Systematic review

Evidence-Based Practice in physiotherapy: a systematic review of barriers, enablers and interventions

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Abstract

Background Despite clear benefits of the Evidence-Based Practice (EBP) approach to ensuring quality and consistency of care, its uptake within physiotherapy has been inconsistent.

Objectives Synthesise the findings of research into EBP barriers, facilitators and interventions in physiotherapy and identify methods of enhancing adoption and implementation.

Data sources Literature concerning physiotherapists’ practice between 2000 and 2012 was systematically searched using: Academic Search Complete, Cumulative Index of Nursing and Allied Health Literature Plus, American Psychological Association databases, Medline, Journal Storage, and Science Direct. Reference lists were searched to identify additional studies.

Study selection Thirty-two studies, focusing either on physiotherapists’ EBP knowledge, attitudes or implementation, or EBP interventions in physiotherapy were included.

Data extraction and synthesis One author undertook all data extraction and a second author reviewed to ensure consistency and rigour. Synthesis was organised around the themes of EBP barriers/enablers, attitudes, knowledge/skills, use and interventions.

Results Many physiotherapists hold positive attitudes towards EBP. However, this does not necessarily translate into consistent, high-quality EBP. Many barriers to EBP implementation are apparent, including: lack of time and skills, and misperceptions of EBP.

Limitations Only studies published in the English language, in peer-reviewed journals were included, thereby introducing possible publication bias. Furthermore, narrative synthesis may be subject to greater confirmation bias.

Conclusion and implications There is no “one-size fits all” approach to enhancing EBP implementation; assessing organisational culture prior to designing interventions is crucial. Although some interventions appear promising, further research is required to explore the most effective methods of supporting physiotherapists’ adoption of EBP.

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Keywords: Evidence-Based Practice; Physiotherapists; Best Practices; Review; Decision Making; Practice-Research Gap

Background

Evidence-Based Practice (EBP) is a 5 step process whereby clinicians integrate best research evidence with clinical expertise and client preferences, producing the most appropriate and effective service [1,2]. As a result there has been growing pressure on physiotherapy to embrace EBP [3]. Engaging with both research and clinical findings can enhance the proficiency of physiotherapists’ clinical practice [2] and help prevent the misuse, overuse and underuse of healthcare services [4]. In an era of growing accountability of healthcare practitioners, this may provide a useful framework within which to work. Indeed, this has led some to argue that there is a moral obligation to base decision-making on research findings [3].

Despite the clear benefits of EBP, its uptake within physiotherapy (and other healthcare domains) has been patchy and inconsistent in quality [5]. Concerns over the compatibility of aspects of EBP and lack of clinically relevant research [3,6], have been raised by researchers and clinicians alike.
Objectives

Research has identified a number of challenges physiotherapists face when implementing EBP [6], which are sometimes inconsistent. This review aimed to synthesise research findings regarding barriers and enablers of EBP, and the effectiveness of current EBP interventions in physiotherapy, to help identify methods of increasing the consistency and quality of EBP implementation.

Method

The review followed the PRISMA guidelines [7] for reporting systematic reviews. A narrative analysis approach was adopted, whereby text is used to summarise and explain review synthesis findings, as it is suitably flexible to allow for the inclusion of diverse methodologies.

Data sources

Literature concerning physiotherapists’ practice between 2000 and 2012 was systematically searched using free-text keywords and MeSH or equivalent terms in combination (see Table S1). Reference lists were searched to identify additional studies.

Study selection

Articles were initially reviewed according to the following inclusion criteria;

- Published in a peer-reviewed journal in English;
- Published between 2002 and 2012;
- Primary research conducted with qualified physiotherapists;
- Focused on at least one of the following;
  - Physiotherapists’ knowledge/understanding of EBP
  - Physiotherapists’ attitudes towards EBP
  - Physiotherapists’ practice/implementation of EBP.
  - EBP interventions in Physiotherapy.

To enhance comparability of researching findings, only studies from the following Western cultures/regions were included: UK, Ireland, Europe, USA, Canada, Australia and New Zealand.

In total, 32 articles were retrieved that met the criteria; 27 used a quantitative method, 3 used a qualitative method and 2 used mixed-methods designs. A flow chart of study retrieval and selection is presented in Fig. S1.

Data extraction and synthesis

One author undertook all data extraction using a pre-defined template, and a second reviewed to ensure consistency and rigour. Synthesis was organised around the themes of EBP barriers/enablers, attitudes, knowledge/skills, use and interventions.

Quality appraisal

Quantitative articles were assessed using the Effective Public Health Practice Project (EPHPP; [8]) tool: each study was rated as strong, moderate or weak (see Table 1). Qualitative articles were appraised using the consolidated criteria for reporting qualitative research (COREQ; [9]), modified to rate articles as strong, moderate or weak. Mixed-methods research was evaluated using both tools.

Results

Despite known variations between countries’ healthcare provision a number of key themes were evident, suggesting they represent factors common to the practice of physiotherapy across contexts; as there were no obvious systematic differences in the characteristics of the research across regions or publication date, the results were structured around these themes. However, to aid with interpretation Table 1 presents studies’ characteristics and findings by region and date.

Practice of EBP

Some studies compared physiotherapists’ practice of EBP with professionals from other healthcare domains. Palfreyman et al. [10] found that although both nurses and physiotherapists had access to a broad range of EBP knowledge sources, physiotherapists used such sources and implemented EBP more frequently. However, both professions relied significantly on patients and colleagues as knowledge sources.

In a study comparing Swedish physiotherapists, dieticians and occupational therapists, physiotherapists read and reviewed research more often and were more likely to say EBP helped them with decision-making [11]. Complex differences between physiotherapists and other allied health professionals (AHPs) were identified in a UK sample [12]; physiotherapists outperformed on some aspects, such as identifying relevant research, but performed less well on others, such as identifying knowledge-gaps. However, other research with UK-based AHPs (physiotherapists, speech and language therapists, occupational therapists, dieticians, radiographers and podiatrists) found no statistically significant differences in EBP implementation, attitudes, or knowledge and skills [13]. These discrepancies may be explained by differences in level of academic preparation and access to educational initiatives (e.g. all professionals in [13]’s study had access to a professional development programme, potentially increasing consistency in EBP), and changes to EBP teaching.
Table 1
Summary of characteristics and findings of studies, arranged according region.

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<th>Findings</th>
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<tr>
<td>UK research Upton 2012 [13]</td>
<td>Opportunistic sample, 154 newly qualified AHPs (response rate = 27%)</td>
<td>Descriptive, cross-sectional survey</td>
<td>Assess and characterise adoption of EBP within newly qualified AHPs’ clinical practice</td>
<td>● No statistically significant differences on EBP Use, Attitudes or knowledge/skills between allied health professions. ● Changes to education/training in recent years have increased adoption and implementation of EBP among newly qualified AHPs ● Adoption and implementation of EBP may be influenced by education and support in tertiary settings.</td>
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<td>Bourne 2007 [36]</td>
<td>Random sample, 134 community physiotherapists from Community Trusts (response rate 67%)</td>
<td>Questionnaire development and descriptive, cross-sectional survey</td>
<td>Identify perceived professional, educational and personal needs of community physiotherapists, and determine good practice in meeting these needs</td>
<td>● 51% of participants had no specific continuing professional development learning objectives. ● Barriers to EBP: access to library resources within reasonable travelling distance, skills to use library facilities effectively, confidence to critically appraise literature, training opportunities to develop skills, opportunity to discuss research evidence with colleagues, computer access, and time and skills to use computer resources. ● Participants who had access to and taken up support (e.g. mentorship and journal clubs) had more positive EBP attitudes.</td>
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<td>Caldwell 2007 [5]</td>
<td>Random sample, recent graduates from 3 London Universities (response rate = 43%); Social workers (N = 26), Occupational Therapists (N = 29), Physiotherapists (N = 10), and Nurses (N = 1)</td>
<td>Descriptive, cross-sectional postal questionnaire</td>
<td>Explore relevance of initial professional training on EBP and explore practitioners’ confidence in engaging with EBP</td>
<td>● 76% stated that they had received training in conducting literature searches ● Positive attitudes held towards EBP and research; implementation of EBP by practitioners is infrequent with limited use of research resources. ● Despite 72% agreeing that EBP is favoured among colleagues, 58% agreed that there was a lack of time for EBP.</td>
<td>Moderate</td>
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<td>Stevenson 2006 [39]</td>
<td>Census of a Community Trust in North Staffordshire (N = 30)</td>
<td>Intervention design with random assignment; intervention group (n = 17), control group (n = 13) Questionnaire survey.</td>
<td>Explore community physiotherapists’ change in clinical management of patients with low back pain (LBP) following an educational intervention, using local opinion leaders</td>
<td>● Physiotherapists may have already been using aspects of psychosocial management (the intervention focus) for patients prior to the intervention. ● Little change was identified for the intervention group in what participants perceived to be important to patient recovery, actual clinical practice following the intervention, and treatment options used.</td>
<td>Strong</td>
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| Upton 2006 [12]     | Stratified sample, 1000 AHPs (response rate = 67%), 137 of which were physiotherapists (response rate = 72%). | Descriptive postal survey                                    | Explore AHPs’ practice and knowledge of EBP.                                                                                             | • Physiotherapists reported greater knowledge of EBP than podiatrists, radiographers and orthoptists, but similar knowledge levels to occupational therapists, dieticians, speech and language therapists and psychologists.  
• Substantial proportion of physiotherapists (35%) self-reported their knowledge as high, with the majority self-reporting as medium (45%).  
• Barriers to EBP similar between all AHPs; two key barriers identified: lack of time and money. | Weak          |
| Stevenson 2004 [22] | Census (N = 30) of physiotherapists from a Community Trust in North Staffordshire. | Intervention design with random assignment; intervention group (n = 17), control group (n = 13) Questionnaire survey. | Explore community physiotherapists’ change in clinical management of patients with low back pain (LBP) following an educational intervention, using local opinion leaders. | • Most believed clinical practice should be based on best evidence.  
• Practitioners reported relying on courses and in-service training for informing practice.  
• Literature, journals and research all rated as low priority for best clinical practice. | Strong        |
| Palfreyman 2003 [10] | Physiotherapists (N = 37, response rate = 37%) and nurses (N = 53, response rate = 24%) from a teaching hospital. | Cross-sectional, descriptive survey.                      | Investigate physiotherapists’ and nurses’ EBP perceptions, skills and barriers.                                                          | • Information from the client and personal experience most common sources used in decision-making, the Internet was the least used source.  
• Physiotherapists more likely to report lack of skills in finding resources than nurses, less likely to report limited access to research.  
• 73% of nurses and physiotherapists reported lack of time as main barrier, followed by colleagues and organisation. | Weak          |
| Barnard 2001 [19]   | Random sample, 56 physiotherapists working in a variety of NHS treatment settings. | Qualitative; focus groups, group and individual interviews. Analysed using thematic analysis. | Identify physiotherapists’ understanding of EBP, their views as to its appropriateness in physiotherapy and what factors promote or discouraged its development. | • Physiotherapists held different definitions of EBP, based on views of what constitutes ‘evidence’ (e.g. research vs. practice-based).  
• All felt EBP was important.  
• Barriers & enablers of EBP: access to resources, workplace culture, ability to challenge senior colleagues’ views, suspicion of research, time, money and involvement with clinical interest groups and poor dissemination of best evidence information. | Moderate      |
| European research   | Opportunistic sample, 227 AHPs at a Swedish University hospital (response rate of 74% overall); 129 physiotherapists (response rate of 70%). | Descriptive, cross-sectional survey.                       | Explore allied health professionals’ attitudes, beliefs, knowledge and behaviour concerning EBP.                                          | • EBP perceived to not take into account the limitations of the clinical practice setting.  
• Physiotherapists scored significantly lower on the belief that EBP improves the quality of care, that they needed to increase the use of evidence in their daily practice, and that they wanted to learn and improve the skills necessary to incorporate EBP into their practice.  
• Physiotherapists read and reviewed research significantly more often and more likely to say EBP helped them to make decisions about patient care. | Moderate      |
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<td>Nilsagård 2010 [16]</td>
<td>Random sample, 833 Swedish Association of Physiotherapists (response rate = 45%).</td>
<td>Cross-sectional web-based survey.</td>
<td>Examine the knowledge, attitudes, behaviour and prerequisites regarding EBP.</td>
<td>• High knowledge of EBP although only 12 to 36% correctly identified the EBP proponents; 70% reported good critical appraisal skills. &lt;br&gt;• 28% performed database searches, while 86% used EBP in clinical practice. &lt;br&gt;• Main barriers: lack of time (86%), advisors (80%), knowledge (55%), and lack of interest from managers (46%).</td>
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<td>Hannes 2009 [28]</td>
<td>Purposive sample, 43 Belgian physiotherapists</td>
<td>Qualitative; 5 focus groups. Grounded theory approach to analysis.</td>
<td>Explore the barriers practitioners face when implementing EBP in daily clinical practice.</td>
<td>• Practitioners feared EBP framework would decrease therapeutic freedom. &lt;br&gt;• Limited evidence base for the profession and, of the research that is available, it is often difficult to translate it into practice. &lt;br&gt;• Negative attitude towards the concept of EBP and lack of motivation to implement, due to the Government initiating a move from quality of care to economic parameters; hence, EBP reduced costs associated with treatments with no proven effects.</td>
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<td>Kamwendo 2002 [21]</td>
<td>Stratified convenience sample, 343 Swedish Physiotherapists (response rate= 62%).</td>
<td>Cross-sectional, postal survey.</td>
<td>Explore perceptions and attitudes towards research and engagement with research-related activities.</td>
<td>• Research an important part of professionals’ role. &lt;br&gt;• Most read Swedish written articles (83%), while only 41% could read English language articles. Only 25% felt that research results were accessible. &lt;br&gt;• High workloads and insufficient time were considered the main barriers towards EBP (52%).</td>
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<td>Russell 2010 [40]</td>
<td>Convenience sample, 122 Canadian physiotherapists from 28 children’s rehabilitation organisations.</td>
<td>Mixed-methods, cohort evaluation study (although this study focuses on quantitative results only).</td>
<td>Evaluate the impact of a multifaceted knowledge translation intervention, involving 25 Knowledge Brokers (KBs) to facilitate the use of four EBP measurement tools.</td>
<td>• Increased familiarity with all the tools following the intervention and 12 months later. &lt;br&gt;• Factor analysis of the organisational characteristics and culture towards research, measurement and EBP revealed three factors (accounting for 78% of the total variation): research culture, resources and supervisor expectations. &lt;br&gt;• Research culture and supervisor expectations were significant predictors of physiotherapists going from “None” to “Some” use of the tools, and Supervisor expectations had was a significant predictor of changes from “Some”” to “High” use.</td>
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<td>Fruth 2010 [24]</td>
<td>Stratified, convenience sample, 24 US Physiotherapists working in a variety of care settings.</td>
<td>Pre-Post survey study</td>
<td>Examine practitioners’ opinions of EBP, whether EBP presentations world influence practitioners’ beliefs and practice, and what EBP barriers.</td>
<td>• Agreed that EBP is essential for practice. &lt;br&gt;• 91% agreed that they would revise their practice in accordance with evidence. &lt;br&gt;• Top three barriers: lack of time, access to publications and research findings.</td>
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| Salbach 2010 [14] | Purposive, opportunistic sample, 270 Canadian Physiotherapists (response rate = 81%) working in stroke rehabilitation. | Descriptive, cross-sectional mail survey. | Identify practitioner, organisational and research characteristics associated with research use among physical therapists involved in post-stroke services. | • 53% reported using research in clinical decision-making 2 to 5 times in a typical month.  
• 33% reported using research in clinical decision making only 0 to 1 times in a typical month.  
• Predictors of research use: academic preparation in EBP, EBP self-efficacy, perception of usefulness of research findings and participation in research. | Moderate       |
| Salbach 2009 [38] | Purposive, opportunistic sample, 270 Canadian Physiotherapists (response rate = 81%) working in stroke rehabilitation. | Descriptive, cross-sectional mail survey. | Identify practitioner, organisational and research characteristics associated with searching or reading literature among physical therapists involved in stroke management. | • 68% of the participants spent 0% of their work time on research activities.  
• Predictors of searching literature 2 or more times a month: participation in research, EBP self-efficacy, being Male, perceived support of research use and internet access to databases at work.  
• Predictors of reading literature 2 or more times a month: participation in research, EBP self-efficacy, membership of a professional body, perceived support, positive perceptions of usefulness of literature and relevancy of interventions evaluated. | Moderate       |
| Salbach 2009 [34] | Multistage sample of 23 Canadian physiotherapists (response rate= 72%). | Qualitative data collected via telephone interviews and analysed using constant comparative method. | Explore how physiotherapists use research evidence to update the clinical management of walking rehabilitation following stroke. | • Peers were a main source of information owing to ease of access, resources and cost.  
• Systematic reviews were found to be useful.  
• Barriers to EBP were insufficient time and organisational barriers, lack of computer and search skills, appraisal and application of research findings. | Moderate       |
| Schreiber 2009 [25] | Stratified, purposive sample of 5 (response rate = 71%) physiotherapists in the USA. | Three phase formative evaluation, action research project using mixed methods. | Identify, implement and evaluate the effectiveness of strategies to enhance EBP and clinical decision-making. | • Positive attitudes towards EBP pre and post interventions identified.  
• More time identified as being needed to practice skills and digest workshop material.  
• Knowledge of EBP may improve, but may not translate to behavioural changes. | Quantitative: Weak, Qualitative: Moderate |
| Saleh 2008 [37] | Purposive and snowball sample, 62 Canadian Physiotherapists (response rate = 84%) and 85 Occupational Therapists (response rate = 91%) working in paediatric Cerebral Palsy rehabilitation. | Cross-sectional survey, using vignettes, collected via telephone interview. | Explore the actual practices of Physical and Occupational therapists working with children with Cerebral Palsy. | • 47% of Physical therapists had conducted research in their work setting.  
• Key factors in EBP implementation: Time, child/parent compliance, resources, tools, and frequent educational sessions on the use of research findings in clinical settings.  
• Some controversial interventions were still being used. | Moderate       |
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| Spoto 2008  | Purposive sample of board-certified orthopaedic physiotherapists (N = 253, response rate = 30%) in the USA. | Descriptive survey of quantitative and qualitative data. | To explore how physiotherapists view and approach diagnosis in clinical practice in the USA. | ● Practitioners used a range of classification systems to inform diagnosis.  
● 50% used more than one classification system.  
● The classification systems used to inform diagnosis were not necessarily those which were best represented in the literature – highlighting a potential lack of awareness of best evidence of available systems. | Weak         |
| Bridges 2007 | Random sample, 939 US Physiotherapists (response rate = 73%).            | Descriptive, cross-sectional mail survey.  | Determine extent to which social system characteristics of Physiotherapists' workplaces influence EBP adoption. | ● Personal characteristics, such as desire for life-long learning, highest degree held and non-conformity (perhaps reflection autonomy) associated with greater adoption of EBP.  
● Age, number of years licensed, percentage of time in direct patient care were negatively associated with lower adoption of EBP.  
● Practicality of evidence (easy to access, time efficient, relevant to practice) associated with greater adoption. | Moderate      |
| Brown 2007  | Snowball sample, 40 US Physiotherapists in general clinical practice.    | Descriptive, cross-sectional survey collected via face-to-face interview. | Explore use of information resources.                                  | ● Only 55% members of the major professional association (APTA).  
● 55% attended continuing education activities 3 or more times a year, 20% attending 0 to 1 such events a year.  
● Greatest access to peer-reviewed journals was through professional membership. | Weak          |
| Salbach 2007 | Purposive, opportunistic sample, 270 Canadian Physiotherapists (response rate = 81%) working in stroke rehabilitation. | Descriptive, cross-sectional mail survey. | Identify practitioner and organisational barriers to EBP implementation. | ● 55% of participants felt there was a divide between research and practice.  
● Only approx. 50% had learnt about EBP in their initial training/received training in searching/appraising research.  
● Self-efficacy was between 50 and 80% for searching and appraising literature, but below 50% for critical appraisal of specific aspects of research and 50% felt they should not be responsible for literature reviews. | Moderate      |
| Carter 2006  | Random sample, 433 (APTA member) Physiotherapists (response rate = 43%).  | Descriptive, cross-sectional mail survey.  | Explore literature reading habits, characteristics relating to reading patterns, how information from publications are used. | ● Most frequently read journals were not peer-reviewed.  
● Educational attainment related to use of literature, also educators read for research ideas, clinicians read for patient management.  
● 37% indicated a key text or continuing education course as most influencing their practice. | Weak          |
| Mikhail 2005 | Stratified random sample, 100 Canadian Physiotherapists (response rate = 86%) from the listings of the provincial licensing. | Descriptive survey administered via telephone interview. | Determine the prevalence of use of interventions with evidence of effectiveness, in the management of acute, non-specific low back pain (LBP). | ● Most influential factor in intervention choice: 35% stated known effectiveness for; 28% stated training; 12% learned about it at a conference/seminar/course.  
● Interventions selected by physiotherapists actually classified mainly as: limited/contradictory effectiveness evidence.  
● High evidence users: graduated more recently, and had taken more postgraduate courses. | Moderate      |
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<td>Solomon 2004 [26]</td>
<td>Purposive sample, 38 Canadian graduates (response rate = 75%) for a survey, and 30 for interviews (response rate = 79%).</td>
<td>Mixed method design (descriptive survey followed by telephone interviews).</td>
<td>Explore the factors influencing career choice and the professional socialisation of Canadian Physiotherapists.</td>
<td>• 60% felt a mentor had significantly contributed to their professional career development. • Positive EBP attitudes, but constraints on adoption identified: time, resources, lack of practitioner led research or feasible to implement outcomes, disillusioned with the professional bodies’ support, resources and expense. • Misconception identified that EBP ignores clinical expertise. • 90% held positive EBP attitudes. • While 82% agreed/strongly agreed they engaged with EBP educational sessions, 84% believed there is a need to increase EBP. • Insufficient time rated by 67% as one of the top 3 barriers.</td>
<td>Quantitative: Moderate Qualitative: Weak</td>
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<td>Jette 2003 [20]</td>
<td>Random sample, 488 (APTA member) Physiotherapists (response rate = 49%).</td>
<td>Postal questionnaire-survey.</td>
<td>Explore; EBP attitudes and beliefs, education, attention to literature, accessibility of information and EBP barriers.</td>
<td>• Physiotherapists demonstrated the highest baseline scores in objective EBP knowledge, but lowest attitude scores. • Only physiotherapists demonstrated significant improvements in all outcomes, and EBP attitude. • Physiotherapists showed the greatest increase in scores.</td>
<td>Weak</td>
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<td>Australian research</td>
<td>Lizarondo 2012 [27]</td>
<td>Maximum variation sample, 93 allied health professionals (n = 19 physiotherapists).</td>
<td>Pilot, pre- post- study. All groups received a 6 month journal club.</td>
<td>Explore the impact of a structured model of journal club on allied health professionals adoption and implementation of EBP.</td>
<td>Moderate</td>
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<td>McEvoy 2011 [35]</td>
<td>Opportunistic sample, 2 cohorts of Australian physiotherapy students/graduates (cohort 1 N = 29 and cohort 2 N = 72).</td>
<td>Prospective observational longitudinal design.</td>
<td>Assess changes in entry-level physiotherapy students’ knowledge, attitudes and behaviours, when transitioning into the workforce.</td>
<td>Weak</td>
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<td>Iles 2006 [15]</td>
<td>Convenience sample, Australian physiotherapists (N = 124, response rate = 54%).</td>
<td>Descriptive, cross-sectional postal survey.</td>
<td>Examine practitioners’ current practice, skills and understanding of EBP.</td>
<td>Moderate</td>
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<td>Gosling 2004 [33]</td>
<td>Random sample, AHPs from 65 Australian hospitals; Physiotherapists (N = 228).</td>
<td>Descriptive, cross-sectional survey.</td>
<td>Explored practitioners’ awareness of an evidence resource online system and their use of evidence and the system.</td>
<td>Moderate</td>
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N.B. No studies from New Zealand meeting the inclusion criteria were identified.
Research suggests physiotherapists’ EBP is infrequent and varying in quality [6]. One study [14] reported that 53% of respondents used research in clinical decision-making only 2 to 5 times in a typical month and 33% used research only once a month or less. Another study discovered that although 69% stated they read relevant research, only 26% critically appraised it [15]. Furthermore, high self-ratings of EBP skills do not necessarily translate to greater or more accurate implementation [15]. For example, Nilsagård and Lohse [16] found that although practitioners rated their knowledge of EBP highly, only 12 to 36% correctly defined the EBP components [16]. Similarly, when asked about the most influential factors in intervention choice, 35% of a sample of American physiotherapists stated “known effectiveness”, despite the interventions actually chosen having limited or contradictory evidence [17]. This suggests a disparity between research awareness, critical appraisal skills and practice. However, it is not clear what physiotherapists in this study took “known effectiveness” to mean.

Lastly, although physiotherapists may believe EBP is important, they may not feel it is their responsibility to undertake all its steps [18].

**Attitudes towards EBP**

The majority of studies identified positive attitudes towards EBP and research use in practice [5,11,17–27], with many physiotherapists viewing EBP as a necessary part of their role which helped inform clinical decision-making. However, misconceptions of EBP were also identified. Some research [28] revealed less positive attitudes towards EBP arising from concerns that it would decrease therapeutic autonomy, resulting in a lack of motivation to implement it. Therapists felt the drive towards EBP was economic, rather than quality of care.

Importantly, this review highlights a disparity between attitudes and behaviour, with some practitioners with positive attitudes failing to consistently implement EBP [15,16] and others with less positive attitudes implementing it more frequently [11]. This raises questions about the link between attitudes and behaviour; particularly for EBP self-efficacy studies, which have identified attitudes as an important, modifiable factor in EBP adoption and implementation [14].

**Knowledge, skills & educational preparation**

A study comparing AHP’s self-reported EBP knowledge revealed physiotherapists’ ratings as similar to occupational therapists, dieticians, speech and language therapists and psychologists, but greater than podiatrists, radiotherapists and orthopists; with the vast majority (80%) of physiotherapists rating their knowledge as mid to high [12]. In another study [20], physiotherapists rated their self-efficacy in research and appraising literature as mid to high (50 to 80%), but critical appraisal of psychometrics and statistics as low (<50%). Clinicians also reported difficulty in interpreting odds ratios [11], and research written in English when it was not their first language [21]. Physiotherapists may also be confused regarding what the term “evidence” actually refers to [19], and therefore what type of evidence they should implement in practice.

Level of academic preparation was found to have a positive relationship with knowledge of EBP [17], more positive attitudes and fewer perceived barriers towards research utilisation [16,29], greater use of interventions with high research-evidence support [17], greater levels of research use in practice [14] and greater adoption of EBP [30]. Holding higher educational qualifications may reflect a desire for lifelong learning, identified as a key predictor of EBP adoption [2], which may account for these findings.

Research indicates that an individual’s personal and workplace libraries may be dominated by those texts acquired during entry-level education [23]. Furthermore, formal educational courses may influence choice of classification tools in practice: Spoto and Collins [31] suggested that frequent self-reported use of unsupported interventions may be due to them featuring prominently in graduate and postgraduate training. These findings indicate that continuing educational engagement may be a means of ensuring core “go-to” information remains up-to-date. Interestingly, Solomon et al. [26] found that although physiotherapists wanted to continue with their education and develop clinical specialisation, they did not wish to do so formally. This suggests physiotherapists may not view formal academic education as a useful means of continuing professional development (CPD), which may relate to the perception of “academic” peer-reviewed information sources as being of limited practical value (e.g. [34]).

Information technology (IT) was consistently identified as important in education and EBP implementation. Gosling and Westbrook [33] found that one of the main factors associated with awareness and use of an online evidence resource was confidence in computer skills. In a study with UK AHPs a gap was apparent between confidence in understanding the 5-step process of EBP and the skills required to implement this knowledge [6]. In part this may be due to lack of confidence with IT, as many may have graduated prior to the widespread introduction of IT in the healthcare setting [5]. Indeed, the Internet has been identified as the least used source of information in decision-making [11], and lack of computer skills as a predictor of lower EBP adoption [14,34].

The period of transition between completion of entry-level education and entering the workforce also presents issues for EBP implementation: there may be a mismatch between the ideals learnt during a course and opportunities for newly qualified practitioners to implement their skills [13,35]. Also, being unable to challenge senior colleagues’ views and practices was a barrier to EBP for junior physiotherapists [19].

**Barriers & enablers**

Time/workload pressures were the most common barrier to EBP implementation [5,11,12,16,18–21,24–26,30,34,
However, as the demands on healthcare professionals seem unlikely to be alleviated in the future, this review focuses on the other consistent but modifiable barriers identified in the research, as potential areas for intervention. If such modifiable barriers are addressed, this may have a positive effect on time/workload pressures, as well as enhancing the provision of appropriate and effective care.

**Ambivalence**

Only 55% of a sample of American physiotherapists [23] were found to be members of the professional association, a theme replicated in other samples [24, 27]. As professional bodies provide a key access-route to peer-reviewed journals [30, 36], and membership of a professional body predicts reading literature twice a month or more [38], this is concerning. Some research [26, 28] revealed that although many felt membership was important and provided their profession with a voice, a significant minority felt disillusioned with the provision (particularly regarding prohibitive costs), leading to ambivalence towards membership.

**Perceptions of research**

As well as the practical aspects of research utilisation such as library and computer access, and having the skills to use resources effectively [18, 19, 24, 34, 36], perceptual barriers were also identified. Some practitioners viewed the evidence-base as limited, difficult to translate into real-world applications [19, 28] and inaccessible [21], resulting in EBP failing to take the limitations of the clinical practice setting into account [11]. This may explain why some physiotherapists felt suspicious of research and did not value it [19].

Differences in perceptions of the role of research, levels of engagement and views on methods of promoting EBP were apparent between physiotherapists working in community and academic hospitals [19].

**Sources of evidence**

A significant proportion of studies reported physiotherapists’ primary sources of decision-making information as the client, personal experience [10], courses and in-service training [39]. Practitioners reported difficulty in reading journal articles, and rated literature and research as low priorities for implementing best clinical practice [22]. Non-peer-reviewed literature was frequently read by practitioners [32] and for many, peers were a core source of information, owing to financial constraints and ease of access [14]. This may also arise from some clinicians’ concern about the lack of practitioner-led research and feasible-to-implement outcomes [26].

Previous research experience and positive attitudes towards conducting research in the future [29] were identified as predictors of positive attitudes towards research implementation. Unfortunately one common theme in the literature was a lack of opportunity for physiotherapists to conduct research [17, 37, 38]. Providing greater opportunity for physiotherapists to engage in research may help increase positive attitudes towards EBP, develop physiotherapists’ EBP skills, and contribute to a practical, applied research base which may provide physiotherapists with more accessible evidence to guide them in their roles.

One worrying observation was the misconception that EBP ignores clinical expertise, leading some physiotherapists to feel they had to apologise for using it in their practice [26] and suggesting there was a fundamental misunderstanding of the premise of EBP. Other physiotherapists were concerned about where the ‘patient’ fits into the process [19]. These concerns could be addressed through in-house education [13], which physiotherapists appeared to desire [37].

**Interventions**

A small number of articles explored the impact of EBP enhancing interventions (n = 6), including: a psychosocial management intervention using opinion leaders [22, 39]; a multi-faceted intervention using Knowledge Brokers (individuals who facilitate collaborative working and understanding between researchers and decision-makers [40]); a formative evaluation project including an EBP workshop [25]; a Journal club [27] and a presentation-based initiative to highlight local examples of EBP [24].

The interventions’ effectiveness received mixed results. For example, little change on perceptions and practice were identified following the psychosocial management [39] and although positive attitudes towards EBP were identified before and after the formative evaluation project, implementation of the taught strategies was variable [25]. The Knowledge Broker [40], journal club [27] and the local EBP presentation-based interventions [24] demonstrated greater effectiveness, such as: greater familiarity of evidence-supported tools, improvements in EBP practice and attitudes and intentions to revise practice.

**Limitations**

Only studies published in the English language, in peer-reviewed journals were included, potentially introducing publication bias. Owing to the inclusion of both quantitative and qualitative findings, textual (rather than statistical) synthesis was performed. Although this approach may be subject to greater confirmation bias (i.e. selection/interpretation of information which confirms pre-existing beliefs), the adoption of a systematic review methodology (i.e. systematic search strategy, quality appraisal, and data extraction procedures), and independent raters help mitigate this issue.

**Reviewed studies’ limitations**

Studies’ quality-ratings ranged from weak to strong, with the modal award being moderate, therefore this synthesis of research findings should be interpreted with a degree of caution. A number of methodological issues can be identified. Many studies relied on subjective, self-report measures; the
issues around the reliability and validity of self-report measures are well documented [41]. Furthermore there appears to be a lack of consistent definitions of EBP or optimal research use. For example, a common implication is that greater amounts of time spent searching for literature indicates greater engagement with research. However, this could equally represent a lack of skills (i.e. inefficiency in identifying and acquiring salient information). Therefore, there is a need to identify robust measures of the quality of EBP implementation, not merely frequency and duration.

Many studies reported low response rates: although this is common with survey research (and some studies examined non-response characteristics), it is reasonable to assume that individuals with more positive attitudes towards research were more likely to participate, thereby biasing results. Furthermore, samples tended to be female and “urban” dominated and recruited from professional bodies’ registration lists, suggesting further research exploring the experiences of other groups of physiotherapists would be useful.

Although some authors recognised that social desirability effects may have impacted on their findings [14,17,37,38] little attempt was made to control for this. Future research should seek to include a measure of socially desirable responding, as this may help to explain the disparity between self-reported attitudes, skill, and actual performance.

Conclusion and implications of key findings

A large proportion of physiotherapists’ hold positive attitudes towards the principles of EBP. However, these attitudes do not necessarily translate into consistent, high-quality EBP. Although there are resources available to enable physiotherapists to implement EBP, they appear to struggle to do so on a daily basis. Concerns regarding EBP are apparent at two levels: EBP as a principle (i.e. using the best evidence in practice), and EBP as a process (i.e. actually implementing all the steps involved in EBP). Indeed, many barriers to EBP implementation have become apparent, such as: lack of time and skills, misperceptions of EBP and what constitutes “evidence”. Furthermore, a significant challenge encountered by physiotherapists is the lack of high quality (i.e. valid and reliable) research evidence available to them. This issue may be compounded by confusion regarding what actually constitutes “best” (i.e. valid, reliable and relevant) research.

Interventions focusing on modifiable factors, such as increasing the practical/applied value of research, increasing open-access resources and peer-reviewed “coffee table” publications, may help reduce time and resource demands for physiotherapists when implementing EBP. Furthermore, there appears to be a preference for information-seeking from ‘human’ as opposed to ‘computer’ sources, suggesting interventions using knowledge brokers (such as the one implemented by Russell et al. [40]) may be particularly welcomed. Greater organisational commitment to signposting physiotherapists to key changes in policy, guidelines, or research evidence may help alleviate the feeling of “shifting sands”, which many encounter when trying to remain up-to-date with best research evidence and applying it to their own practice. Another important issue to recognise is that there is no “one size fits all” intervention for enhancing EBP. For example, physiotherapists working in different settings (e.g. community, hospital, acute) may have different educational needs and encounter different barriers [36,39]. Therefore, assessing organisational culture prior to the development of educational interventions is essential.

In-house CPD activities appear to be a key method of ensuring knowledge and skills remain current, as well as capitalising on the preference for ‘human’ information sources. Although a few promising interventions have been identified, further systematic evidence is required to understand which are the most effective in enabling physiotherapists to implement EBP.

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Appendix A. Supplementary data

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