

Evidence-Based Practice: Beliefs, Attitudes, Knowledge, and Behaviors of Physical Therapists

Background and Purpose. Little research has been done regarding the attitudes and behaviors of physical therapists relative to the use of evidence in practice. The purposes of this study were to describe the beliefs, attitudes, knowledge, and behaviors of physical therapist members of the American Physical Therapy Association (APTA) as they relate to evidence-based practice (EBP) and to generate hypotheses about the relationship between these attributes and personal and practice characteristics of the respondents. **Methods.** A survey of a random sample of physical therapist members of APTA resulted in a 48.8% return rate and a sample of 488 that was fairly representative of the national membership. Participants completed a questionnaire designed to determine beliefs, attitudes, knowledge, and behaviors regarding EBP, as well as demographic information about themselves and their practice settings. Responses were summarized for each item, and logistic regression analyses were used to examine relationships among variables. **Results.** Respondents agreed that the use of evidence in practice was necessary, that the literature was helpful in their practices, and that quality of patient care was better when evidence was used. Training, familiarity with and confidence in search strategies, use of databases, and critical appraisal tended to be associated with younger therapists with fewer years since they were licensed. Seventeen percent of the respondents stated they read fewer than 2 articles in a typical month, and one quarter of the respondents stated they used literature in their clinical decision making less than twice per month. The majority of the respondents had access to online information, although more had access at home than at work. According to the respondents, the primary barrier to implementing EBP was lack of time. **Discussion and Conclusion.** Physical therapists stated they had a positive attitude about EBP and were interested in learning or improving the skills necessary to implement EBP. They noted that they needed to increase the use of evidence in their daily practice. [Jette DU, Bacon K, Batty C, et al. Evidence-based practice: beliefs, attitudes, knowledge, and behaviors of physical therapists. *Phys Ther.* 2003;83:786–805.]

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The demand for and interest in applying evidence to physical therapist practice has grown in the past decade, as demonstrated, in part, by publication of a series of systematic reviews in the October 2001 special issue of *Physical Therapy* and other articles related to evidence in practice.¹⁻³ There also are continuing education offerings on the topic. Sackett et al defined *evidence-based medicine* as “the use of current best evidence in making decisions about the care of individual patients.”⁴(p71) They noted that both clinician expertise and clinically relevant research were important components of evidence-based practice (EBP). They contended that identification and application of patients’ preferences should be part of clinical decision making.

The concept of evidence-based medicine, or, more broadly, EBP, marks a shift among health care professionals from a traditional emphasis on actions based on the opinions of authorities to guide clinical practice to an emphasis on data-based, clinically relevant studies and research. To effectively apply evidence in practice, in addition to skills in taking a history, conducting an examination, determining a diagnosis, and determining appropriate options for intervention, Guyatt and colleagues⁵ maintained that a clinician must have the ability to: (1) identify gaps in knowledge, (2) formulate clinically relevant questions; (3) conduct an efficient literature search; (4) apply rules of evidence, including a hierarchy of evidence, to determine the validity of studies; (5) apply the literature findings appropriately to the patient problem; and (6) understand how the patient’s values

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At the time this study was begun, Dr Bacon, Dr Batty, Ms Carlson, Dr Ferland, Dr Hemingway, Dr Hill, Dr Olgivie, and Dr Volk were students in the transitional DPT program at Simmons College.

All authors provided concept/idea/research design. Dr Jette provided writing and data collection and analysis.

The study was approved by the Institutional Review Board of Simmons College.

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Table 1.
Characteristics of Respondents

Characteristic	Percentage	Number ^a	National Data (%) ^b
Sex			
Male	29.4	141	32.8
Female	70.6	338	67.2
Age (y)			
20–29	20.7	99	19.0
30–39	32.4	160	32.5
40–49	31.1	149	27.7
50+	14.8	71	20.7
Years licensed			
<5	27.1	130	24.3 (range=1–5)
5–10	22.5	108	17.2 (range=6–10)
11–15	11.9	57	14.7
>15	38.5	185	43.8
Entry-level degree			
Certificate	5.5	26	9.0
Baccalaureate	49.9	238	55.4
Master's	42.6	203	34.1
Doctorate	1.7	8	1.3
Highest degree			
Baccalaureate	39.3	188	50.1
Professional master's	39.1	187	
Advanced master's	16.7	80	45.2 (any master's degree)
Professional doctorate	2.1	10	1.8
Advanced doctorate	2.1	10	2.2
Other	0.6	3	
Certified specialist			
Cardiovascular-pulmonary	0.2	1	
Geriatric	0.6	3	
Neurological	0.2	1	
Orthopedic	5.3	26	
Pediatric	1.0	5	
Clinical instructor	54.8	261	
Geographical area of practice ^c			
Northeast	21.7	103	
Mid-Atlantic	11.4	54	
South Atlantic	13.7	65	
North Central	27.8	132	
South Central	11.1	53	
Mountain	7.6	36	
Pacific	15.8	75	

^a Number varies for each variable due to missing data.

^b Data from March 2002, access on American Physical Therapy Association Web site: http://www.apta.org/Research/survey_stat/pt_demo. Some relevant data not available.

^c Some respondents indicated more than one geographical area of practice.

ity of the research base, poor access to evidence, organizational barriers, and ineffective education. Researchers studying physicians and nurses^{7–13} have identified a number of factors believed to inhibit the use of EBP in the clinic. Limited time for retrieving and interpreting research and for applying research to individual patients has been cited by numerous authors^{7–9,12–14} as a major reason clinicians do not incorporate evidence in their practices. Many health care professionals have argued that they lack the expertise to assess the validity of evidence or the knowledge of how to obtain relevant information.^{7,9,12,13} Limited access to information also has been shown to be a problem.^{7,13} Additional barriers to EBP have been determined, including inadequacy of data sources,^{8,10,13,14} perceived conflict with patient preferences,¹¹ and economic pressures.¹⁴

To date, little research has been done regarding the attitudes toward and use of evidence among physical therapists. Those studies that have focused on physical therapists largely examined their use of evidence, including journal readership and application of literature, in determining patient management.^{15–19} The primary purpose of this study was to describe physical therapists' self-reported: (1) attitudes and beliefs about EBP; (2) education, knowledge, and skills related to obtaining and evaluating evidence; (3) attention to the literature relevant to practice; (4) access to and availability of information; and (5) perceptions of the barriers to EBP. Our secondary purpose was to describe associations among the elements listed and characteristics of physical therapists and their practice environments.

affect the balance between potential advantages and disadvantages of the available management options, and appropriately involve the patient in the decision.⁵

The inability to carry out any of these functions may constitute a barrier to the application of evidence in practice. Haynes and Haines,⁶ analyzing the gap between research and evidence, suggested that the problems in implementing evidence included the size and complex-

Method

Subjects

Our study sample consisted of a random sample of 1,000 physical therapists in the United States who were members of the American Physical Therapy Association (APTA) in July 2002. The list was generated by APTA and sent to the authors. The final sample consisted of 488 physical therapist members of APTA. The subjects

Table 2.
Characteristics of Respondents' Practice

Characteristic	Percentage	Number ^a	National Data (%) ^b
Hours of work per week			
<20	7.2	34	
20–30	10.1	48	
31–40	23.6	112	
>40	59.2	281	
Patients per day			
<5	11.3	53	
5–10	34.8	164	
11–15	34.4	162	
>15	19.5	92	
Percentage of time in patient care			
<25	7.1	33	
25–50	4.6	22	
51–75	9.8	46	
>75	78.5	371	
Setting			
Rural	20.1	95	
Urban	36.6	173	
Suburban	43.3	205	
Type of facility ^c			
Acute care hospital	13.5	62	16.3
Acute rehabilitation	4.3	20	5.9
Subacute rehabilitation	3.0	14	4.2
Skilled nursing facility	5.0	23	6.3
Private outpatient clinic	34.2	157	32.3
Facility-based outpatient clinic	25.7	118	17.4
Home care	7.8	36	8.0
School system	5.7	26	5.0
University	1.5	7	4.9
Other	1.7	8	
No. of physical therapists at facility			
<5	57.1	271	
5–10	24.2	115	
11–15	5.7	27	
>15	13.1	62	
Type of condition for majority of patients treated ^c			
Orthopedic	68.5	303	
Neurological	20.1	95	
Cardiovascular	5.2	23	
Other	6.8	30	
No patient care	2.3	10	
Age (y) of the majority of patients treated ^c			
Pediatric (≤18)	16.0	65	
Adult (19–64)	57.4	233	
Geriatric (65+)	24.4	99	
No patient care	2.2	9	

^a Number varies for each variable due to missing data.

^b Data from March 2002, access on American Physical Therapy Association Web site: http://www.apta.org/Research/survey_stat/pt_demo. Some relevant data not available.

^c Some respondents indicated more than one category.

are described in Table 1. The sample was approximately 71% women, slightly greater than the 67% reported by the APTA membership survey in March 2002.²⁰ Additionally, there were slightly more survey respondents in the youngest age group (21%) and slightly fewer in the

oldest age group (15%) than reported for the APTA membership (19% and 21%, respectively). Sixty percent of the respondents practiced in either private or facility-based outpatient settings, and the majority (57%) practiced in settings with fewer than 5 physical therapists on staff. The majority of patients managed by most respondents had orthopedic (68%) or neurological (20%) conditions. Table 2 shows the practice setting characteristics.

Procedure

We developed a self-report questionnaire (Appendix) that was patterned after one used to study the attitudes of physician general practitioners toward evidence-based medicine.⁷ Our questionnaire was designed to explore respondents' attitudes and beliefs about EBP (survey items 1, 2, 4, and 6–11); interest in and motivation to engage in EBP (survey items 3 and 5); educational background and knowledge and skills related to accessing and interpreting information (survey items 25–31); level of attention to and use of the literature (survey items 12–14); access to and availability of information to promote EBP (survey items 18, 19, and 21–23); and their perceived barriers to using evidence in practice (survey item 32). Demographic and practice data were collected. We also sought answers about use of and access to practice guidelines (items 15–20) that we decided not to include in this report.

Responses to most items concerning attitudes and beliefs and education, knowledge, and skills related to EBP were addressed using a 5-point Likert scale with “strongly disagree” and “strongly agree” as anchors. Several items related to access to information required “yes/no” responses. To evaluate content validity, a draft of the questionnaire was presented to a sample of 10 experienced physical therapists practicing in pediatrics (n=1), acute care (n=4), orthopedics (n=2), and rehabilitation (n=3). Slight modifications were made based on their feedback, and a final questionnaire was drafted. A small subsample of the survey respondents (n=54) completed the questionnaire twice between

2 weeks and 2 months apart in order to allow us to assess the reliability of the items. Intraclass correlation coefficients (ICC [1,k]) were determined for the ordinal items, and percentages of agreement were determined for categorical and ranked items. The ICCs ranged from .37 to .90, with 50% of the items having ICCs of $>.70$. Percentages of agreement ranged from 68% to 93% for dichotomous items and from 59% to 80% for ranked items.

An initial mailing of the questionnaire was done in July 2002. The return rate from the first mailing was 28%. A second mailing was done in September 2002 to those who had not responded. The final return rate was 48.8%.

Data Analysis

Data were analyzed using the SPSS version 10.1 for Microsoft Windows.* Response frequencies for the survey questions were determined and displayed in tabular and graphic formats. After examining the response frequencies, and before examining the associations between variables, some variable categories were collapsed in order to allow further analysis using them as dependent measures in logistic regression analyses. For those items with a 5-point Likert scale and a positive response set (ie, agreement with the statement suggested positive regard for EBP), the “strongly agree” and “agree” categories were combined, as were the “neutral,” “strongly disagree,” and “disagree” categories, so that responses fell into 1 of 2 categories: “agree” or “disagree.”

For items with a negative response set, the “neutral” category was combined with the “agree” and “strongly agree” categories. For the items with a “yes/no/do not know” choice set, the “do not know” category was combined with the “no” category based on our belief that lack of knowledge about whether, for example, a facility had access to the Internet was as unhelpful to a respondent as not having access. For items categorized by the number of times articles were read or databases were accessed in an average month, the lowest category (<2) was distinguished from the higher categories based on our belief that the lowest level of access represented poor attention to the literature that was inconsistent with the intent of EBP. For items that were designed to examine the degree of understanding of research terms, the “understand completely” and “understand somewhat” categories were combined so that a 2-category response was obtained: “understand at least somewhat” or “do not understand.” We did not examine the item identifying knowledge of the term “heterogeneity” (item 31g), because we believe the word could be understood in multiple contexts.

For some of the demographic data, where subsamples were small, we collapsed categories in an effort to derive stable models. For example, our sample included only 8 individuals who indicated a professional (entry-level) doctorate as their first professional degree and only 10 individuals with an advanced doctorate (additional degree beyond the professional degree [eg, PhD, EdD, ScD]) as their highest degree. Categories, therefore, were created to include all postbaccalaureate professional degrees and all advanced highest degrees.

After item categories were collapsed, logistic regression analyses were conducted to examine the following univariate associations: (1) responses to items measuring attitudes and beliefs; interest and motivation; education, knowledge, and skills; and access to and availability of evidence with items measuring age, years since licensure, education level (including specialization certification), and whether a respondent was a clinical instructor; (2) responses to items measuring attitudes and beliefs with items measuring types of patient conditions seen in practice and access to information; (3) responses to items measuring attention to and use of the literature with items measuring number of physical therapists in the practice setting, number of patients seen in an average day, number of hours worked in an average day, and access to sources of evidence; and (4) responses to items measuring access to and availability of evidence with items measuring the type of practice facility and the number of physical therapists in the practice setting. An alpha level of .01 was used to determine whether a model was to be reported.

Odds ratios and their 95% confidence intervals were determined for each level of the independent variables in those models that were significant. Odds ratios in this context describe the likelihood of demonstrating a particular behavior (eg, understanding a research term) given a particular characteristic (eg, having more than 15 years of experience). One level of each characteristic is used as the reference group against which the odds of demonstrating the behavior at all other levels of the variable are measured. The reference group is usually chosen by the researcher when initiating the analysis to allow the most salient interpretation of results. Confidence intervals provide information about the precision of the estimated odds ratio. Confidence intervals including 1.0 are, by definition, not statistically significant. We chose to examine univariate associations rather than multivariate associations to present our information at its most simple level in order to provide a foundation for future hypothesis testing.

* SPSS Inc, 233 S Wacker Dr, Chicago, IL 60606.

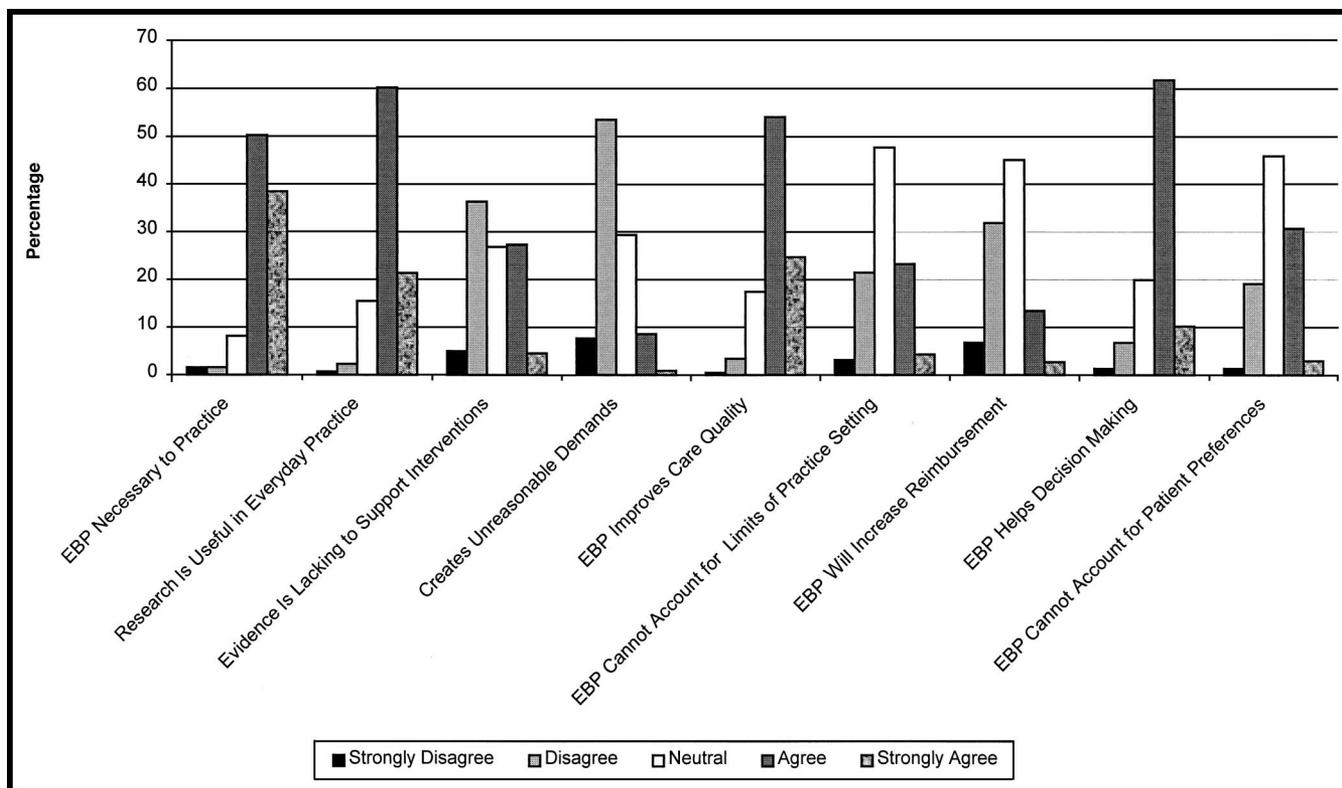


Figure 1. Self-reported attitudes and beliefs about evidence-based practice (EBP).

Results

Attitudes and Beliefs

Respondents stated they held generally positive attitudes and beliefs regarding EBP, with a majority contending that: they agreed or strongly agreed that EBP is necessary (90%), literature is useful to practice (82%), EBP improves the quality of patient care (79%), and evidence helps in decision making (72%). Sixty-one percent of the respondents stated they either disagreed or strongly disagreed that using evidence in practice places unreasonable demands on them. Respondents chose a neutral response more frequently than other responses when asked whether EBP takes into account the limitations of their practice setting (47%), increases reimbursement rates (46%), or takes into account patient preferences (46%). Respondents were diverse in their beliefs about whether there was a lack of strong evidence to support aspects of their practice. Forty-one percent stated they disagreed or strongly disagreed and 32% stated they agreed or strongly agreed with the statement. Figure 1 shows the distribution of responses related to attitudes and beliefs about EBP.

For the most part, demographic factors were not associated with attitudes and beliefs (Tab. 3). Where associations were found, those therapists who were younger or had been licensed for fewer years were more likely to say they agreed that EBP is necessary, improves patient care

quality, and improves reimbursement rates. For example, respondents who had less than 5 years since licensure were 4.6 times more likely to agree that EBP is necessary and 2.6 times more likely to agree that EBP improves the quality of patient care than respondents with more than 15 years since licensure. The variables of age and years since licensure were highly correlated ($r=.80$). We examined each variable separately to account for respondents who may have attended and graduated from professional programs at an older age than traditionally seen.

Eighty-four percent of the respondents indicated that they agreed or strongly agreed that they needed to increase the use of evidence in their daily practice. Eighty-five percent of the respondents indicated that they agreed or strongly agreed that they were interested in learning or improving the skills necessary to implement EBP. Respondents with access to online databases at home were 3.2 times more likely to express an interest in learning or improving their skills in implementing EBP than those who did not have access at home.

Education, Knowledge, and Skills

The respondents were diverse in expressing whether or not they had completed educational sessions either in school or through continuing education on EBP or search strategies. Forty-two percent agreed and forty percent strongly agreed that they had engaged in edu-

Table 3.
Factors Associated With Beliefs About Evidence-Based Practice

Attitude or Belief	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ^{2,c}	N
Evidence-based practice is necessary	Years since licensure	<5 y	4.6 (1.9–11.3)	.001	.07	477
		5–10 y	1.8 (0.9–3.6)			
		11–15 y	4.0 (1.2–13.5)			
		>15 y	Reference ^b			
Evidence-based practice improves the quality of patient care	Years since licensure	<5 y	2.6 (1.4–5.0)	.003	.05	477
		5–10 y	0.9 (0.5–1.6)			
		11–15 y	2.1 (0.9–4.7)			
		>15 y	Reference			
Reimbursement will increase with use of evidence in practice	Age	20–29 y	4.1 (1.1–14.7)	.005	.05	473
		30–39 y	6.0 (1.8–20.2)			
		40–49 y	3.7 (1.1–12.9)			
		>50 y	Reference			
Interested in improving skills	Access to online databases at home	Yes	3.2 (1.7–6.2)	.001	.04	475
		No or do not know	Reference			

^a95% CI=95% confidence interval.

^bIn logistic regression, one level of the independent variable serves as a reference against which the odds of the other levels occurring are determined. For example, in this instance, the odds of agreeing (as opposed to disagreeing) that evidence-based practice is necessary are 4.6 times greater for those with less than 5 years since licensure than for those with more than 15 years since licensure.

^cNagelkerke R².

cational sessions in the foundations of EBP or in search strategies, respectively. Sixty-five percent of the respondents agreed or strongly agreed that they were confident they had search skills, and 70% of the respondents agreed or strongly agreed that they had knowledge about using databases such as MEDLINE and CINAHL. Sixty-seven percent of the respondents stated they were educated in critical appraisal of research literature, and 55% of the respondents stated they were confident in their abilities in this skill. Figure 2 shows the distribution of responses related to education, knowledge, and skills associated with EBP.

Respondents' reports of their education, knowledge, and skills related to EBP were generally associated with age, years since licensure, and both professional (entry-level) and advanced academic degrees (Tab. 4). Training, familiarity with and confidence in search strategies, use of databases, and critical appraisal tended to be associated with younger age and fewer years since licensure. Those therapists with a baccalaureate degree or certificate as their first professional or highest degree were less likely to have training and confidence in these skills than those with a postbaccalaureate professional degree or an advanced master's degree or advanced doctorate as their highest degree. For example, respondents with a baccalaureate professional degree were 70% less likely than respondents with a postbaccalaureate professional degree to be familiar with online databases.

The therapists' self-evaluated knowledge of terms associated with EBP is described in Figure 3. Respondents' knowledge of the terms such as "relative risk," "odds

ratio," "confidence interval," and "publication bias" was most often associated with the highest degree they attained. Respondents' self-reported knowledge of meta-analysis and confidence intervals was associated with years since licensure, professional degree, and highest degree. Those respondents with less than 5 years since licensure tended to have more knowledge of the terms than those with greater than 15 years since licensure. Those with less than 5 years experience were 2.1 times more likely to understand the term "meta-analysis" and 4.2 time more likely to understand the term "confidence interval" than those respondents with more than 15 years of experience. Those respondents with baccalaureate degrees as their first professional or highest degree were less likely to understand the terms than those with a postbaccalaureate professional degree or an advanced master's degree or doctorate as their highest degree (Tab. 5).

Attention to Literature

In this category, we included reading literature related to clinical practice, using literature to inform decision making, and searching for relevant literature using online databases. Seventeen percent of the respondents reported reading fewer than 2 articles in a typical month. The majority of the respondents (66%) reported reading between 2 and 5 articles in an average month. Sixty-five percent of the respondents reported performing fewer than 2 database searches in a typical month. Seventy-four percent of the respondents reported using professional literature in the process of clinical decision making 5 or fewer times per month. Figure 4 shows the distribution of responses related to attention to the

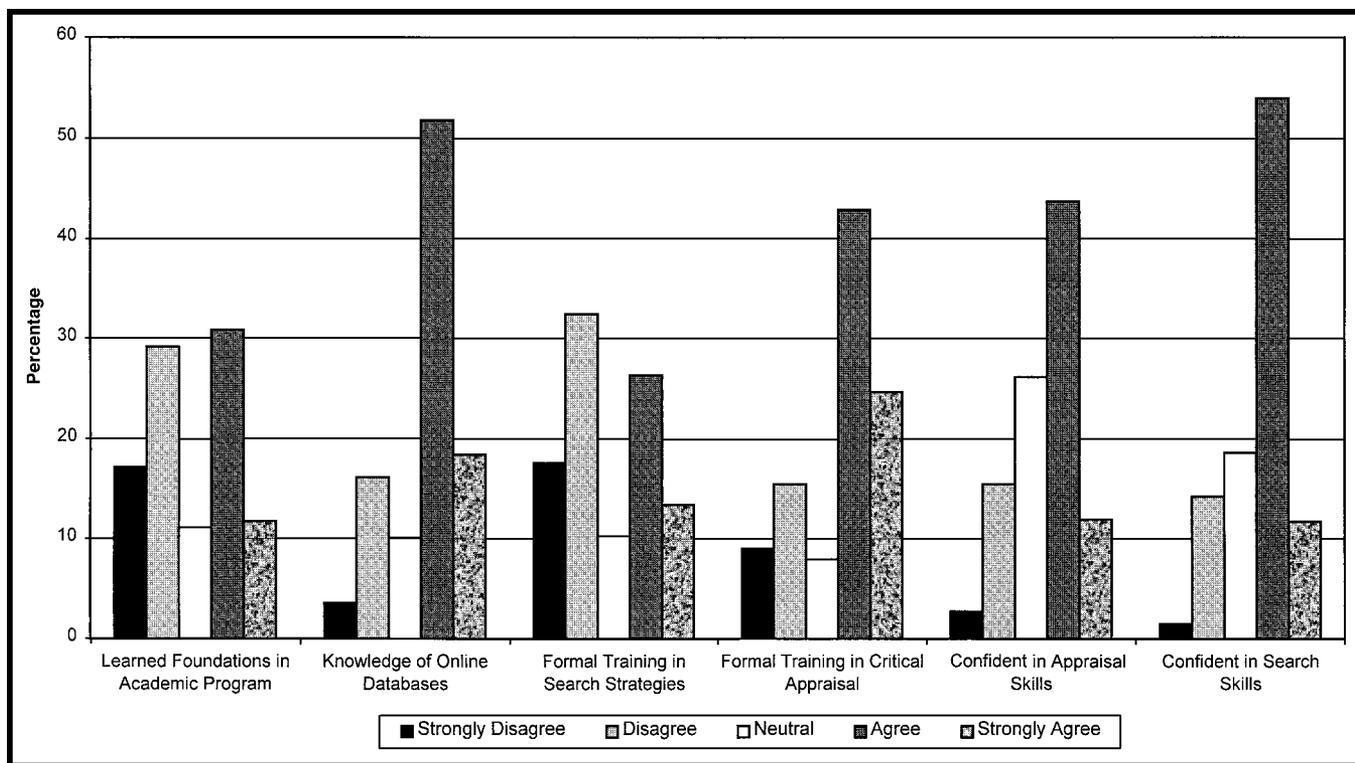


Figure 2. Self-reported education, knowledge, and skills.

literature. Those respondents with access to the Internet at home or at work were 4.7 times and 2.6 times more likely, respectively, to state they used online databases more than once per month than those without access to the Internet in those places. Those respondents with access at home were 3.1 times more likely to state they read more than one article per month than those without access (Tab. 6).

Access to and Availability of Literature

Nearly all of the respondents (96%) reported they had access to professional journals in paper form. Eighty percent of the respondents contended that clinical guidelines relevant to their practice areas were available, and 75% stated that they had access to those guidelines online. More respondents stated they had access to relevant databases and the Internet at home (89%) than at work (65%). Only 67% of the respondents stated they agreed or strongly agreed that their facility supports the use of evidence in practice. Figure 5 illustrates the distribution of responses related to access to and availability of literature. Access to online databases at work was associated with type of practice setting. Those therapists in the acute hospital setting were 3 times more likely to state they had access and those working in subacute rehabilitation or skilled nursing facilities were 60% less likely to state they had access than those in private practice outpatient settings (Tab. 7).

Barriers

Forty-six percent of the respondents indicated insufficient time was the most important barrier to the use of evidence in practice. Nearly 67% of the respondents rated insufficient time as one of the top 3 barriers. Approximately 30% of the respondents rated lack of generalizability of research findings to their specific patient population and the inability to apply findings to individual patients with unique characteristics as important barriers. Lack of interest was chosen as an important barrier by 11% of the respondents (Fig. 6).

Discussion

Attitudes and Beliefs

Our results suggest that physical therapists who are members of APTA have a generally positive regard for EBP. The results suggest they believe that the use of evidence in practice is necessary, that the literature is helpful to them in their practice and decision making, and that quality of patient care is better when evidence is used. These beliefs have been similarly reflected in studies of physicians and nurses.¹⁰⁻¹² McColl et al⁷ found that most physician general practitioners surveyed in the United Kingdom agreed that practicing using evidence improved patient care. In a study of pediatricians in the United States, 94% agreed or strongly agree that they were motivated to use clinical practice guidelines by a

Table 4.

Factors Associated With Education, Skills, and Knowledge Necessary for Evidence-Based Practice

Education, Skill, or Knowledge	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ^{2,c}	N	
Learned foundations in academic program	Age	20–29 y	18.1 (8.3–39.7)	.000	.27	475	
		30–39 y	3.9 (2.0–7.7)				
		40–49 y	1.2 (0.6–2.5)				
		>50 y	Reference ^b				
	Years since licensure	<5 y	24.1 (13.3–43.9)		.000	.38	476
		5–10 y	7.1 (4.1–12.5)				
		11–15 y	2.0 (1.0–4.2)				
		>15 y	Reference				
	Professional degree	Baccalaureate or certificate	0.1 (.09–0.2)		.000	.25	471
		Postbaccalaureate	Reference				
Highest degree	Baccalaureate or certificate	0.4 (0.3–0.8)	.000	.20	471		
	Entry-level postbaccalaureate	3.0 (1.8–5.0)					
	Advanced master's or doctorate	Reference					
Familiar with online databases	Age	20–29 y	11.4 (5.0–26.3)	.000	.12	475	
		30–39 y	3.0 (1.7–5.4)				
		40–49 y	2.2 (1.2–3.8)				
		>50 y	Reference				
	Years since licensure	<5 y	10.1 (4.8–21.2)		.000	.17	476
		5–10 y	2.0 (1.2–3.4)				
		11–15 y	1.0 (0.5–1.8)				
		>15 y	Reference				
	Professional degree	Baccalaureate or certificate	0.3 (0.2–0.4)		.000	.11	471
		Postbaccalaureate	Reference				
Highest degree	Baccalaureate or certificate	0.3 (0.1–0.5)	.000	.13	471		
	Entry-level postbaccalaureate	1.2 (0.6–2.2)					
	Advanced master's or doctorate	Reference					
Formal training in search strategies	Age	20–29 y	15.7 (7.0–35.1)	.000	.21	476	
		30–39 y	4.5 (2.2–9.5)				
		40–49 y	1.9 (0.9–4.2)				
		>50 y	Reference				
	Years since licensure	<5 y	12.3 (7.2–21.2)		.000	.26	477
		5–10 y	3.6 (2.1–6.1)				
		11–15 y	2.0 (1.0–4.0)				
		>15 y	Reference				
	Professional degree	Baccalaureate or certificate	0.2 (0.1–0.3)		.000	.19	472
		Postbaccalaureate	Reference				
Highest degree	Baccalaureate or certificate	0.2 (0.1–0.4)	.000	.20	472		
	Entry-level postbaccalaureate	1.6 (1.0–2.7)					
	Advanced master's or doctorate	Reference					
Formal training in critical appraisal	Age	20–29 y	22.7 (8.7–58.9)	.000	.24	476	
		30–39 y	5.2 (2.8–9.5)				
		40–49 y	1.5 (0.8–2.7)				
		>50 y	Reference				
	Years since licensure	<5 y	19.6 (9.1–42.5)		.000	.30	477
		5–10 y	6.4 (3.5–11.4)				
		11–15 y	1.5 (0.8–2.8)				
		>15 y	Reference				
	Professional degree	Baccalaureate or certificate	0.09 (.05–0.1)		.000	.28	472
		Postbaccalaureate	Reference				
Highest degree	Baccalaureate or certificate	0.2 (.09–0.3)	.000	.28	472		
	Entry-level postbaccalaureate	1.8 (0.9–3.5)					
	Advanced master's or doctorate	Reference					
Confident in critical appraisal skills	Age	20–29 y	2.7 (1.4–5.1)	.000	.07	477	
		30–39 y	1.2 (0.7–2.1)				
		40–49 y	0.7 (0.4–1.2)				
		>50 y	Reference				
	Years since licensure	<5 y	3.4 (2.1–5.7)		.000	.09	478
		5–10 y	1.4 (0.9–2.3)				
		11–15 y	0.8 (0.4–1.4)				
		>15 y	Reference				

(Continued)

Table 4.
Continued.

Education, Skill, or Knowledge	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ^{2,c}	N	
Confident in search skills	Professional degree	Baccalaureate or certificate	0.3 (0.2–0.5)	.000	.08	472	
		Postbaccalaureate	Reference				
	Highest degree	Baccalaureate or certificate	0.5 (0.3–0.8)	.000	.10	472	
		Entry-level postbaccalaureate	1.6 (1.0–2.7)				
		Advanced master's or doctorate	Reference				
	Years since licensure		<5 y	3.4 (2.0–5.9)	.000	.08	478
			5–10 y	1.3 (0.8–2.1)			
			11–15 y	0.7 (0.4–1.3)			
			>15 y	Reference			
	Professional degree	Baccalaureate or certificate	0.4 (0.3–0.7)	.000	.05	472	
		Postbaccalaureate	Reference				
	Highest degree	Baccalaureate or certificate	0.5 (0.3–0.8)	.000	.06	472	
Entry-level postbaccalaureate		1.2 (0.7–2.1)					
Advanced master's or doctorate		Reference					

^a 95% CI=95% confidence interval.

^b In logistic regression, one level of the independent variable serves as a reference against which the odds of the other levels occurring are determined.

^c Nagelkerke R².

desire to improve quality of care.¹⁰ Eighty-seven percent of nurses surveyed in one medical center in Australia believed that research helped their practice.¹²

The respondents in our study were not sure that EBP could take into account the limitations in their practice settings or the preferences of their patients. Similarly, qualitative statements by physician general practitioners in the United Kingdom¹⁴ and hospital nurses in Australia¹² have suggested doubts about the applicability of practice guidelines to specific patients in specific settings and the relevance of research findings to their practices. In a letter to the *British Medical Journal* in 1999, Main²¹ noted that the incorporation of evidence into practice would prove “disappointingly small” until its advocates had a better understanding of clinical realities. Proponents of EBP, however, have frequently reiterated that the evaluation of patient preferences, circumstances, and values is part of a clinician’s decision in determining appropriate intervention.^{4–6} Such evaluation requires clinical expertise and clinical judgment, thus defining EBP as the integration of research-based evidence with clinical expertise.¹

Some of the problems of accounting for the limitations in evidence in practice settings have been addressed by Haines and Donald.²² They noted that researchers may not be involved in the implementation of their findings in day-to-day practice and that research questions may not be framed and tested in relevant contexts. For this reason, we believe the responses of the physical therapists in our study may reflect a belief by practitioners that the interventions designed for research studies may not be adaptable for implementation into practice. Additionally, respondents in our survey were mixed in their

beliefs about whether good evidence existed to support the interventions they provided. Their belief about whether evidence existed to support their practice was not related to the area of practice or type of patients seen by the physical therapists. The mixed responses related to beliefs about the existence of evidence to support practice reinforce the notion that more research is needed in support of our practice.

A large proportion of our respondents indicated that they were interested in improving their skills related to incorporating evidence into practice and that they needed to incorporate more evidence. McColl et al⁷ found that most of the physicians they surveyed were “welcoming” toward EBP. Reported motivations for using clinical practice guidelines among pediatricians included allowing uniform management and standardized care.¹⁰ In a qualitative study of physicians’ implementation of evidence, Freeman and Sweeney¹¹ provided several quotations that illustrated the range of emotions associated with increasing the use of evidence in practice. Words that were used to describe implementation of clinical evidence were “anxious,” “hard work,” “risky,” and “hassle.” The authors¹¹ noted, however, that the physicians they interviewed wanted to implement interventions based on the evidence.

The fact that positive beliefs were more likely among younger and more recently licensed respondents than those who were older or had been licensed longer suggests a more recent focus on the topic of using evidence in practice within physical therapist education programs. The relationship of interest in improving skills with access to online databases at home, in our opinion, may be because those who have access to the

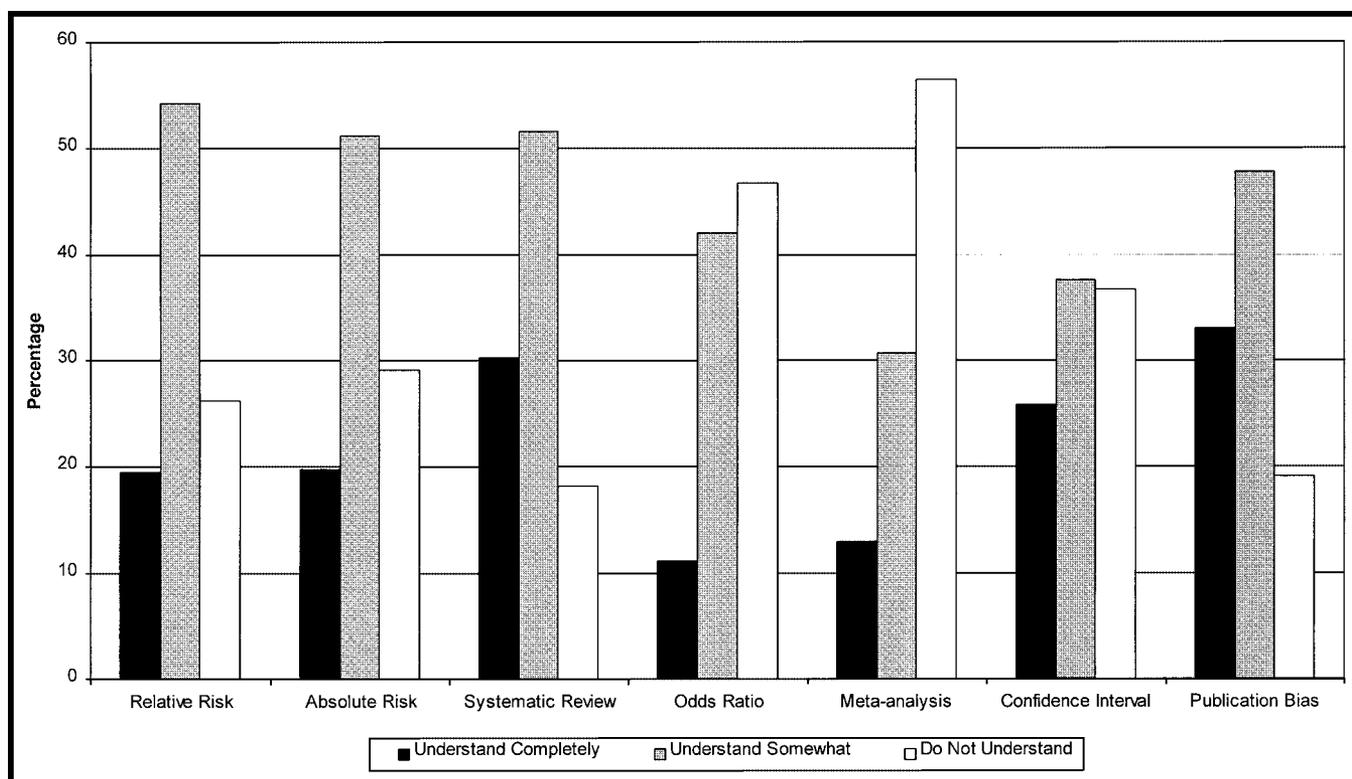


Figure 3.
Self-reported knowledge of specific terms.

Internet at home have an appreciation for its usefulness or are more able to find time at home than during the workday to seek and retrieve information.

Education, Knowledge, and Skills

Engagement in educational sessions (either in school or through continuing education), knowledge of technical terms, and confidence in skills needed to retrieve and critically appraise information were related to age, years since licensure, and education in our sample. That both age and education level were related to knowledge, suggests that within recent years all professional education programs, regardless of the degree offered, have increased emphasis on the skills needed to implement EBP. In our sample, however, those therapists with baccalaureate degrees were less likely to claim to have the skills than those with professional master's or advanced degrees. These differences, we believe, reflect the degree of emphasis on research skills, critical appraisal skills, and scholarship in programs offering graduate degrees. Those respondents who were younger (20–29 years of age) may have reported more confidence in skills than the oldest respondents (50+ years of age) due to the fact that they are part of a generation that grew up with computers at school and in the home.

McColl et al⁷ reported that 16% of the physician general practitioners in the United Kingdom they surveyed had had formal training in search strategies. A study of a

similar sample, however, showed that physicians admitted having a lack of technical skills to appraise the literature.⁹ McColl et al⁷ found that most of their respondents reported at least some understanding of technical terms used in the literature, similar to those we queried in our study. The terms “odds ratio” and “confidence interval” were understood by the fewest of their respondents (48% and 31% did not understand the respective terms), percentages similar to those of our sample (47% and 37%, respectively).

Attention to Literature

Seventeen percent of the physical therapists in our sample stated they read fewer than 2 articles in a typical month, and one quarter of the respondents stated they used literature in their clinical decision making less than twice per month. In studies of the reading habits of physical therapists in Australia¹⁶ and the United Kingdom,¹⁷ slightly less reading appeared to occur. In both countries, approximately three quarters of the physical therapists reported reading their primary professional journal (*Australian Journal of Physiotherapy* or *Physiotherapy*) about one time per month or less.

In our estimation, the level of attention to the literature in our sample may not be consistent with the intent of EBP. Experienced clinicians who treat patients with similar problems on a day-to-day basis may not need to refer frequently to the literature. Our data, however, did

Table 5.
Factors Associated With Understanding of Specific Terms

Term (Partially to Completely Understood)	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ² , ^c	N
Meta-analysis	Years since licensure	<5 y	2.1 (1.3–3.3)	.000	.05	477
		5–10 y	1.0 (0.6–1.7)			
		11–15 y	0.6 (0.3–1.1)			
		>15 y	Reference ^b			
	Professional degree	Baccalaureate or certificate	0.5 (0.3–0.7)	.000	.04	471
		Postbaccalaureate	Reference			
Highest degree	Baccalaureate or certificate	0.4 (0.2–0.6)	.000	.07	471	
	Professional postbaccalaureate	0.9 (0.5–1.5)				
	Advanced master's or doctorate	Reference				
Confidence interval	Age	20–29 y	3.7 (1.8–7.2)	.000	.06	478
		30–39 y	1.6 (0.9–2.8)			
		40–49 y	1.0 (0.6–1.8)			
		>50 y	Reference			
	Years since licensure	<5 y	4.2 (2.4–7.2)	.000	.09	478
		5–10 y	1.2 (0.7–1.9)			
		11–15 y	1.2 (0.6–2.1)			
		>15 y	Reference			
	Professional degree	Baccalaureate or certificate	0.4 (0.3–0.6)	.000	.06	473
		Postbaccalaureate	Reference			
	Highest degree	Baccalaureate or certificate	0.3 (0.2–0.5)	.000	.12	472
		Professional postbaccalaureate	1.1 (0.6–1.9)			
Advanced master's or doctorate		Reference				

^a95% CI=95% confidence interval.

^bIn logistic regression, one level of the independent variable serves as a reference against which the odds of the other levels occurring are determined.

^cNagelkerke R².

not show a relationship between the amount of time a therapist had been licensed or had achieved clinical specialist certification (possible surrogates for clinical expertise) and attention to the literature. Our finding that 65% of physical therapists reported using online databases to access literature less than twice per month is difficult to evaluate. Given that most health-related journals are published monthly, this level of review could be adequate. We also found, not surprisingly we believe, that those physical therapists with easier access to online databases were likely to perform database searches more frequently and tended to read more articles. In our opinion, these data emphasize the need for technology to assist in the use of evidence in the workplace.

Data from studies of the retrieval and reading patterns of other health care professionals do not directly correspond to our findings. Some similarities, however, may be noted. For example, in a survey conducted from July 1998 to January 2000 in Ontario, Canada, 64% of family physicians, 100% of oncologists, and 72% of nurses accessed the Internet for health information.²³ Based on studies that examined the reading practices of physicians and their use of information in clinical decision making, relatively few physicians appeared to attend to important sources of relevant information. For example, McColl et al⁷ found that, depending on the publication, between 2% and 28% of physicians referred to sources of evi-

dence such as the Cochrane Database of Systematic Reviews, and between 1% and 17% of the physicians used data from these sources to assist them in decision making. Prescott et al²⁴ found that, depending on the database, 10% to 91% of a sample of general practitioners in the United Kingdom referred to sources at least occasionally. In a qualitative study of general practitioners' awareness and understanding of the results of 2 high-profile clinical trials related to treatment of hypercholesterolemia, only 7 of the 24 physicians studied reported reading at least one of the reports.⁹

Fairhurst and Huby⁹ concluded that most physicians they interviewed in Scotland used personal contacts as sources of information and changed practice based on consensus rather than on information they read and appraised. Indeed, McColl et al⁷ found that only 5% of physicians they surveyed in England believed that the best way to move from opinion-based to evidence-based medicine was to identify and appraise the primary literature. Similarly, the literature has shown that physical therapists in England and Australia rank colleagues ahead of the literature as sources of information about patient management.^{15,18,19}

Access to and Availability of Literature

In our opinion, using evidence in practice is possible only when there is efficient access to information

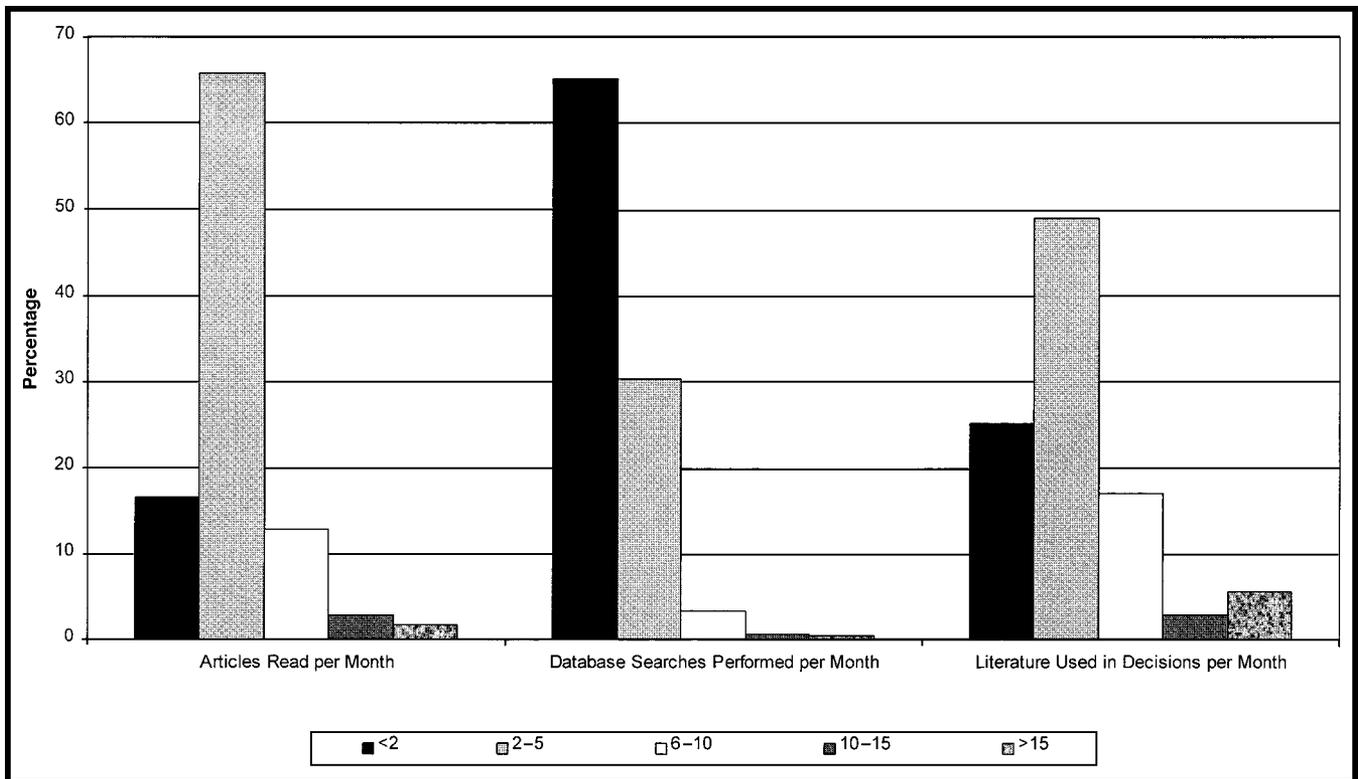


Figure 4.
Self-reported attention to literature.

Table 6.
Factors Associated With Attention to Literature

Type of Attention	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ^{2,c}	N
Read research literature relevant to practice >1 time per month	Access to online databases at home	Yes	3.1 (1.6–5.8)	.001	.04	478
		No or do not know	Reference ^b			
Use online databases >1 time per month	Access to online databases at work	Yes	2.6 (1.7–4.1)	.000	.06	473
		No or do not know	Reference			
	Access to online databases at home	Yes	4.7 (1.9–11.2)	.000	.05	477
		No or do not know	Reference			

^a95% CI=95% confidence interval.

^bIn logistic regression, one level of the independent variable serves as a reference against which the odds of the other levels occurring are determined.

^cNagelkerke R².

resources. Efficiency requires easy retrieval of information, use of online sources, and skill in finding relevant resources. The majority of our respondents had access to online information, although more had access at home (89%) than at work (65%). In 1990, Bohannon¹⁹ reported that only 2 of 27 clinicians interviewed mentioned computer searches as sources of information. Eight years later, McColl et al⁷ found that 17% of physicians had access to the Internet at work and 29% had access at home. Although there is the possibility of differences in access across health care professionals, we believe these differences likely reflect the changes occur-

ring in the workplace and increasing access to computers and high-speed connections in the home over the past few years.

We found no associations between access to the Internet at home or at work and demographic factors. Those physical therapists who practiced in subacute rehabilitation or skilled nursing facilities had less access and those who practiced in the acute hospital setting had more access to online databases at work than those who practiced in private practice settings. Our data did not allow us to determine the reason for these differences.

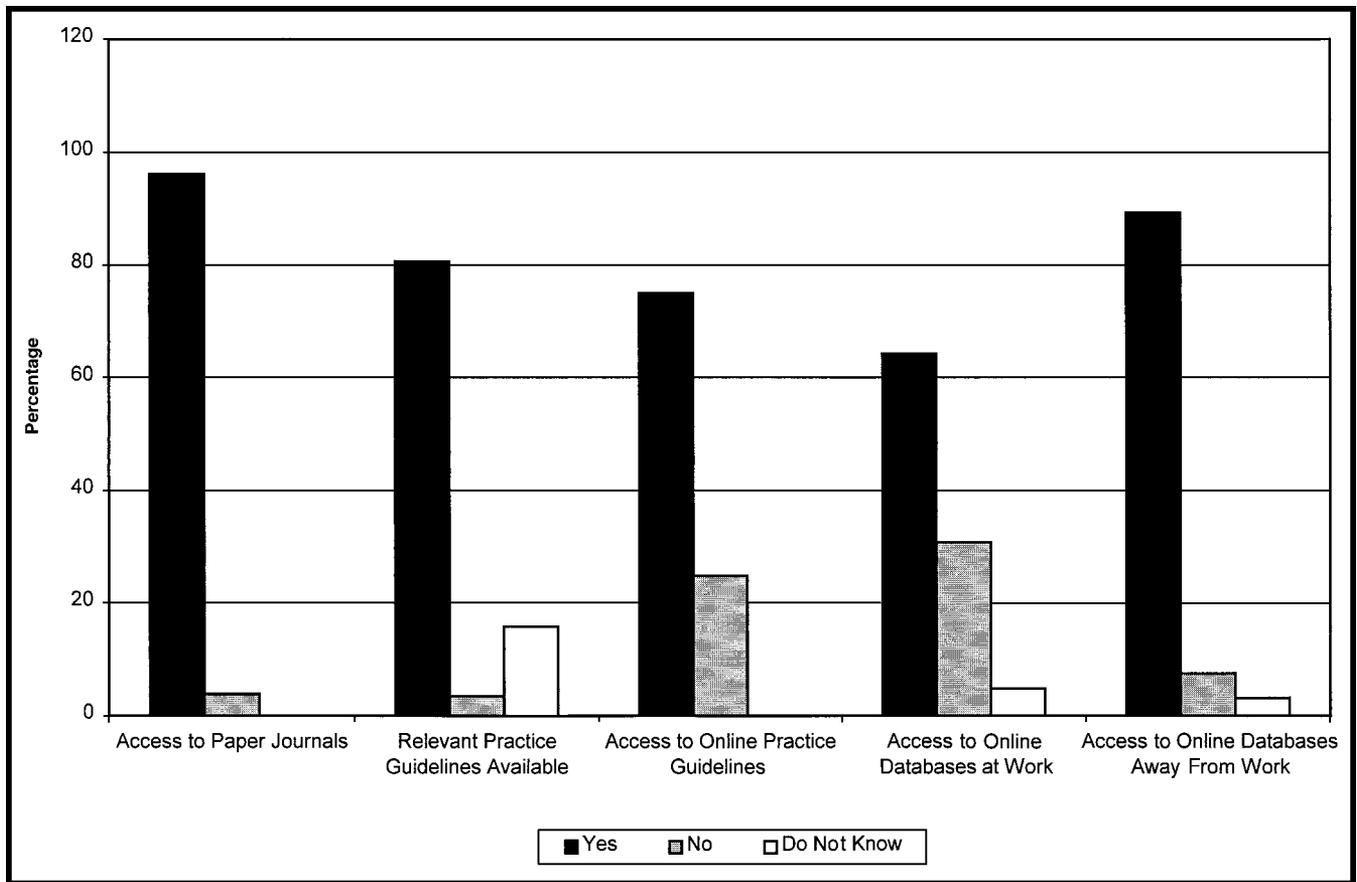


Figure 5. Self-reported access to and availability of literature.

Table 7. Factors Associated With Access to and Availability of Literature

Type of Access	Factor	Level	Odds Ratio (95% CI) ^a	Model P	Model R ^{2,c}	N
Access to online databases at facility	Type of facility	Acute care hospital	3.0 (1.4–6.2)	.000	.10	438
		Acute rehabilitation	2.5 (0.8–7.8)			
		Subacute rehabilitation or skilled nursing facility	0.4 (0.2–0.8)			
		Hospital outpatient	1.6 (1.0–2.8)			
		Home care	0.5 (0.2–1.0)			
		School system	1.2 (0.5–2.8)			
		Private outpatient	Reference ^b			

^a 95% CI=95% confidence interval.

^b In logistic regression, one level of the independent variable serves as a reference against which the odds of the other levels occurring are determined.

^c Nagelkerke R².

Economic issues, complexity and amount of information for each patient, or possible beliefs about the utility of information technology in the various practice settings may have been factors.

Barriers

Other researchers^{7–9,12–14} found, as we did, that the primary barrier to implementing EBP was lack of time. Ely et al⁸ suggested that time for answering a clinical

question includes modifying the question so that it is specific and answerable, selecting an effective search strategy, finding a source that covers the topic under question, determining when the relevant information has been found and the search can stop, and synthesizing multiple pieces of information to formulate an answer to the question. Although less than 20% of our participants chose lack of search skills or lack of critical appraisal skills as one of the top 3 barriers, some of the

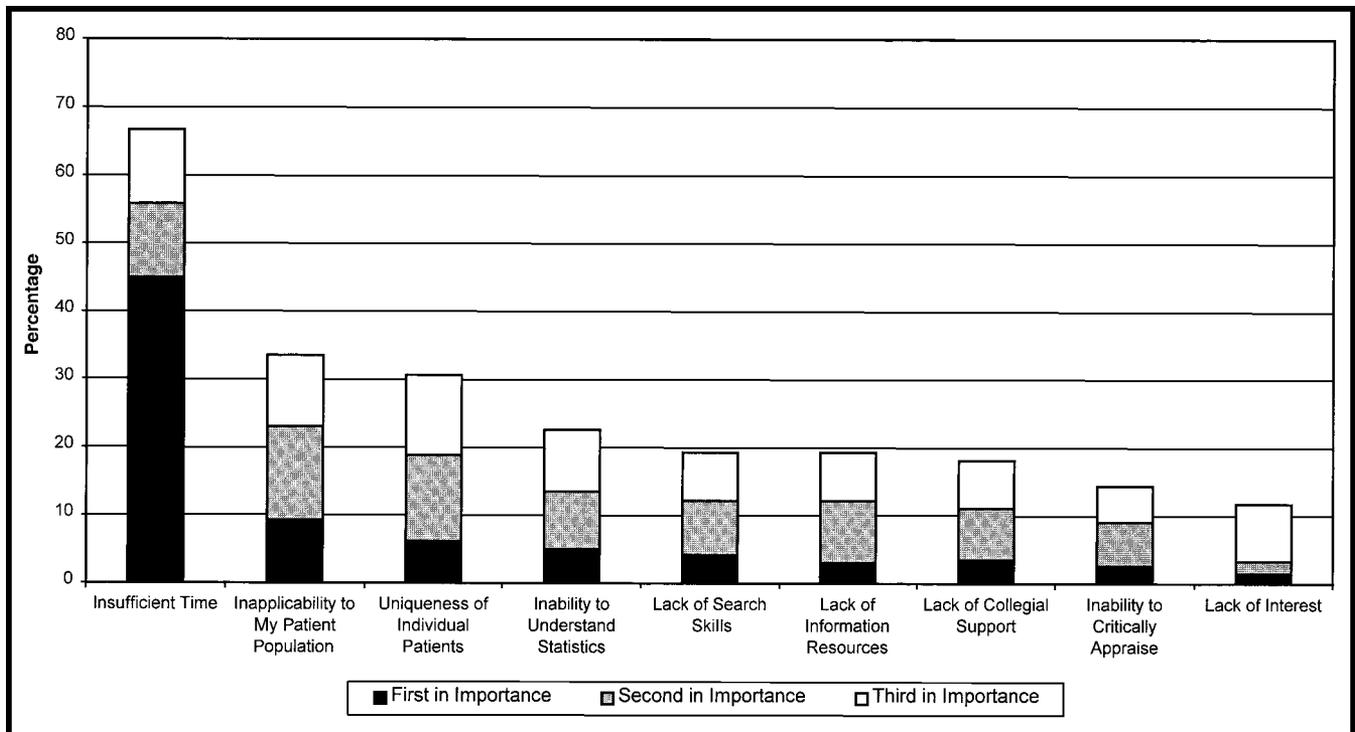


Figure 6. Self-reported ranking of barriers to evidence-based practice.

obstacles reported by Ely et al⁸ are particularly salient, given that 44% of our sample stated they did not feel particularly confident in their critical appraisal skills and 34% stated they did not feel confident in their search skills.

Other barriers frequently identified by our respondents were the inability to apply research findings to the types of patients seen in practice and the inability to apply the research findings from a group of patients to a specific patient. These are somewhat related problems and appear as barriers to the use of evidence by physicians and nurses as well.^{10,12-14} One of the reasons that some pediatricians have given for not implementing clinical practice guidelines is that the guidelines represent “cookbook medicine” and do not allow for clinical judgment.⁷ In a study by Cranney et al, general practitioners in England viewed clinical practice guidelines as having been developed by “enthusiasts outlining ideal practice.”^{14(p360)} Haines and Jones²⁵ have suggested that one factor working against implementation of evidence in practice is the “cultural divide” among researchers, clinicians, and administrators.

Our respondents did not view lack of interest or lack of collegial support as a primary barrier to implementing EBP. The majority felt that they were supported in their workplace. Restas,¹² however, found that 2 of the top 10 barriers cited by nurses in Australia were lack of cooperation from physicians and lack of support from col-

leagues. Similarly, Kajermo et al¹³ found that nurses in Sweden felt isolation from colleagues and lack of authority to change practice were moderate to large barriers to using research. Given the findings that among physicians information from the research literature acquires status and is implemented when local consensus reasons that it fits in the context of practice,⁹ support for EBP from colleagues and others within the work facility seems quite important.

Limitations

Among the limitations of our study were the relatively low response rate (48.8%), the low reliability for some items, and a lack of information about the validity of the questionnaire we used. The degree of reliability may have been affected by the relatively long period (up to 2 months) we used between responses or by a lack of clarity in item instructions or wording. The response bias cannot be assessed because data about nonrespondents were not available. Although the respondents to our survey appear to be fairly similar to a larger national sample of APTA members in terms of demographic characteristics, the results of our analysis may have been skewed by a higher response rate from those interested in EBP and, therefore, more positive about it.

Our questionnaire was developed using items to identify elements similar to those surveyed in the study of physician general practitioners by McColl and colleagues.⁷ It is possible that the important beliefs and

attitudes about EBP are different for physicians than for physical therapists. There is evidence, for example, to suggest that the focus on use of evidence for physicians is on implementation of clinical practice guidelines and use of systematic reviews. Less of this type of evidence in summary form is available to inform physical therapist practice. Additionally, we believe EBP has been a topic of interest in the medical profession for much longer than in physical therapy. For this reason, we might suspect a different focus is needed when evaluating the attitudes, beliefs, and perceived barriers among physical therapists.

Another limitation results from our decision to dichotomize the dependent variables for analyses. Our choice of where to dichotomize the 5-point Likert scale used to measure several dependent variables was somewhat arbitrary. Fishbein and Ajzen,²⁶ however, have suggested that the neutral category reflects a negative attitude or belief in Likert scales that have a positive response set. Additionally, information is lost when the data are reduced into simple categories of positive/negative response. Such data reduction and application of a logistic model imply an abrupt change in odds at the point chosen for distinguishing 2 different categories for the variable and no difference in the odds across those levels of the variable subsumed within each category.

A final limitation is the potential bias introduced by the sampling frame. Only APTA members were surveyed. It is unclear how APTA members are similar or dissimilar to all physical therapists. In our opinion, APTA members may be more likely to have access to evidence, at least through their paper journal, and may be more likely to have heard of EBP and read some of the related articles in both *Physical Therapy* and *PT Magazine*. We believe this exposure may lead to a positive regard for, and understanding of, EBP. Additionally, given the current professional emphasis on EBP, respondents may have addressed items in a socially acceptable manner. That is, they may have reported more positive attitudes and beliefs and higher levels of knowledge than they actually have.

Practice Implications

Our findings, in our opinion, have implications for the educational, research, and clinical communities. Furthermore, these implications likely interact. Our data suggest that, in the past few years, newly licensed practitioners have come to the profession with a belief they have skills in information retrieval and appraisal. These skills are not claimed by those who have been licensed longer or by those with baccalaureate degrees. The education community may have a role to play in providing continuing education at clinical sites or in local

regions to help improve the skills of clinicians in practice who, by and large, are interested in improving their skills and increasing their use of evidence. This notion is supported by reports of nurses regarding perceived facilitators to increasing use of evidence in practice.¹³ Because time is said to be a major barrier to using EBP, educational programs that emphasize efficiency in searching may be particularly useful. Clinical administrators, in turn, may need to make efforts to increase the availability of computer access to research databases and to provide the time for clinicians to retrieve and read the literature or communicate research findings among their colleagues.¹³

A message for researchers may be that not only does a need exist for more research related to the effectiveness of interventions and diagnostic tools that are used by physical therapists, but the information generated from the research also needs to be expressed in a manner that assists clinicians in applying data to typical patients in typical clinical settings. Research also needs to be accessible in terms of being written in an understandable manner.¹³ Moreover, because of clinicians' lack of time, there is a need for evidence to be published in summary forms that can be accessed in one simple stop. Suggestions for future research include studies that examine the actual processes through which evidence is gathered, synthesized, and applied by physical therapists across various settings and demographic factors.

Conclusion

Physical therapists who are APTA members state they have a generally positive attitude toward EBP and state they are interested in increasing their skills and the amount of evidence used in their practices. Many of the beliefs, skills, and behaviors we examined were related to the age, years since licensure, and degree attainment of our sample. Those respondents who were younger and more recently licensed, and had other than a baccalaureate degree, tended to express more positive attitudes and state they had greater skills and confidence related to accessing and critically appraising information. Reported use of online databases to search the literature and the amount of reading respondents reported doing in a typical month were related to their computer access at home and at work. Access at work, in turn, was related to the type of practice setting. Lack of time was said to be the most important barrier to using EBP. The findings have implications for the education, clinical, and research communities.

References

1 Ciccone CD. Clinical question: Does ambulation immediately following an episode of deep vein thrombosis increase the risk of pulmonary embolism? *Phys Ther.* 2002;82:84-88.

- 2 Ciccone CD. Does acetic acid iontophoresis accelerate the resorption of calcium deposits in calcific tendinitis of the shoulder? *Phys Ther.* 2003;83:68–74.
- 3 Whitman JM, Fritz JM, Boyes RE. Clinical question: Is there evidence that performing joint manipulation under local anesthetic block might be more effective than continuing a program of joint mobilization, stretching, and mobility exercises in a woman with recalcitrant adhesive capsulitis of the shoulder? *Phys Ther.* 2003;83:486–496.
- 4 Sackett DL, Rosenberg WMC, Muir Gray JA, et al. Evidence-based medicine: what it is and what it isn't. *BMJ.* 1996;312:71–72.
- 5 Guyatt GH, Haynes RB, Jaeschke RZ, et al. Users' guide to the medical literature, XXV: evidence-based medicine—principles for applying the users' guides to patient care. *JAMA.* 2000;284:1290–1296.
- 6 Haynes B, Haines A. Barriers and bridges to evidence based clinical practice. *BMJ.* 1998;317:273–276.
- 7 McColl A, Smith H, White P, Field J. General practitioners' perceptions of the route to evidence based medicine: a questionnaire survey. *BMJ.* 1998;316:361–365.
- 8 Ely JW, Osheroff JA, Ebell MH, et al. Obstacles to answering doctors' questions about patient care with evidence: qualitative study. *BMJ.* 2002;324:710–713.
- 9 Fairhurst K, Huby G. From trial data to practical knowledge: qualitative study of how general practitioners have accessed and used evidence about statin drugs in their management of hypercholesterolaemia. *BMJ.* 1998;317:1130–1134.
- 10 Flores G, Lee M, Bauchner H, Kastner B. Pediatricians' attitudes, beliefs, and practices regarding clinical practice guidelines: a national survey. *Pediatrics.* 2000;105:496–501.
- 11 Freeman AC, Sweeney K. Why general practitioners do not implement evidence: qualitative study. *BMJ.* 2001;323:1100–1102.
- 12 Retsas A. Barriers to using research evidence in nursing practice. *J Adv Nurs.* 2000;31:599–606.
- 13 Kajermo KN, Nordstrom G, Krusebrant A, Bjorvell H. Barriers to and facilitators of research utilization, as perceived by a group of registered nurses in Sweden. *J Adv Nurs.* 1998;27:798–807.
- 14 Cranney M, Warren E, Barton S, et al. Why do GPs not implement evidence-based guidelines? A descriptive study. *Fam Pract.* 2001;18:359–363.
- 15 Turner PA, Whitfield TWA. Physiotherapists' use of evidence-based practice: a cross-national study. *Physiotherapy Research International.* 1997;2:17–29.
- 16 Turner PA, Whitfield TWA. Journal readership amongst Australian physiotherapists: a cross-national replication. *Australian Journal of Physiotherapy.* 1997;43:197–202.
- 17 Turner PA, Whitfield TWA. A multivariate analysis of physiotherapy clinicians' journal readership. *Physiotherapy Theory and Practice.* 1996;12:221–230.
- 18 Carr JH, Mungovan SF, Shepard RB, et al. Physiotherapy in stroke rehabilitation: bases for Australian physiotherapists' choice of treatment. *Physiotherapy Theory and Practice.* 1994;10:201–209.
- 19 Bohannon RW. Information accessing behavior of physical therapists. *Physiotherapy Theory and Practice.* 1990;6:215–225.
- 20 PT Membership Demographics. American Physical Therapy Association. Available at: http://www.apta.org/Research/survey_stat/pt_demo. Accessed: October 7, 2002.
- 21 Main J. Using research findings in clinical practice [letter]. *BMJ.* 1999;318:332.
- 22 Haines A, Donald A. Getting research findings into practice: making better use of research findings. *BMJ.* 1998;317:72–75.
- 23 Sigouin C, Jadad AR. Awareness of sources of peer-reviewed research evidence on the Internet. *JAMA.* 2002;287:2867–2870.
- 24 Prescott K, Lloyd M, Douglas H-R, et al. Promoting clinically effective practice: general practitioners' awareness of sources of research evidence. *Fam Pract.* 1997;14:320–323.
- 25 Haines A, Jones R. Education and debate, implementing findings of research. *BMJ.* 1994;308:1488–1492.
- 26 Fishbein M, Ajzen I. *Belief, Attitudes, Intention, and Behavior: An Introduction to Theory and Research.* Reading, Mass: Addison-Wesley Publishing Co; 1975:82.

Appendix.

Evidence-Based Practice (EBP) Questionnaire^a

This section of the questionnaire inquires about personal attitudes toward, use of, and perceived benefits and limitations of EBP.

For the following items, place a mark in the appropriate box that indicates your response.

1. Application of EBP is necessary in the practice of physical therapy.
 Strongly disagree Disagree Neutral Agree Strongly Agree
2. Literature and research findings are useful in my day-to-day practice.
 Strongly disagree Disagree Neutral Agree Strongly Agree
3. I need to increase the use of evidence in my daily practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
4. The adoption of EBP places an unreasonable demand on physical therapists.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
5. I am interested in learning or improving the skills necessary to incorporate EBP into my practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
6. EBP improves the quality of patient care.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
7. EBP does not take into account the limitations of my clinical practice setting.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
8. My reimbursement rate will increase if I incorporate EBP into my practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
9. Strong evidence is lacking to support most of the interventions I use with my patients.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
10. EBP helps me make decisions about patient care.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
11. EBP does not take into account patient preferences.
 Strongly Disagree Disagree Neutral Agree Strongly Agree

For the following items, place a mark in the appropriate box that indicates your response for a typical month.

12. Read/review research/literature related to my clinical practice.
 ≤1 article 2–5 articles 6–10 articles 11–15 articles 16+ articles
13. Use professional literature and research findings in the process of clinical decision making.
 ≤1 time 2–5 times 6–10 times 11–15 times 16+ times
14. Use MEDLINE or other databases to search for practice-relevant literature/research.
 ≤1 time 2–5 times 6–10 times 11–15 times 16+ times

The following section inquires about personal use and understanding of clinical practice guidelines. Practice guidelines provide a description of standard specifications for care of patients with specific diseases and are developed through a formal, consensus-building process that incorporates the best scientific evidence of effectiveness and expert opinion available.^b

For the following items, place a mark in the appropriate box that indicates your response.

15. Practice guidelines are available for topics related to my practice.
 Yes No Do Not Know
16. I actively seek practice guidelines pertaining to areas of my practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
17. I use practice guidelines in my practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
18. I am aware that practice guidelines are available online.
 Yes No
19. I am able to access practice guidelines online.
 Yes No
20. I am able to incorporate patient preferences with practice guidelines.
 Strongly Disagree Disagree Neutral Agree Strongly Agree

The following section inquires about availability of resources to access information and personal skills in using those resources.

For the following items, place a mark in the appropriate box that indicates your response. In items referring to your "facility," consider the practice setting in which you do the majority of your clinical care.

21. I have access to current research through professional journals in their paper form.
 Yes No
22. I have the ability to access relevant databases and the Internet at my facility.
 Yes No Do Not Know

Continued

Appendix.

Continued

23. I have the ability to access relevant databases and the Internet at home or locations other than my facility.
 Yes No Do Not Know
24. My facility supports the use of current research in practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
25. I learned the foundations for EBP as part of my academic preparation.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
26. I have received formal training in search strategies for finding research relevant to my practice.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
27. I am familiar with the medical search engines (eg, MEDLINE, CINAHL).
 Strongly Disagree Disagree Neutral Agree Strongly Agree
28. I received formal training in critical appraisal of research literature as part of my academic preparation.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
29. I am confident in my ability to critically review professional literature.
 Strongly Disagree Disagree Neutral Agree Strongly Agree
30. I am confident in my ability to find relevant research to answer my clinical questions.
 Strongly Disagree Disagree Neutral Agree Strongly Agree

For the following item, place a mark in one box in the row for each term.

31. My understanding of the following terms is:

Term	Understand Completely	Understand Somewhat	Do Not Understand
a) Relative risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Absolute risk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Systematic review	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Odds ratio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Meta-analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Confidence interval	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Heterogeneity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Publication bias	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

For the following items, rank your top 3 choices by placing numbers in the appropriate boxes (1=most important).

32. Rank your 3 greatest barriers to the use of EBP in your clinical practice.
- Insufficient time
 - Lack of information resources
 - Lack of research skills
 - Poor ability to critically appraise the literature
 - Lack of generalizability of the literature findings to my patient population
 - Inability to apply research findings to individual patients with unique characteristics
 - Lack of understanding of statistical analysis
 - Lack of collective support among my colleagues in my facility
 - Lack of interest

The following section inquires about personal demographic information.

For the following items, place a mark in the appropriate box next that indicates your response.

33. What is your sex?
 Male Female
34. What is your age group?
 20–29 y 30–39 y 40–49 y 50+ y
35. Do you currently hold a valid physical therapy license?
 Yes No
36. For how many years have you been licensed?
 <5 y 5–10 y 11–15 y >15 y
37. What is your entry-level degree for physical therapy?
 Certificate
 Baccalaureate
 Entry-level master's
 Entry-level doctorate
 Other

(Continued)

Appendix.

Continued

38. What is your highest degree attained?
- Baccalaureate
 - Entry-level master's
 - Advanced master's
 - Entry-level doctorate
 - Advanced doctorate
 - Other
39. If you do not currently hold an advanced degree, do you intend to pursue one in the future?
- Yes No Do Not Know
40. Are you a clinical certified specialist? If so, in which speciality?
- Yes No Speciality: _____
41. Do you regularly (\geq once per year) participate in continuing education courses?
- Yes No
42. Do you belong to one or more professional practice-oriented organizations (eg, APTA)?
- Yes No
43. Are you a clinical instructor for physical therapist students/interns/residents?
- Yes No
44. On average, how many hours per week do you work?
- <20 20–30 31–40 >40
45. On average, how many patients do you see daily?
- <5 5–10 11–15 >15
46. How many full-time physical therapists are in the facility in which you do the majority of your patient care?
- <5 5–10 11–15 >15
47. Please indicate the percentage of your total work time that you spend in each type of activity during an average month.
- a) Patient care %
- b) Research %
- c) Teaching %
48. Which of the following *best* describes the location of the facility in which you perform the majority of your patient care?
- Rural
- Urban
- Suburban
49. List the state(s) in which you practice.
50. Which of the following *best* describes the facility at which you do most of your patient care?
- Acute care hospital
 - Acute rehabilitation
 - Subacute rehabilitation
 - Skilled nursing facility
 - Privately owned outpatient clinic
 - Facility-based outpatient clinic
 - Home care
 - School system
 - University
 - Other
51. Which of the following *best* describes the majority of patients and types of problems you see? Mark one box in each section.
- Orthopedic
 - Neurological
 - Cardiovascular/pulmonary
 - Other
 - Do not treat patients
- Pediatric (<18 y)
- Adult (19–64 y)
- Geriatric (65+ y)
- Other
- Do not treat patients

^a The questionnaire was developed by the authors and contains elements as reported by McColl et al.⁷

^b Brown GC, Brown MM, Sharma S. Health care in the 21st century: evidence-based medicine, patient preference-based quality, and cost effectiveness. *Health Qual Manag Care.* 2000;9:23–32.