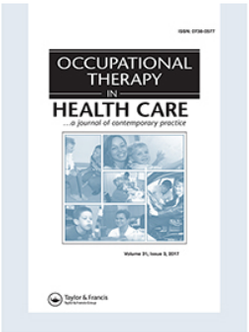

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Practitioner Training for Use of Evidence-Based Practice in Occupational Therapy

Christine T. Myers and Jennifer Lotz

University of Florida, Gainesville, Florida, USA

ABSTRACT

The purpose of this integrative review was to examine the evidence-based practice (EBP) training literature for occupational therapy practitioners in order to describe the relationships between EBP use in practice and practitioner training for EBP. A systematic search of literature related to EBP training in occupational therapy was followed by a research evaluation, review of case examples, and qualitative content analysis. Findings suggest that comprehensive, contextually-relevant, and collaborative training approaches are necessary for practitioners to address implementation of EBP. Research investigating the mechanisms of practitioner training and ways to measure the relationships between training, changes in how practitioners use evidence-based practices, and client outcomes and other quality indicators is recommended.

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KEYWORDS
Clinical decision-making; evidence-based practice; professional competence; professional education

The use of evidence-based practice (EBP) has been an essential component of occupational therapy for two decades. Law and Baum (1998) defined EBP in occupational therapy as using "research evidence together with clinical knowledge and reasoning to make decisions about interventions that are effective for a specific client" (p. 131). Likewise, Holm (2000) described the use of evidence as a tool for improving occupational therapy efficiency and effectiveness, as well as a way of demonstrating practitioners' continuing competence. The American Occupational Therapy Association (AOTA) supported EBP by envisioning a science-driven and evidence-based occupational therapy profession in their centennial vision (AOTA, 2007).

Internationally, the push for increasing EBP has included the assimilation of occupational therapy with knowledge translation, an approach to integrating knowledge and context with the goal of implementing best practice (Bennett et al., 2006; Cramm et al., 2013). In the United States, expectations of health organizations and third-party payers include an occupational therapy workforce who value and dependably employ EBP (Arbesman et al., 2014; Fisher & Friesema, 2013). More recently, occupational therapy literature has described EBP as an integral part of

CONTACT Christine T. Myers, PhD, OTR/L ctmyers@phhp.ufl.edu Department of Occupational Therapy, University of Florida, PO BOX 100164, Gainesville, FL 32610, USA.

healthcare quality, as occupational therapy services provided without grounding in scientifically-based approaches and clearly delineated decision-making processes may risk relegating the profession to the healthcare sidelines (Leland et al., 2015). This prospect heightens the importance of practitioners' ability to understand, apply, and implement EBP.

Students in entry-level occupational therapy academic programs receive training in understanding and practical application of EBP. Following graduation, occupational therapy practitioners typically obtain information about EBP through participation in continuing education, on-the-job in-services, and other types of training. Elements of training programs differ; some employ a primarily lecture-based approach, some focus on engaging the learner with interactive strategies, and others provide continued facilitation and training support over extended time periods. Yet, to date, there has been no comprehensive description of how EBP training for occupational therapy practitioners is implemented and how this EBP training intersects with everyday practice. The purpose of this review was to examine the EBP training literature in occupational therapy in order to describe the relationships between practice, practitioner training, and EBP. An organizing framework of the relationships was created following an evaluation of the research literature in order to identify research gaps and implications regarding EBP training and implementation.

Method

The authors conducted an integrative review, a broad type of research review that included research representing diverse methods, theoretical literature, and practice literature to define concepts, review theory or evidence, or analyze methodological issues (Whittemore & Knafl, 2005) related to practitioner training and EBP. In order to obtain a comprehensive understanding of the concepts, case examples, as well as research from all methodology types, were included. The five step process, described by Whittemore and Knafl, was used: (1) systematic literature search, (2) evaluation of research literature, (3) charting and description of selected empirical and non-empirical literature, (4) qualitative content analysis of all included sources, and (5) interpretation of findings reported in diagrammatic form. The following questions directed the review: How has practitioner training for EBP been studied in occupational therapy? What are the key concepts related to occupational therapy practice, practitioner training, and EBP?

Literature search

Records were retrieved from the electronic databases (e.g., CINAHL, PubMed, ERIC, PsycInfo, ProQuest Dissertations and Theses) from January 1, 2000 through July 15, 2016. The timeframe was chosen to account for recognition of EBP in occupational therapy during the early 2000's. The search terms were occupational therapy and evidence based practice*, knowledge translation, research utilization, implementation, and dissemination. Additionally, manual searching of reference

lists and key journals through August 15, 2016 was performed. Inclusion criteria were: (1) published in English, (2) published in a peer-reviewed journal or a published dissertation or thesis, and (3) a research study or case example including either general EBP training or targeted EBP training focused on specific interventions (i.e. knowledge translation and implementation activities) for occupational therapy practitioners, with EBP as defined by Law and Baum (1998), or a variant of EBP, such as research utilization, knowledge translation, or implementation. Excluded from analysis were sources deemed commentary or sources with no EBP training component. After the search by the first author, the first and second authors reviewed abstracts independently in order to identify relevant articles for inclusion. If an abstract was selected for further review, the full-text article was reviewed independently to determine relevance. Discrepancies were discussed until consensus was reached.

Data evaluation

Following the literature search, the authors evaluated all selected studies. In keeping with the modified framework for integrative reviews that guided this study, it was decided to include all selected studies. Including all studies was important for identifying knowledge gaps and obtaining a comprehensive understanding of EBP training for occupational therapy practitioners, improving the veracity of the data analysis, rather than using the data evaluation to include or exclude studies. The authors first reviewed the full-texts to determine if they were research or case examples. Papers that were deemed a case example did not undergo evaluation. Both authors independently evaluated all papers categorized as research using tools developed by the McMaster University Occupational Therapy EBP Research group (Law et al., 1998; Letts et al., 2007). Levels of evidence were assigned based on the Research Pyramid model for occupational therapy (Tomlin & Borgetto, 2011). This model was chosen due to the exploratory nature of the topic and the authors' desire to maintain parity across methodology types, a criticism of the traditional levels of evidence models that use a single-hierarchy (Tomlin & Borgetto, 2011). The authors reviewed the initial evaluations together and then discussed the findings until reaching consensus. Based on the Research Pyramid model, studies were categorized as descriptive, qualitative, experimental, or outcome and provided a score of 1 (most rigor) to 4 (least rigor) based on their level of evidence within each methodology type.

Data analysis and interpretation

Each selected article was read and data extracted by creating evidence tables for research studies, and developing descriptive tables for case examples. Evidence tables included the author, year of publication, study design, participants, intervention, outcome measures and/or instruments, and results. Case example tables included the author, year of publication, and a brief description. Qualitative content analysis was used to direct the data analysis process, supporting trustworthiness

through investigator triangulation, the development of a coding system, and maintenance of an audit trail (Hsieh & Shannon, 2005). After initial readings, the text of all articles was individually re-read line by line and key concepts systematically coded. Data displays were created to assist in analysis and comparison of the patterns, preliminary themes, and relationships between the research papers and case examples. Levels of evidence and results from research paper evaluations informed the analysis through identification of promising training strategies and by clarifying areas of future research need. Throughout this process the authors met regularly, using an iterative process to discuss and describe the emerging themes and relationships across the data in order to develop a final synthesis and interpretation of the findings (Whittemore & Knafl, 2005).

Results

The search resulted in 4,350 records with an additional four identified through a manual search. Figure 1 illustrates the flow of eligibility to final selection of 23 full-texts included 16 research papers, 1 dissertation, and 6 case examples. The

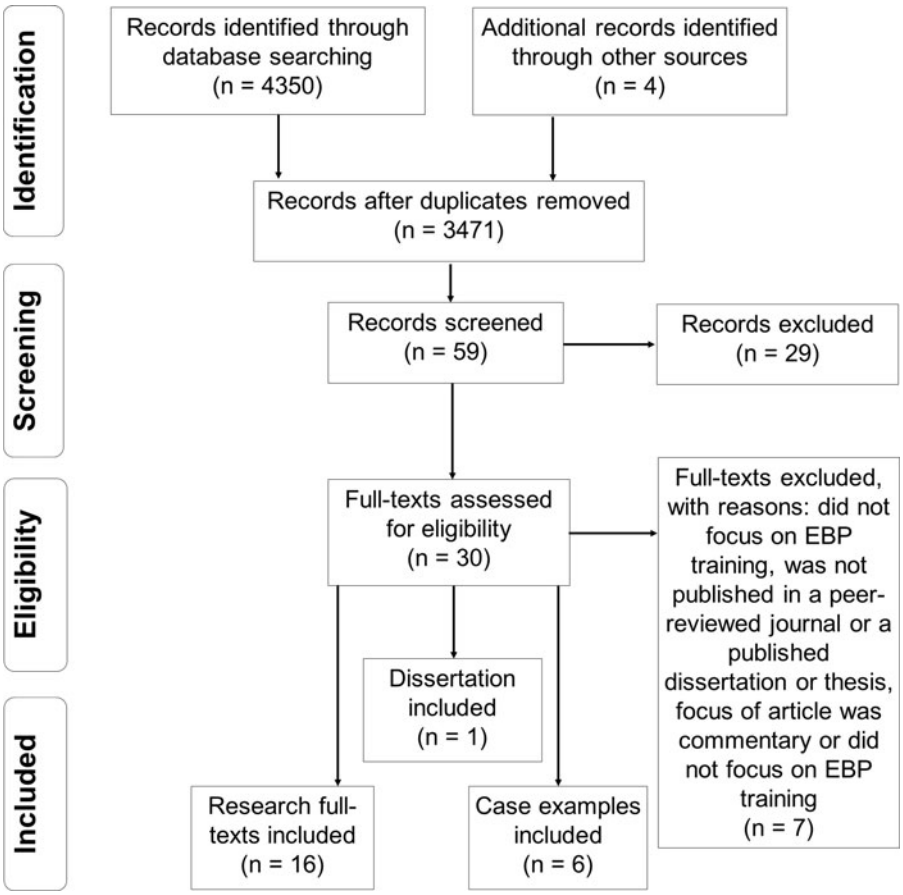

Figure 1. Search strategy decision tree.

dissertation was also published in a peer-reviewed journal and therefore was only counted as one study (Petzold et al., 2012). Seven countries were represented: United States (n = 7), Canada (n = 4), Australia (n = 3), Ireland (n = 1), South Africa (n = 1), South Korea (n = 1), United Kingdom (n = 1), and one article represented both the United Kingdom and the United States. Eleven different journals published the included articles, with the most publications from *Occupational Therapy in Health Care* (n = 8) and *American Journal of Occupational Therapy* (n = 4).

Of the research papers, there was greater representation from quantitative studies (n = 12) than qualitative studies (n = 3) and mixed methods (n = 1). When categorized using the Research Pyramid model, most studies were outcome, level 4 (one-group, pre-post; n = 10). The three qualitative studies varied from a level of evidence of 2 (group study with more rigor) for one study and a level of 3 (group study with less rigor) for the other two studies. One descriptive study was a level 3 (descriptive survey) and one experimental study was a level 2 (randomized controlled trial). For the mixed method study, each component (qualitative and outcome) was evaluated separately and assigned a level of evidence: level 2 for the qualitative portion and level 4 for the outcome portion.

Themes

The authors generated six themes related to key concepts identified during content analysis: training for practice change, active learning strategies, collaboration, perceptions and attitudes, facilitators and barriers, and training components. See Table 1 for theme definitions, key findings, and supporting literature. See Table 2 for research studies and Table 3 for case examples included in the review.

Training for practice change. This theme was defined as the instruction of practitioners focused on understanding how to utilize and implement EBP in real-world settings. Examples include the use of targeted implementation efforts, such as training of facilitators to increase use of an evidence-based fall prevention intervention (Brangan et al., 2015), and goal-setting and creation of written action plans to help participants identify EBP changes they could incorporate into their practice settings (Doyle & Bennett, 2014; Peterson et al., 2005). Four qualitative studies described success in changing participants' practice patterns or increasing participants' intent to change their practice (Anaby et al., 2015; Bazyk et al., 2015; Egan et al., 2004; Welch & Dawson, 2006). One outcome study demonstrated significantly improved EBP implementation behaviors through a workshop, combined with coaching and workplace supports provided over an extended period (Novak & McIntyre, 2010). Jeong et al. (2016) found that a webinar increased participants' awareness of evidence-based assessment practices.

Other studies found no changes related to practice change. Forhan and Law (2009) measured beliefs and attitudes of participants toward a specific clinical population, persons with obesity, finding that only beliefs changed in one of two workshops. A continuing education course did not change practitioners' use of EBP interventions, as measured through a case scenario activity (Dunleavy, 2015). In two

Table 1. Themes with supporting references, definitions, and key findings.

Themes and Supporting References	Definitions and Key Findings
Training for Practice Change	
Anaby et al. (2015) Bazyk et al. (2015) Brangan et al. (2015) Buchanan et al. (2014) Doyle & Bennett (2014) Dunleavy (2015) Egan et al. (2004) Forhan & Law (2009) Jeong et al. (2016) McCluskey & Lovarini (2005) Peterson et al. (2005)*	Instruction of practitioners focused on understanding how to utilize and implement EBP in real-world settings • Participants report practice change, intent to change or no change • Participants report change in thinking about EBP: integrating EBP goals into everyday practice, changing beliefs and attitudes about client conditions as a first step to practice change • Training of facilitators as a way to increase implementation of EBP
Active Learning Strategies	
Anaby et al. (2015) Bailey et al. (2007)* Bazyk et al. (2015) Brangan et al. (2015) Buchanan et al. (2014) Cahill et al. (2015) Doyle & Bennett (2014) Dunleavy (2015) Egan et al. (2004) Forhan & Law (2009) Forsyth et al. (2005)* Forsyth et al. (2015)* McCluskey & Lovarini (2005) Novak & McIntyre (2010) Petzold et al. (2012) Reynolds (2010)* Szucs et al. (2016) Welch & Dawson (2006)	Training activities that promote reflection, application, analysis and evaluation • Clinically-relevant case studies • Discussion • Creation of products: evidence statement, action plans, sharing of information, development of personal learning goals, critically-appraised topics • Group activities and learning groups • Coaching and modeling with practice sessions • Reflection • Peer support • Script writing, role play, rehearsal
Collaboration	
Anaby et al. (2015) Bailey et al. (2007)* Bazyk et al. (2015) Cahill et al. (2015) Crist et al. (2005)* Forsyth et al. (2005)* Forsyth et al. (2015)* Lizarondo et al. (2012) Novak & McIntyre (2010) Reynolds (2010)* Szucs et al. (2016) Welch & Dawson (2006)	Integration of faculty, researchers, practitioners, and/or stakeholders to develop and implement EBP in the community and other practice settings • Learning groups provide for shared learning opportunities with interdisciplinary or unidisciplinary collaboration • Communities of practice • Journal club • Collaboration with a facilitator such as a knowledge broker or change leader • Practitioners, researcher, and stakeholder collaboration
Perceptions and Attitudes	
Anaby et al. (2015) Bazyk et al. (2015) Brangan et al. (2015) Cahill et al. (2015)	Practitioners' attitudes, behaviors, and beliefs towards EPB • Affective domain emphasized • Practitioners identify increased perceptions of empowerment, confidence, self-efficacy • Practitioners have increased awareness of appreciation for the importance of EBP and research utilization

(*Continued on next page*)

Table 1. Continued

Themes and Supporting References	Definitions and Key Findings
Doyle & Bennett (2014) Egan et al. (2004) Forhan & Law (2009) McCluskey & Lovarini (2005) Petzold et al. (2012) Szucs et al. (2016) Welch & Dawson (2006)	• Practitioners have increased motivation to use research and seek out further training to use research
Facilitators and Barriers	
Anaby et al. (2015) Cahill et al. (2015) Dunleavy (2015) Egan et al. (2004) McCluskey & Lovarini (2005) Novak & McIntyre (2010) Petzold et al. (2012) Szucs et al. (2016) Welch & Dawson (2006)	Internal and external factors that create actual or perceived challenges to implementing EBP Facilitators: • Workplace supports • Time to reflect on learning and practice • Time to speak with peers about learning and practice • Incentives (increase motivation) Barriers: • Lack of time to train or integrate EBP into practice • Lack of available evidence • Difficulty accessing the evidence • Lack of confidence in ability to integrate EBP in practice • Lack of clinical relevance in training results in decreased motivation • Technology issues in training
Training Components	
Anaby et al. (2015) Bailey et al. (2007)* Brangan et al. (2015) Buchanan et al. (2014) Cahill et al. (2015) Doyle & Bennett (2014) McCluskey & Lovarini (2005) Novak & McIntyre (2010) Reynolds (2010)* Szucs et al. (2016) Welch & Dawson (2006)	Method of practitioner instruction based on common elements of evidence-based medicine, learning theories, and knowledge translation/implementation frameworks Theories and models guide training choices: • Adult learning theory • Theory of planned behavior • Social cognitive theory • Knowledge to Action model Instruction in EBP adapted to occupational therapy by Sackett and colleagues (1997): • Specific strategies taught in steps • Writing patient, problem or population, intervention, comparison and outcome(s) (PICO) questions • Doing literature searches with online databases • Developing evidence tables • Completing critical appraisal of research studies • Applying the findings to a practice problem

Note. EBP = evidence-based practice. *= case example.

studies, there was no change in EBP behaviors following a workshop and outreach support for practitioners (Buchanan et al., 2014; McCluskey & Lovarini, 2005). Participating in six monthly journal club sessions significantly increased EBP skills for occupational therapists, but not EBP uptake (i.e. integration of the key steps of EBP into day-to-day practice) (Lizarondo et al., 2012).

Active learning strategies. All reviewed sources utilized active learning strategies designed to engage the learner in meaningful activities and encourage reflection. These active learning strategies were consistent with andragogy, or adult learning theory, which supports learner-centered, contextually-relevant, and cooperative teaching and learning (Merriam & Bierema, 2014). All studies using active learning strategies and measuring EBP knowledge (n = 11) found significant knowledge

Table 2. Evidence-based practice training.

Author/year	Level of Evidence	Study Design	Participants/Setting	Intervention and Control	Outcome Measures	Findings
Anaby et al. (2015)	Level II (Qualitative)	Reflective, qualitative-based approach to evaluate change in practice	N = 14 clinicians who worked with children and youth with physical and/or motor disabilities in a rehabilitation center (n = 8 occupational therapy practitioners) in Canada	*Intervention* Six collaborative group sessions (1.5 hours, 1 time a week) facilitated by a knowledge broker.	N/A	Four themes emerged from the data: impact of learning on the personal and professional level, barriers and facilitators for implementation, motivation to learn and elements of the learning environment. The intervention promoted reflective practice and readiness for the practitioners to integrate research.
Bazyk et al. (2015)	Level II (Qualitative) & Level IV (Outcome)	One group/pretest-posttest Phenomenology	N = 185 occupational therapy practitioners working in Ohio schools	*Intervention* The building capacity process that included a community of practice with active and reflective learning activities over a six-month time period.	Researcher-developed questionnaire	Significant pre- to post-intervention increases in participants' knowledge of content areas related to children's mental health ($p < 0.02$). Four major themes regarding meaning and impact of the building capacity process were generated.
Brangan et al. (2015)	Level IV (Outcome)	One group/pretest-posttest	N = 136 occupational therapists working in Ireland	*Intervention* One-day workshop with twenty or less participants (repeated seven times) that included didactic lectures, small group work and whole group discussion on EBP.	Evidence-based Practice Confidence Scale	Significant pretest to posttest changes across all questions on outcome measure indicating increased confidence in EBP knowledge, skills and use.

(*Continue on next page*)

Table 2. (Continued)

Author/year	Level of Evidence	Study Design	Participants/Setting	Intervention and Control	Outcome Measures	Findings
Buchanan et al. (2014)	Level II (Experimental)	Matched pairs randomized-controlled trial	N = 42 occupational therapists working for the Department of Health in South Africa	*Intervention* Interactive educational intervention with four-hour education session, two-hour session one week later, emailed notes from second session and telephone/email follow-up. *Control* Didactic educational intervention with four-hour education session.	Shortened Adapted Fresno Test of Competence, Modified Knowledge, Attitude & Behavior Questionnaire Researcher-developed Audit Checklist	No significant between-group differences suggesting that the interventions had similar effects.
Cahill et al. (2015)	Level IV (Outcome)	One group/pretest-posttest	N = 29 occupational therapy practitioners from a special education cooperative in Chicago metropolitan area	*Intervention* Evidence-based practice professional development initiative.	Adapted Fresno Test	Significant increases in participants' EBP knowledge and skills. Increased confidence regarding EBP as demonstrated by pre- and post-survey.
Doyle & Bennett (2014)	Level IV (Outcome)	One group/pretest-posttest	N = 19 occupational therapists working with stroke survivors in the Pacific Northwest United States	*Intervention* Workshop (8 hours) based on Adult Learning Theory and the Theory of Planned Behavior.	Patient-Practitioner Orientation Scale Researcher-developed questionnaires for preworkshop and postworkshop	Increased percentages of agreement for behaviors pre- (range of 5.3% to 52.6%) and post- workshop (range from 84.2% to 100%), including using evidence to inform intervention (100% post-workshop). Pre- to post-workshop improvements in attitude about benefit of interventions ($p = .00$), knowledge ($p = .00$), and patient-centeredness ($p = .00$).

Dunleavy (2015)	Level IV (Outcome)	One group/pretest-posttest	N = 24 occupational therapy practitioners from Illinois	*Intervention* One 3-hour training for continuing education on use of applied behavioral analysis in occupational therapy.	Researcher-developed questionnaire, Self-efficacy Measure (adapted from Generalized Self-Efficacy Scale)	Significant differences in pretest to posttest scores in self-efficacy ($p < .001$), specific content knowledge of the A-B-C model ($p < .001$), and back-rated knowledge and skills ($p < .001$). Significant differences in pretest to follow-up of knowledge and skills ($p < .001$) and specific content of A-B-C skills ($p < .013$). Self-efficacy decreased at follow-up. Limited change in identified intervention strategies for the case scenario presented pre- and post-course.
Egan et al. (2004)	Level III (Qualitative)	Participatory action research	N = 57 occupational therapists working in Canada	*Intervention* Online group focused on identification of research use, barriers and resources, and application of research information to a priority problem.	N/A	Two themes were identified regarding participants' experiences of the online group: (1) internet linkage of occupational therapists (establishing a link, maintaining a link, finding common ground, challenges of the medium), and (2) changes to participants' use of research findings in clinical practice (enhancement of existing awareness, motivation and confidence, knowledge to be used in practice, continuing barriers to research utilization).

(*Continue on next page*)

Table 2. (Continued)

Author/year	Level of Evidence	Study Design	Participants/Setting	Intervention and Control	Outcome Measures	Findings
Forhan & Law (2009)	Level IV (Outcome)	One group/pretest-posttest	N = 51 occupational therapists working in Canada	*Intervention* Two conference workshops were held, using knowledge translation strategies, for occupational therapists interested in learning about working with obese clients.	Attitudes Towards Obese Persons Beliefs About Obese Persons Researcher-developed workshop evaluation tool	Significant pre-post differences were found only for more positive beliefs of participants regarding obese persons in the 2007 workshop; no other significant differences found.
Jeong et al (2016)	Level III (Descriptive)	Survey	N = 28 occupational therapists and educators from South Korea	*Intervention* Webinar to educate participants about occupational therapy tools used to evaluate participation in children with disabilities.	Researcher-developed webinar evaluation tool	The majority of participants reported that the webinar was useful to their clinical practice (96%) and the majority of practitioners indicated that the webinar helped them to think differently about their clinical practice (93%). Most practitioners (87%) and educators (75%) were willing to use and teach tools taught in the webinar.
Lizarondo et al. (2012)	Level IV (Outcome)	One-group/pretest-posttest	N = 93 allied health professionals working in health facilities in Tasmania, Australia (n = 36 occupational therapists)	*Intervention* Six monthly one-hour journal club sessions using the iCAHE model. Members were trained in aspects of EBP prior to the first session.	Adapted Fresno Test Researcher-adapted questionnaire	Occupational therapists demonstrated statistically significant improvements in EBP knowledge and self-reported knowledge, but not attitude and EBP uptake.

McCluskey & Lovarini (2005)	Level IV (Outcome)	One-group/pretest-posttest	N = 114 occupational therapists working in New South Wales, Australia	*Intervention* Two-day workshop on evidence-based practice (lectures, practical sessions, small group discussions) followed by outreach support for the following 8 months.	Adapted Fresno Test Researcher-developed questionnaire	Post-workshop there were significant gains in knowledge that was maintained at follow-up ($p < .0001$). Frequency of reading research publications and appraisal of research articles did not increase over time.
Novak & McIntyre (2010)	Level IV (Outcome)	One-group/pretest-postest	N = 88 allied health professionals from one community-based site for children and adults with cerebral palsy in Australia (n = 33 occupational therapists)	*Intervention* Two change management interventions focused on evidence-based practice: (1) one-day workshop using competency-based learning followed by individual coaching, and (2) workplace supports.	Adapted Fresno Test, Frequency counts of evidence-based practice implementation behaviors from human resources professional development records	The mean change in evidence-based practice knowledge was significantly different from pre- to posttest with higher scores following the training ($p < .001$). By 18 months after introduction of workplace supports and the workshop, indirect EBP implementation behavior significantly improved ($p < .001$).

(*Continue on next page*)

Table 2. Continued

Author/year	Level of Evidence	Study Design	Participants/Setting	Intervention and Control	Outcome Measures	Findings
Petzold et al. (2012)	Level IV (Outcome)	One-group/pretest-posttest	N = 20 occupational therapists working with adult stroke clients in Canada	*Intervention* Workshop (7 hours) with didactic lectures, hands-on sessions, use of e-learning resources, and dissemination of summary information on unilateral spatial neglect followed by an 8-week reinforcement period with access to online resources.	Evidence-based Practice Self-Efficacy Scale Evidence-based Practice Questionnaire Researcher-developed knowledge questionnaire Researcher-developed patient case vignettes	Half of participants (n = 10) submitted biweekly logs of time spent with online resources. Mean knowledge scores of unilateral spatial neglect management were significantly higher following the intervention ($p < .000$). Post-intervention scores of self-efficacy were significantly higher ($p = .045$).
Szucs et al. (2016)	Level IV (Outcome)	One-group/pretest-posttest	N = 10 occupational therapy practitioners working in a pediatric facility (n = 6 occupational therapists, n = 4 occupational therapy assistants) in the United States	*Intervention* Guided journal club (one time per month for six months) with training on developing a clinical question and critical appraisal.	Researcher-developed questionnaire	Participants demonstrated significant improvements ($p < .0008$ to $p < .0001$) in items related to comfort, confidence and understanding of EBP.
Welch & Dawson (2006)	Level III (Qualitative)	Action research	N = 7 senior occupational therapists working in a rehabilitation center in the United Kingdom	*Intervention* Collaborative learning groups meeting monthly for six (1.5 hour) sessions for training in evidence-based practice.	N/A	Five themes were identified: evidence-based practice: academic or practitioner activity, collaborative learning groups, did the collaborative learning groups empower therapist to change their practice?, collegial relationships, and managing change. Findings suggest that the therapists were empowered to change their practice.

Note. Level of evidence based on Tomlin and Borgetto (2011); 1 = most rigor; 4 = least rigor. EBP = evidence-based practice.

Table 3. Case examples.

Author/Year	Brief Description of Program or Course
Bailey et al. (2007)	A course in EBP taught to practitioners enrolled in a post-professional OT master's degree program in the United States. The course required a project in which a potential clinical scenario was researched and research findings were applied to the case. Hypothetical intervention plans were presented in a scripted, role-played discussion format.
Crist et al. (2005)	Description of the Practice-Scholar Program's four partnership sites: a collaborative speech-language/occupational therapy pediatric clinic, day-care sites in a marginalized underserved community, a homeless shelter for women, and a county jail in the United States. Students and faculty worked alongside OT practitioners, practice-scholars, at each site. Practice-scholars participated in meetings with faculty to develop habits of scholarship.
Forsyth et al. (2005)	A collaborative partnership was developed between the UK Centre for Outcomes Research and Education and Gloucestershire Partnership NHS Trust to increase the use of EBP at the Trust. The partners developed a program for practitioners that used leaders as trainers in order to educate participants to deliver contextually-relevant EBP.
Forsyth et al. (2015)	Three collaborative, EBP focused initiatives exemplifying a scholarship of practice approach were presented In the United States and the United Kingdom. The approach was a synergistic partnership between OT practitioners and educators that promoted research and application of therapeutic knowledge. All three initiatives specialized in treatment of dementia and found that collaboration between researchers and practitioners was beneficial to therapeutic interventions.
Peterson et al. (2005)	Partnership for Healthy Aging of MaineHealth (PFHA) incorporated the *Matter of Balance (MOB)* intervention in an effort to engage clinicians in EBP. The framework of this program involved strategies that emphasized knowledge dissemination and utilization. PFHA facilitated interactions between their staff and personnel while providing MOB training. A participant satisfaction tool was used to evaluate program quality and facilitator effectiveness.
Reynolds (2010)	A course for post-professional doctor of occupational therapy students in the United States that emphasized skills including: citing resources; developing search strategies; categorizing, analyzing, and appraising evidence; summarizing in clinically relevant formats; and identifying resources that would further develop their appraisal skills. Assignments included: discussions, team case studies, appraisals of systematic reviews, and a final critical review of a self-chosen clinical question.

Note. EBP = evidence = based practice. OT = occupational therapy.

increases before and after training. Training content in reviewed studies and case examples was supported by strategies that allowed for reflection, discussion, and peer interaction (Anaby et al, 2015; Bazyk et al., 2015; Brangan et al., 2015; Forsyth et al., 2015; Reynolds, 2010). Case studies with focused discussions were also used, as were clinically-relevant problem solving, goal-setting, and small group activities (Brangan et al., 2015; Cahill et al., 2015; Dunleavy, 2015; Egan et al., 2004; Forhan & Law, 2009; Forsyth et al., 2005; Novak & McIntyre, 2010). Journal clubs included group discussions and practice in critical appraisal (Lizarondo et al., 2012; Szucs et al., 2016). Online teaching and learning was part of several training interventions, with active learning strategies such as discussions and application of online resources integrated into training (Bazyk et al., 2015; Forsyth et al., 2015; Petzold et al., 2012). Creation of products that supported EBP implementation (e.g., best evidence statements, critically appraised topics) also engaged participants in active learning (Cahill et al., 2015; Egan et al., 2004; McCluskey & Lovarini, 2005; Novak & McIntyre, 2010).

Collaboration. Twelve training programs included collaboration between practitioners, researchers, and stakeholders. The programs included training on the procedures associated with EBP (e.g., writing a clinical question, appraising research articles), using evidence-based interventions with specific client populations (e.g. public school students with and without disabilities, persons with Alzheimer's disease and their caregivers), or a combination of both. Evidence in support of specific training strategies indicated that collaborative continuing education sessions (n = 5) significantly increased knowledge and journal clubs (n = 2) increased confidence in using EBP for occupational therapy practitioners. Five collaborative learning communities were developed and implemented within workplaces, health systems, or populations of practitioners (e.g. occupational therapists working in school-based practice) to support integration of evidence into practice within specific settings (Bazyk et al., 2015; Lizarondo et al., 2012; Novak & McIntryre, 2010; Szucs et al., 2016; Welch & Dawson, 2006).

Training in two case examples took place within higher education as a part of post-professional (master's and doctoral) occupational therapy programs, with groups of practitioners engaged in EBP projects (Bailey et al., 2007; Reynolds, 2010). Other training was sponsored by institutions of higher education, with faculty engaging practitioners in targeted professional development opportunities or providing training as a part of a collaborative project with faculty and students (Cahill et al., 2015; Crist et al., 2005). Professional development opportunities were also incorporated into scholarship of practice projects by engaging practitioners in workshops and other training with the intent of increasing implementation of evidence-based interventions in stroke, dementia, and other populations within community settings (Forsyth et al., 2005; Forsyth et al., 2015). Collaboration with stakeholders was a crucial element of these projects, as clients were engaged throughout the project planning and implementation phases.

Perceptions and attitudes. Participants in nine studies demonstrated affective changes such as reported increases in feelings of empowerment and confidence, and increased self-efficacy in using EBP, positive attitudes towards EBP and, in some cases, self-reported EBP behaviors after engaging in training opportunities (Anaby et al., 2015; Bazyk et al., 2015; Brangan et al., 2015; Cahill et al., 2015; Doyle & Bennett, 2014; McCluskey & Lovarini, 2005; Petzold et al., 2012; Szucs et al., 2016; Welch & Dawson, 2006). Cahill et al. found that participants' confidence increased the most in the areas of literature searching, determining the significance of a study, and using electronic databases after participation in a community of practice. Intention to engage in EBP behaviors (i.e. remaining current with the research evidence) increased following participation in a workshop targeted toward intervention for upper-limb poststroke sensory impairments (Doyle & Bennett, 2014). Participants also demonstrated a greater awareness of the importance of research utilization and an increased motivation to use research in practice throughout participation in an online learning community (Egan et al., 2004). Two studies did not demonstrate significant improvements in attitudes toward EBP by occupational therapy practitioners (Buchanan et al., 2014; Lizarondo et al., 2012).

Facilitators and barriers. Participants identified context-specific facilitators and barriers to using EBP in practice and engaging in EBP training. Workplace supports, such as clinical leadership, infrastructure, and incentives to change practice, were considered facilitators to EBP (Anaby et al., 2015) and contributed to increased EBP implementation behaviors in one outcome study (Novak & McIntyre, 2010). Identified barriers to using EBP in practice included lack of time to find evidence and to change practice, lack of available evidence, difficulty accessing the evidence, and decreased understanding of EBP (Cahill et al., 2015; Dunleavy, 2015; McCluskey & Lovarini, 2005; Petzold et al., 2012; Szucs et al., 2016; Welch & Dawson, 2006). Lack of time, technology issues (e.g. difficulty accessing online resources, decreased motivation to participate in online activities), and lack of clinical relevance in training activities were barriers to participating in EBP training (Egan et al., 2004; Petzold et al., 2012).

Training components. Descriptions of teaching strategies based on the common elements and content for instruction in EBP originated by Sackett and colleagues (1997) were common amongst reviewed sources. Specific strategies were taught in steps, and included one or more of the following components as training activities: writing patient, problem or population intervention, comparison and outcome(s) (PICO) questions; doing literature searches with online databases; developing evidence tables; completing critical appraisals of research studies, and applying the findings to a practice problem (Brangan et al., 2015; Buchanan et al., 2014; Cahill et al., 2015; Lizarondo et al., 2012; McCluskey & Lovarini, 2005; Novak & McIntyre, 2010; Reynolds, 2010; Szucs et al., 2016; Welch & Dawson, 2006). Training programs were guided by theories or models to increase participants' knowledge and evidence uptake, such as knowledge translation models, adult learning theory, theory of planned behavior, and social cognitive theory (Anaby et al. 2015; McCluskey & Lovarini, 2005; Novak & McIntyre, 2010). Three studies of training programs that included these components demonstrated significantly improved practitioner confidence in using EBP (Brangan et al., 2015; Cahill et al., 2015; Szucs et al., 2016).

Synthesis of findings

Based on the themes generated through content analysis, the findings were synthesized and an organizing framework developed depicting the relationships between practice, training, and EBP in occupational therapy (see Figure 2). In this interpretation, context includes EBP facilitators (e.g. workplace supports) and barriers (e.g. lack of time). Contextually-relevant training consists of (1) teaching core EBP components which are the skills of EBP (i.e. asking a clinical question, acquiring the evidence, appraising the evidence and applying the evidence), (2) active learning strategies that are informed by best practices in andragogy (i.e. adult education), and (3) collaboration between practitioners, researchers, and/or stakeholders that includes opportunities for participation in learning communities. Practitioner perceptions and attitudes towards EBP influence training which, in turn, may impact practitioner perceptions and attitudes. Training then influences changes in practitioner EBP behaviors.

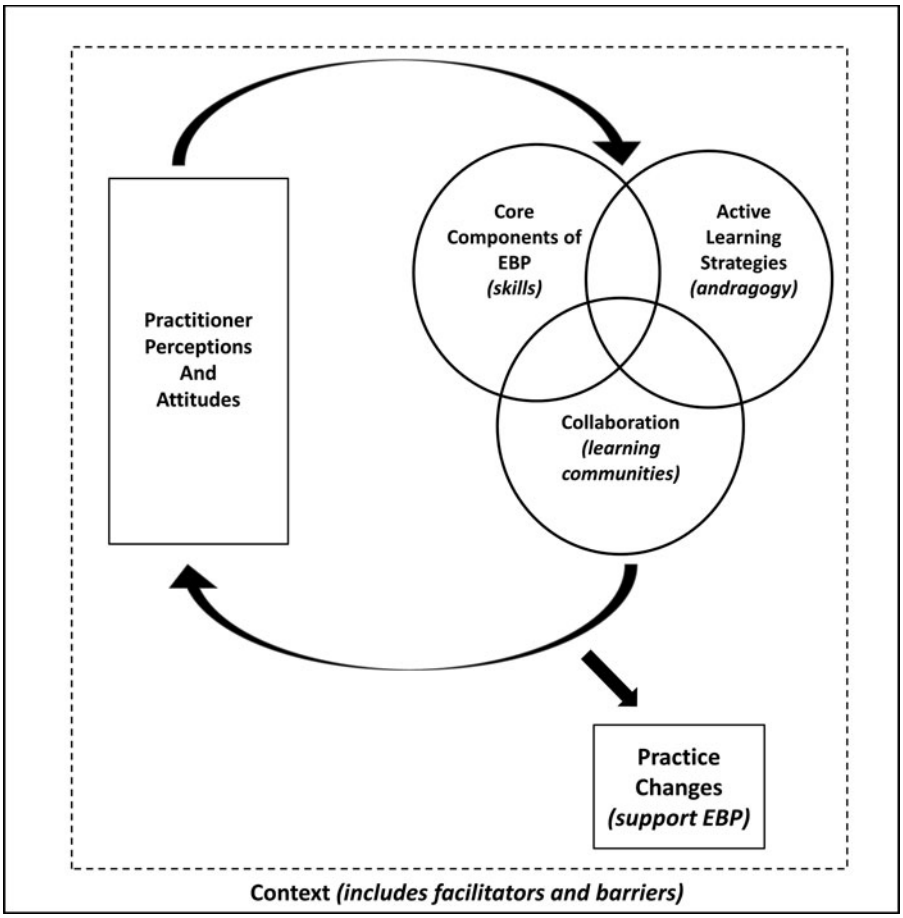

Figure 2. Organizing framework of the relationships between practice, training, and evidence-based practice in occupational therapy.

Discussion

This review examined the EBP training literature for occupational therapy practitioners in order to describe the relationships between practice, practitioner training, and EBP. The most promising training programs for increasing EBP appear to be those that include context-specific, collaborative approaches with multiple components and social learning opportunities. A potential outcome of training is the engagement of practitioners in a transformational process that results in practice change.

Multi-component interventions

Findings from this review mirror conclusions drawn in the larger body of literature on EBP in rehabilitation, nursing, and medicine that training programs targeting EBP knowledge, skills, and confidence work best when they include multiple strategies for learning. Systematic reviews of knowledge translation interventions have found that multi-component approaches were most effective for changing practice

behavior (Jones et al., 2015; Scott et al., 2012). However, there is variable evidence on improvements in practice outcomes. Häggman-Laitila et al. (2016) found that EBP training in nursing had significant outcomes in knowledge and skills when the programs utilized a variety of learning approaches, but no reported improvements in patient care or patient outcomes. One study in this review found that the addition of interactive educational components to a workshop with follow-up supports after training did not significantly increase EBP behaviors when compared to a didactic educational intervention without follow-up, indicating a need for further research in relating training components to practice outcomes in occupational therapy (Buchanan et al., 2014). Yet, research in medicine primarily supports the benefit of including interactive components in training programs. A synthesis of systematic reviews on continuing medical education (CME) concluded that CME improves physician performance and likely patient health outcomes, with "greater improvement …if it is more interactive, uses more methods, involves multiple exposures, is longer, and is focused on outcomes that are considered important by physicians" (Cervero & Gaines, 2015, p. 136).

Social foundations of learning

For studies in this review, opportunities for participants to engage in shared learning, through planned learning communities (e.g. communities of practice, journal clubs) provided a contextually-relevant emphasis that allowed participants to focus on EBP as related to the client populations with whom they worked (Bazyk et al., 2015; Lizarondo et al., 2012; Szucs et al., 2016). Authors of five articles describe the integration of occupational therapy faculty, researchers, and practitioners to develop and implement EBP approaches collaboratively and in context based on theoretical and conceptual frameworks that supported social constructivism (i.e. adult learning theory, social cognitive theory) (Crist et al., 2005; Forsyth et al., 2005; Forsyth et al., 2015; McCluskey & Lovarini, 2005; Novak & McIntyre, 2010). Knowledge translation and implementation frameworks were also used with constructivist practices to increase EBP with specific client populations and within different occupational therapy settings (Anaby et al., 2015; Peterson et al., 2005).

Interacting with peers and mentors has been identified as a strategy used by occupational therapy practitioners to address EBP (Upton et al., 2014). Providing participants with a common purpose and a continuous form of engagement after training, such as a community of practice or a facilitator over an extended time period (e.g. knowledge broker, opinion leader), may be necessary for the behavior change that supports practice change, as may protected time for engaging in research activities, searching for evidence, and reflecting on practice (Salter & Kothari, 2016; Thomas & Law, 2014). This approach concurs with that of Thomas et al. (2011) who advocated a social constructivist perspective in the teaching of EBP in occupational therapy, arguing that an individual's interaction with the social environment, including exchanges with peers and clients regarding research evidence, strongly supports the development of EBP knowledge and implementation.

Transformative process

Practitioners who engaged in training that included shared learning opportunities or long-term workplace supports demonstrated changes or reported changes in their practice patterns to include more EBP and reported a new sense of empowerment to make practice changes (Bazyk et al., 2015; Anaby et al., 2015; Novak & McIntyre, 2010; Welch & Dawson, 2006). The transformational quality of these training programs, as displayed by the affective responses of participants, supports assertions that empowerment and changing belief systems are important components of EBP integration. The qualitative and mixed method studies provided especially important insights regarding transformational changes.

McWilliam (2007) described a similar phenomenon, termed transformative knowledge translation, as "clinicians in an on-the-job process of creating a deeply felt interest in research findings relevant to everyday practice through a facilitated process of perspective transformation" (p. 76). Through the transformative process, practitioners may join together their own experiences, craft knowledge, sociocultural context, and research knowledge to change practice in personally meaningful ways (McWilliam et al., 2009). Transformative practice change, as initiated through training that empowers practitioners, may be particularly important for those who have limited support from their organizations or administrators to implement EBP.

Implications for research

The data evaluation revealed the abundance of one-group outcome studies, focused on EBP training, and only one study using an experimental design. The addition of qualitative studies in this integrative review provided an important lens into the experiences of practitioners participating in EBP training, including transformational processes that influenced reported practice changes. This evaluation lead to the identification of two main knowledge gaps: (1) mechanisms of interventions that result in occupational therapy practice change related to EBP and (2) ways to measure the influence of EBP training interventions. Collaborative practices with practitioners, researchers, and stakeholders, such as learning communities and the use of workplace supports, should continue to be studied to determine the mechanisms and future research should continue to focus on developing ways to measure the influence of EBP training interventions on client outcomes and other quality indicators in occupational therapy.

The organizing framework developed from this review has the potential to address training approaches for occupational therapy practitioners. Several conceptual frameworks that provide a structure for supporting the uptake of evidence-based practices in health care currently exist (e.g. Knowledge to Action Framework, Diffusion of Innovations Framework). Training is included as only one aspect of these frameworks and it is important to describe a broader approach to implementation of EBP in order to address the complexity of health care organizations and systems, in addition to the challenges of changing practitioner behavior. This

organizing framework provides a specialized view of how promising approaches may be integrated with individual (i.e. perceptions, attitudes) and organizational (i.e. contextual) aspects of practice to address EBP within occupational therapy.

Development of a discipline-specific framework for practitioner training may benefit occupational therapy, as previous systematic reviews have demonstrated improvement in knowledge, skills, and attitudes of healthcare professionals following educational interventions, however contextual factors (e.g. professional and educational background) may influence effectiveness of these programs in specific disciplines (Hecht et al., 2016; Jones et al., 2015). For example, in a journal club training program that included five different groups of allied health professionals, only physical therapists showed significant improvements in attitudes towards EBP, suggesting that group differences may influence training outcomes (Lizarondo et al., 2012).

Implications for education

EBP may be viewed as a domain with varying levels of expertise that requires continued development after entry-level preparation (Thomas et al., 2011). The context of real-world practice suggests that engaging practitioners in continued professional development may address barriers to EBP, such as lack of research available, low quality research, and difficulty translating research findings for clinical decision-making (Upton et al., 2014). Incorporation of EBP into a post-professional occupational therapy curriculum is an example of how formalized training may be used to address EBP application (Bailey et al., 2007; Reynolds, 2010). Practitioners seeking graduate degrees have clinical experiences to guide their learning and may be more likely to apply their training directly to practice, further developing their expertise. Increased experience and training for practitioners may assist in addressing issues such as lack of or low quality research and challenges in using research to make clinical decisions. Practitioners who have been trained to apply their knowledge directly using an EBP model that equates clinical experience, client values, and research evidence may be better equipped to manage issues of research availability and quality than those who have not.

Limitations

While including all selected papers in the content analysis allowed for a fuller picture of EBP training in occupational therapy, the findings and themes should be considered as a first step in laying the groundwork for future research. This review reported only on activities that included an EBP training component within occupational therapy. All of the outcome studies used a one group/pretest-posttest design with only the randomized-controlled trial having a comparison group. As more studies are published and contribute to the body of knowledge on EBP, the concepts and relationships between training, practice, and EBP in occupational therapy described in this review should be reexamined and revised.

Conclusion

The findings indicate that comprehensive, contextually-relevant, and collaborative training approaches addressing implementation of EBP represent promising practices for occupational therapy practitioners. The studies and case examples included in this integrative review represent a wide variety of settings and clients, from workplace to population-based initiatives, providing a sampling of occupational therapy applications across the profession, both nationally and internationally. The included qualitative studies and case examples in occupational therapy provided important insights into practitioners' experiences while engaging in EBP training and subsequent self-reported changes in their practice patterns.

Types of training approaches that focus on changing practitioner behavior in the specific work setting may be more successful in actually changing practice patterns because training that focuses only on increasing knowledge and skills does not seem sufficient. Occupational therapy EBP training programs that include shared learning components and contextual facilitators like workplace supports, in addition to core components of EBP and active learning strategies, may assist practitioners in overcoming barriers to the use of EBP, and may strengthen integration of different forms of evidence into clinical reasoning and decision-making. More research is needed to determine the best ways to measure changes in the use of evidence-based practices, as related to client outcomes and quality indicators, as well as the optimal training methods, or combination of methods, for EBP implementation.

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About the Authors

Christine T. Myers, PhD, OTR/L, Clinical Associate Professor and Director of the Masters in Occupational Therapy Program, University of Florida, Gainesville, Florida, USA. **Jennifer Lotz**, graduate student, Department of Occupational Therapy, College of Public Health and Health Professions, University of Florida, Gainesville, Florida, USA.

ORCID

Christine T. Myers http://orcid.org/0000-0003-1492-9008

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