select and evaluate studies?
- Is there an adequate explanation for how the results of the studies were combined?
- Are the conclusions sufficiently supported by the cited data?

Steps for conducting a systematic review

Systematic reviews cannot be completed by a single person

1. Assembling the team;
   Systematic reviews cannot be completed by a single person – they are always a team effort. Important areas of expertise to cover include:
   - Content experts
   - Systematic review methods experts
   - Statistician
   - EBP database librarian
   - Reference management
2. Develop a protocol or work plan;
3. Formulate a clearly defined answerable question or series of questions which identify the population, intervention, comparison condition, and outcome(s) of interest;
4. Undertake systematic and comprehensive evidence searches;
5. Establish inclusion/exclusion rules, and carefully consider the inclusion/exclusion rules in the database search process;
6. Critically appraise the relevant literature;
7. Abstraction of data to identify pre-determined data elements from individual studies, and enter the data into a table or database;
8. Synthesize data;
9. Communicate results.

Where do they fit in evidence-based practice?

An important source of evidence for decision making, the first three steps of the EBP process are covered during a systematic review: Ask, Acquire, and Appraise. This provides a short-cut, allowing EBP practitioners to focus on the subsequent steps: Apply, Analyze, and Adjust.

Meta-analyses

To integrate the findings and synthesize the results, meta-analysis employs statistical methods to combine the data from individual, independent studies. It often evaluates various trials to offer guidance on the effectiveness of different solutions. Meta-analytic studies may also cover issue such as health care policy. Systematic reviews often use meta-analysis to examine differences in intervention effects across multiple studies. Meta-analysis statistically combines the effect sizes, and models them using the study characteristics (Cheung, 2018; Cheung & Vijayakumar, 2016). It has a few goals:

- Draws general conclusions on a particular topic.
- Tests the homogeneity (consistency) of the findings.
- Accounts for the heterogeneity of effect sizes.
- Estimates an average effect size.
- Tests potential moderators if the studies are heterogeneous.

When should I conduct (or not conduct) a meta-analysis?

Are there enough primary studies for the meta-analysis?

If there are too few, the field may not be mature enough yet for a meta-analysis.

How important and pressing is the topic?

If it is critical to human life or society, researchers may still want to conduct a meta-analysis despite there not being enough primary studies.

What are the differences between a systematic review and meta-analysis?

- Meta-analysis is usually undertaken after a systematic review.
- A systematic review focuses on the process of identifying the studies.
- Meta-analysis provides a statistical method to combine the data.
- There are rare instances after a systematic review, in which researchers decide against a meta-analysis. For example, if the studies are very different or incompatible with one another.

Critical Appraisal (APPRAISE)

Step 3: Critically Appraise the Evidence

The first step of critical appraisal can be efficiently accomplished by answering three key questions.

Step 3 in the EBP process is vital, as it involves a critical appraisal of the evidence obtained from the search process. Although some professionals might view critical appraisal as an exhaustive, time-consuming process, the first step of critical appraisal can be efficiently accomplished by answering three key questions as part of a rapid process in which studies are evaluated for their validity, reliability, and applicability to answer the posed clinical question:

1. **Validity** - Are the results of the study valid? In other words, are they as close to the truth as possible; did the researchers conduct the study using the best applicable research methods? For example, during intervention trials, it is crucial to determine whether the subjects were randomly assigned to intervention or control groups, and whether their key characteristics were equal prior to the intervention.
2. **Reliability** - What are the results? For example, during an intervention trial, this includes: (a) whether the intervention worked; (b) how large an intervention effect was obtained; and (c) whether practitioners can expect similar results if they implement the intervention using their own practice settings. With qualitative studies, in addition to other factors, this includes evaluating whether the research approach fits the purpose.
3. **Applicability** - Will the results help me in caring for my service clients? This includes asking whether: (a) the subjects in the study are similar to the clients for whom intervention is being implemented; (b) the benefits are greater than the risks of intervention; (c) the intervention can be implemented in the practice setting; and (d) if the client desires the intervention.

Answering the above ensures the relevance and transferability of the evidence to the practitioner's specific population.

Critical appraisal not only finds flaws in a study, but it also determines its worth.

Critical appraisal not only finds flaws in a study, but it also determines its worth. In a rapid critical appraisal (RCA), practitioners will review each study to determine:

1. Its level of evidence
2. How well it was conducted
3. How useful it is in practice

Once they have determined which are good studies, practitioners will undertake evaluation and synthesis. These last two steps determine whether the overall findings from the evidence review will help improve client outcomes.

Critical appraisal of studies that attempt to determine whether an intervention works includes:

- Controlled trials, both randomized (or experimental) and non-randomized.
- Time series research designs. These include interrupted time series, as well as within-subject or single case designs.
- Systematic reviews, including meta-analysis.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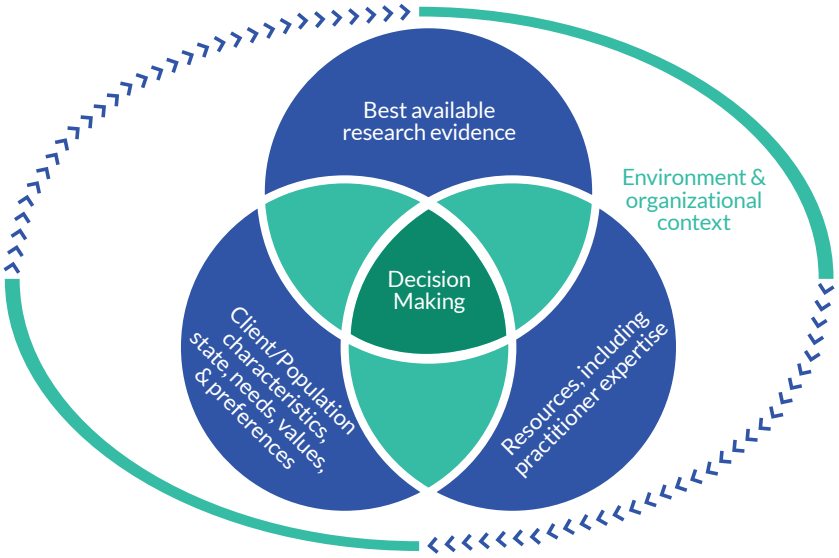
The Decision-Making Process (APPLY)

Step 4: Integrate the Evidence with Clinical Expertise and Client Preferences to Make the Best Clinical Decision

Service providers hold an ethical responsibility to involve service clients in intervention decisions.

The following step in EBP is integrating the best evidence found from the literature with the service provider's expertise, service client/population preferences, and values to implement a decision. Consumers of services often want to be involved in the decision-making process. As such, service providers hold an ethical responsibility to involve service clients in intervention decisions (Melnyk & Fineout-Overholt, 2006). Regardless of whether evidence from extensive research and critical appraisal strongly supports the benefits of a certain intervention, a service client might provide reasons as to why the intervention is not acceptable. Therefore, despite the compelling evidence that might support an intervention, a decision against its use can be determined after assessing the service client. In addition, a discussion based on the risks and benefits of an intervention is necessary. Similarly, a practitioner's assessment of the available resources to implement an intervention decision is a critical part of the EBP decision-making process.

Let us refer to the EBP framework.



Spring, B. & Hitchcock, K. (2009) Evidence-based practice in psychology. In I.B. Weiner & W.E. Craighead (Eds.) Corsini's Encyclopedia of Psychology, 4th edition (pp. 603-607). New York:Wiley

Decisions that place demands on communities or service clients, must be considered.

Decisions that place demands on communities or service clients, where they do not have enough resources, are not ideal; and all available resources, including practitioner training and expertise, must be considered (Spring & Hitchcock, 2010).

Decisions regarding optimal intervention need to consider an individual's or community's resources. For example, practitioners trained in delivering interventions and who have the means to pay for care (Spring & Hitchcock, 2010).

Examples:

- Insurance status
- Grant funds
- Community/practice space for interventions
- Practitioner training and expertise

At the center of the model is decision making: the cognitive action that turns evidence into contextualized EBPs. This is placed in the center to emphasize its central role in EBP. Decision making integrates research evidence, services client characteristics, and considers resources, when reaching a conclusion regarding a target population's custom-designed care options, as well as the context in which they are set (Spring & Hitchcock, 2010).

Moreover, environmental and organizational factors create a cultural context that helps moderate the acceptability of an intervention, its feasibility, and the degree of adaptation required for the intervention to fit the setting. Across all disciplines, context is important when making evidence-based decisions. Some disciplines – such as nursing, social work, and public health – place great emphasis on adapting evidence-based interventions to match the target context (Spring & Hitchcock, 2010).

Service Client characteristics and resources – Individual

When gathering data for the Service Client Characteristics and Resources circles, consider each of the following categories:

1. Service Client Characteristics, e.g.
   - Personal attributes and relevant history
   - Health status and current needs
   - Cultural beliefs and values
   - Treatment preferences
2. Resources, e.g.
   - Insurance coverage
   - Financial resources
   - An available, accessible interventionist trained to deliver the behavioral treatment
   - Accessible provider willing to prescribe medications if appropriate

Population characteristics and resources – Community

When gathering data for the Population Characteristics and Resources circles, consider each of the following categories (Spring & Hitchcock, 2010):

1. Population characteristics, e.g.
   - Prevalence and incidence of condition
   - Social norms related to the condition and intervention options
   - Identification of high-risk subpopulations
2. Resources, e.g.
   - Government funding
   - Volunteers and grassroots efforts
   - Product taxes and set-asides
3. Public health staffing and infrastructure

Evaluation, Dissemination and Follow-up (ANALYSE & ADJUST)

Step 5a: Evaluate the Outcomes of the Practice Decisions or Changes Based on Evidence (Analyze)

Step 5 evaluates the evidence-based initiative in terms of how the change affected service client outcomes; or how effective the decision was with a particular service client or practice setting. This evaluation is essential in determining whether the change based on evidence resulted in the expected outcomes in a real-world practice setting. Outcome measurement is vital in determining and recording the impact of the EBP change on service quality and/or client outcomes. If a change in practice (based on evidence) did not produce the same findings as the rigorous research, practitioners must ask many questions (e.g., Was the intervention administered in exactly the same way as the study? Were the clients in the practical setting similar to those in the studies?)

Step 5b: Disseminate the Outcomes of the Evidence-Based Practice Change (Adjust)

The final step in EBP is disseminating the outcomes of the EBP change. It is very common for practitioners to achieve positive outcomes through making changes in their practice based upon evidence. Yet, those outcomes are not shared with others (even colleagues), within their same institution. As a result, others are unable to learn and benefit from these outcomes. It is extremely important for practitioners to disseminate such outcomes through venues such as oral and poster presentations at local, regional, and national conferences, in addition to EBP rounds within their own institutions, journals, newsletters, and other types of publications.

Levels of program applicability and impact

Some nonprofit, organizations, such as the Laura and John Arnold Foundation (LJAF) in the United States, contribute in the launch of the evidence-based policy movement. This organization acts as an impartial reviewer, and identifies social programs that – based on rigorous studies in consultation with outside experts – meet the criteria for "Top Tier," "Near Top Tier," or "Suggestive Tier." It produces sizable, sustained benefits to participants and society. This enables policy officials and other readers to readily distinguish these programs from others that claim to have such evidence. The three types of tiers are as follows:

Top tier

These are programs which produce sizable, sustained effects on important outcomes. To be classified as top tier, evidence must not only be reproducible but also be performed at a large multi-site RCT, or two or more independent sites. This type of evidence strengthens the credibility of the program, in that it is able to produce important effects if carried out faithfully under conditions similar to the original.

Near top tier

Mainly comprising of programs that meet all aspects of the top tier standards for a single study site, these programs also require a replication RCT to confirm the initial findings and establish that the results generalize to other sites. It can be seen as tentative evidence that the program it is able to produce important effects if carried out faithfully under conditions similar to the original.

Suggestive tier

This includes programs that have been evaluated in one or more well-conducted RCTs and found to produce large positive effects. That said, the evidence of such programs might be limited by short-term follow-up, lack of statistical significance, or other factors. This type of evidence suggests that the program might be an excellent candidate for further research, but is not ready to be implemented in new settings.

Understanding the Difference between Empirical Research and EBP

EBP does not focus on developing new knowledge or validating existing knowledge.

Unlike research, EBP does not focus on developing new knowledge or validating existing knowledge. Instead, it translates the best evidence and then applies it to clinical decision making. In fact, uncovering the best evidence relies heavily on research. That said, EBP stretches far beyond research alone, as it also includes clinical expertise, patient preferences, and values. In some instances, EBP considers that the best evidence can sometimes come from opinion leaders and experts. This can occur without the existence of definitive knowledge from research results. Research focuses on developing new knowledge, whereas EBP uses innovation to find and translate the best evidence into practice. The table below shows the fundamental differences between empirical research and EBP.

	Empirical Research	Evidence-Based Practice
About	Developing new knowledge; Investigation, exploration, and discovery and requires an understanding of the philosophy of science.	Finding and translating the best evidence and applying it to clinical decision-making.
Purpose	To generate new knowledge or; To validate existing knowledge based on a theory.	To use the best evidence available to make patient-care decisions.
Process	Involve systematic, scientific inquiry to answer specific research questions or test hypotheses using disciplined, rigorous methods.	Include integrating the best evidence with one's clinical expertise, as well as patient/client preferences and values, and evaluating the effectiveness of applying the evidence.
Reliability and Validity of Evidence	For research results to be considered reliable and valid, researchers must use the scientific method in orderly, sequential steps.	The use of EBP takes into consideration that sometimes the best evidence is that of opinion leaders and experts, even though no definitive knowledge from research results exists.

Evidence-Based Practice in Various Disciplines

EBP in Social Sciences

EBP in psychology and counselling promotes effective practices and enhances public health.

In addition to medical services, there are various areas in social sciences that focus on Evidence-Based Practice (EBP). Such areas include psychology, counselling, and social work. Through the application of empirically supported principles of psychological assessment, case formulation, therapeutic relationships, and intervention, EBP in psychology and counselling promotes effective practices and enhances public health. In contrast, the purpose of EBP in the field of social work is to ensure that the most effective outcomes are achieved by its services and treatments. The aforementioned use of EBP for social work also allows programmes with proven success to be adopted on a larger scale.

To build upon their existing practice, medical practitioners often take advantage of evidence that is accumulated from clinical case studies and intervention research. For instance, the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 2013), is used by many psychiatrists, as it offers a common language and standard criteria for classifying psychological disorders. This particular manual demonstrates how the systematic documentation of clinical practice guides mental health practitioners. In addition, structured inventories based on empirical studies i.e., Beck's Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), Personality Assessment Inventory (PAI; Morey, 2007), and Minnesota Multiphasic Personality Inventory (MMPI; Hathaway & McKinley, 1951), are commonly used to assess clinical mental health. These resources are a solid example of evidence-based research being used to assist medical practitioners. Furthermore, there are a number of widely-used modalities, such as cognitive behavioral therapy (Beck & Beck, 2011) and interpersonal psychotherapy (Robertson, Rushton, & Wurm, 2008), which are also supported by systematic intervention research with randomized controlled trials (Luty et al., 2007).

EBP in Business

There are many uses of EBP in business; take game theory for example. This mathematical model studies cooperation and conflict between rational decision makers. Business-related industries, such as economics and finance, apply this theory for business strategy. For example, a company's empirical findings from game theory can be used to deal, compete, or negotiate with their competitors. In addition to game theory, Evidence-Based Management (EBM) – based on the concept of EBP – is a fundamental principle of business practice. For instance, companies often use EBM in areas including downsizing, motivating employees, setting goals, encouraging entrepreneurship, managing mergers, financial incentives, management training, improving performance, as well as selecting and evaluating employees. Clearly, the use of EBP can be applied to a diverse range of industries and disciplines.

Evidence-Based Management (EBM) – based on the concept of EBP – is a fundamental principle of business practice.

Similar to medicine, business management can only be properly developed through knowledge acquisition and experience. For business managers, logic and evidence is a primary component of operating more effectively. To further this development, managers must also be relentless in seeking knowledge from inside and outside of their companies. This type of practice allows managers and companies to gain an advantage over their competitors.

Under the principles of EBM, managers of companies can solve organizational issues with guidance from social science and organizational research. During the decision making process, information from scientific research, organizational data, professional experience, as well as stakeholder concerns and values, are taken into account. With the support of evidence-based research, leaders of organizations are better equipped to make decisions that might benefit their company. In fact, some companies supply manuals for their employees to help increase productivity and standards. For example, an accounting officer might receive a manual that specifies the necessary handling of accounting transactions, procedures, reports, and so on.

In terms of EBM, there must be a combination of critical thinking and solid evidence to inform managerial decisions. This evidence might come from scientific research, but business information and professional experience can also fall under this category. In many cases, business managers tend to overlook the quality of evidence when making decisions. As a result, their ill-informed management decisions can cause negative consequences for their company. Unfortunately, management decisions are often based on 'best practice' or the success stories of others. This can be misleading and damaging in the long-run. Conversely, EBP critically evaluates the validity, generalizability, and applicability of any given evidence, which allows the 'best available' evidence to be ascertained.

For business managers, another way of implementing scientific evidence in the decision-making process is through online databases. Taking advantage of technology, managers can evaluate the validity of online data and then see whether it is applicable to their company. Universities and business schools have also seen great potential in this resource, and thus have incorporated EBP in their curriculum. These educational facilities cover various aspects such as research, methodology, and scientific analysis. This way of thinking helps to counterbalance one's judgment, which is often based on inner thoughts and subjectivity.

Taking advantage of technology, managers can evaluate the validity of online data and then see whether it is applicable to their company.

EBP in Law

Law is a set of principles and regulations that are binding or enforced by a controlling authority. This practice is based on research, data, and evidence. Criminal justice covers areas including law enforcement, pretrial justice, community supervision, prisons, and reintegration. As such, these domains serve at the forefront of policy, innovation, and legal practice. Moreover, criminal justice can be measured and quantified, which allows evidence-based innovation to be implemented on a wide scale. Having a vast amount of legal practitioners also creates a broad platform for research, evidence, and tools for new policies and improved practices.

EBP strategies and collaborations in criminal justice can act as a catalyst for innovation and reforms in society.

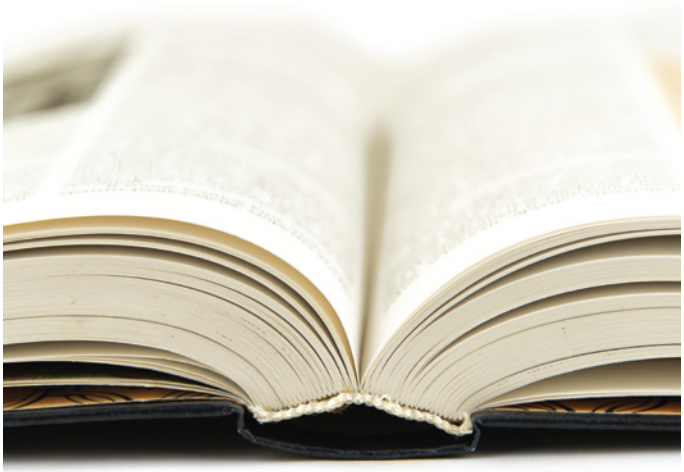
Under these conditions, EBP strategies and collaborations in criminal justice can act as a catalyst for innovation and reforms in society. As a result, this creates a knock-on effect in the overall safety of a community, as well as the values of equity, fairness, effectiveness, and justice.

EBP in Education

EBP also has great potential in education, as it draws upon teaching experience and learning projects that are independently evaluated. More specifically, schools that have special educational needs, parental engagement, language, literacy, and teaching methodologies, can apply EBP to develop a variety issues, themes, or practices. For example, a study found that a student-centered teaching method – as opposed to a teacher-centered method – provided students with better opportunities when learning English as a foreign language (Ellis, 2009; Peyton, Moore & Young, 2010). Based on these findings, the teachers modified their approach to optimize their teaching methods (Gutiérrez, 2008; Lin & Chien, 2009; Zeng & Takatsuka, 2009).

The research evidence, viewed alongside the other resources, provides a better picture of how to improve the positive outcomes of students.

The research evidence, viewed alongside the other resources, provides a better picture of how to improve the positive outcomes of students. Thus, in response to the various challenges that might arise, EBP projects can developed in collaboration with teachers, school leaders, and researchers; thereby further informing teaching and learning.



Definition of EBP in Various Disciplines

Disciplines	Definitions
Psychology	EBP is the combination of three parts, best research evidence, clinical expertise, and patient values (APA Presidential Task Force on Evidence-Based Practice, 2006).
Social Work	EBP is a process in which the practitioner integrates well-researched interventions with clinical experience, ethics, client preferences, and culture to guide and inform the delivery of treatments and services (Social Work Policy Institute, 2010).
Management	EBP is the conscientious, explicit, and judicious use of information in making decisions about service delivery to clients (Briner, Denyer & Rousseau, 2009). The sources of information include: 1. Practitioner expertise and judgment, 2. Evidence from the local context, 3. A critical evaluation of the best available research evidence, and 4. The perspectives of those people who might be affected by the decision
Law	EBP refers to outcome-oriented approaches and interventions which have been scientifically tested in controlled studies and proven effective. EBP suggests that there is a definable outcome(s) which can be measured and are defined according to practical realities (eg. recidivism, victim satisfaction, etc) (California Courts, 2018).
Education	EBP refers to a paradigm by which education practitioners make informed decisions on education interventions, policies, practices, and programs by using empirical evidence. When making a decision, "evidence-based" approach is emphasized over "opinion-based" approach (The Wing Institute, 2018).

References

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub.

APA Presidential Task Force on Evidence-Based Practice. (2006). Evidence-based practice in psychology. The American Psychologist, 61(4), 271-285.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. Archives of general psychiatry, 4(6), 561-571.

Beck, J. S., & Beck, A. T. (2011). Cognitive behavior therapy: Basics and beyond. NY: The Guilford Press.

Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-based management: Concept cleanup time?. Academy of Management Perspectives, 23(4), 19-32.

Brownson, R. C., Kreuter, M. W., Arrington, B. A., & True, W. R. (2006). Translating Scientific Discoveries Into Public Health Action: How Can Schools Of Public Health Move Us Forward? Public Health Reports, 121(1), 97–103.

California Courts (2018). Evidence-based practice. Retrieved September 25, 2018, from http://www.courts.ca.gov/5285.htm

Cheung, M. W. L. (2018). Applying evidence-based practice with meta-analysis. Retrieved from https://ids.hksyu.edu/assets/event/20180301_mike-cheung-1/ma-revised-.pdf.

Cheung, M. W.-L., & Vijayakumar, R. (2016). A guide to conducting a meta-analysis. Neuropsychology Review, 26(2), 121-128.

Drake, R. E., Goldman, H. H., Leff, H. S., Lehman, A. F., Dixon, L., Mueser, K. T., & Torrey, W. C. (2001). Implementing evidence-based practices in routine mental health service settings. Psychiatric services, 52(2), 179-182.

Ellis, R. A., Hughes, J., Weyers, M., & Riding, P. (2009). University teacher approaches to design and teaching and concepts of learning technologies. Teaching and Teacher Education, 25(1), 109-117.

Fineout-Overholt, E., Melnyk, B. M., & Schultz, A. (2005). Transforming health care from the inside out: advancing evidence-based practice in the 21st century. Journal of Professional Nursing, 21(6), 335-344.

Green, S., Higgins, J. PT., Alderson, P., Clarke, M., Mulrow, C. D., Oxman, A. D. (2005). Chapter 1 Introduction. In Cochrane handbook for systematic reviews of interventions (pp. 3-9). United Kingdom. A John Wiley & Sons, Ltd, Publication.

Gutiérrez, K. D. (2008). Developing a sociocritical literacy in the third space. Reading research quarterly, 43(2), 148-164.

Hargreaves, D. (1996a). Educational research and evidence-based educational practice–a response to critics. Research Intelligence, 58, 12-16.

Hargreaves, D. H. (1996b). Teaching as a research-based profession: possibilities and prospects (p. 7). London: Teacher Training Agency.

Hathaway, S. R., & McKinley, J. C. (1951). The MMPI manual. New York: Psychological Corporation.

Haynes, R. B. (2006). Of studies, syntheses, synopses, summaries, and systems: the "5S" evolution of information services for evidence-based health care decisions. ACP journal club, 145(3), A8-A8.

Kerner, J., Rimer, B., & Emmons, K. (2005). Introduction to the special section on dissemination: dissemination research and research dissemination: how can we close the gap?. Health Psychology, 24(5), 443.

Lin, G. H. C., & Chien, P. S. C. (2009). An Investigation into Effectiveness of Peer Feedback. Online Submission, 3, 79-87.

Luty, S. E., Carter, J. D., McKenzie, J. M., Rae, A. M., Frampton, C. M., Mulder, R. T., & Joyce, P. R. (2007). Randomised controlled trial of interpersonal psychotherapy and cognitive–behavioural therapy for depression. The British Journal of Psychiatry, 190(6), 496-502.

Melnyk, B. M., & Fineout-Overholt, E. (2006). Consumer preferences and values as an integral key to evidence-based practice. Nursing Administration Quarterly, 30(2), 123-127.

Morey, L. C. (2007). Personality assessment inventory (PAI): professional manual. PAR (Psychological Assessment Resources).

Peyton, J. K., Moore, S. C. K., & Young, S. (2010). Evidence-Based, Student-Centered Instructional Practices. CAELA Network Brief. Center for Adult English Language Acquisition.

Rycroft-Malone, J. O. (2008). Evidence-informed practice: from individual to context. Journal of Nursing Management, 16(4), 404-408.

Social Work Policy Institute. (2010). Evidence-based practice. Retrieved September 25, 2018, from http://www.socialworkpolicy.org/research/evidence-based-practice-2.html

Spring, B., Craighead, W. E., & Hitchcock, K. (2009). Evidence-based practice in psychology. In I. B. Weiner (Ed.), Corsini's Encyclopedia of Psychology, 4th edition (pp. 603-607). New York: Wiley.

Spring, B., & Hitchcock, K. (2010). Evidence-Based Practice. The Corsini Encyclopedia of Psychology, 1-4.

Straus, S., & Haynes, R. B. (2009). Managing evidence-based knowledge: the need for reliable, relevant and readable resources. Canadian Medical Association Journal, 180(9), 942-945.

The Wing Institute (2018). Evidence-based education. Retrieved September 25, 2018, from https://www.winginstitute.org/

University of Canberra (2018). Evidence-Based Practice in Health. Retrieved October 11, 2018, from https://canberra.libguides.com/c.php?g=599346&p=4149721

Wurm, C., Robertson, M., & Rushton, P. (2008). Interpersonal psychotherapy: an overview. Psychotherapy in Australia, 14(3), 46.

Zeng, G., & Takatsuka, S. (2009). Text-based peer–peer collaborative dialogue in a computer-mediated learning environment in the EFL context. System, 37(3), 434-446

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