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A Survey Of Variables Influencing Speech-Language Pathologists' Use Of Evidence-Based Practice In Clinical Settings

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A SURVEY OF VARIABLES INFLUENCING SPEECH-LANGUAGE PATHOLOGISTS'
USE OF EVIDENCE-BASED PRACTICE IN CLINICAL SETTINGS

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USE OF EVIDENCE-BASED PRACTICE IN CLINICAL SETTINGS

By

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ABSTRACT

Although the need for evidence-based practice (EBP) in speech-language pathology has been well attested, multiple barriers hamper its implementation. **Purpose:** The purpose of this study was to compare variables influencing the use of EBP by practicing speech-language pathologists (SLPs). **Method:** Eighty-five SLPs based out of different primary work settings in El Paso, Texas responded to a survey addressing: 1. attitudes and perceived barriers toward EBP, 2. exposure to EBP, research methodology and statistics in graduate courses, 3. time in practice, 4. practice setting(s), 5. amount and nature of support for EBP in work settings, and 6. use of research literature to support their caseload. **Results:** Clinicians who complete more coursework in EBP and research methodology, engage in more research activities, and receive more support in their workplace are more likely to implement EBP.

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CHAPTER 1: INTRODUCTION

The concept of evidence-based practice (EBP) is often traced to Sackett and colleagues' descriptions of methods for combining the best scientific evidence with clinical expertise and client preferences to maximize patient care (Davidoff, Haynes, Sackett, Smith, 1995; Sackett, Strauss, Richardson, Rosenburg, Haynes, 2000). Sackett et al. (2000) delineated five steps for carrying out evidence-based practice:

(1) convert the need for information into an answerable question, (2) track down the best evidence to answer that question, (3) critically appraise the evidence for its validity, impact, and applicability, (4) integrate the critical appraisal with clinical expertise and the client's circumstances, (5) evaluate the effectiveness and efficacy of the performance. (p. 4)

Although Sackett and colleagues are often associated with evidence-based practice, critical use of evidence in clinical practice clearly did not originate with these authors. Ingham (2003) reported that reliance on well-designed empirical research for selecting treatment procedures has been a benchmark of psychologists, educators and speech-language pathologists (SLPs) for the last several decades. In describing the general characteristics of the behavioral modification approach, Kazdin (1978) foreshadowed the goals of EBP: "to apply well-established findings or to generate techniques derived from a particular theory to clinical practice" (p. 204). Within the field of speech-language pathology, researchers similarly emphasized using experimental designs that could prove a treatment's effectiveness. While presenting at the 1978 Clinical Aphasiology Conference, Wertz, Rosenbek, Davis, LaPointe and Salvatore presented four papers summed up by the motto "Our data, not our word". Salvatore (1978) summarized the crux of these papers by urging clinicians to apply "the experimental

analysis of behavior to the problems associated with evaluating the effectiveness, duration, magnitude, generality and interactions of variables involved in treatment of aphasic individuals” (p. 30). Responsible implementation of EBP has become an objective for most healthcare disciplines to demonstrate that interventions not only produce the best outcomes for patients, but are also cost-effective (Reilly, 2004).

In its 2005 position statement, the American Speech-Language-Hearing Association (ASHA) mandated SLPs to incorporate EBP into their clinical decision-making. ASHA enumerated six guidelines clinicians should follow to make their clinical practice evidence-based:

- (1) recognize the needs, abilities, values, preferences and interests of individuals and families to whom they provide clinical services, and integrate those factors along with best current research evidence and their clinical expertise in making clinical decisions;
- (2) acquire and maintain the knowledge and skills that are necessary to provide high-quality professional services, including knowledge and skills related to evidence-based practice;
- (3) evaluate prevention, screening, and diagnostic procedures, protocols, and measures to identify maximally informative and cost-effective diagnostic and screening tools, using recognized appraisal criteria described in the evidence-based practice literature;
- (4) evaluate the efficacy, effectiveness, and efficiency of clinical protocols for prevention, treatment, and enhancement using criteria recognized in the evidence-based practice literature;

- (5) evaluate the quality of evidence appearing in any source or format, including journal articles, textbooks, continuing education offerings, newsletters, advertising, and Web-based products, prior to incorporating such evidence into clinical decision making; and
- (6) monitor and incorporate new and high quality research evidence having implications for clinical practice (ASHA, 2005, p. 23).

ASHA's guidelines emphasized that clinicians not only need to search for research to support their clinical practices, but also critically evaluate the available evidence. ASHA acknowledged that not all evidence is equal, but the organization admitted that it is difficult to choose one single scheme to rank levels of evidence that satisfies the needs of the entire communication disorders discipline (ASHA, n.d.). In a technical report addressing EBP, ASHA (2004) advocated using a scheme that ranked evidence into six different levels. Table 1 illustrates this hierarchy ranging from highest quality evidence coming from a well-designed meta-analysis of randomized controlled trials (Ia) to the lowest quality evidence coming from expert opinions (IV).

Table 1: Scheme for ranking levels of evidence	
Level	Description of Evidence
Ia	Well-designed meta-analyses of > 1 randomized controlled trial
Ib	Well-designed randomized controlled study
IIa	Well-designed controlled study without randomization
IIb	Well-designed quasiexperimental study
III	Well-designed nonexperimental studies
IV	Expert committee report, consensus conference, clinical experience of respected authorities

While this type of scheme may represent the ideal for research on a theoretical level, several papers have questioned its applicability to speech-language pathology. Worrall (2002) argued that randomized controlled trials (RCTs) and systematic reviews of randomized trials may be the “gold standard” for certain treatments, such as those in the medical community, but “carefully conducted (i.e. carefully controlled) non-randomized studies” may represent the best evidence for professions such as SLP (p. S329). Enderby (2004) similarly supported the notion that RCTs may not provide the best evidence for SLP. She emphasized that clinicians must search for evidence “from a broad range of resources to inform and defend their clinical decision-making” and not assume that RCTs are the only option for their particular client (p. 126). Likewise, Montgomery and Turkstra (2003) contended that practice that is based only on RCTs or other rigorous evidence discounts “the role of reasoned judgments made by experienced clinicians” (p. xii). Hegde (2007) maintained that SLPs should not advocate for a level of evidence scheme that holds RCTs as the gold standard of evidence. Using this kind of scheme, Hegde stated that clinicians would be obliged to conclude that “most of their treatment procedures have not been effective” because they haven’t been supported by RCTs. Instead, Hegde lobbied for a scheme tailored to SLP. He argued that SLPs should embrace fundamental differences separating the profession from the field of medicine: SLPs can not administer the same treatments to large numbers of people and engage in RCTs because practices are more individualized to each client. Rather, Hegde contended that “[d]irect and systematic replication of well controlled studies using either single-subject experimental designs or small-group experimental designs will better serve the profession than large-scale RCTs that fail to use randomization and tend to produce variable and ambiguous data that contradict individual uniqueness” (p. 17). Specifically, rather than demoting single-subject experimental research to

one of the lower levels of evidence, SLPs should implement a scheme that highlights the evidence that is most efficacious for the field.

Selecting data from appropriate levels of evidence is just one of the various barriers that inhibits SLPs from carrying out EBP with their clients. Zipoli and Kennedy (2005) cited demands on clinicians' time as the prime obstacle to implementing EBP. Other barriers that are commonly mentioned include clinicians' lack of knowledge and skills in searching for and interpreting research, lack of resources for accessing research studies, lack of availability of high quality research, and the cost of participating in continuing education courses (Zipoli & Kennedy, 2005; Mullen, 2005; Nail-Chiwetalu & Bernstein Ratner, 2007).

While papers identifying barriers to EBP are numerous, studies offering potential solutions for overcoming these challenges are less common. This current study will seek information regarding what practices being implemented by academic institutions, professional organizations and work settings result in successful implementation of EBP by practicing SLPs. These findings will offer the entire SLP field - including practitioners, employers, researchers, and university programs - guidelines for implementing EBP in their practice.

CHAPTER 2: METHOD

Participants

A list compiled by the Texas Department of State Health Services revealed that a total of 305 speech-language pathologists are currently licensed in El Paso, Texas. Of the total 175 questionnaires distributed to speech-language pathologists working in El Paso, 85 were completed (48.6% response rate). A formula by Krejcie and Morgan (1970, as cited in Gay, 1996) suggested a sample size of about 170 would be appropriate for this population size. However, this sample size was not achieved in this preliminary study.

Participants were recruited at a workshop conducted by the El Paso Speech Hearing Association (EPSHA), by the lead SLPs at three school districts in the area, by head SLPs at two local early childhood intervention work settings, and through personal contacts. Inclusion criterion was specified as SLPs who currently hold the ASHA Certificate of Clinical Competence (CCC).

Procedure

The researcher gave participants two documents: an informed-consent form and questionnaire. Participants were instructed to read and sign the informed consent form, and then to complete the questionnaire anonymously. The researcher separated informed consent forms from questionnaires upon receipt to ensure subject anonymity.

Questionnaire

The cross-sectional questionnaire consisted of 4 sections (based on Vallino-Napoli & Reilly, 2004 and Zipoli & Kennedy, 2005). The first section gathered background information,

including sex, age, education, career, professional affiliations, and work settings. The second section investigated the participant's exposure to evidence-based practice, research methodology and statistics in their speech-language pathology master's program. The third section questioned the sources of evidence that each participant uses professionally, the time they devote to searching for evidence, and the levels of evidence they find acceptable. Lastly, the fourth section asked participants to rate 21 statements regarding EBP using a 5-point Likert scale.

Institutional Review Board Approval

The Institutional Review Board at the University of Texas at El Paso approved this study.

Content Validity of the Questionnaire

A committee of three doctoral-level professors at the University of Texas of El Paso - two ASHA certified faculty members in the Department of Speech-Language Pathology and a faculty member in the Department of Public Health Science - reviewed the Institutional Review Board protocol, informed consent form, and questionnaire. This committee suggested modifications and approved these revised documents.

Data Analysis

The primary investigator summarized and coded the questionnaire data in an Excel spreadsheet. After entry of the final questionnaire, the primary investigator and an undergraduate assistant compared these summarized data to the original data marked on each questionnaire to avoid data processing errors (Bryman, 2001). The judges achieved 100% inter-coder agreement for the data reviewed.

The author analyzed the data using SPSS Statistics Student Version 17.0. Calculating frequency counts including percentages, medians and mode scores for data that were scored using a nominal scale and the percentages and medians for ordinal data. Using alpha levels of 0.01 and 0.05, the Mann-Whitney test (U) was used to compare two independent values and the Kruskal-Wallis test (H) was used to compare three or more variables.

Participants occasionally did not respond to all of the questions on the instrument. For these omitted responses, the investigator left out the null response from calculations for that variable. This resulted in certain questions having a reduced total number of responses when compared to others.

CHAPTER 3: RESULTS

Demographic Information

Eighty-nine percent of the respondents were female, and 11% were male. Ages ranged from 26 to 58 ($M = 41.70$, $SD = 9.35$) with modes of 30 and 40 years, and a median of 40 years. These numbers correspond to national averages for speech-language pathology (ASHA, 2010).

Table 2: Characteristics of Respondents	
Characteristics	Respondents n (%)
Gender $n = 85$	
Female	76 (89.4)
Male	9 (10.6)
Age (in yrs) $n = 81$ $M = 41.70$, $SD = 9.35$; Range: 26-58 yrs	
26 – 35 yrs	23 (28.4)
36 – 45 yrs	25 (30.9)
46 – 58 yrs	33 (40.7)
Number of Years Practicing as SLP $n = 83$ $M = 12.39$, $SD = 9.00$; Range: 0.3-36 yrs	
0.3 – 11 yrs	44 (51.8)
12 – 23 yrs	23 (27.1)
24 – 36 yrs	16 (19.3)

Respondents matriculated at 12 different graduate speech-language pathology master's programs between the years of 1975 and 2009. The majority of respondents attended programs in the vicinity of El Paso, Texas: 61 (70.7%) attended the University of Texas at El Paso, 7 (8.5%) attended the Texas Women's University and 7 (8.5%) attended the New Mexico State University. No participant had received a degree higher than a master's at the time of completing the survey, however, 2 (2.4%) of the respondents indicated that they planned on pursuing a

doctoral level degree in speech-language pathology and 4 (4.9%) noted that they planned to pursue a higher degree in another field. The number of years the respondents had been employed as speech-language pathologists ranged from 3 months to 36 years, $M = 12.39$ and $SD = 9.0$ years. Refer to Table 2.

Clinicians' Work Settings

Respondents indicated their primary work settings. The greatest number of clinicians worked in the elementary, middle, or high school setting, amounting to 41 (48.2%) of the total. Refer to Table 3 for all percentages. These percentages correspond to national averages reported by ASHA (2010).

Table 3: Percentage of Clinicians in Each Primary Work Setting		
Primary Work Settings	Respondents <i>n</i> = 85 <i>n</i> (%)	School (S) <i>n</i> = 50 or Non-School (NS) <i>n</i> = 35 Classification
elementary, middle or high school	41 (48.2)	S
birth to three	15 (17.6)	NS
preschool	9 (10.6)	S
acute care hospital	6 (7.1)	NS
outpatient clinic	5 (5.9)	NS
private practice	4 (4.7)	NS
rehabilitation hospital	2 (2.4)	NS
home health	2 (2.4)	NS
skilled nursing facility	1 (1.2)	NS

Because of the preponderance of clinicians in school settings, the investigator collapsed the work settings into two classifications – school and non-school – to create groups with more

equal distributions of clinicians. Fifty (58.8%) of the respondents worked in school settings, and 35 (41.2%) worked in non-school settings. The investigator compared data from these groups using non-parametric Mann-Whitney *U* tests.

Exposure to Coursework in Evidence-based Practice, Research Methodology and Statistics in SLP Master's Program

Survey respondents indicated the amount of exposure they had received to evidence-based practice, research methodology and statistics during their SLP master's program.

Evidence-Based Practice Coursework

Sixty-four (75.3%) of the respondents completed a course that introduced the concept of evidence-based practice. Thirty-four (40.0%) of the respondents received some exposure to evidence-based practice as a part of a course not dedicated to this subject, while 30 (35.3%) received an entire course dedicated to evidence-based practice. Twenty-one (24.7%) of respondents claimed to have received no exposure to evidence-based practice during their graduate studies.

Research Methodology Coursework

Sixty-six (77.6%) of the respondents revealed that they had completed an entire course in research methodology during their SLP program. Seventeen (20.0%) noted that they received some exposure to research methodology, but not an entire course dedicated to that subject. Two (2.4%) did not receive any exposure to research methodology during their graduate program.

Statistics Coursework

Thirty-five (41.2%) of respondents claimed to have completed an entire course in statistics during their graduate program. However, this number needs to be interpreted with caution considering 11% of respondents specified that they had received a statistics course during their undergraduate education. It is likely that at least some of the respondents who marked that they had received this course failed to note that the question stipulated the coursework they had completed during their graduate studies only. Thirty-five (41.2%) of respondents mentioned receiving some exposure to statistics as part of a course not dedicated to this subject. Fifteen (17.6%) respondents revealed that they received no exposure to statistics during graduate school.

National Trends for Coursework in Evidence-Based Practice and Research Methodology

The courses that the clinicians completed correspond to national trends for SLP master's programs. The course listings and descriptions of 20% of the 241 academic programs offering master's degrees in speech-language pathology that ASHA's Council on Academic Accreditation (CAA) listed as accredited as of December 2009 were reviewed. The author organized the programs alphabetically by state and then chose 48 randomly to determine if the programs offered courses in evidence-based practice, research methodology, both these subjects, or neither. The author and another master's level graduate student in speech-language pathology reviewed the data. These judges achieved 90% inter-rater agreement. The judges presented items that they disagreed on to a panel comprised of an assistant professor, faculty member and master's level graduate student in speech-language pathology. This panel and the two original judges achieved 100% inter-rater agreement on the disagreed items. Out of the forty-eight

programs examined, only 6 offered both research methodology and evidence-based practice courses. Thirty-eight programs offered only research methodology courses. Six of the programs searched offered neither research methodology nor evidence-based practice courses.

Composite Experience in Evidence-based Practice and Research Methodology during and since SLP Master’s Program

Respondents indicated the experiences they had received with evidence-based practice and research methodology during and since completing their speech-language pathology master’s degree. The researcher labeled clinicians who completed from one to four different research activities (i.e. critiqued published research, wrote a research proposal without carrying it out, attended a course or workshop on EBP, etc.) as having “low-level research experience”. Clinicians who had engaged in five or more of these activities were coded as having “high-level research experience”. Table 4 indicates that most clinicians had “low-level research experience”.

Table 4: Composite research experience	
Research Experience	Respondents n (%)
Low-level	51 (60.0)
High-level	34 (40.0)

Sources of Evidence

Respondents ranked their primary sources of evidence. Clinicians identified the sources that they gather research evidence from, including: peer-reviewed literature in journals, professional newsletters (e.g. ASHA Leader), non-ASHA professional magazines (e.g. ADVANCE for Speech-Language Pathologists and Audiologists), continuing education courses,

personal contacts (e.g. colleagues, supervisors), procedures that have been effective in the past with clients with a similar profile, general website searches using a search engine (e.g. Google, Yahoo), Google Scholar, books, textbooks, and manuals, discussion lists or Internet chat rooms, and company advertising and promotional materials. 76 out of the total 85 respondents, or 92.6%, answered the sources of evidence question. The most common source of evidence identified by respondents was “procedures that have been effective in the past with clients with a similar profile”, which was chosen by 25 (34.1%) of the total. Clinicians didn’t specify if they had acquired these procedures from the literature or through another source or experience. 12 (15.9%) of the respondents identified “books, textbooks and manuals” as their primary source of information. Only 6 (8.5%) of the clinicians chose “peer-reviewed literature in journals” as their primary source of information.

Levels of Evidence

The investigator also asked respondents to rank levels of evidence. The questionnaire presented the subcomponents of the 6 levels of evidence presented in Table 1. To make the questionnaire more accessible to participants, the researcher combined ASHA’s level of evidence scheme (Table 1) with Reilly’s (2004) complementary, but more user-friendly scheme. The advantage of Reilly is that she specified each experimental design falling under each level in the hierarchy from highest (Level Ia) to lowest (Level IV). Table 5 elucidates this combination.

Table 5: Revised scheme for ranking levels of evidence using ASHA (2004) and Reilly (2004)

Level	ASHA's Description of Evidence	Reilly's Experimental Designs Adapted to ASHA's Levels
Ia	Well-designed meta-analyses of > 1 randomized controlled trial	systematic reviews of randomized control trials
Ib	Well-designed randomized controlled study	randomized control trials
IIa	Well-designed controlled study without randomization	controlled trials without randomization
IIb	Well-designed quasiexperimental study	case-control studies (retrospective comparison of intervention versus comparison group); cohort studies (group of people followed over time)
III	Well-designed nonexperimental studies	multiple baseline or single-subject design
IV	Expert committee report, consensus conference, clinical experience of respected authorities	clinical experience; reports of expert committees; expert opinion

As with the sources of evidence question, a large number of respondents chose not to rank the types of evidence: 69 clinicians, or 84.1% of the total responded. The largest number of clinicians, 23 (32.9%), indicated that they rely on their own clinical experience as their primary type of evidence. Clinical experience is one of the weakest types of evidence according to the ASHA (2004) hierarchy (Level IV). Fourteen (20.7%) of the respondents chose multiple baseline or single-subject design. This level of evidence is also ranked low on the ASHA hierarchy (Level III).

Amount of Time Dedicated to Finding Evidence

Respondents revealed the amount of time per week that they dedicate to searching for

evidence, both during work and outside of work. Twenty-five (29.4%) respondents reported that their work setting did not allow them any time during their workday to research their caseload. Sixteen (18.8%) stated that their work setting allowed them 5 to 15 minutes of research time per week.

Respondents dedicated more time to researching their clinical cases during their personal time. Twenty-three (27.1%) of the clinicians spent 46 to 60 minutes searching for evidence.

Table 6 lists the amount of time that clinicians research their caseload overall and by work setting.

Table 6: Time Dedicated to Researching Caseload at Work and outside Work						
Time Searching for Evidence (minutes/week)	Percent of Respondents Searching at Work			Percent of Respondents Searching outside Work		
	All Settings n = 81 n (%)	School Settings n = 49 n (%)	Non- School Settings n = 32 n (%)	All Settings n = 83 n (%)	School Settings n = 49 n (%)	Non- School Settings n = 34 n (%)
0 min	25 (29.4)	17 (34.0)	7 (22.9)	3 (3.5)	2 (4.0)	1 (2.9)
5 – 15 min	16 (18.8)	11 (22.0)	5 (14.3)	14 (16.5)	10 (20.0)	4 (11.4)
16 - 30 min	8 (9.4)	5 (10.0)	3 (8.6)	19 (22.4)	12 (24.0)	7 (20.0)
31 – 45 min	9 (10.6)	6 (12.0)	3 (8.6)	13 (15.3)	3 (6.0)	10 (28.6)
46 – 60 min	9 (10.6)	5 (10.0)	4 (11.4)	23 (27.1)	14 (28.0)	8 (25.7)
61 – 90 min	5 (5.9)	1 (2.0)	4 (11.4)	2 (2.4)	2 (4.0)	0 (0)
> 90 min	9 (10.6)	4 (8.0)	5 (14.3)	9 (10.6)	6 (12.0)	3 (8.6)

Statements Regarding Evidence-Based Practice and Research

Respondents assigned ratings to a series of statements regarding research and evidence-

based practice. Ratings were based on a 1 through 5 Likert scale, where ‘1’ represented ‘strongly agree’ and ‘5’ represented ‘strongly disagree’.

Table 7: Median and Mean Opinion Scores for Statements Regarding Evidence-Based Practice, Research and Work-Setting Support			
Scores: 1 = strongly agree 2 = agree 3 = undecided 4 = disagree 5 = strongly disagree	Median	Mean	Standard Deviation
Positive Statements regarding Evidence-Based Practice			
I am familiar with the <i>term</i> ‘evidence-based practice’.	1.00	1.56	.969
I understand what knowledge and skills are required to implement evidence-based practice.	2.00	1.98	1.0
My clinical practices are evidence-based.	2.00	2.29	.897
All speech-language pathologists should complete a compulsory course on <i>evidence-based practice</i> .	2.00	1.86	.959
Negative Statements regarding Evidence-Based Practice			
Basing practice on research findings would take a lot of time.	3.00	2.92	1.164
Basing practice on research findings would be expensive.	3.00	3.30	1.128
Research findings have very little impact on my clinical practice.	4.00	3.86	1.031
It is hard to apply research into practice.	4.00	3.58	1.067
Most speech-language pathologists are not interested in implementing research findings.	3.00	3.30	.979
Speech-language pathologists don’t have time to conduct research on their caseload.	3.00	2.74	1.194
Research			
I am comfortable using online databases to search for articles (e.g. MEDLINE, PubMed, PsychINFO, ERIC, EBSCO, etc.)	2.00	2.11	1.047
I enjoy searching for research and evidence.	2.00	2.54	1.097
I feel comfortable using computers.	1.00	1.72	1.007
I am comfortable reading and interpreting journal articles.	2.00	2.27	.892
I use single-subject research designs to document therapy progress with individual clients.	3.00	3.00	1.058
Research helps me achieve my clinical goals as a speech-language pathologist.	2.00	2.33	.851
Speech-language pathologists are convinced of the value of research.	2.00	2.56	.974
All speech-language pathologists should complete a compulsory course on <i>research methodology</i> .	2.00	2.12	1.028
Work Setting Support for Evidence-Based Practice and Research			
I have access to online databases through my primary work setting.	3.00	2.76	1.348
My primary work setting encourages use of evidence-based practice.	2.00	2.12	1.074
My primary work setting allows me time and resources to search for evidence for evidence-based practice <i>during my work hours</i> .	3.00	3.32	1.088
My primary work setting encourages me to search for evidence for evidence-based practice, but during time <i>outside my work hours</i> .	3.00	2.74	1.135

As shown in Table 7, Respondents most strongly agreed with statements affirming their support of evidence-based practice and their familiarity with its definition and the knowledge and skills needed to implement it. Clinicians disagreed with a statement stating that research has little to do with clinical practice.

Work Setting and Statements Regarding EBP

The researcher evaluated how a clinicians' primary work setting (school versus non-school settings) affected their views about research. Mann-Whitney U analyses revealed that clinicians in school settings agreed with several statements significantly more than SLPs in non-school settings.

- (1) SLPs in school settings agreed with the statement "I understand what knowledge and skills are required to implement evidence-based practice." (*Median (Mdn) = 2.00*) significantly more than SLPs in non-school settings (*Mdn. = 2.00*), $U = 608.50$, $z = -2.57$, $p < .05$, $r = -.279$.
- (2) Additionally, SLPs in school settings agreed with the statement "My clinical practices are evidence-based." (*Mdn = 2.00*) significantly more than SLPs in non-school settings (*Mdn = 2.00*), $U = 614.00$, $z = -2.62$, $p < .05$, $r = -.284$.
- (3) SLPs in school settings agreed with the statement "Basing practice on research findings would take a lot of time." (*Mdn = 2.00*) significantly more than SLPs in non-school settings (*Mdn = 4.00*), $U = 607.00$, $z = -2.35$, $p < .05$, $r = -.255$.

These attitudes expressed by school-based clinicians suggest that they understand what procedures are needed to carry out EBP and that they utilize these procedures in their clinical

work. However, these clinicians also admit that carrying out EBP is not an effortless process, but requires time and effort.

Clinicians indicated to what extent their work setting supports EBP.

- (1) SLPs in school settings agreed with the statement “My primary work setting encourages use of evidence-based practice.” ($Mdn = 2.00$) significantly more than SLPs in non-school settings ($Mdn = 2.00$), $U = 472.00$, $z = -3.81$, $p < .001$, $r = -.413$.
- (2) At the same time, SLPs in non-school settings agreed with the statement “My primary work setting allows me time and resources to search for evidence during my work hours.” ($Mdn = 3.00$) significantly more than SLPs in school settings ($Mdn = 4.00$), $U = 616.50$, $z = -2.26$, $p < .05$, $r = -.245$.

Clearly, clinicians in both work settings perceive their workplace to support the use of EBP to some extent. The clinicians from the non-school work settings reveal that their workplaces go beyond merely encouraging EBP by actually allowing the clinicians time to carry out searching for evidence during their work day.

Composite Research Experience and Statements Regarding EBP

Clinicians who had engaged in more research experiences during their SLP graduate program as well as since they had been practicing clinically were more likely to agree with several positive statements about research and EBP than clinicians who had less research experience.

- (1) SLPs with a greater number of research experiences ($Mdn = 1.0$) were significantly more likely to agree with the statement “I am familiar with the

term *evidence-based practice*” than clinicians with fewer research experiences ($Mdn = 1.0$), $U = 666.00$, $z = -2.12$, $p < .05$, $r = -.231$.

(2) Clinicians with a greater number of research experiences ($Mdn = 1.0$) were also significantly more likely to agree with the statement “I understand what knowledge and skills are required to implement evidence-based practice” than clinicians with fewer research experiences ($Mdn = 2.0$), $U = 521.50$, $z = -3.35$, $p < .005$, $r = -.363$.

(3) Additionally, clinicians with more research experience ($Mdn = 1.0$) were significantly more likely to agree with the statement “I am comfortable using online databases to search for articles” than clinicians with less research experience ($Mdn = 2.0$), $U = 537.50$, $z = -3.11$, $p < .005$, $r = -.337$.

Engaging in research activities assisted clinicians in understanding what EBP is as well as knowing how to carry out the steps for EBP.

Statistics Course and Statements Regarding EBP

SLPs differed in their perception of how difficult research and EBP are based on their background in statistics.

(1) A Kruskal-Wallis analysis revealed that responses to the statement “It is hard to apply research into practice” were significantly affected by whether the SLP had completed a course in statistics or not, $H(2) = 8.36$, $p < .05$. Mann-Whitney tests were used to follow up this finding. Because several Mann-Whitney tests on the same data set risk inflating the Type I error rate, a Bonferroni correction was used to divide the .05 critical significance value by

the number of tests being compared (Field, 2009). This converted the critical value to a .0167 level of significance.

(1a) Responses to the statement did not differ significantly for the respondents who had received only some exposure to statistics as part of another course ($Mdn = 3.00$) compared to respondents who had received no exposure to statistics in graduate school ($Mdn = 4.00$), $U = 245.00$, $z = -.227$, ns , $r = -.032$.

(1b) Likewise, there was no significant difference between respondents who had received no exposure to statistics ($Mdn = 4.00$) versus SLPs who had received an entire course ($Mdn = 4.00$), $U = 183.00$, $z = -1.77$, ns , $r = -.250$.

(1c) However, SLPs who had completed an entire course in statistics disagreed with the statement ($Mdn = 4.00$) significantly more than the respondents who had received only a section in statistics as part of another course ($Mdn = 3.00$), $U = 372.50$, $z = -2.80$, $p < .01$, $r = -.337$.

These results demonstrate that SLPs who had not completed a course in statistics were more likely to agree with the statement “It is hard to apply research into practice” than those who had completed a course in statistics. These data suggests that having completed a statistics course leads SLPs to view the application of research into practice more favorably.

Research Methods Course and Statements Regarding EBP

Clinicians’ reported pleasure in gathering research is affected by their coursework in research methodology in graduate school.

(1) Responses to the statement “I enjoy searching for research and evidence” were significantly affected by whether the SLP had completed a course in research methodology or not, $H(2) = 8.59$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(1a) There was not a significant difference between the responses produced by the SLPs who had not received a course in research methodology ($Mdn = 2.50$) versus those who had completed an entire course ($Mdn = 2.00$), $U = 10.00$, $z = -.975$, ns , $r = -.224$.

(1b) There was also no significant difference in the responses of the SLPs who had not completed a course ($Mdn = 2.50$) versus those who had completed a course that had just a section dedicated to research methodology ($Mdn = 3.00$), $U = 183.00$, $z = -1.77$, ns , $r = -.250$.

(1c) However, SLPs who completed an entire course in research methodology ($Mdn = 2.00$) were significantly more likely to agree with the statement “I enjoy searching for research and evidence” than were the SLPs who had only been exposed to research methodology as a section in another class ($Mdn = 3.00$), $U = 315.00$, $z = -2.91$, $p < .005$, $r = -.319$.

These data suggest that SLPs who had completed an entire course in research methodology were more likely to be enthusiastic about searching for evidence.

Evidence-Based Practice Course and Statements Regarding EBP

SLPs who had some exposure to EBP in their graduate coursework were significantly more likely to have favorable attitudes toward EBP.

(1) Responses to the statement “My clinical practices are evidence-based” were significantly affected by whether the SLP had completed a course in evidence-based practice or not, $H(2) = 7.25$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(1a) There was not a significant difference between the responses produced by the SLPs who had not received a course in evidence-based practice ($Mdn = 2.00$) versus those who had completed an entire course ($Mdn = 2.00$), $U = 224.50$, $z = -1.91$, ns , $r = -.267$.

(1b) There was also no significant difference in the responses of the SLPs who had completed an entire course ($Mdn = 2.00$) versus those who had completed a course that had just a section dedicated to evidence-based practice ($Mdn = 2.00$), $U = 468.00$, $z = -.645$, ns , $r = -.081$.

(1c) However, SLPs who had received some exposure to evidence-based practice as part of a course ($Mdn = 2.00$) were significantly more likely to agree with the statement “My clinical practices are evidence-based” than were the SLPs who had only received no exposure in graduate school to evidence-based practice ($Mdn = 2.00$), $U = 220.00$, $z = -2.69$, $p < .01$, $r = -.363$.

Clearly even some exposure to EBP in graduate school, but not necessarily an entire course, positively influences whether clinicians utilize EBP in their clinical work.

Clinicians who had not completed a course in EBP in their graduate program admitted that it is difficult for them to implement EBP in their clinical work.

(2) Responses to the statement “It is hard to apply research into practice” were significantly affected by whether the SLP had completed a course in evidence-based practice or not, $H(2) = 13.92$, $p < .005$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(2a) There was not a significant difference between the responses produced by the SLPs who had not received a course in evidence-based practice ($Mdn = 3.50$) versus those who had completed only a portion of a course in evidence-based practice ($Mdn = 3.00$), $U = 307.00$, $z = -.620$, ns , $r = -.084$.

(2b) There was also no significant difference in the responses of the SLPs who had completed an entire course ($Mdn = 4.00$) versus those who had not completed a course in evidence-based practice ($Mdn = 3.50$), $U = 193.50$, $z = -2.23$, ns , $r = -.315$.

(2c) However, SLPs who had received some exposure to evidence-based practice as part of a course ($Mdn = 3.00$) were significantly more likely to agree with the statement “It is hard to apply research into practice” than were the SLPs who had received an entire course in graduate school to

evidence-based practice ($Mdn = 4.00$), $U = 224.00$, $z = -3.78$, $p < .001$, $r = -.484$.

Clinicians who had completed a course in EBP perceive implementing evidence-based procedures to be less challenging than their colleagues who lack this academic background.

Evidence-Based Practice Course and Time Dedicated to Researching Caseload

The amount of time a clinician spends researching his caseload outside of work is significantly affected by whether the SLP had completed a course in evidence-based practice or not in graduate school, $H(2) = 6.73$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(1a) There was no significant difference in the responses of the SLPs who had completed an entire course in evidence-based practice ($Mdn = 5.00$) versus those who had not completed a course ($Mdn = 3.00$), $U = 206.50$, $z = -1.82$, ns , $r = -.260$.

(1b) Additionally, there was no significant difference between SLPs who received no exposure to an evidence-based practice course ($Mdn = 3.00$), versus those who were exposed as part of another course ($Mdn = 3.00$), $U = 335.50$, $z = -.381$, ns , $r = -.051$.

(1c) However, SLPs who had received an entire course in graduate school in evidence-based practice ($Mdn = 5.00$) spent significantly more time researching their caseload after work than SLPs who had received only

some exposure to evidence-based practice as part of a course ($Mdn = 3.00$), $U = 303.00$, $z = -2.51$, $p < .0167$, $r = -.319$.

The more exposure clinicians had to EBP in their graduate coursework the greater the amount of time they research their caseload.

Years as SLP, Time Dedicated to Researching Caseload and Statements Regarding EBP

The number of years SLPs had been employed in their work settings was related to the amount of time they could research their caseload during work hours, whether they had access to research databases, and also their comfort level in carrying out EBP.

Clinicians who had been employed 24 years or more indicated that their work setting provided them with a greater amount of time to perform research and also provided them with databases on which to search for data.

(1) The amount of time a clinician spends researching his caseload at work is significantly affected by the number of years the SLP has been practicing, $H(2) = 8.64$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(1a) There was no significant difference in the amount of time clinicians spend researching their caseload during their work day between SLPs who had been in practice for 12 to 23 years ($Mdn = 3.0$) and SLPs who had been practicing for 24 to 36 years ($Mdn = 4.5$), $U = 130.00$, $z = -1.56$, ns , $r = -.319$.

(1b) Additionally, there was no significant difference between SLPs who had been in practice 11 or fewer years ($Mdn = 2.0$) and SLPs who had been practicing for 12 to 23 years ($Mdn = 3.0$), $U = 361.50$, $z = -1.45$, ns , $r = -.183$.

(1c) However, SLPs who had been practicing for 24 years or more ($Mdn = 4.5$) spent significantly more time researching their caseload at work than SLPs who had been practicing for 12 to 23 years ($Mdn = 3.0$), $U = 166.50$, $z = -2.85$, ns , $r = -.381$.

(2) Responses to the statement “I have access to online databases through my primary work setting” were significantly affected by the number of years an SLP had been practicing, $H(2) = 19.24$, $p < .001$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(2a) There was no significant difference in the responses of clinicians who had been in practice 12 to 23 years ($Mdn = 2.0$) and clinicians who had been practicing 24 to 36 years ($Mdn = 1.0$), $U = 138.00$, $z = -1.39$, ns , $r = -.223$.

(2b) However, clinicians who had been employed 11 years or less ($Mdn = 3.0$) were significantly more likely to disagree with the statement “I have access to online databases through my primary work setting” than clinicians who had been employed as an SLP 12 to 23 years ($Mdn = 2.0$), $U = 251.00$, $z = -3.44$, $p < .005$, $r = -.420$.

(2c) Additionally, clinicians who had been practicing 24 to 36 years (*Mdn* = 1.0) agreed with the statement significantly more than clinicians who had been practicing as an SLP 11 years or less (*Mdn* = 3.00), $U = 146.00$, $z = -3.52$, $p < .001$, $r = -.454$.

Although some aspects of EBP benefited as a result of SLPs practicing a greater number of years, other EBP skills were stronger in clinicians who had been practicing less than 11 years. These less seasoned SLPs indicated greater understanding of the requirements of EBP, and greater comfort with carrying out some of its technological requirements such as using online databases and computers.

(3) Responses to the statement “I understand what knowledge and skills are required to implement evidence-based practice” were significantly affected by the number of years an SLP had been practicing, $H(2) = 6.74$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(3a) There was no significant difference between clinicians who had been working for 12 to 23 years (*Mdn* = 2.0) and clinicians who had been employed as an SLP for 24 to 36 years (*Mdn* = 2.50), $U = 125.50$, $z = -1.83$, *ns*, $r = -.293$.

(3b) There was also no significant difference in the responses of clinicians who had been practicing for 11 years or fewer (*Mdn* = 2.0) and clinicians who had been practicing 24 to 36 years (*Mdn* = 2.0), $U = 336.50$, $z = -.283$, *ns*, $r = -.037$.

(3c) However, clinicians who had been practicing 11 years or less ($Mdn = 2.0$) were significantly more likely to agree with the statement “I understand what knowledge and skills are required to implement evidence-based practice” than clinicians who had been practicing 12 to 23 years ($Mdn = 2.0$), $U = 330.50$, $z = -2.51$, $p < .0167$, $r = -.307$.

(4) Responses to the statement “I am comfortable using online databases to search for articles” were significantly affected by the number of years an SLP had been practicing, $H(2) = 7.83$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance.

(4a) There was no significant difference between clinicians who had worked as an SLP for 12 to 23 years ($Mdn = 2.0$) and clinicians who had worked for 24 to 36 years ($Mdn = 2.5$), $U = 172.00$, $z = -.356$, ns , $r = -.057$.

(4b) There was also no significant difference between SLPs who had been practicing for 11 years or less ($Mdn = 2.0$) and ones who had been practicing 24 to 36 years ($Mdn = 2.5$), $U = 269.00$, $z = -1.47$, ns , $r = -.190$.

(4c) SLPs who had been practicing 11 years or less ($Mdn = 2.0$) were significantly more likely to agree with the statement “I am comfortable using online databases to search for articles” than SLPs who had been practicing for 12 to 23 years ($Mdn = 2.0$), $U = 305.00$, $z = -2.83$, $p < .01$, $r = -.346$.

(5) A Kruskal-Wallis test revealed that responses to the statement “I am comfortable using computers” were significantly affected by the number of

years an SLP had been practicing, $H(2) = 6.69$, $p < .05$. Mann-Whitney tests were used to follow up this finding by comparing the groups and using a Bonferroni correction resulting in a .0167 level of significance. However, none of the group differences reached the .0167 level of significance using these follow-up tests. The groups that approached a significant difference were clinicians who had been practicing 11 years or less ($Mdn = 1.0$) who agreed with the statement “I am comfortable using computers” to a greater degree than SLPs who had been practicing 24 to 36 years ($Mdn = 2.0$), $U = 234.00$, $z = -2.24$, $p < .05$, $r = -.289$. Younger clinicians felt greater ease using this technology than veteran clinicians.

CHAPTER 4: DISCUSSION

The purpose of this study was to evaluate the use of evidence-based practice by SLPs in El Paso, Texas. The study evaluated whether work setting; years in practice; coursework in evidence-based practice, research methodology and statistics; and research experience would influence a clinician's use of EBP. Review of the data reveals several courses of action that the SLP community can implement to increase and improve utilization of EBP in clinical practice.

Levels of Evidence

SLPs have been constrained by existing schemes for ranking levels of evidence. ASHA (2004) advocates using a scheme that prioritizes randomized controlled-trials, and minimizes single-subject designs (SSDs). However, 14 (20.7%) of the survey respondents ranked SSDs as their highest level of evidence. Furthermore, researchers like Mullen (2007) argue that single-subject design

constitutes a very important part of the research in [our field], and often offers the best ways to address some of the research questions of interest to ASHA members. Because of their focus on an individual subject and in-depth examination of behavior, this type of experimental design may be suited to developing and testing specific treatments (p. 9).

ASHA has a responsibility to create a level of evidence scheme that is tailored to SLP. A revised scheme emphasizing experimental designs like multiple-baseline or single-subject designs would encourage clinicians to utilize the high-level data that exist in our field. Additionally, bolstering designs like SSD, which is more suited to the individualized nature of SLP may encourage more clinicians to collect and report their own data. Logemann (2000) notes that clinicians who use

techniques that lack published efficacy data in peer-reviewed journals “have a responsibility to collect and publish the data on its effectiveness”. She maintains that the future of the profession depends “on the effectiveness of our treatments, not on our impressions of their effectiveness” (p. 3). Clinicians can prove that their treatments are effective by collecting data using well-controlled experimental designs.

Coursework in SLP Master’s Programs

The data demonstrate the more coursework in evidence-based practice, research methodology and statistics the respondents completed in graduate school the more favorable their ratings of the statements regarding EBP and research. Clinicians who had completed entire courses in evidence-based practice and statistics stated that it was not hard to apply research into practice. Respondents who had completed an entire course in research methodology reported that they enjoyed searching for research and evidence.

While completing these courses increases the likelihood that clinicians will carry out EBP, in reality most clinicians do not complete all these courses during the course of their SLP master’s program. Although most clinicians received an entire course in research methodology, only 36.6% of the respondents completed an EBP course, and only 42.7% completed a course in statistics. These numbers reflect the national trend in SLP programs where only 12.5% of the sample the investigator reviewed required their students to complete a course in both EBP and research.

Considering the strong correlation between coursework and use of EBP, ASHA should require accredited universities to mandate that SLP master’s students to complete courses in evidence-based practice, research methodology and statistics.

Amount of Research Experience and Evidence-Based Practice

The data suggest that the more research experiences a clinician engages in, the more knowledge and comfort she has in implementing EBP. This point underlines Logemann's (2000) argument that clinicians should not merely act as consumers of research, but also practitioners of research by collecting and interpreting their own data. In doing so, clinicians not only contribute evidence but also are more likely to support EBP. Work and academic settings can support SLPs by not only encouraging them to search for evidence, but also to generate and share their own data with colleagues.

Work Settings and Time Researching Caseload and Statements Regarding EBP and Research

Respondents in both work settings (school and non-school) indicated that they spent more time researching their caseload outside of work than during their workday. The highest percentage of clinicians both school and non-school settings had no time to conduct research at work, but 14 (28.0%) school clinicians spent 46 to 60 minutes and 10 (28.6%) non-school clinicians spent 31 to 45 minutes conducting research after work.

SLPs in school settings stated that they understood EBP and carried out the procedures necessary to be an evidence-based clinician. These SLPs reported that their work setting supported their pursuit of evidence-based practice.

Work settings should acknowledge that speech-language pathology differs from other health-related fields because of the highly individualized nature of each client. Work settings should encourage greater use of EBP in working with these clients by facilitating or even requiring a certain amount of time be spent researching their caseload during work hours and also providing their clinicians access to sources of evidence such as online databases.

Number of Years Practicing as an SLP

The number of years clinicians had been practicing influenced the resources they had to support EBP and their comfort in carrying out EBP. Clinicians who had been practicing for more than 24 years revealed that they had greater time for research and access to databases though work than clinicians with less work experience. However, clinicians who had been practicing 11 years or less stated that they knew what skills are necessary to carry out EBP and are comfortable using online databases to gather evidence. These data suggest that clinicians of various levels of expertise would benefit by pooling their strengths to advocate for a work place that offers time and research databases that clinicians can navigate together.

Limitations of the Study

Because of the limitations of this pilot study, the researcher did not generate a representative sample size for the population of 305 SLPs. Therefore, it is not possible to generalize the results of this study beyond the sample collected. The small sample size also precluded individual work settings from being compared due to prohibitively small numbers in each group. Future research would benefit from collecting a larger sample size and comparing clinicians in all work settings separately.

It is possible that the clinician may have generated more robust statistical results by employing other procedures and data reduction techniques such as a factor analysis.

The study is also constrained by the fact that all the data is based on clinicians' self-report. It is possible that clinicians stated more favorable responses to questionnaire items to express attitudes that they perceive to be correct, but that do not necessarily reflect their own clinical practices.

Conclusion

Support for evidence-based practice continues to grow in the field of speech-language pathology. Some of the strongest moves toward EBP have included adopting some of the schemes and practices that have helped EBP to flourish in other disciplines. However, the data demonstrates that schemes that aren't tailored to the unique needs of speech-language pathology fail to support the field in carrying out EBP. Speech-language pathology require practitioners, employers, researchers and university programs to band together to create guidelines that will allow clinicians to overcome some of the barriers hindering their use of evidence-based practice.

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