2000

Research Utilization in Hand Therapy Practice Using a World Wide Web Survey Design

Amy D. Heathfield

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RESEARCH UTILIZATION
IN HAND THERAPY PRACTICE
USING A WORLD WIDE WEB
SURVEY DESIGN

By

Amy D. Heathfield

THESIS

Submitted to the School of Health Professionals
at Grand Valley State University
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MASTER OF SCIENCE IN OCCUPATIONAL THERAPY

2000
ABSTRACT

The purpose of this study was to investigate how frequently occupational therapists, certified hand therapists (OT, CHTs) read, integrate, and contribute to occupational therapy research; identify barriers and solutions to research utilization; and identify the effectiveness of World Wide Web (WWW) survey research with OT, CHTs. Of the 306 questionnaires sent, 154 were used (50% response rate). Most OT, CHTs reported reading some OT research, but integrated little into practice. One-half reported participating in research since graduation and 82% of those who did not participate reported interest in future research participation. Barriers to research were lack of time, research was not applicable to practice, and lack of knowledge to evaluate research. Solutions were CEUs for research participation and access to local research personnel. WWW survey research was not effective for OT, CHTs. Respondents reported that it was faster to respond via mail than on the WWW.
ACKNOWLEDGEMENTS

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CHAPTER 1
INTRODUCTION

occupation - n. chunks or units of culturally and personally meaningful activity within the stream of human behavior, (Yerxa, Clark, Frank, Jackson, Parham, Pierce, Stein, & Zemke as cited in Henderson, 1996).

Background to Problem

Occupational therapy is the use of meaningful and purposeful activity (occupation) as a therapeutic modality to improve an individual's level of independence, competence, and adaptation to environmental demands. Unfortunately, not all occupational therapists practice occupational therapy using occupation (meaningful and purposeful activity); instead they utilize rote exercise (Bordenet & Wilkinson, 1998; Cooper & Evarts, 1998; Cooper, Paquette, Evarts & Moorhead, 1998; Paquette, 1998; Roth, Dimick, Kasch, Fullenwider, & Mullins, 1996). Occupation (meaningful and purposeful activity) has a psychological advantage over exercise because it draws upon cognitive, social, and emotional sources of motivation and shows the patient immediate application of treatment to daily function (Dutton, 1989). Pure exercise is thought to have a single purpose because the person thinks of nothing other than controlling a body part (Huss as cited in Dutton, 1989; Katz, Marcus, & Weiss, 1994).

Problem Statement

Occupational therapists' selections of pure exercise as treatment modalities is detrimental to occupational therapy profession. Cooper and Evarts (1998) and Taylor and Manguno (1991) are concerned that occupational therapists practicing in physical dysfunction are replacing meaningful and purposeful activities (occupations) with other nonactivity modalities associated with physical therapy (i.e. physical agent modalities and exercise). Using physical agent modalities and rote exercise associated
with physical therapy causes a loss of professional identity. Nowhere in physical
dysfunction is this more apparent than the treatment of hand injuries. Certified Hand
Therapists (CHTs) are more concerned with implementing a therapeutic exercise
program and maintaining range of motion than enhancing function (Roth, Dimick, Kasch,
Fullenwider, & Mullins, 1996). Hand therapy certification is obtained by both
occupational therapists (OT) and physical therapists (PT). If both occupational
therapists and physical therapists practice like physical therapists, then what is the
benefit of having occupational therapy in hand therapy practice?

Hand therapy treatment must be functional by using occupation to provide the
best care possible. Many studies show that use of occupations (meaningful and
purposeful activities) produce higher quality outcomes than rote exercises (King, 1993;
Kircher, 1984; Nelson, Konosky, Fleharty, Webb, Newer, Hazboun, Fontane, & Licht,
1996; Steinbeck, 1986; Steitsema, Nelson, Mulder, Mervau-Scheidel, & White, 1993;
Thomas, 1996; Yoder, Nelson, & Smith, 1989; Yuen, Nelson, Peterson & Dickinson
1994). One hypothesis for lack of occupation use in hand therapy is that OT, CHTs are
not reading or using occupational therapy literature. Roth et al. (1996) find that 40% of
CHT respondents infrequently participate in education, interpret relevant research, and
participate in activities and associations that advance professional practice.

**Significance of the Problem**

As professionals, occupational therapists have an ethical duty to provide the best
care possible. Part of providing optimum care requires integration of current research
into the clinical reasoning process (Brown & Rodger, 1999; Tickle-Degnen, 1999).
Failure to do so leads to decay in professional knowledge and outmoded and ineffective
practice (Alsop, 1997).

Reimbursement can also be affected. Roth et al. (1996) suggest that the trend
in reimbursement is to define success of hand therapy interventions by the patient's
functional ability rather than on physical impairment or disability. Roth et al. report that respondents in both the 1985 and 1994 role-delineation studies spend very little time teaching and modifying activities of daily living (ADLs), function, and dexterity in comparison to the amount of time addressing physical needs of the patient. If OT, CHTs do not change their current practice by incorporating occupations that foster improved functioning into their care plans, their rate of reimbursement will be threatened. Quite possibly, occupational therapy services in hand therapy practice may not be reimbursable because OT, CHTs are not using occupation.

Another problem associated with OT, CHTs not using occupation in hand therapy practice is the breach in contract with society. If occupational therapy is the use of meaningful and purposeful activity as a therapeutic modality to increase an individual's level of independence, competence, and adaptation to environmental demands, and OT, CHTs do not use occupation in their practice; then OT, CHTs are not providing a service they promised to perform in the health care field. In addition, other health care providers may notice the trend in reimbursement structures toward functional abilities, tailor their practice to suggest they are performing functional activities, and squeeze OT, CHTs out of practice. In other words, if OT, CHTs do not keep their contract with members of society and use occupation, other health care providers will try to assume their role in health care. The patients will lose out because other health care practitioners do not share occupational therapy's holistic approach by addressing social, psychological, developmental, physical, and spiritual needs of the patient.

Purpose

The primary purpose of this study was to investigate how frequently occupational therapists as certified hand therapists read, integrated, and participated in occupational therapy research; to identify barriers to research utilization; and to offer possible solutions to overcome these barriers. Those individuals surveyed had the opportunity to
mail their responses or enter their responses on the World Wide Web. The secondary purpose of this study was to investigate the effectiveness of conducting World Wide Web survey research on occupational therapists certified in hand therapy. More and more, researchers were using the World Wide Web as a medium to survey populations with great success. Nowhere in occupational therapy literature had this methodology been attempted.
The purpose of this chapter is to present an evaluation and synthesis of the literature. The literature will provide background information as to why this study was important. First, the literature presented will identify the credentialing process of becoming an occupational therapist certified in hand therapy. Second, the literature presented will address historical trends for occupation use in occupational therapy and benefits of using occupation in care plans over rote exercise. Third, the literature will describe research utilization within the occupational therapy and health care arena. Fourth, the literature will review current uses of World Wide Web survey design and provide rationale for this study's methodology.

History of Hand Therapy

There were many factors that influenced the development of hand rehabilitation as a specialty in occupational therapy. The U.S. Government played a large role in the initial development of hand rehabilitation. Involvement began after World War II when the injured soldiers returned home for rehabilitation. Many of the early hand surgeons were trained in military installations and worked with military therapists on hand rehabilitation units (Fess, 1993). The polio epidemics of the 1950’s provided another crux for government intervention. The U.S. Government increased support for rehabilitation, thus providing the impetus for the development of upper extremity functional assessments and dynamic splinting (Melvin, 1985).

Advances in technology and hand surgery techniques also affected hand rehabilitation development. Moldable plastics introduced in the 1960’s innovated orthotics and therapeutic aids manufacturing. This provided new treatment options and
increased the demand for occupational therapy services (Melvin, 1985). Joint
replacement surgery, microsurgery, and advances in tendon surgery during the 1960's
and 1970's greatly enlarged the knowledge base, research, and practice (Melvin, 1985).

Hand rehabilitation's existence was secured with the development of the first
hand rehabilitation centers during the mid-1960's. Many U.S. hand surgeons trained in
India with renowned British hand surgeon, Dr. Paul Brand (Fess, 1993). Dr. Brand
trained assistants to perform postoperative therapy in his clinic and discussed the role of
therapists in hand rehabilitation (Fess, 1993). Dr. Earl Peacock, who trained in Dr.
Brand's clinic in India, established the first U.S. hand rehabilitation center in Chapel Hill,
North Carolina (Fess, 1993). In 1967, Dr. Peacock, Dr. Madden, and Irene Hollis, OTR,
FAOTA organized the first hand rehabilitation symposium at Chapel Hill which was the
catalyst for the formation of other hand rehabilitation centers throughout the U.S. (Fess,
1993).

Hand rehabilitation continued to grow throughout the 1970's, 1980's, and 1990's
with the creation of a national association for hand therapy, several major publications,
and a certification committee for hand therapy. The American Society for Hand Therapy
(ASHT) was founded in 1977 to advance hand therapy through communication,
education, research, and establishment of clinical standards (ASHT Membership
Directory, 1999). The majority of charter members were occupational therapists (Melvin,
1985). In 1976, the American Journal of Hand Surgery was established in response to
the growth of hand surgery as a specialty. In 1978, Dr. James Hunter, Dr. Lawrence
Schneider, Judith Bell-Krotoski, OTR, FAOTA, CHT, and Evelyn Mackin, PT developed
the first edition of Rehabilitation of the Hand: Surgery and Therapy; the virtual "Bible" of
hand rehabilitation, promoting the team efforts of surgeon and therapist. The Journal of
Hand Therapy was first issued in 1987 by the ASHT to emphasize clinical issues related
to hand dysfunction (Fess, 1993). The Hand Therapy Certification Commission (HTCC),
developed under the auspices of the ASHT, was incorporated in 1989 (Fess, 1993). The purpose of the HTCC was to develop and administer the Hand Therapy Certification Exam (HTCE) and bestow the credentials of Certified Hand Therapist (CHT). The first exam was administered in 1991. Contents were based on a 1985 role-delineation study performed by the Certification Committee of the American Society of Hand Therapist (Roth et al., 1996). The HTCC re-evaluated hand therapy practice in 1994 and these findings were incorporated into the present HTCE.

The HTCC had strict requirements for a therapist to become certified in hand therapy. The individual had to be a licensed or certified occupational therapist or physical therapist residing in the United States or Canada. The therapist needed a minimum of five years experience since licensure or certification. The therapist also must have obtained a minimum of 2,000 hours of direct practice experience in hand therapy in either the U.S. or Canada. These hours must be acquired within the past five years prior to applying for the HTCE. After passing the HTCE, the CHT submitted for recertification in 5 years by either sitting for the HTCE or engaging in continuing education.

Use of Occupation

History

Occupational therapists did not consistently use forms of occupation in treatment activities throughout history. Arts and crafts were the primary occupations used to achieve holistic therapeutic goals for the mentally ill during occupational therapy's inception in the early 20th century (Reed, 1993). This was due to the influence of the arts and crafts movement in society at the time. World War I extended occupational therapy philosophy to include treatment of the physically disabled using arts and craft occupations (Bissell & Mailloux, 1981). From the 1930s to the 1960s, occupational therapists aligned more closely with reductionist views of the American Medical
Association to increase their status in the medical profession (Kielhofner, 1997). Occupational therapists began to stress treatment of physical disabilities by concentrating on strength, coordination, and range of motion with more emphasis on exercise and little emphasis on psychosocial aspects of patients and use of occupation (Bissell & Mallioux, 1981). Between the 1970s and 1980s, occupational therapists began using modalities more closely identified with other professions (whirlpool, electrical stimulation, ultrasound) and diminish the use of occupations (Eliason & Gohl-Giese, 1979; Neistadt & Seymour, 1995; Taylor & Manguno, 1991). Reductionist activities lead to the loss of professional identity (Kielhofner, 1997). Occupational therapy professionals noticed this crisis. They began turning back to the profession's roots to recapture the benefits of occupation. In the late 1980s and early 1990s, occupational therapists in adult physical dysfunction began using more occupation in practice. These occupational therapists most frequently treated patients using self-care occupations (Neistadt & Seymore, 1995; Taylor & Manguno, 1991). Although this movement was promising, treatment did not focus on the breadth of occupational behaviors. Treatment still lacked the balance sought through incorporation of work and play/leisure occupations.

Not all occupational therapists in adult physical dysfunction were following the trend toward reclaiming the use of occupation, especially those occupational therapists specializing in hand therapy. Roth, Dimick, Kasch, Fullenwider, & Mullins (1996) surveyed approximately 200 CHTs (88% of whom were occupational therapists). Roth et al. (1996) found that CHTs rated implementing a therapeutic exercise program, restoring and maintaining range of motion, and modifying the effects of edema as extremely important; enhancing vascularity, teaching and modifying activities of daily living (ADL), function, and dexterity were rated as least important. These CHTs were not providing the best care possible because they focused more on therapeutic exercise

Therapeutic/rote exercise did not prove to be more beneficial than use of meaningful and purposeful activities/occupation. In fact, the contrary was reported in many studies (Bloch, Smith, & Nelson, 1989; Cooper, Paquette, Moorhead, & Evarts, 1996; Hsieh, Nelson, Smith, & Peterson, 1996; King, 1993; Kircher, 1984; Lang, Nelson, & Bush, 1992; Nelson, Konosky, Fleharty, Webb, Newer, Hazboun, Fontane, & Licht, 1996; Steinbeck, 1986; Sietsema, Nelson, Mulder, Mervau-Scheidel, & White, 1993; Thompson, 1996; Toth-Fejel, Toth-Fejel, & Hendricks, 1998; Trombly & Wu, 1999; Yoder, Nelson, & Smith, 1989; Yuen, Nelson, Peterson, & Dickinson, 1994). During the past two decades, occupational therapists have published more research on the effects of occupations on patient outcomes. Much of the research conducted identified purposeful or added purpose activities, occupations, occupationally embedded interventions/exercises, functional activities, or goal-directed activities as the conditions studied. These conditions all require the use of everyday items and activities to elicit a desired response, and were thus occupationally based. The research studies cited above supported improved outcomes using occupations over rote exercise.
Deficits of Rote Exercise

Use of therapeutic exercise did not always transfer to skill acquisition for improved occupational performance. Helm & Dickerson (1995) performed a phenomenological study on the effect of hand therapy by interviewing a patient with a Colles' fracture. Helm & Dickerson (1995) questioned whether occupational therapists specializing in hand therapy provided holistic care. In this study, Helm & Dickerson (1995) found two themes in the patient's experience: (a) the patient felt frustrated because she could not perform ADLs, and (b) the patient believed the home exercise programs were too overwhelming and non-purposeful. The patient also commented that much of the improvement was attributed to just using the extremity and not due to therapeutic exercise.

Some researchers found that only when occupation was used in treatment did the patient exhibit improved occupational performance. Toth-Fejel, Toth-Fejel, & Hendricks (1998) presented a case report on a woman who had undergone a medial epicondylectomy. After ten weeks of therapy, the patient achieved most of her physical goals, but still complained of significant functional limitations. Toth-Fejel, Toth-Fejel, & Hendricks (1998) used a daily questionnaire and electronic signaling device to identify hand use, position of affected hand, and daily occupational performance. By using the questionnaire, the patient became aware of her nonadaptive substitution patterns. She also realized that she was not performing a valued daily occupation, sewing, which was then incorporated into the clinic and home setting for treatment (Toth-Fejel, Toth-Fejel, & Hendricks, 1998). By discharge, the patient significantly improved in all physical measures and required minimal to no verbal cues to avoid nonadaptive substitution patterns during her occupational performances (Toth-Fejel, Toth-Fejel, & Hendricks, 1998).
Some researchers questioned whether standard assessments used in hand therapy accurately gauged function. Rice, Leonard, and Carter (1998) compared grip strengths with abilities to open everyday containers. These researchers tested grip and pinch strengths of 49 college students using dynamometry. Forces required to open common household containers were measured using force transducers attached to each container. This study showed weak correlations between grip and pinch strength and forces used to open containers \( (r = -0.179 \text{ to } r = 0.333) \). Results also showed significant gender differences in grip and pinch strength but no differences in the forces used to open containers. Many times in hand therapy practice, patient outcomes were based on grip and pinch strengths. Since this study questioned the relation of grip and pinch strength to functional outcomes, more occupationally based functional assessments should be used.

**Benefits of Occupation**

Experimental studies found that use of meaningful and purposeful activities/occupation had a variety of benefits over rote exercise use. Some benefits found were, increased heart rate, increased repetitions, increased range of motion (ROM), improved quality of movements, and enhanced learning of motor skills. Studies as they related to specific benefits were discussed below.

**Heart Rate**

Use of occupation was shown to produce a faster heart rate than did the rote exercise condition. Kircher (1984) studied 26 normal females, aged 19-37, to identify the amount of perceived exertion during purposeful and non-purposeful activities. Subjects were asked to jump rope (purposeful condition) and jump in place as if jumping rope (nonpurposeful/rote exercise condition) until feeling "very hard work" on the Borg Scale of Perceived Exertion (Kircher, 1984). Kircher (1984) found that heart rate increase for a given rate of perceived exertion was significantly higher \( (p = 0.001) \) for
jumping rope. Bloch, Smith, and Nelson (1989) replicated Kircher (1984) and found that at a given rate of perceived exertion, increase in heart rate after jumping rope was significantly higher (p = .01) than jumping without rope.

Repetitions

Experimental studies have found that use of occupation promoted greater repetitions than did rote exercise. Steinbeck (1986) studied the effects of purposeful and nonpurposeful activities on repetitions completed. Steinbeck (1986) recruited 15 male and 15 female undergraduate subjects to perform in four conditions: (a) a cycling activity that operated a drill press (lower extremity purposeful activity/occupation); (b) a cycling activity that required peddling on a Fitron Cycle Ergometer (lower extremity nonpurposeful activity/rote exercise); (c) a game that required rapid unilateral squeezing of a rubber bulb to produce a stream of air to keep a Ping-Pong ball at a particular level (upper extremity purposeful activity/occupation); and (d) squeezing the rubber bulb detached from the game (upper extremity nonpurposeful activity/rote exercise). Steinbeck (1986) found significantly greater number of repetitions completed in the purposeful activities (p = .001) than in the nonpurposeful activities at equal levels of exertion.

Lang, Nelson, & Bush (1992), Hsieh, Nelson, Smith, & Peterson (1996), and Thompson (1996) found increased repetitions in occupational conditions when they studied the effects of materials-based occupations, imagery-based occupations, and rote exercise on the number of repetitions performed. Lang, Nelson, & Bush (1992) found the materials-based occupational condition elicited significantly more repetitions than the other two conditions. Hsieh et al. (1996) found that subjects performed significantly more repetitions in the occupational intervention (added-materials) and in the imagery-based condition than in the rote exercise condition (p < .05). Thompson (1996) found that subjects participating in the materials-based condition elicited significantly more
repetitions ($p = .0001$) and required a significantly longer self-perceived rest period ($p < .0001$) than both the imagery-based and rote exercise conditions. Thompson (1996) also reported a strong correlation ($r = .95$) between duration of movement and number of repetitions.

Yoder, Nelson, & Smith (1989) found increased repetitions in occupational conditions when studying the use of occupationally embedded intervention versus rote exercise. Elderly female nursing home residents ($N=30$) were randomly assigned to participate in either stirring cookie dough (occupationally embedded intervention) or a rotary arm exercise (rote exercise). The results of this study showed the occupationally embedded intervention elicited significantly more arm repetitions (one-tailed $p=.012$) than the rote exercise condition.

King (1993) found increased repetitions with occupation use when examining the use of computers in hand therapy practice. King (1993) recruited 146 hand therapy patients (84 males, 62 females) and assigned them to either gripping or pinching activities according to their individual needs and abilities. In the purposeful computer program condition (occupation), subjects were to grip or pinch the device to move the defense barrier and protect against falling missiles. In the nonpurposeful computer program condition (rote exercise), subjects were offered instructions to exercise at a comfortable pace, prompted subjects as to the amount of time remaining, and tallied the number of repetitions. The results of this study showed that the mean number of repetitions for the purposeful gripping and pinching conditions were significantly higher ($p<.001$ and $p<.05$ respectively) than the nonpurposeful conditions.

Range of Motion

Experimental studies found that use of occupation provided greater range of motion (ROM) than did use of rote exercise. Sietsema, Nelson, Mulder, Mervau-Scheidel, & White (1993) examined the use of occupationally embedded intervention...
and rote exercise on range of motion in individuals with traumatic brain injury and mild to moderate upper extremity spasticity. Twenty subjects (17 men, 3 women) were asked to complete ten trials each of the occupationally embedded intervention (playing Simon, a computer-controlled game) and the rote arm-reach exercise. Sietsema et al. (1993) found that game use (occupation) elicited significantly greater range of motion ($t(19) = 5.77, p < .001$) than the rote exercise condition.

Nelson, Konosky, Fleharty, Webb, Newer, Hazboun, Fontane, & Licht (1996) found increased range of motion (ROM) with occupation when they investigated bilaterally assisted supination in persons with hemiplegia in occupationally embedded intervention and rote exercise conditions. Subjects consisted of 26 individuals recovering from cerebrovascular accidents who had pronator spasticity, full passive range for supination after warm-up, and no functional supination. Subjects were randomly assigned to either the occupationally embedded intervention (dice game) or rote exercise condition (no game). The researchers found that the occupationally embedded condition elicited significantly more handle rotations (requiring more supination ROM) than the rote exercise condition ($p$ (one-tailed) < .05).

Cooper, Paquette, Moorhead, & Evarts (1996) studied the differences in range of motion elicited by functional activity and isolated exercise. These researchers presented videotaped sessions of patients with various upper extremity diagnoses performing functional activities and isolated exercise at the American Society of Hand Therapists (ASHT) Annual Meeting in September, 1996. Cooper et al. observed greater wrist range of motion during the functional activities than during the isolated exercise. Cooper et al. believed that incorporating familiar and non-threatening tasks into treatment sessions were invaluable in achieving less guarded, less painful, and measurably improved range of motion.
Quality of Movement

Trombly & Wu (1999) found improved quality of movement using occupation when they studied the effects of goal-directed activity versus rote exercise on motor performance. Trombly & Wu (1999) used 14 subjects who had been previously hospitalized after a cerebrovascular accident for this study. Subjects were required to reach for a preferred food (goal-directed/occupational behavior) or to a spatial location (rote exercise). This research showed that goal-directed action (occupational behavior) produced significantly smoother, faster, more forceful, and more preplanned movement patterns than did the rote exercise condition.

Acquisition of Motor Skills

Yuen, Nelson, Peterson, and Dickinson (1994) found use of occupation improved learning of motor skills when they studied the use of object-produced visual input in learning control of flexion and extension of an above-elbow training prosthesis. Yuen et al. (1994) randomly assigned 52 male college students to two training conditions: (a) two 1.5 minute periods using a flashlight attached to the hook of the prosthesis to connect dots on paper with the light (added-materials/occupation), or (b) two 1.5 minute periods to practice moving an equally weighted prosthesis, but without the light or paper (rote exercise). After undergoing the training sessions, subjects were asked to trace a continuous line through a maze with a pen attached to the hook. Yuen et al. found significantly more skill in the added-materials group than the rote exercise group.

By avoiding the use of occupations (meaningful and purposeful activities) in hand therapy, occupational therapists as CHTs have performed a disservice to the profession of occupational therapy. By not using occupation, occupational therapists as certified hand therapists (OT, CHTs) have contributed to the loss of professional identity and used outmoded or ineffective treatment. Research studies showed that use of occupation in treatment provided improved outcomes than did use of rote exercise. As
occupational therapy professionals, OT, CHTs had a duty to provide current and best practice by reading and integrating occupational therapy research into hand therapy practice. By not utilizing occupational therapy research, OT, CHTs decreased the credibility of the occupational therapy profession.

**Research Utilization**

A large portion of CHTs infrequently interpret relevant research (Roth et al., 1996). Without interpretation of relevant research, CHTs can not integrate relevant research into practice. Occupational therapists, CHTs have a professional duty to keep abreast of current research presenting optimum outcomes (i.e. use of occupation) and incorporate this research into practice to provide rationale for the best patient care. In this section, research utilization within the clinical reasoning process, evaluation of “best evidence,” barriers to research utilization, and proposed solutions will be discussed.

**Research Utilization and Clinical Reasoning**

Recently, occupational therapy literature increased publications on the use of research to support interventions in practice. Two key phrases were used to identify this process, research utilization and evidence-based practice. McCurren (as cited in Brown & Rodger, 1999) described research utilization as a process in which research was applied to verify current practice or to change practice. Tickel-Degnen (1999) described evidence-based practice as a tool to assist practitioners in integrating the best research evidence into the clinical reasoning process. These descriptions suggested that “research utilization” and “evidence-based practice” were essentially the same.

Neistadt and Smith (1996) described clinical reasoning as thought processes occupational therapists used during evaluation and treatment. Neistadt and Smith (1996) found many types of clinical reasoning in OT literature. Procedural reasoning was used to identify occupational problems and treatment strategies while focusing on
the disease or disability. Interactive reasoning was used to identify the client’s illness perspective as an individual. Conditional reasoning was used to continually revise treatment to meet the client’s needs now and in the future. Pragmatic reasoning was used to evaluate the treatment possibilities given the environment and therapist knowledge, values, and skills. Narrative reasoning was used to identify activity preference within the context of the client’s occupational story.

Research was not the only evidence used in clinical reasoning to identify best practice. Different types of clinical reasoning required different types of evidence to formulate plans of care. Client data provided in an interview could have been used in procedural, interactive, conditional, and narrative reasoning to understand the individual’s unique experience. Clinical experience could have been used in pragmatic reasoning to provide insight on what has worked in the past. Educational background used in pragmatic reasoning shaped knowledge bases therapists draw upon for treatment approaches (e.g. use of occupation vs. rote exercise). Theory/OT frames of reference could have been used in procedural reasoning to define the literature search given the diagnosis, and in conditional reasoning to revise treatment when rehabilitation goals change. Peers could have been sources of expert opinion in interactive reasoning to reveal their experiences with similar conditions. Research could have been utilized in procedural reasoning to develop treatment strategies and in conditional reasoning to revise treatment strategies. Unfortunately, research findings were believed to be the most underused form of evidence in the clinical reasoning process (Tickle-Degnen, 1999).

Evidence-based practice literature supported the use of a variety of evidence for the development of “best practice.” Sackett, Rosenberg, Gray, Haynes, and Richardson (as cited in Taylor, 1997) argued that use of evidence-based practice was a part of the clinical decision-making process, blending a mix of clinical expertise, the best evidence,
and patient preference. Naylor (as cited in Alsop, 1997) suggested that evidence must be used in conjunction with clinical experience and critical thinking skills to transverse the "gray zones" where a clear course of action was absent.

In the evidence-based practice literature, "evidence" centered mostly on research findings (Alsop, 1997; Bannigan, 1997; Brown & Rodger, 1999; Egan, Duboulouz, von Zweck, & Valierand, 1998; Eakin, 1997; Hayes & McGrath, 1998; Lloyd-Smith, 1997; Taylor, 1997; Tickle-Degnen 1998, 1999, 2000a, 2000b). The "best evidence" was reported to derive from systematic reviews of randomized controlled trials (RCTs) (Eagan et al. 1998; Lloyd-Smith, 1997; Hayes & McGrath, 1998; Taylor, 1997). Systematic reviews identified and evaluated RCT research studies on a particular topic and then summarized findings (Taylor, 1997). After systematic reviews, other types of research studies were ranked. The individual randomized controlled trial was more credible followed by non-randomized trials and case studies (Eagan et al. 1998; Lloyd-Smith, 1997). One problem associated with using only RCTs was the belief that RCTs could not answer all research questions (Eagan et al; Hayes & McGrath, 1998; Lloyd-Smith, 1997; Taylor, 1997). Eakin (1997) argued that "...much of the research required in the therapy professions is not amenable to experimental or laboratory methods," (p.292). Qualitative studies were believed helpful in understanding the individual client (Hayes & McGrath, 1998; Krefting & Krefting as cited in Egan et al.; Taylor, 1997) and to develop theory (Krefting & Krefting as cited in Egan et al.). Hayes and McGrath (1998) stated that RCTs were not infallible at producing incorrect results and evidence from lower order studies could produce correct results. However, systematic reviews of RCTs were argued to have less chance of being incorrect than reviews of less rigorous studies (Collins, Peto, Gray, & Parish as cited in Hayes & McGrath, 1998).
Barriers to Research Utilization

Barriers to research utilization were presented in the literature that could explain why research was underused in the clinical reasoning process of OT, CHTs. Difficulty with research utilization was not specific to the field of occupational therapy and those occupational therapists specializing in hand therapy. Ottenbacher, Barris, & Van Deusen (1986) found that most clinical professions also shared problems of integrating research into practice. Barriers such as accessibility, time, knowledge, institutions, and research content were discussed.

Many occupational therapists and other health care providers cited accessibility to research literature as a barrier (Funk, Champagne, Tomquist, & Wiese as cited in Dubouloz, Egan, Vallerand, & von Zweck, 1999). Performing a quality systematic review of RCT required use of published and unpublished research. Many clinicians found difficulty with locating published and unpublished studies (Bannigan, 1997; Eakin, 1997; Taylor, 1997). Occupational therapy researchers and practitioners believed there was a lack of occupational therapy research to use as evidence (Alsop, 1997; Eakin, 1997; Ottenbacher et al., 1986). Other problems associated with access were that journals, libraries, and databases were not available locally (Eakin, 1997; Lloyd-Smith, 1997; Taylor, 1997) and the system of dissemination of research was not effective (Alsop, 1997; Eakin, 1997). On the other hand, Hayes and McGrath (1998) wrote that there was too much information available and that it was impossible to digest even a fraction of the information.

Lack of time or knowledge to search for, read, interpret, and evaluate research was a second barrier (Funk, Champagne, Tomquist, & Wiese as cited in Dubouloz et al., 1999). Searching for, reading, interpreting, and evaluating was considered time consuming. Bannigan (1997) suggested that the process, from the time of initial search to implementation, could take longer than a year. Alsop (1997) reported that not all
health professionals and managers have been trained to evaluate, interpret and search for research. In their research, Dubouloz et al. found that occupational therapists believed strongly in their lack of knowledge and expertise required for research participation.

Third, institutional barriers to changing current practice existed (Funk, Champagne, Tomquist, & Wiese as cited in Dubouloz et al., 1999). Alsop (1997) speculated that managers might not be promoting or fostering evidence-based practice. Eakin (1997) reported on managerial views of research being separate from practice and practice given priority over research. Dubouloz et al. found that use of evidence-based practice had potential to change clinical practice and might be threatening to occupational therapists or other team members.

A fourth barrier was perceived quality of published research. Some clinicians believed research studies presented in journals were too esoteric and did not relate to clinical practice (Dubouloz et al., 1999; Minns as cited in Eakin, 1997; Ottenbacher et al., 1986; Taylor, 1997). Egan et al. (1998) speculated (a) occupational therapists might believe that research studies were not applicable to their individual clients, and (b) occupational therapy intervention issues differ from diagnosis, treatment and prognosis considered in evidence-based practice.

Practitioners' attitudes and values influenced perception of quality. Alsop (1997) suggested that research studies were received and understood by clinicians, but clinicians were unconvinced or unwilling to accept the findings. Again, these beliefs were not unique to the field of occupational therapy. Schwartz, Soumerai, and Avom (as cited in Dubouloz et al.) found that when physicians were asked to justify motivations for prescribing drugs, they cited knowledge gained from clinical experience as primary in their decision making process. Some physicians became hostile to the suggestion that research findings might provide better evidence than impressions from their own clinical
experience. Some believed that use of evidence-based practice would diminish quality
of patient care. A frequent concern was that use of evidence-based practice would lead
to cost-cutting “cook-book” practice, where only one cheap intervention would be
recognized for a specific problem (Taylor, 1997).

Solutions to Barriers

Suggestions to overcome barriers and facilitate research utilization were found in
the literature. Many of the suggestions focused on models of research
utilization/evidence-based practice. Environmental and social supports were also
presented. Programs to assist clinicians with research utilization have been established.
Descriptions of these possible solutions were presented in the following text.

Many research utilization/evidence-based practice models existed in the
literature. Alsop (1997), Bannigan (1997), and Tickle-Degnen (1998) mentioned
systematic reviews as a way of collecting large amounts of research on a specific topic.
Bannigan (1997) and Hayes & McGrath (1998) presented the Cochrane Collaboration as
a model to locate relevant research, perform systematic reviews, disseminate and house
review findings. Egan et al. (1998) and Tickle-Degnen (1998) provided examples of how
to use systematic reviews in conjunction with client interests to provide holistic “best
practice.” Alsop (1997) argued that use of systematic reviews was a highly skilled and
time-consuming activity not likely to be undertaken readily by practitioners. Brown and
Rodger (1999) discussed nine models of research utilization and concluded that to use
the research utilization models and be successful at integrating research into practice,
practitioners must possess knowledge of the research process and how to evaluate and
integrate research studies. In summary, although research utilization/evidence-based
practice models assisted in the development of best practice, the models could not be
used effectively until other barriers of lack of time or knowledge to search for, read,
interpret, and evaluate research were overcome.
Environmental and social supports were suggested to alleviate time constraints and facilitate research utilization into practice. Managerial support was thought to be important for fostering research integration (Eakin, 1997) and needed to provide an atmosphere that valued and supported research activity. Brown and Rodger (1999) suggested management establish protected work-time for clinicians to conduct research studies. Gray (as cited in Taylor, 1997) suggested that librarian support and access to databases, the Internet, and a personal computer with software for storing evidence systematically were necessary to be effective at evidence-based practice.

Environmental and social supports were presented to assist in the development of knowledge on research methodology, evaluation and process. Alsop (1997) argued that opportunities to develop research skills and participate in evidence-based practice were needed for practitioners at all career levels to become research consumers. Practitioners could enroll in a research methods course (Alsop, 1997) or pursue an advanced degree (Dubouloz et al., 1999). Course material could be integrated into the work place. Alsop (1997) contended that professional development was normally part of performance reviews, and managers could support research skill development under the guidance of academic staff while research was performed at work. Other supports mentioned were accessibility to clinical experts or clinicians experienced in research (Dubouloz et al. and Brown & Rodger, 1999) and participation in journal clubs to review and critique articles (Alsop, 1997; Lloyd-Smith, 1997).

Recently, two initiatives were developed to assist occupational therapists with research participation. The American Occupational Therapy Association (AOTA) formed a research listserv for occupational therapists on the Internet. Interested clinicians could subscribe via e-mail to join in discussions of current research, brainstorm research ideas, and facilitate networking among academic and clinical researchers ("New Research Listserv for OTs", 1999). The ASHT developed the "Read and Respond
Program.” Individuals who registered for the program, read selected articles from *Journal of Hand Therapy*, and answered 80% of the questions on the articles correctly, earned continuing education credits (American Society of Hand Therapists: The read and respond program, 1999).

**World Wide Web Applications**

More and more, researchers are using the World Wide Web as a medium to survey population samples. Hilsden, Meddings, & Vehoef (1999) used the World Wide Web (WWW) to survey individuals with inflammatory bowel disease to determine complementary and alternative medicine usage. WWW survey results were compared with a similar survey administered to patients in a clinic setting. Soetikno, Mrad, Pao, & Lenert (1997) used the WWW to survey patients with ulcerative colitis and patients who received surgery for the treatment of ulcerative colitis. The WWW survey results were compared with similar patients in a surgical practice using the same computer-based questionnaire. Joinson (1999) examined how measures of self-consciousness, social anxiety, self-esteem, and social desirability varied in WWW and pen and paper survey conditions. Stanton (1998) assessed data collection using WWW and pen and paper surveys on exploring determinants of individuals' perceptions of fairness in day to day interactions with their supervisors. Kaye and Johnson (1999) surveyed on the WWW to examine how the WWW and other media sources affected voting behaviors and the relationship between the use of the Web for political information and feelings of alienation and political interest. Kaye and Johnson (1999) used their experience with this survey to address online research issues and offer techniques for improving online surveys. No survey research using the WWW was found in the occupational therapy literature.
Benefits of WWW Surveys

Using the Internet for survey research was shown to be beneficial. One benefit was data could be directly entered into a database from the Web based responses. This eliminated the need for data entry and therefore decreased cost, time, and data entry errors (Schmidt, 1997).

A second benefit was that posting the survey on the Web reduced the need for paper resources. Traditional paper surveys required paper supplies for publication, distribution, and respondent reminding (Schmidt, 1997). Therefore, posting the survey on the Web again decreased costs associated with supplies (copy charges, paper, envelopes, stamps, and postcards) and labor required for assembly and disbursement.

Third, Web surveys had produced a higher quantity of data. Stanton (1998) and Soetiikno et al. (1997) found that Web survey responses had less missing data than traditional paper survey responses. To ensure complete responses, these researchers programmed the common gateway interface program (CGI) to send reminders to the respondent that an answer was missing. A common gateway interface program was a program designed to accept the incomming data. This technique was also discussed in Schmidt (1997). Although, Soetikno et al. found that mailing electronic reminder notes to complete surveys had little effect on completion rates. Therefore, even without electronic reminders, Web based surveys produce more complete responses.

Fourth, WWW survey techniques have improved data quality. Hilsden, Meddings, & Verhoef (1999) speculated and Joinson (1999) found that WWW survey respondents had decreased inhibition and were more likely to answer honestly. In contrast, Stanton (1998) argued that perceived anonymity could affect how respondents' answered and that people's beliefs about anonymity on the WWW were unknown. In defense, Joinson (1999) found that anonymous and non-anonymous groups in the WWW condition were more disinhibited than the anonymous pen and paper condition.
when measuring self-consciousness, social anxiety, self-esteem, and social desirability.

Differences in data outcomes between pen and paper and WWW survey conditions should be investigated. If Joinson's findings on decreased inhibition with WWW surveys were corroborated in other studies, this could affect how sensitive/personal data will be collected in the future.

Another major benefit for using the Internet for survey research was access to a large population of individuals. Kaye & Johnson (1999) found after reviewing a multitude of sources that the estimated number of Web users ranged from 26.4 million to 62 million. In the research studies presented, populations on the WWW were accessed and sampled using newsgroups (Hilsden, Meddings, & Verhoef, 1999; Kay & Johnson, 1999) listservs and chat forums (Kay & Johnson, 1999), postings to special interest WWW sites, and commercial Internet search engines (Soetikno et al., 1997).

Problems with WWW Surveys

Some problems could arise while using a Web survey, but the tactics presented diminished adverse effects. First, respondents could enter their responses more than once and contaminate data. Schmidt (1997) suggested using a common gateway interface program (CGI) to filter out duplicate responses.

A second concern was data integrity and security of the survey. Schmidt (1997) explained that when the survey was placed on the WWW, anyone with access to the Web site had the ability to download and examine the survey programmed with the hypertext markup language (HTML). Web users had the ability to change the HTML document to read other questions, keep the same survey variables, and send bogus data to the CGI for processing (Schmidt, 1997). Web users also had the ability to send data directly to the CGI program for processing without accessing the HTML program (Schmidt, 1997). Schmidt (1997) suggested writing the CGI program to check for origin of the HTML document when displayed on the respondent's browser, and accept data
from authorized Web servers only. Schmidt (1997) also suggested using password protection schemes to restrict access to the survey.

Third, technical difficulties could impair survey completion on the WWW. Soetikno et al. (1997) found that not all of the respondents' browsers could read the text on their WWW survey. Kaye & Johnson (1999) used a basic text survey design, two small graphic displays, and a light blue background. Kaye & Johnson (1999) reported that although they did not view their survey on other browsers to check for technical difficulties, there were no browser-related design flaws reported. Schmidt (1997) recommended testing the survey pages with a variety of WWW browsers and using a text-based browser called Lynx because not all respondents may have graphical WWW access. Other technical difficulties Soetikno et al. faced were that some respondents had improperly sized screens that hid navigation commands, and the WWW survey technology selected outpaced some of the respondents' computer equipment. Soetikno et al. reported using advanced Internet technologies such as sound, frames, and HTML scripting languages. Of all surveys investigated, Soetikno et al. was the only study to identify technical difficulties. Whether technical difficulties were due to the use of advanced Internet technologies or providing respondents the opportunity to describe their computer problems could not be determined.

Fourth, generalizing the results of typical WWW user to the WWW user population was questionable. The Graphics, Visualization, and Usability Center (GVU) at Georgia Institute of Technology conducted surveys to identify the "average" WWW user (Schmidt, 1997). The latest survey, "GVU's Tenth WWW User Survey" was conducted in 1998. From these results, the "average" WWW user appeared to be male; between ages of early twenties and late forties; Caucasian; American; have had some college or graduated from college; have had a yearly income over $50,000; have spent between 10-40 hours per week on the Web primarily for work, with one to ten hours per
week spent on the Web for leisure; and used the Web for gathering personal
information, work, education, entertainment, and shopping
(http://www.gvu.gatech.edu/user_surveys/). Whether this description of the typical
WWW user could be generalized to the WWW user population as a whole was
questionable. The respondents were not selected randomly from the WWW population.
The majority of respondents accessed the WWW survey via a text link from another Web
page (http://www.gvu.gatech.edu/user_surveys/). Unless the WWW user came across
the survey advertisement, he/she did not have the opportunity to reply to the survey.
Unfortunately, no central registry of Web users existed upon which a random sample
could have been drawn (Kaye & Johnson, 1999).

Fifth, WWW users differ from the general public. The U. S. median household
income in 1989 was $30,056 (http://factfinder.census.gov/). This figure was at least
$20,000 less than the average WWW user as cited above. In 1989, roughly 45% of the
U. S. population had at least some college (http://factfinder.census.gov/). The majority
of the WWW users had some college or higher. In 1989, approximately 46% of the U.S.
population were between 20 years to 49 years in age. The majority of WWW users were
within this age range. The U.S. demographics could have changed with the last ten
years, and perhaps the Internet demographics will also change. Kaye & Johnson
(1999) described the early Internet users as “White males with high socioeconomic
status” (p.324), but suggested that as the Internet becomes more mainstream, the
demographics may shift and become more diverse. As for now, results gathered from
Internet population sampling should not be generalized to the general population.

WWW survey respondents also differed from clinic respondents. Hilsden,
Meddings, & Verhoef (1999) found that Internet respondents tended to be better
educated; had a shorter mean duration of inflammatory bowel disease; and were more
likely to use complementary and alternative medicine (CAM) secondary to their doctors’
beliefs about causes and treatments of the disease and lack of care or human touch needed than the earlier clinic sample. Soetikno et al. (1997) found the WWW respondents to differ slightly from the typical WWW user. The WWW respondents were of equal proportions of males and females and had lower income. Soetikno et al. also noted distinct differences between the WWW and clinic respondents. WWW respondents were younger, more often single, without children, and had more symptoms of ulcerative colitis than respondents at the surgical clinic.

Sampling from a defined population had an affect on homogeneity between WWW and pen and paper groups. Joinson (1999) sampled from an introductory research methods course to form a WWW survey group and a pen and paper survey group. Joinson (1999) reported between group similarities in age, gender, and number of respondents. To control access to the survey, Schmidt (1997) suggested selecting respondents by conventional methods and then referring them to the Web survey. This technique would also allow the researcher(s) to calculate response rates. In Web surveys, the response rate could not be calculated due to the inability to count how many potential respondents viewed the survey or its links but declined to participate (Kaye & Johnson, 1999).

There were many techniques used to improve random sampling on the WWW. Swoboda, Muhlberger, Weitkunat, and Schneeweib (as cited in Kaye & Johnson, 1999) randomly selected e-mail addresses from 200 newsgroups. James, Wotring, & Forrest (as cited in Kaye & Johnson, 1999) randomly selected a sample from a number of bulletin board users. Penkoff, coleman, and Katzman (as cited in Kaye & Johnson, 1999) randomly sampled from various Usenet newsgroups. Kaye and Johnson (1999) found that sampling frames could be obtained from any source where e-mail addresses are posted.
Nonprobability sampling techniques were believed to improve sampling on the WWW. Kaye and Johnson (1999) explained that nonprobability sampling was more appropriate when conducting a Web survey secondary to the lack of mechanism for random sampling the Web user population. Subsets of the larger WWW user population could be identified and purposively sampled, but results could only be generalized to the subsets selected and not the larger population (Kaye & Johnson, 1999). This type of sampling technique was used in “GVU’s Tenth WWW User Surveys,” 1998 as previously discussed and its limitations noted.

Use of the WWW for survey research has benefits and problems. As with all surveys, the sample is only as good as the population list upon which it was drawn and the techniques used to sample. Results can only be generalized to the population sampled. When sampling from two different populations, chances are there will be differences between groups. Differences are not necessarily negative, because use of the Web allows access to individuals who might not otherwise be sampled. Conducting Web surveys is cheaper due to the decrease in labor and resources needed. Web surveys produce higher quality and quantity of data. Proactive survey programming can eliminate security problems, duplicate responses, and technical difficulties.

Summary and Implications for the Study

Occupational therapists as certified hand therapists (OT, CHTs) were more concerned with developing a therapeutic exercise program than addressing activities of daily living and function (Roth et al., 1996) through use of occupation. Use of occupation had been shown to provide more benefits than the use of rote exercise. A hypothesis for the lack of occupation in hand therapy practice was that the OT, CHTs were not reading occupational therapy research which contained studies on the benefits of occupation. Barriers to utilizing research were presented and could possibly explain why OT, CHTs were not utilizing occupational therapy research. If this were the case, solutions to these
barriers needed to be identified for this population. No where in the OT literature had WWW survey design been found.

To capture a higher quantity and quality of data on issues of research utilization, and identify the effectiveness of conducting a WWW survey with the OT, CHT population, a World Wide Web survey design was used. To allow respondents who did not use or have access to computers or the Internet to participate in the study, a paper questionnaire was used. Using both WWW and paper questionnaires also provided respondents a choice as to which survey medium they preferred to respond. If the WWW survey design was shown to be more effective than traditional paper survey design in the OT, CHT population, it will provide the profession with a better methodology in which to survey its members.
CHAPTER 3
METHODOLOGY

Study Design

This quantitative research study was designed to (a) identify OT, CHTs' frequency of reading, integrating, and contributing to occupational therapy research studies, (b) identify barriers to utilizing research presented in occupational therapy journals, (c) present solutions for overcoming these barriers in this population, and (d) investigate the effectiveness of conducting World Wide Web (WWW) survey research with OT, CHTs. Information was gathered using two forms of questionnaires; a paper and a WWW questionnaire (Appendix A). Paper and WWW questionnaires were used to reach a large number of OT, CHTs across the United States at a relatively low cost and to ensure respondent confidentiality. Other aspects of this research project design included subject selection, instrumentation, validity/reliability, and procedure. These aspects were discussed in the following text.

Subjects

Subjects were selected from the 1999 American Society of Hand Therapy (ASHT) membership list. Subjects were required to be OT, CHTs and active members of the ASHT. Members who met criteria were given a number between 0001 and 1368. Approximately 1% of the population was male. No attempts to stratify the sample were made to ensure male representation due to lack of representation in the population itself. Three hundred seven numbers were selected using a random number sequence generated in Microsoft Excel. One of the sample respondents was eliminated due to Canadian residency, for a total of 306 OT, CHTs in the sample. Traditional sampling techniques from a defined population were suggested in Schmidt (1997) to control access to the survey and in Joinson (1999) to increase homogeneity between WWW and paper respondents.
Instruments

Both the paper and WWW questionnaires contained questions on demographics, practice, research utilization, and Internet/computer usage. Demographics questions included gender, education level, state residency, and household income. Income ranges were taken from [http://factfinder.census.gov/](http://factfinder.census.gov/). Practice questions included clinical reasoning, length of occupational therapy registration and hand therapy certification, practice sites, professional membership and sources of clinical reasoning. Length of occupational therapy registration was originally taken from Roth et al., 1996, but ranges were changed to provide equality in year ranges at all but two response options (e.g. fewer than five years, 5-7 years, 8-10 years, 11-13 years, 14-16 years, 17-20 years, 21-24 years, and more than 25 years). Research utilization questions included number of articles read and integrated, research study participation, barriers to research utilization, and solutions to barriers. All but one response option in the question regarding barriers were based on information found in Alsop (1997); Bannigan (1997); Dubouloz et al. (1999); Eakin (1997); Egan et al. (1998); Lloyd-Smith (1997); Ottenbacher et al. (1996); and Taylor (1997). All but two solutions to barriers were found in Alsop (1997); Bannigan (1997); Brown and Rodger (1999); Dubouloz et al. (1999); Eakin (1997); Egan et al. (1998); Hayes and McGrath (1998); Lloyd-Smith (1997); Tickle-Degnen (1998); Taylor (1997); “New Research Listserv for OTs”, 1999; and American Society of Hand Therapists: The read and respond program, 1999. Internet and computer questions included computer and Internet access, hours spent per week on the Internet, and reasoning behind mail or Internet response.

Paper and Web questionnaires differed on directions for filling in responses, a question regarding questionnaire selection, and background color. In the paper directions, respondents were asked to fill in the appropriate boxes. In the WWW directions, respondents were asked to click on the appropriate box with the mouse. For
the last question, individuals using the paper questionnaire were asked why they selected the paper format and individuals using the WWW questionnaire were asked why they selected the WWW survey format. Both the cover letter (Appendix B) and paper questionnaire were printed on light blue paper to draw attention to themselves and not become lost among other white papers. The WWW questionnaire was light gray in order to facilitate reading of the text on the computer monitor.

Questions designed in the paper survey with the above changes were formatted and adapted to the Internet Web site. The survey was written in hypertext markup language (HTML) and used common gateway interface (CGI) program. The CGI program prevented tampering of the HTML survey document by restricting access (Schmidt, 1997) and stored data for analysis. The WWW questionnaire was text-based to allow greater access to the survey for the intended sample and eliminated browser-related design flaws (Kaye & Johnson, 1999). Respondents were asked to log onto the Internet and enter the WWW address provided in the cover letter (Appendix B). At the Web site, respondents were asked to enter a password provided in the cover letter (Appendix B) to restrict survey access to only sample respondents (Schmidt, 1997). Once the Web survey was completed, respondents were asked to mouse click on the "SUBMIT" icon. A message appeared to the respondent notifying him/her that the survey was accepted.

Validity/Reliability

Validity measurement was not conducted in this research project, although controls and threats to validity were identified. History, subject maturation, testing procedures, subject selection, subject mortality/attrition, and instrumentation were noted threats to internal validity (Bailey, 1991). Historical contamination, maturation, and mortality/attrition were not perceived as threats to internal validity due to the nature of the methodology (survey) and brief response time (four weeks). Testing as a threat to
validity was also dismissed due to the nature of the study (survey) and the fact that the sample was surveyed only once. Subject selection was considered a slight threat because subjects in the random sample had the choice of whether or not to participate. Instrumentation was also perceived as a small threat. Researcher bias to question and response selection was due to the belief that the use of occupation and research utilization were important aspects of occupational therapy practice. Other internal validity threats due to instrumentation occurred in two questions. First, several respondents questioned the definitions of sources in the clinical reasoning (see question 9, Appendix A). Some respondents questioned if education included formal and continuing education. Other respondents did not comprehend what available resources were. An example should have been provided as seen in question 13 (Appendix A). Second, it was questionable if all respondents excluded Journal of Hand Therapy and Journal of Hand Surgery in their responses to questions 11 and 12 (Appendix A). If some respondents included these two journals in their answers, the actual number of occupational therapy journals read and integrated into practice would be lower than the data reported. Directions should have specifically stated to exclude these journals from responses. The questions must be interpreted as OT, CHTs' perceptions of occupational therapy journal articles.

Bailey (1991) reported the Hawthorne effect, replication, generalizability, multitreatments, and researcher effect were threats to external validity. The Hawthorne effect occurred when a subject performed better just because he/she was receiving special attention (Bailey, 1991). The Hawthorne effect was not seen as a threat to external validity because of the nature of the study (survey) and no personal attention was given to respondents. Replication was not seen as a threat because sufficient instructions as to where questions were generated and procedure for administering the survey were presented. Generalizability was not seen as a threat because 22% of the
population was randomly sampled, with a usable response rate of 154 (50%). This sample size and response rate was similar to results in Roth et al. (1996). Roth et al. randomly sampled 400 from a population size of approximately 1800 CHTs (22%) obtained from the Hand Therapy Certification Commission (HTCC). From this sample, a 50% response rate was achieved, which was also similar to the 49% response rate in the ASHT 1985 role-delineation study (Roth et al.). This sample size was large and the response rate was high, thus results could be generalized to the ASHT OT, CHT population. Multitreatments were not performed due to the nature of the study (survey) and were not perceived as a threat to external validity. Researcher effect could be perceived as a threat if the respondents wanted to please the researcher by identifying the researcher's belief that use of occupation and research utilization were important and thus responded accordingly. Data collected in this study did not support the researcher effect and thus was not perceived as a threat.

Reliability could not be assessed because the questionnaires were used in only one trial. Bailey (1991) reported that there were seven threats to reliability: (a) subject fatigue, (b) subject motivation, (c) subject learning, (d) subject availability, (e) tester skill, (f) different testers and (g) test environment. These problems which confound reliability were addressed below and related to this study.

Subject fatigue was one threat to reliability. Subject fatigue could influence reliability if subjects were required to perform physical or mental tasks repeatedly (Bailey, 1991). Subject fatigue was not seen as a problem since both the WWW and paper questionnaires contained less than 20 questions and respondents could complete the questionnaire at their own pace.

Two, subject motivation could also impact reliability. If subjects were not interested in the study, it could influence the effort they put into the testing process.
Subject motivation did not compromise reliability because participation was not required. If subjects were not interested, they did not have to respond.

Three, subject learning could impact reliability. If subjects were repeatedly tested on the same instrument a practice affect could be seen (Bailey, 1991). This was not a threat to reliability in this study. First, learning some measurable skill was not assessed. Second, respondents were asked to reflect on past events that could not be changed.

Four, subjects' abilities could affect reliability. A subject's ability to respond to questions could vary according to skill level or knowledge of the topic and affect reliability (Bailey, 1991). Skill level and knowledge were not perceived to hamper the ability to respond to the questions, but knowledge and skill level of OT, CHTs to analyze OT research literature was questioned.

Five, tester skill could affect reliability. If the tester did not administer the tests in exactly the same way responses could vary from subject to subject (Bailey, 1991). Tester skill was not a threat to reliability because all respondents received the initial request to participate in the study in the same manner, via mail.

Six, testing environment could affect reliability. Individuals could be exposed to distractions which could influence a subject's responses (Bailey, 1991). The environment could also affect reliability as respondents were able to choose how and where they responded. The environment could not be controlled in this study and threatens all nonexperimental designs where the environment was not controlled.

**Procedure**

Questionnaires (Appendix A) were mailed with a stamped return envelope and cover letter (Appendix B) to the 306 randomly selected OT, CHTs. The cover letter described the purpose of the study, explained the options of mailing the questionnaire or entering responses on the Web site, gave instructions on how to access the Web site,
and provided human subjects review committee's and researcher's phone numbers for questions concerning the study.

Completed paper surveys were mailed to the researcher's home address. Once received, questionnaires were removed from the post-marked envelopes, given a respondent number to facilitate data entry, and placed in a file. No attempts were made to match post-marked envelopes with sample addresses. Responses received after the deadline were not used in analysis.

WWW responses were collected in the CGI program. Data was gathered for four weeks from initial mailing. After the deadline, the responses were downloaded to a disk for data analysis.
CHAPTER 4
RESULTS/DATA ANALYSIS

After the questionnaires were collected, data analysis was performed. The purpose of this chapter was to report data obtained using both the paper and WWW questionnaires. This chapter described response characteristics, data analysis techniques, and sample characteristics as related to variables collected.

Response Characteristics

Of the 306 questionnaires mailed to the sample, 157 were completed and returned by the deadline outlined in the cover letter (Appendix B). Of the 157 completed responses, 153 were paper responses and 4 were WWW responses. Three responses were eliminated (2 WWW and 1 paper) because the relationship between years registered as an OT and the year certified was invalid. As explained earlier in the literature review, an OT must practice 5 years before she/he may sit for the hand therapy certification exam. Thus, a 5-year difference must exist between years registered as an OT and CHT certification year. A five year difference did not occur for those 3 respondents. This elimination resulted in 154 usable responses or a 50% response rate. Two respondents mailed uncompleted questionnaires and disqualified themselves from the study because they were not practicing as CHTs at this time. Seven questionnaires were returned because the OT, CHT had moved and forward time had expired. Seven paper questionnaires were returned after the deadline and data analysis had begun, thus they were not used.

Data Analysis Techniques

Both the paper and WWW responses were coded and entered into an Excel spreadsheet by the researcher. Excel data was then entered into SPSS 9.0 statistical software. Frequencies were obtained to satisfy the purposes of this research study.
Initially Chi Squared analyses were to be used in this study to identify response
differences between the paper and WWW respondents. Due to the extreme inequality in
the number of usable paper responses (152) to WWW responses (2), Chi Squared was
thought to be ineffective and was eliminated from data analysis.

Demographics

The first four questions pertained to respondents' demographics. Gender, state
residency, household income, and level of education were collected and presented in
the following text. Question one asked for respondents' gender. All respondents
answered this question (n=154). There were 142 female respondents (92.2%) and 12
male respondents (7.8%). Males represented approximately 1% of the ASHT OT, CHT
population.

Next, respondents were asked to provide the state in which they lived. Of the
154 responses, 36 of the 50 (72%) United States were represented (see table 1). The
states with the highest representation were Florida (n=18, 11.7%), California (n=15,
9.7%), and Pennsylvania (n=11, 7.1%).

Third, respondents were asked to provide their household income level. Of the
154 responses, 146 replied and 8 abstained. Of those who responded 45 (30.8%) reported
household income ranging between $100,000 and $149,999; 38 (26.0%) reported
household income between $75,000 and $99,999; and 32 (21.9%) reported
income between $50,000 and $74,999 (see table 2).
<table>
<thead>
<tr>
<th>State</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
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<td>1.3</td>
</tr>
<tr>
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<td>.6</td>
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<td>3.2</td>
<td>64.3</td>
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<td>.6</td>
<td>64.9</td>
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<td>5.8</td>
<td>70.8</td>
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<td>4.5</td>
<td>4.5</td>
<td>75.3</td>
</tr>
<tr>
<td>OR</td>
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<td>1.9</td>
<td>77.3</td>
</tr>
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<td>7.1</td>
<td>84.4</td>
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<td>.6</td>
<td>.6</td>
<td>85.7</td>
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<td>89.6</td>
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<td>1.9</td>
<td>1.9</td>
<td>91.6</td>
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<td>5.2</td>
<td>5.2</td>
<td>96.8</td>
</tr>
<tr>
<td>WI</td>
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<td>2.6</td>
<td>99.4</td>
</tr>
<tr>
<td>WY</td>
<td>1</td>
<td>.6</td>
<td>.6</td>
<td>100.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>154</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
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Table 2. Household Income

<table>
<thead>
<tr>
<th>Income &amp; coded value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
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<tr>
<td>Less than $5,000 (1)</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>$5,000 to $9,999</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>$10,000 to $14,999 (3)</td>
<td>1</td>
<td>.6</td>
<td>.7</td>
<td>.7</td>
</tr>
<tr>
<td>4-$15,000 to $24,999 (4)</td>
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<td>0</td>
<td>0</td>
<td>.7</td>
</tr>
<tr>
<td>$25,000 to $34,999 (5)</td>
<td>1</td>
<td>.6</td>
<td>.7</td>
<td>1.4</td>
</tr>
<tr>
<td>$35,000 to $49,999 (6)</td>
<td>4</td>
<td>2.6</td>
<td>2.7</td>
<td>4.1</td>
</tr>
<tr>
<td>$50,000 to $74,999 (7)</td>
<td>32</td>
<td>20.8</td>
<td>21.9</td>
<td>26.0</td>
</tr>
<tr>
<td>$75,000 to $99,999 (8)</td>
<td>38</td>
<td>24.7</td>
<td>26.0</td>
<td>52.1</td>
</tr>
<tr>
<td>$100,000 to $149,999 (9)</td>
<td>45</td>
<td>29.2</td>
<td>30.8</td>
<td>82.9</td>
</tr>
<tr>
<td>$150,000 or more (10)</td>
<td>25</td>
<td>16.2</td>
<td>17.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>146</td>
<td>94.8</td>
<td>100.0</td>
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</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fourth, Respondents were asked for the highest degree obtained. Respondents were offered bachelor's, master's and doctorate options. All respondents answered (N=154) of which 113 (73.4%) reported bachelor's and 41 (26.6%) reported master's education. No respondent reported doctorate level education.

Practice

Questions five through ten pertained to practice. Respondents were asked questions on length of OT registration, CHT certification year, practice site, professional organization membership, and sources of clinical reasoning. Data were collected and presented below.

Respondents were asked how many years had they been registered as an occupational therapist. Of the 154 responses, 31(20.1%) reported they had been practicing for 14 to 16 years; 29 (18.8%) reported practicing for 17 to 19 years; and 25 (16.2%) reported practicing for 11 to 13 years (see table 3). Another way to look at the
data was 60 (38.9%) of the respondents practiced between 14 and 19 years, while 106
(68.7%) of the respondents practiced between 11 and 22 years.

<table>
<thead>
<tr>
<th>Year range &amp; coded values</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
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<tr>
<td>Fewer than 5 years (1)</td>
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<td>0</td>
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<td>0</td>
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<tr>
<td>5 to 7 yrs. (2)</td>
<td>1</td>
<td>.6</td>
<td>.6</td>
<td>.6</td>
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<tr>
<td>8 to 10 yrs. (3)</td>
<td>14</td>
<td>9.1</td>
<td>9.1</td>
<td>9.7</td>
</tr>
<tr>
<td>11 to 13 yrs. (4)</td>
<td>25</td>
<td>16.2</td>
<td>16.2</td>
<td>26.0</td>
</tr>
<tr>
<td>14 to 16 yrs. (5)</td>
<td>31</td>
<td>20.1</td>
<td>20.1</td>
<td>46.1</td>
</tr>
<tr>
<td>17 to 19 yrs. (6)</td>
<td>29</td>
<td>18.8</td>
<td>18.8</td>
<td>64.9</td>
</tr>
<tr>
<td>20 to 22 yrs. (7)</td>
<td>21</td>
<td>13.6</td>
<td>13.6</td>
<td>78.6</td>
</tr>
<tr>
<td>23 to 25 yrs. (8)</td>
<td>15</td>
<td>9.7</td>
<td>9.7</td>
<td>88.3</td>
</tr>
<tr>
<td>More than 25 years (9)</td>
<td>18</td>
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<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Next, respondents were asked for the year they passed the CHT certification
exam. The majority of respondents (61%) passed the certification exam during the first
2 years available. The largest number of respondents passed in 1991, 70 (45.5%) and
24 (15.6%) passed in 1992 (see table 4).

<table>
<thead>
<tr>
<th>Certification Year &amp; Coded Value</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
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<tr>
<td>1991 (1)</td>
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<td>45.5</td>
<td>45.5</td>
<td>45.5</td>
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<td>1992 (2)</td>
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<td>1997 (7)</td>
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<tr>
<td>1998 (8)</td>
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<td>100.0</td>
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<tr>
<td>1999 (9)</td>
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<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Third, respondents were asked identify which type of facility best described
where they worked (see table 5). Many respondents worked in either a hospital-based
outpatient facility, 51(33.3%), or in a therapist-owned practice, 42 (27.5%). Some
respondents chose two facility options. These responses were categorized as “other”.
Six respondents reported working as faculty in either OT or OTA programs and as a
clinician. Three respondents worked in both hospital-based inpatient and outpatient facilities. Two respondents reported performing contract work at several types of facilities. The remaining respondents who reported "other" provided the following facilities: therapist/corporate partnership; Mayo Clinic; hospital-based, corporate owned academic institution; occupational medicine clinic; non-profit outpatient medical foundation; and joint hospital/physician owned clinic.

<table>
<thead>
<tr>
<th>Facility Type</th>
<th>Frequency</th>
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<th>Valid Percent</th>
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<td>0</td>
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<td>27.5</td>
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<td>0</td>
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</tr>
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<td>13.7</td>
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<td>.6</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
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</table>

Respondents were also asked to which professional organizations they belonged (see table 6). All respondents were members of the American Society of Hand Therapists in order to be selected for this study. Only 84 (54.5%) reported American Occupational Therapy Association membership. Other memberships included state occupational therapy associations 85 (55.2%) and local occupational therapy associations 17 (11.0%). The following organizations were reported in the "other" category: state chapters of the American Society of Hand Therapists (9); American Association of Hand Surgery (8); local hand special interest group (7); local hand study group (4); Arthritis Foundation (2); local surgeons group (2); state and county hand societies; American Society of Shoulder and Elbow Therapists; Lymphodema
Association; state public health association; American Burn Association; and state hand therapy education group.

Table 6: Professional Organization Membership

<table>
<thead>
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<th>Professional Organization</th>
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<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>AOTA</td>
<td>84</td>
<td>54.5</td>
<td>54.5</td>
</tr>
<tr>
<td>State OT Assoc.</td>
<td>85</td>
<td>55.2</td>
<td>55.2</td>
</tr>
<tr>
<td>Local OT Assoc.</td>
<td>17</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Other</td>
<td>40</td>
<td>25.9</td>
<td>25.9</td>
</tr>
</tbody>
</table>

Fifth, respondents were asked to rate the importance of a variety of sources used in clinical reasoning to formulate care plans (see table 7). The majority of respondents, 124 (81.6%) found theory/frames of reference to be unimportant or somewhat important at best. Scientific Journals were reported to be either somewhat or very important by most respondents, 147 (96.1%). Sources of clinical reasoning identified in “other” and found as very important were physicians (20); continuing education (6); insurance providers (3); client’s employer (3); client’s family (2); standards of care; symptoms; networking; mentors; current research; Internet information; diagnostic tests; ADLs; objective evaluations; available equipment; patient cooperation; and rehabilitation teamwork.

In a related question, respondents were asked to rank the three most important sources of clinical reasoning (see table 8). Clinical experience, diagnosis, and client’s interests were ranked as the most important sources, while scientific journals were ranked 7 of 11 sources.
Table 7. Perceived Importance of Clinical Reasoning Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client's Interests</td>
<td>152</td>
<td>1 (0.7%)</td>
<td>24 (15.8%)</td>
<td>127 (83.6%)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>154</td>
<td>0 (0%)</td>
<td>13 (8.4%)</td>
<td>141 (91.6%)</td>
</tr>
<tr>
<td>Books</td>
<td>152</td>
<td>8 (5.3%)</td>
<td>94 (61.8%)</td>
<td>50 (32.9%)</td>
</tr>
<tr>
<td>Clinical Experience</td>
<td>154</td>
<td>0 (0%)</td>
<td>3 (1.9%)</td>
<td>151 (98.1%)</td>
</tr>
<tr>
<td>Education</td>
<td>153</td>
<td>2 (1.3%)</td>
<td>45 (29.4%)</td>
<td>106 (69.3%)</td>
</tr>
<tr>
<td>Theory/ Frames of Reference</td>
<td>152</td>
<td>38 (25%)</td>
<td>86 (56.6%)</td>
<td>28 (18.4%)</td>
</tr>
<tr>
<td>Available Resources</td>
<td>150</td>
<td>5 (3.3%)</td>
<td>66 (44.0%)</td>
<td>79 (52.7%)</td>
</tr>
<tr>
<td>Scientific Journals</td>
<td>153</td>
<td>6 (3.9%)</td>
<td>77 (50.3%)</td>
<td>70 (45.8%)</td>
</tr>
<tr>
<td>Protocols</td>
<td>154</td>
<td>4 (2.6%)</td>
<td>75 (48.7%)</td>
<td>75 (48.7%)</td>
</tr>
<tr>
<td>Peers</td>
<td>153</td>
<td>7 (4.6%)</td>
<td>72 (47.1%)</td>
<td>74 (48.4%)</td>
</tr>
<tr>
<td>Other**</td>
<td>50</td>
<td>0 (0%)</td>
<td>7 (14.0%)</td>
<td>43 (86.0%)</td>
</tr>
</tbody>
</table>

* Frequency (Valid Percent)
**Respondents were provided with 2 opportunities to write in other sources. The two "other" sources were combined.

Table 8. Perceptions of Most Important Sources of Clinical Reasoning

<table>
<thead>
<tr>
<th>Source</th>
<th>Frequency</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client's Interests</td>
<td>67</td>
<td>3</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>122</td>
<td>2</td>
</tr>
<tr>
<td>Books</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Clinical Experience</td>
<td>133</td>
<td>1</td>
</tr>
<tr>
<td>Education</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td>Theory/ Frames of Reference</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Available Resources</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Scientific Journals</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Protocols</td>
<td>41</td>
<td>4</td>
</tr>
<tr>
<td>Peers</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Other*</td>
<td>20</td>
<td>6</td>
</tr>
</tbody>
</table>

*Respondents were provided with 2 opportunities to write in other sources. The two "other" sources were combined.

Research Utilization

Questions 11 through 15 related to research utilization. In this section, respondents were asked about the number of occupational therapy journal articles read and integrated into practice, perceived barriers of integrating research into practice, research participation, and possible solutions. Data were collected and presented below.
First, respondents were asked to report the number of occupational therapy journal articles they had read during 1999 (see table 9). Of the 154 who responded, 48.7% read between 1 and 8 OT journal articles during 1999. Approximately one quarter of the respondents reported reading 13 or more OT journal articles during 1999 (see figure 1).

<table>
<thead>
<tr>
<th>Number of Articles</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero</td>
<td>17</td>
<td>11.0</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>1 to 4</td>
<td>38</td>
<td>24.7</td>
<td>24.7</td>
<td>35.7</td>
</tr>
<tr>
<td>5 to 8</td>
<td>37</td>
<td>24.0</td>
<td>24.0</td>
<td>59.7</td>
</tr>
<tr>
<td>9 to 12</td>
<td>23</td>
<td>14.9</td>
<td>14.9</td>
<td>74.7</td>
</tr>
<tr>
<td>13 or more</td>
<td>39</td>
<td>25.3</td>
<td>25.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Second, respondents were asked to report the number of these OT journal articles integrated into practice (see table 10 and figure 2). Of the 154 who responded to this question, 39 (25.3%) reported that no OT journal articles were integrated into practice. Another 74 (48.1%) reported integrating only 1 to 4 OT journal articles.
Third, respondents were asked to identify barriers to integrating occupational therapy research into practice (see table 11 and figure 3). A majority of respondents (102, 66.2%) perceived lack of time to search for, read, interpret and evaluate research as a barrier. Other barriers experienced by many respondents were that research studies presented in journal articles were not applicable to clinical interventions, 75 (48.7%); lack of knowledge/difficulty in interpreting and evaluating research findings, 54 (35.1%); and specific protocols ordered by physicians, 44 (28.6%).
Next, respondents were asked about research participation. Of the 154 who responded to the question, 77 (50%) reported participating in research studies since graduation and 77 (50%) reported no research participation since graduation. Of those who provided frequency of research participation (76), the majority (75%) were involved in 1 to 3 studies (see table 12 and figure 4). Those reporting no research participation were asked if they would be interested in participating in research studies in the future. Of the 74 who responded to this question, 61 (82.4%) replied that they would be interested in participating in research studies in the future.
### Table 12. Research Participation, Number of Studies Since Graduation

<table>
<thead>
<tr>
<th>Number of Studies</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>13.0</td>
<td>26.3</td>
<td>26.3</td>
</tr>
<tr>
<td>2</td>
<td>23</td>
<td>14.9</td>
<td>30.3</td>
<td>56.6</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>9.1</td>
<td>18.4</td>
<td>75.0</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>3.2</td>
<td>6.6</td>
<td>81.6</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>1.9</td>
<td>3.9</td>
<td>85.5</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>.6</td>
<td>1.3</td>
<td>86.8</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>1.3</td>
<td>2.6</td>
<td>89.5</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>.6</td>
<td>1.3</td>
<td>90.8</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>90.8</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>1.9</td>
<td>3.9</td>
<td>94.7</td>
</tr>
<tr>
<td>11 or more</td>
<td>4</td>
<td>2.6</td>
<td>5.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>49.4</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>78</td>
<td>50.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4.**

Research Participation Since Graduation

In question 15, respondents were asked what types of initiatives would assist them in participating in the research process in the future (see table 13 and figure 5). Respondents found many of the initiatives useful, but the most popular solutions were (a) receiving continuing education credits for participating in research projects, 73 (47.4%), (b) having personnel available locally to answer research questions, 68 (44.2%), (c) Web sites linking practitioners interested in learning more about research with faculty advisors 61 (39.6%), and (d) on-line courses on research methodology, 54...
Respondents were given the opportunity to offer their own solutions, which included having more time at work for research participation (19); having facility/managerial support and encouragement (7); financial resources (6); consultants to set up statistical tests and data analysis (4); pooling of subjects to obtain a consistent patient population (2); researchers recruiting clinicians to gather data; increased computer access at either work or home; surgeon/physician participation; change in healthcare motivations away from productivity and profits; and publishing journal articles with more clinical application.

### Table 13. Perceived Solutions to Increase Research Participation

<table>
<thead>
<tr>
<th>Solution</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Personnel Available Locally</td>
<td>68</td>
<td>44.2</td>
</tr>
<tr>
<td>CEU for Research Participation</td>
<td>73</td>
<td>47.4</td>
</tr>
<tr>
<td>On-Line Methods Courses</td>
<td>54</td>
<td>35.1</td>
</tr>
<tr>
<td>Web Sites Linking Practitioners with Faculty</td>
<td>61</td>
<td>39.6</td>
</tr>
<tr>
<td>Working on Research with Master's Candidates</td>
<td>46</td>
<td>29.9</td>
</tr>
<tr>
<td>Journal Groups</td>
<td>33</td>
<td>21.4</td>
</tr>
<tr>
<td>Other*</td>
<td>40</td>
<td>26.0</td>
</tr>
</tbody>
</table>

*Respondents were provided with 2 opportunities to write in other sources. The two "other" sources were combined.

### Figure 5

**Suggested Solutions to Barriers**

[Bar chart showing the percentage of respondents for various solutions to barriers.]
Internet/Computer Use

Questions 16 through 18 pertained to computer and Internet usage. In this section respondents were asked about computer and Internet access, the number of hours per week spent on the Internet, and reasons for selecting paper or Web questionnaire format. Data were collected and presented below.

Questions 16 and 17 pertained to computer and Internet access. Of the 153 who responded, 148 (96.7%) reported having access to a computer either at home or work, while 5 (3.3%) did not have access. When asked if they had Internet access on that computer, 144 (95.4%) affirmed Internet access, while 7 (4.6%) had no access. Respondents who had Internet access were then asked to identify how many hours per week they spent logged on to the Internet (see table 14). Of the 145 who replied, 53 (36.6%) spent between 0 and 1 hour per week and 52 (35.9%) spent between 2 to 4 hours on the Internet.

table 14. Hours of Internet Use

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 1</td>
<td>53</td>
<td>34.4</td>
<td>36.6</td>
<td>36.6</td>
</tr>
<tr>
<td>2 to 4</td>
<td>52</td>
<td>33.8</td>
<td>35.9</td>
<td>72.4</td>
</tr>
<tr>
<td>5 to 6</td>
<td>20</td>
<td>13.0</td>
<td>13.8</td>
<td>86.2</td>
</tr>
<tr>
<td>7 to 9</td>
<td>9</td>
<td>5.8</td>
<td>6.2</td>
<td>92.4</td>
</tr>
<tr>
<td>10 to 20</td>
<td>9</td>
<td>5.8</td>
<td>6.2</td>
<td>98.6</td>
</tr>
<tr>
<td>21 to 40</td>
<td>1</td>
<td>.6</td>
<td>.7</td>
<td>99.3</td>
</tr>
<tr>
<td>Over 40</td>
<td>1</td>
<td>.6</td>
<td>.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>145</td>
<td>94.2</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The last question of the survey pertained to reasons for selecting either the paper or Web format. An overwhelming majority of respondents, 152 (98.7%) selected the paper format rather than the Web format. Many of the respondents found it was faster to write out responses on paper than to log on to the Internet, 106 (68.8%) (see table 15 and figure 6). Some respondents found the paper format to be more confidential than the Web format, 35 (22.7%). Of the 2 WWW respondents, both
believed that it was faster to complete on the Web than writing their responses out and 1 respondent did not have to mail the questionnaire (see table 16).

Respondents were also given the opportunity to identify other reasons for selecting the survey format, but only paper respondents provided additional information to explain their selections. Many found that although they had access to the computer/Internet, that access was limited (22). Factors that cause limited access were that they were not near the computer when they received the questionnaire, and phone line or computer was being used. Two respondents reported no Internet access. Respondents also suggested that they could complete the paper survey while doing another task (8). Some believed that they would procrastinate if they waited to reply by Web (3). Three respondents wrote they did not want to waste a stamp. Two respondents filled out the paper questionnaire before reading the entire instructions and did not know the Web was an option. Two respondents wrote that their computer needed upgrading. Other positive reason for using the paper format included beliefs that the paper format was more convenient, more comfortable, more personable, easier to read and easier than logging on to the Web. Negative attitudes about computer usage were reasons for paper selection and included that they were not in the mood to log on to the Internet, too many obstacles on the Internet, and the computer was tedious.

### Table 15. Reasons for Selecting Paper Survey Over Web Survey

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster to write responses than log onto internet</td>
<td>106</td>
<td>68.8</td>
</tr>
<tr>
<td>Mail survey was more confidential</td>
<td>35</td>
<td>22.7</td>
</tr>
<tr>
<td>I do not use the computer</td>
<td>10</td>
<td>6.5</td>
</tr>
<tr>
<td>Technical difficulties</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Other</td>
<td>42</td>
<td>27.3</td>
</tr>
</tbody>
</table>
Reasons for Selecting Paper Survey

Faster 70%
More Confidential 10%
Lack of Computer Use 10%
Technical Difficulties 10%
Other 10%

Table 16. Reasons for Selecting Web Survey Over Paper Survey

<table>
<thead>
<tr>
<th>Reason</th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster to complete than writing answers</td>
<td>2</td>
<td>1.3</td>
</tr>
<tr>
<td>Did not have to mail response</td>
<td>1</td>
<td>.6</td>
</tr>
<tr>
<td>Web survey was more confidential</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
The main purpose of this research was to identify how often occupational therapists as certified hand therapists read, integrated, and participated in occupational therapy research; and to identify barriers and solutions to utilizing occupational therapy research. The secondary purpose was to study the effectiveness of performing World Wide Web survey research in this population. In this chapter, survey data was compared with information found in research literature, findings were applied to practice, limitations were addressed, and suggestions were made for future research.

Discussion

Demographics

The first section of the questionnaire pertained to demographic characteristics. Initially, this section was designed to allow for comparisons among the paper respondents, Web respondents, and Web user characteristics found in the literature. Since only two respondents replied by Web, no comparisons between questionnaire respondents as a whole and Web user characteristics were made.

As stated in chapter 2, “GVU’s Tenth WWW User Survey” (1998) reported that the “average” WWW user appeared to be male; between ages of early 20s and late 40s; have had some college or graduated from college; have had a yearly income over $50,000; and spent between 10-40 hours per week on the Web primarily for work, with one to ten hours per week spent on the Web for leisure (http://www.gvu.gatech.edu/user_surveys/). The respondents in this survey differed from the GVU “average” WWW user. One, the vast majority of respondents in this study were female (92.2%) and only 7.8% were male. Two, the age range for average survey respondent
smaller. Age was inferred using years of OT registration and education level. Assuming that the average college graduate was 21 upon graduation and the majority of respondents practiced between 11 and 22 years, the "average" respondent was between 32 and 43 years old, at the very least. Three, survey respondents were more educated. Most respondents (73.4%) reported obtaining a bachelor's degree and 26.6% obtained a master's degree. Four, respondents had higher levels of income. The "average" respondent had household incomes between $75,000 to $99,000 and 95.9% had household incomes over $50,000. Fifth, survey respondents spent very little time on the Internet. The majority of respondents, 105 (72.4%), reported using the Internet 0 to 4 hours per week as compared to the GVU "average" user's 10 to 40 hours per week.

The survey respondents also differed from the general public. As stated in chapter 2, the U. S. median household income in 1989 was $30,056 (http://factfinder.census.gov/). This figure was at least $20,000 less than the average WWW user as cited above and at least $45,000 less than mean for survey respondents. In 1989, roughly 45% of the U. S. population had at least some college (http://factfinder.census.gov/) whereas 100% of the survey respondents obtained either bachelor's or master's degrees.

In summary, the OT, CHT respondents had some defining characteristics. The OT, CHTs were mostly female. Male OT, CHTs responded at a higher level than represented in the ASHT OT, CHT population (7.8% VS 1%). OT, CHT respondents resided in 36 of 50 states which provided a national representation. OT, CHTs were highly educated and reported high socioeconomic status in comparison with U.S. Census data.

Practice

The second section of the questionnaire pertained to practice. This section was designed to identify level of experience, practice sites, participation in professional
organizations, and perceived importance of sources used in making clinical decisions. Respondents were found to be very experienced both as an occupational therapist (11 to 22 years of experience) and as a CHT (8 to 9 years of experience). Although the year categories were changed slightly to provide more equitable ranges, these respondents appeared to be slightly more experienced than those identified in Roth et al. (1996). This could be accounted for by maturation of the population. On a related issue, very few respondents reported passing the CHT exam after 1995. This could be due to test changes resulting from the 1994 role-delineation study as published in Roth et al. (1996).

Respondents were asked to identify the facility type that best described where they worked. The response was very similar to results found in Roth et al. (1996). Most were employed in hospital-based outpatient facilities (33.3%), followed by therapist-owner practice (27.5%). There were differences noted. There was an approximate 10% decrease in hospital-based outpatient employment and an approximate 10% increase in the “other” category from results reported in Roth et al. Perhaps this was due to the changing work place. Half of the respondents in the “other” category were splitting their time between facilities and/or educational institutions. Was this by choice or was it mandatory to sustain a living due to hospital cut backs?

Individuals were also asked to identify to which professional organizations they belonged. Roth et al. (1996) reported that OT, CHTs infrequently participated in activities and associations that advanced professional practice. Only 84 (54.5%) reported belonging to the American Occupational Therapy Association (AOTA) and 85 (55.2%) reported belonging to their state occupational therapy association. Thus, only half of the OT, CHTs were participating in organizations that advance occupational therapy practice. Low levels of occupational therapy association membership could have impacted the types of research to which the OT, CHTs were exposed. AOTA
membership provided a subscription to the *American Journal of Occupational Therapy* (AJOT). *AJOT* publishes research on the use and benefits of occupation. Because many OT, CHTs were not exposed to literature on occupation on a regular basis, they would be less likely to read and integrate occupational therapy literature.

Questions on sources used to develop care plans helped to identify the clinical reasoning processes OT, CHTs often used in practice as well as perceived importance of scientific journals within the clinical reasoning process. Each source was related to types of clinical reasoning. The three most important sources reported in this study were clinical experience, diagnosis, and client’s interests. Clinical experience related to pragmatic reasoning. *Pragmatic reasoning* was used to evaluate the treatment possibilities given the environment and therapist knowledge, values, and skills (Neistadt & Smith, 1996). Diagnosis related to procedural reasoning. *Procedural reasoning* was used to identify occupational problems and treatment strategies while focusing on the disease or disability (Neistadt & Smith, 1996). Client’s interests was related to narrative reasoning. *Narrative reasoning* was used to identify activity preference within the context of the client’s occupational story (Neistadt & Smith, 1996).

These findings were similar to what the literature recommended. Sackett et al. (as cited in Taylor, 1997) suggested that evidence-based practice was the mix of clinical expertise, “best evidence”, and patient preference. OT, CHT respondents also found clinical expertise and client’s interests (patient preference) of utmost importance. There was a crucial difference. The “best evidence” was found mostly in scientific journals. Although 147 (96.1%) of respondents found scientific journals “somewhat” to “very” important, respondents ranked the importance of scientific journals low in comparison with other types of evidence/sources. In other words, OT, CHT respondents did not find scientific journals as important as other sources of information used in clinical reasoning. This could be reason for the lack of scientific journal use in the clinical reasoning.
As noted previously in chapter 3, some respondents had difficulty understanding the meaning of some sources of clinical reasoning. This could be affected by level of education and when OT, CHTs were educated. Clinical reasoning, along with use of occupation and research utilization, was more heavily focused in occupational therapy curriculum in the 90s than in the 80s when the majority of OT, CHT respondents were formally educated. If respondents were not reading occupational therapy literature and enrolling in continuing education courses on clinical reasoning, then maybe they did not understand what each source meant and its relevance to the clinical reasoning process. This could explain for the lack of perceived importance of such sources as scientific journals and theory/frames of references. In addition, bachelors level education may not have placed the same emphasis on clinical reasoning as did masters level education. Since the majority of respondents earned bachelors degrees, this also could have affected their level of understanding.

This reasoning indicates an even broader problem for the profession. This reasoning would indicate that once OTs graduated from their formal education, and became CHTs, they did not engage in learning new and different knowledge than was presented in formal education in the 1980s. This could explain why OT, CHTs were not using occupation and incorporating occupational therapy literature in hand therapy practice. OT, CHTs were not progressing practice by using occupation and were reading journal articles that supported non-occupation based practice.

Research Utilization

In the next section, respondents were asked questions on research utilization. First, respondents were asked how often they read occupational therapy journal articles
in 1999. The data suggested that OT, CHTs read OT literature at different levels. Results showed 11% did not read occupational therapy journal articles, 48.7% read approximately one OT journal article per quarter to one every other month, while 40.3% read approximately one or more OT journal articles per month.

Second, the respondents were asked how often they integrated occupational therapy journal articles read in 1999. Data suggested that little of the occupational therapy research read was integrated into practice. Of the 154 who responded to this question, 39 (25.3%) reported they did not integrate the occupational therapy journal articles into practice, while 74 (48.1%) only integrated 1 to 4 occupational therapy journal articles into practice. Integration of research relied on reading and interpreting research articles. This supported Roth et al (1996) findings that many CHTs infrequently interpret relevant research that advanced professional practice.

Data on lack of research integration could be explained in three ways. One, respondents reported in the practice section that scientific journals were not as important as other sources of evidence. Therefore, respondents were less likely to use journal articles in practice due to lack of perceived importance in the clinical reasoning process.

Two, the respondents could have experienced cognitive dissonance after reading the occupational therapy journal articles. "Cognitive dissonance' occurs when one cognitive element or bit of knowledge implies the opposite of a second cognitive element," (Wicklund, 1977, p.201). In other words, cognitive dissonance occurred when one attitude, value, belief or information was challenged or disagreed with another attitude, value, belief, or information. When this discrepancy appeared, a person tried to reduce the dissonance. Wicklund (1977) wrote that to reduce dissonance, an individual changed whatever cognitive element that was least resistant to change. Wicklund (1977) also suggested that the more struggle required to perform the behavior, the more reason the subject had not to perform the behavior.
The following example used cognitive dissonance theory to explain the lack of research utilization. Suppose the OT, CHT believed that her/his current practice was correct and using occupation in practice was not necessary to provide the best patient care. If she/he read an occupational therapy journal article supporting use of occupation provided the best patient care, cognitive dissonance would occur. The OT, CHT had two options to overcome dissonance; either change current beliefs about practice and use occupation in treatment or discredit information in the article and continue on with current treatment practice. Discrediting the article on occupation might appear easier than integrating the information and changing beliefs and current practice. Therefore, occupational therapy research articles would not be integrated into practice. This type of behavior was also noted by Alsop (1997) suggesting that research studies were received and understood by clinicians, but clinicians were unconvinced or unwilling to accept the findings.

Another aspect of cognitive dissonance theory was selective exposure. A handful of respondents wrote that they consistently read other journals such as Journal of Hand Therapy and Journal of Hand Surgery but not occupational therapy journals such as AJOT. Selective exposure was a behavior used by individuals to reduce dissonance by biasing their exposure to information that supported one's beliefs (Wicklund, 1977). For those respondents, they chose to read articles that supported their current beliefs and behaviors, rather than the occupationally based articles found in AJOT the other occupational therapy journals.

Third, much of the research utilization literature supports the view that current occupational therapy research was difficult to apply. Some clinicians believed research studies presented in journals were too esoteric and did not relate to clinical practice (Dubouloz et al., 1999; Ottenbacher et al., 1986; Taylor, 1997). Minns (as cited in Eakin, 1997) suggested that the current style of occupational therapy research articles were
unreadable and provided recommendations that few were able to apply, let alone understand. This explanation coincided with data obtained in the question on perceived barriers to research utilization.

Respondents were asked to identify barriers to integrating occupational therapy research into practice. The greatest barrier perceived was the lack of time to search for, read, interpret and evaluate research, 102 (66.2%). Data supported Funk, Champagne, Tomquist, & Wiese (as cited in Dubouloz et al., 1999) and Bannigan (1997) findings that lack of time was a barrier to research utilization. Another barrier was that research presented in journal articles was not applicable to clinical intervention, 75 (48.7%). This data supported explanations found in literature as discussed previously. Lack of knowledge/difficulty in interpreting and evaluating research findings was a third barrier found to impact research utilization, 54 (35.1%). This data supported Dubouloz et al. (1999) findings that occupational therapists believed strongly in their lack of knowledge and expertise required for research participation.

Perceived lack of journal applicability could actually be influenced by lack of knowledge in evaluating and interpreting research findings. This lack of knowledge could cause an individual to believe that an occupational therapy journal article did not apply. Respondents were asked to report all occupational therapy journal articles read in 1999. Respondents were given examples of American Journal of Occupational Therapy (AJOT), Canadian Journal of Occupational Therapy (CJOT), British Journal of Occupational Therapy (BJOT), and Occupational Therapy in Health Care as possible sources of occupational therapy literature. In reviewing only the 1999 AJOT issues, there were at least seven journal articles and three guidelines that could be integrated into hand therapy practice alone. The 10 articles were as follows:


Of those who responded, 73.4% reported integrating 0 to 4 occupational therapy journal articles. Therefore, much more occupational therapy research applied to hand therapy practice and could have been integrated into care plans. Because of this reasoning, lack of knowledge appeared to have a bigger influence on not using occupational therapy research than did the reported problem that occupational therapy journal articles did not apply to hand therapy practice. Also supporting this conclusion was the data collected in the solutions to barriers section. Respondents reported a desire to obtain more education in research methodology.

Lack of knowledge could be a result of educational training. When asked for the highest degree obtained, the majority of respondents, 113 (73.4%) reported obtaining a bachelor’s degree. Bachelor OT programs did not usually emphasize research in the curriculum. Even if the bachelor’s OT programs did teach research skills, the information gained approximately 11 to 22 years ago might have been forgotten, especially if not used.

Next, respondents were asked about research participation. One half of the respondents that reported participating in research did so at a low level. Of the 76 who responded, 57 (75%) reported participating in 1 to 3 studies. When compared to the mean years of occupational practice (about 16-17 years), research participation equated to approximately once every five years at best. Many of the respondents who had no research experience since graduation reported interest in performing research in the future, 61 (82.4%). Not only was there a need for more research participation, but an overwhelming desire to engage in the research process.

Roth et al. (1996) stated that several respondents in the 1985 and 1994 role-delineation surveys reported that they did not participate in research studies and were
not trained in research design. These researchers assumed that because CHTs were held accountable for proving that the services they provided were responsible for patient improvement, CHTs would be driven to take actions to increase their understanding and skill in research techniques. This assumption was not supported by the data presented in this study. OT, CHTs were interested in participating in research, as noted above, but still believed they needed guidance and education in research methodologies, as noted below. Thus, being held accountable for proving treatment planning lead to patient improvement was not enough incentive to engage in learning opportunities on research design.

Respondents were asked to indicate what initiatives would help facilitate participation in the research process. Respondents reported that a variety of initiatives would assist them with research participation as shown by the data. Many respondents, 73 (47.4%), reported that continuing education credits for research participation would be helpful. Alsop (1997) contended that professional development was normally part of performance reviews, and managers could support research skill development under the guidance of academic staff while research was performed at work. The ASHT developed the "Read and Respond Program" on the Internet where individuals who registered for the program, read selected articles from Journal of Hand Therapy, and answered 80% of the questions on the articles correctly, earned continuing education credits (American Society of Hand Therapists: The read and respond program, 1999).

Having personnel available locally to answer research questions was another solution favored by respondent data, 68 (44.2%). In the "other" category, 4 respondents suggested having consultants available to set up statistical tests and data analysis. This data supported findings in Dubouloz et al. (1999) and Brown and Rodger (1999) that accessibility to clinical experts or clinicians experienced in research would assist practitioners with engaging in the research process.
A third solution noted was establishing Web sites linking practitioners interested in learning more about research with faculty advisors, 61 (39.6%). AOTA established a research listserv just recently where interested clinicians could subscribe via e-mail to join in discussions of current research, brainstorm research ideas, and facilitate networking among academic and clinical researchers ("New Research Listserv for OTs", 1999). A fourth solution noted by some respondents was developing on-line courses on research methodology, 54 (35.1%). A point worth noting was despite non-use of the Web based survey format, many respondents believed that Internet based opportunities would assist them with research participation. There appeared to be a genuine interest in Internet usage given an appropriate learning incentive, but whether or not Web based solutions would be effective at increasing research participation remained uncertain given their non-use of the Internet.

Two solutions provided by respondents in the "other" category were supported in the literature and related to the greatest perceived barrier, time. Many believed that having more time at work for research participation (19) and having support and encouragement from management (7) would be beneficial. Brown and Rodger (1999) suggested management establish protected work-time for clinicians to conduct research studies, while Eakin (1997) thought managerial support was important for fostering research integration.

Content criterion for these solutions must be addressed. If these solutions are to truly work by increasing consumption of occupational therapy literature and use of occupation in hand therapy practice, content of the solutions must be geared to the benefits and use of occupation. This means that a shift in OT, CHTs beliefs about the value of using occupation in hand therapy practice must also occur. Only when OT, CHTs consistently use occupation in practice and consume occupational therapy literature will the solutions be considered effective.
Internet/Computer Use

The last section of this questionnaire focused on Internet and computer use. Respondents were asked if they had access to a computer and the Internet. Most respondents reported having access to a computer at home or work, 148 (96.7%). Likewise, King and Walsh (1990) found that 82% of ASHT respondents had access to computers within their clinical practice. Most of the respondents reported having Internet access, 144 (95.4%). As described briefly in the above demographic section, respondents did not spend a lot of time on the internet. Of the 145 who replied, 105 (72.4%) spent four hours or less on the Internet per week. Kaye and Johnson (1999) found that the typical Internet user spent an average of 13.2 hours on the Web. OT, CHT respondents were not typical Internet users in spite of having computer and Internet access.

The last question of the study pertained to reasons for selecting either the paper or WWW survey format. Almost all of the respondents, 98.7%, replied by mail. Many respondents, 68.8%, found it was faster to write out responses than to log on to the Internet. This data confirmed Kaye and Johnson (1999) findings that given the same questionnaire, it took longer to fill out the Web version than to fill out the paper version. However, to the contrary, both the Web respondents reported that it was faster to complete the Web version than filling out the paper survey. Data gathered in the “other” category related to the issue of time. Limited computer/Internet access was noted by 22 respondents and 3 respondents believed that they would procrastinate if they waited to reply the Web. If access was limited, respondents would have to wait, or procrastinate in order to fill out the Web based version. Other respondents (6) wrote that using the paper format allowed them to complete two tasks at once which would make for more efficient use of time. This type of activity has been called multi-tasking or described in occupational science literature “enfolding” one occupation into another. Bateson (1996)
explained that women were able to perform a variety of tasks at the same time or in an "enfolded manner." Enfolding one occupation into another allowed for efficient use of time. An example of enfolded occupations from the collected data was that a respondent was able to fill out the paper questionnaire while supervising.

Other findings from this study were related to WWW literature. Only 22.7% found the paper format to be more confidential than the Web format. This data was related to findings of Hilsden, Meddings, & Verhoef (1999) and Joinson (1999) suggesting that WWW survey respondents were more likely to answer honestly. If respondents were more likely to answer more honestly, their perceived confidentially of the Web must be satisfactory. In this study, lack of confidentially on the Web format was not perceived as a major reason for respondents' selections of the paper format. No technical difficulties related to Web programming were reported, only those technical difficulties related to personal computers were noted. Stanton (1998) and Soetiikno et al. (1997) found that Web survey responses had less missing data than traditional paper survey responses. Although the comparison was skewed, both the Web respondents answered all questions and some paper respondents skipped questions or in one case the last page of the paper survey.

**Application of Findings**

Data obtained in this study had direct application to the field of hand therapy. In order for occupational therapy to progress as a profession, occupational therapists in hand therapy practice, as well as other areas of occupational therapy, needed to utilize occupational therapy research to provide current and best practice. Eakin (1997) reported on a research strategy developed by the College of Occupational Therapists' (COT's) Research and Development Committee. Eakin (1997) described occupational therapists within this strategy as (a) research consumers (all occupational therapists); (b) research participants (a substantial number); and (c) proactive researchers (a limited
number). The American Occupational Therapy Foundation (AOTF) published a more complex version of this idea in “Research Competencies for Occupational Therapy” (http://www.aotf.org/html/research_competencies_for_occu.html). However, these two initiatives along with models of research utilization presented in Brown and Rodger (1999) appeared to have “missed the boat” per se. Research utilization literature along with data presented in this study confirmed that lack of time to search for and evaluate research and lack of knowledge or difficulty with interpreting findings were barriers to utilizing occupational therapy research. If OT, CHTs did not have the time or knowledge to evaluate research, how were they to apply it and become consumers of occupational therapy research? Alsop (1997) argued that opportunities to develop research skills and participate in evidence-based practice were needed for practitioners at all career levels to become research consumers.

OT, CHT respondents identified many initiatives that would assist them in participating in the research process. The top four solutions were receiving continuing education credits for participating in research, having research personnel available locally to answer questions, establishing Web sites to link clinicians with faculty, and establishing on-line methods courses. It would behoove the AOTA to establish programming to assist the OT, CHTs in utilizing occupational therapy research. In the process, the AOTA could possibly recapture the 50% or so of the OT, CHTs who were not AOTA members and educate them on the benefits of using occupation in treatment. This would also assist with the advancement of practice and a unified professional identity. Management must also assist in this process. OT, CHTs needed managerial support and time set aside to consume current research and improve practice. Occupational therapy schools could offer assistance to local OT, CHTs by providing faculty members as research consultants and providing opportunities for continuing education courses on research methodology. Above all, occupational therapy programs
must include education on research methodology to assure that occupational therapy practitioners have the skills needed to advance the profession in the future. Not all occupational therapists have to perform research, but they all must be consumers of occupational therapy research to provide “best practice.”

The need to justify treatment efficacy was not shown to be enough incentive to stimulate OT, CHTs’ participation in initiatives to increase knowledge in research design and methodologies. Receiving CEUs for research participation in research was noted as a possible solution to increase research participation, but in what type of research would OT, CHTs participate? Would research be based on occupation or would it be based on prevailing hand therapy practice? Perhaps the National Board for Certification in Occupational Therapy, Inc. (NBCOT) could begin to require re-certification for all occupational therapists. In this re-certification process, the NBCOT could require OTs to engage in occupation based continuing education courses in research methodology and provide sample therapy notes to prove they were indeed using occupation in treatment. Because OT, CHTs must be registered occupational therapists in order to maintain their CHT status, they would fall under these requirements.

**Limitations**

Two limitations were perceived in this study. One, question 9 in the instrument should have included examples for each source of clinical reasoning. A few respondents questioned the meanings of the options provided. Therefore, it was difficult to assess with confidence that sources shared the same meaning for all respondents and could affect the validity of the results on perceived importance of clinical reasoning sources. Two, question 11 in the instrument asked for the number of occupational therapy journal article read in 1999. Some respondents made distinctions between occupational therapy journals and journals such as *Journal of Hand Therapy* or *Journal of Hand Surgery*. In this study, these journals were not considered as occupational
therapy journals. Question 11 should have specifically stated not to include these journals in the answer. If respondents included these journals in their answers, the number of occupational therapy journal articles read would have been lower. Question 12 also relied on interpretation of question 11. If non-occupational therapy journal articles were included, integration could have been lower also. Question 11 must be interpreted as “perceptions” of occupational therapy research.

Suggestions for Further Research/Modifications

A few questions appeared during this study. One question was on the importance of “client interest” as a source in the clinical reasoning process. If OT, CHTs were not using occupation, how were they incorporating “client interest” into hand therapy practice? Did the OT, CHTs systematically identify clients’ interests using assessments such as the Canadian Occupational Performance Measure (COPM) or Interest Check List or did they just engage in conversation on the clients’ interests. Future research could be performed on the frequency of occupation use among OT, CHTs and how they incorporated client interest into hand therapy practice. Researchers could also ask why OT, CHTs were/were not using occupation in hand therapy practice.

WWW literature suggested that Internet surveys were effective. In this population, WWW survey research was not effective. OT, CHT respondents had all the characteristics of the typical Internet user except one, gender. The OT, CHTs were mostly women. Was gender a factor in the failure of this survey technique? Could it possibly be related to division of household labor? Many women worked a double shift. They worked all day, came home, and then started the double shift of taking care of children and perform household occupations. Was lack of free time a factor in this failure? Another possible factor was type of profession. OT, CHTs interact with patients, not computers, for most of the day. Do individuals who spend their work day on computers tend to use the Internet more often? Maybe the factor was that the WWW
survey design was before its time and as OT, CHTs gain more access to computers and
the Internet, WWW survey design would be effective in a few years. Would WWW
survey design work in other healthcare professions? Research could be performed on
effectiveness of WWW survey design in other healthcare populations to identify whether
or not this outcome was unique to this population or common among healthcare
providers. Researcher could perform a WWW VS paper survey design to compare
results to this study or only perform a WWW survey design to see effects of not offering
a survey choice.

A follow up study on research utilization with this population would be beneficial.
Possible solutions to overcome barriers to research utilization were presented. It would
be interesting to identify how often OT, CHTs utilize occupational therapy research once
solutions had been implemented by managers, educational institutions, and occupational
therapy professional organizations. Were these solutions indeed helpful at increasing
occupational therapy research utilization and research participation?

Modifications to the survey instrument and survey design would increase validity.
One modification as noted previously was providing examples of sources listed in clinical
reasoning. A second modification was to specifically write "do not include Journal of
Hand Therapy" and other types of journals that could be misleading in the instructions of
question 11 and 12. A pilot study using local OT, CHTs would identify other
misconceptions or questions in the instrument before sending to the sample.

Conclusion/Summary

The primary purpose of this study was to identify how often occupational
therapists as certified hand therapists (OT, CHTs) read, integrated, and participated in
occupational therapy research, and barriers and solutions to utilizing occupational
therapy research. The secondary purpose was to discover if WWW survey design was
an effective research tool to use with the OT, CHT population. Data from this study
suggested that OT, CHTs read occupational therapy journals articles at a variety of levels, but little of this research was integrated into hand therapy practice. Half of the respondents reported participating in research and those who did not participate were interested in participating in the future. Perceived barriers to utilizing occupational therapy research included lack of time to search for, read, interpret, and evaluate research; research presented in journal articles was not applicable to clinical intervention; and lack of knowledge or difficulty with interpreting and evaluating research findings. Solutions thought to be most helpful in facilitating research participation included receiving continuing education credits for participating in research projects; having access to local personnel to answer research questions; establishing Web sites linking practitioners interested in learning more about research with faculty advisors; and creating on-line courses on research methodology. WWW survey design was not effective in this population: Of the 154 respondents, 2 replied by WWW.

This study showed that OT, CHTs were not integrating occupational therapy journal articles into practice. Research on the benefits of occupation was presented in occupational therapy journals. Lack of occupational therapy research utilization could account for the lack of occupation use in treatment planning. Use of occupation had been shown to increase repetitions, heart rate, and range of motion; produce improved quality of motions; and enhanced motor learning when compared with rote exercise use. OT, CHTs needed to utilize occupational therapy research to provide the most current and best practice. In order for this to occur, the occupational therapy profession needed to support the OT, CHTs and provide opportunities to develop research utilization skills at all career levels.
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APPENDIX A

PAPER AND WEB QUESTIONNAIRES
Research Utilization in Hand Therapy Practice

Listed below are questions concerning your experience using research in your practice. Please indicate your response to each question by filling in the appropriate boxes.

Q1. What is your gender? □ MALE □ FEMALE

Q2. Which state do you reside?

□ AK □ AL □ AR □ AZ □ CA □ CO □ CT □ DC □ DE □ FL □ GA
□ HI □ IA □ ID □ IL □ IN □ KS □ KY □ LA □ MA □ MD □ ME
□ MI □ MN □ MO □ MS □ MT □ NC □ ND □ NE □ NH □ NJ □ NM
□ NV □ NY □ OH □ OK □ OR □ PA □ RI □ SC □ SD □ TN □ TX
□ UT □ VA □ VT □ WA □ WI □ WV □ WY

Q3. What is your household income?

□ LESS THAN $5,000. □ $5,000 TO $9,999.
□ $10,000 TO $14,999. □ $15,000 TO $24,999.
□ $25,000 TO $34,999. □ $35,000 TO $49,999.
□ $50,000 TO $74,999. □ $75,000 TO $99,999.
□ $100,000 TO $149,999. □ $150,000 OR MORE.

Q4. What is the highest degree you have obtained?

□ BACHELOR'S □ MASTER'S □ DOCTORATE

Q5. How many years have you been registered or licensed as an occupational therapist?

□ FEWER THAN 5 YEARS □ 5 TO 7 YEARS □ 8 TO 10 YEARS
□ 11 TO 13 YEARS □ 14 TO 16 YEARS □ 17 TO 19 YEARS
□ 20 TO 22 YEARS □ 23 TO 25 YEARS □ MORE THAN 25 YEARS

Q6. What year were you certified as a certified hand therapist (CHT)?

□ 1997 □ 1998 □ 1999
Q7. Which of the following best describes the facility in which you work?

□ HOSPITAL-BASED PRACTICE (INPATIENT)
□ HOSPITAL-BASED PRACTICE (OUTPATIENT)
□ THERAPIST-OWNED PRACTICE
□ PHYSICIAN-OWNED PRACTICE
□ CORPORATE OWNED PRACTICE
□ HEALTH MAINTENANCE ORGANIZATION
□ OTHER (PLEASE SPECIFY)______________________________

Q8. What professional organizations do you belong? Check all that apply.

□ ASHT
□ AOTA
□ YOUR STATE OCCUPATIONAL THERAPY ASSOCIATION
□ YOUR LOCAL OCCUPATIONAL THERAPY ASSOCIATION
□ OTHER (PLEASE SPECIFY)______________________________
□ OTHER (PLEASE SPECIFY)______________________________

Q9. Listed below are sources clinicians may use to select plans of care/treatment for their clients. Please indicate whether you feel each source is NOT IMPORTANT, SOMEWHAT IMPORTANT, OR VERY IMPORTANT in formulating your plans of care.

A. CLIENT'S INTERESTS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

B. DIAGNOSIS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

C. BOOKS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

D. CLINICAL EXPERIENCE □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

E. EDUCATION □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

F. THEORY/FRAMES OF REFERENCE □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

G. AVAILABLE RESOURCES □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

H. SCIENTIFIC JOURNALS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

I. PROTOCOLS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

J. PEERS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

K. OTHER (please specify) □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT

K. OTHER (please specify) □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
Q10. Of the possible sources listed in Q9, which do you feel are most important for treatment selection. Please write the source letter from Q9 in the appropriate box.

☐ MOST IMPORTANT  ☐ 2ND MOST IMPORTANT  ☐ 3RD MOST IMPORTANT

Q11. How many occupational therapy journal articles did you read in 1999 (e.g. AJOT, CJOT, Occupational Therapy in Health Care, etc.)?

☐ NO JOURNAL ARTICLES READ
☐ 1 TO 4
☐ 5 TO 8
☐ 9 TO 12
☐ 13 OR MORE JOURNAL ARTICLES READ

Q12. Of those journal articles read in 1999, how many did you apply/integrate into practice?

☐ ZERO, NO JOURNAL ARTICLES WERE INTEGRATED INTO PRACTICE.
☐ 1 TO 4
☐ 5 TO 8
☐ 9 TO 12.
☐ 13 OR MORE JOURNAL ARTICLES WERE INTEGRATED INTO PRACTICE.

Q13. What do you feel are barriers to integrating occupational therapy research into practice? Check all that apply.

☐ LACK OF KNOWLEDGE/DIFFICULTY IN INTERPRETING AND EVALUATING RESEARCH FINDINGS.
☐ DIFFICULTY ACCESSING RESEARCH LITERATURE.
☐ SUGGESTING CHANGE IN TREATMENT MAY BE THREATENING TO OTHER TEAM MEMBERS.
☐ INSTITUTIONAL BARRIERS TO CHANGING CURRENT CLINICAL PRACTICE.
☐ LACK OF RESOURCES SUCH AS SUPPLIES OR PERSONNEL.
☐ LACK OF TIME TO SEARCH FOR, READ, INTERPRET, AND EVALUATE RESEARCH.
☐ RESEARCH PRESENTED IN JOURNAL ARTICLES WAS NOT APPLICABLE TO CLINICAL INTERVENTION.
☐ SPECIFIC PROTOCOLS ORDERED BY REFERRING PHYSICIANS.

Q14.A. Other than research required for degree completion, have you participated in any research studies since graduation?

☐ YES  ☐ NO

Q14.B. If "YES," how many research studies?

☐ 1  ☐ 2  ☐ 3  ☐ 4  ☐ 5
☐ 6  ☐ 7  ☐ 8  ☐ 9  ☐ 10
☐ 11 OR MORE
Q14.C. If "NO," would you be interested in participating in research studies in the future?

☐ YES  ☐ NO

Q15. Please indicate which of the following would help facilitate your participation in the research process? Check all that apply.

☐ PERSONNEL AVAILABLE LOCALLY TO ANSWER RESEARCH QUESTIONS.
☐ CONTINUING EDUCATION CREDITS FOR PARTICIPATING IN RESEARCH PROJECTS.
☐ ON-LINE COURSES ON RESEARCH METHODOLOGY.
☐ WEB SITES LINKING PRACTITIONERS INTERESTED IN LEARNING MORE ABOUT RESEARCH WITH FACULTY ADVISORS.
☐ WORKING WITH MASTER'S CANDIDATES ON RESEARCH PROJECTS.
☐ FORMATION OF GROUPS TO DISCUSS JOURNAL ARTICLES.
☐ OTHER (PLEASE DESCRIBE)__________________________________________
☐ OTHER (PLEASE DESCRIBE)__________________________________________

Q16.A. Do you have access to a computer, either at work or home?

☐ YES  ☐ NO

Q16.B. If "YES," do you have Internet access?

☐ YES  ☐ NO

Q17. If you have Internet access, how many hours per week do you log on to the Internet?

☐ 0 TO 1 HOUR PER WEEK.
☐ 2 TO 4
☐ 5 TO 6
☐ 7 TO 9
☐ 10 TO 20
☐ 21 TO 40
☐ OVER 40 HOURS PER WEEK.

Q18. Why did you respond using the mail survey as opposed to the Web site? Check all that apply.

☐ IT WAS FASTER TO WRITE OUT MY RESPONSES THAN TO LOG ONTO THE INTERNET.
☐ I FELT THAT THE MAIL SURVEY WAS MORE CONFIDENTIAL.
☐ I DO NOT USE THE COMPUTER.
☐ I HAD TECHNICAL DIFFICULTIES.
(PLEASE SPECIFY)______________________________________________
☐ OTHER (PLEASE SPECIFY)________________________________________
Research Utilization in Hand Therapy Practice

Listed below are questions concerning your experience, in your practice, using research. Please indicate your response to each question by clicking on the appropriate boxes with your mouse.

Q1. What is your gender? □ MALE □ FEMALE

Q2. Which state do you reside?
□ AK □ AL □ AR □ AZ □ CA □ CO □ CT □ DC □ DE □ FL □ GA
□ HI □ IA □ ID □ IL □ IN □ KS □ KY □ LA □ MA □ MD □ ME
□ MI □ MN □ MO □ MS □ MT □ NC □ ND □ NE □ NH □ NJ □ NM
□ NV □ NY □ OH □ OK □ OR □ PA □ RI □ SC □ SD □ TN □ TX
□ UT □ VA □ VT □ WA □ WI □ WV □ WY

Q3. What is your household income?
□ LESS THAN $5,000.
□ $5,000 TO $9,999.
□ $10,000 TO $14,999.
□ $15,000 TO $24,999.
□ $25,000 TO $34,999.
□ $35,000 TO $49,999.
□ $50,000 TO $74,999.
□ $75,000 TO $99,999.
□ $100,000 TO $149,999.
□ $150,000 OR MORE.

Q4. What is the highest degree you have obtained?
□ BACHELOR’S □ MASTER’S □ DOCTORATE

Q5. How many years have you been registered or licensed as an occupational therapist?
□ FEWER THAN 5 YEARS □ 5 TO 7 YEARS □ 8 TO 10 YEARS
□ 11 TO 13 YEARS □ 14 TO 16 YEARS □ 17 TO 19 YEARS
□ 20 TO 22 YEARS □ 23 TO 25 YEARS □ MORE THAN 25 YEARS

Q6. What year were you certified as a certified hand therapist (CHT)?
□ 1997 □ 1998 □ 1999
Q7. Which of the following best describes the facility in which you work?

□ HOSPITAL-BASED PRACTICE (INPATIENT)
□ HOSPITAL-BASED PRACTICE (OUTPATIENT)
□ THERAPIST-OWNED PRACTICE
□ PHYSICIAN-OWNED PRACTICE
□ CORPORATE OWNED PRACTICE
□ HEALTH MAINTENANCE ORGANIZATION
□ OTHER (PLEASE SPECIFY)______________________________

Q8. What professional organizations do you belong?

□ ASHT
□ AOTA
□ YOUR STATE OCCUPATIONAL THERAPY ASSOCIATION
□ YOUR LOCAL OCCUPATIONAL THERAPY ASSOCIATION
□ OTHER (PLEASE SPECIFY)______________________________
□ OTHER (PLEASE SPECIFY)______________________________

Q9. Listed below are sources clinicians may use to select plans of care/treatment for their clients. Please indicate whether you feel each source is NOT IMPORTANT, SOMewhat IMPORTANT, OR VERY IMPORTANT in formulating your plans of care.

A. CLIENT'S INTERESTS  □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
B. DIAGNOSIS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
C. BOOKS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
D. CLINICAL EXPERIENCE □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
E. EDUCATION □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
G. THEORY/FRAMES OF REFERENCE □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
G. AVAILABLE RESOURCES □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
H. SCIENTIFIC JOURNALS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
I. PROTOCOLS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
J. PEERS □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
L. OTHER (please specify)______________________________ □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
L. OTHER (please specify)______________________________ □ NOT IMPORTANT □ SOMEWHAT IMPORTANT □ VERY IMPORTANT
Q10. Of the possible sources listed in Q9, which do you feel are most important for treatment selection. Please write the source letter from Q9 in the appropriate box.

☐ MOST IMPORTANT ☐ 2ND MOST IMPORTANT ☐ 3RD MOST IMPORTANT

Q11. How many occupational therapy journal articles did you read in 1999 (e.g. AJOT, CJOT, Occupational Therapy in Health Care, etc.)?

- NO JOURNAL ARTICLES READ
- 1 TO 4
- 5 TO 8
- 9 TO 12
- 13 OR MORE JOURNAL ARTICLES READ

Q12. Of those journal articles read in 1999, how many did you apply/integrate into practice?

- ZERO, NO JOURNAL ARTICLES WERE INTEGRATED INTO PRACTICE.
- 1 TO 4
- 5 TO 8
- 9 TO 12
- 13 OR MORE JOURNAL ARTICLES WERE INTEGRATED INTO PRACTICE.

Q13. What do you feel are barriers to integrating occupational therapy research into practice? Check all that apply.

- LACK OF KNOWLEDGE/DIFFICULTY IN INTERPRETING AND EVALUATING RESEARCH FINDINGS.
- DIFFICULTY ACCESSING RESEARCH LITERATURE.
- SUGGESTING CHANGE IN TREATMENT MAY BE THREATENING TO OTHER TEAM MEMBERS.
- INSTITUTIONAL BARRIERS TO CHANGING CURRENT CLINICAL PRACTICE.
- LACK OF RESOURCES SUCH AS SUPPLIES OR PERSONNEL.
- LACK OF TIME TO SEARCH FOR, READ, INTERPRET, AND EVALUATE RESEARCH.
- RESEARCH PRESENTED IN JOURNAL ARTICLES WAS NOT APPLICABLE TO CLINICAL INTERVENTION.
- SPECIFIC PROTOCOLS ORDERED BY REFERRING PHYSICIANS.

Q14.A. Other than research required for degree completion, have you participated in any research studies since graduation?

☐ YES ☐ NO

Q14.B. If "YES," how many research studies?

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11 OR MORE
Q14.C. If "NO," would you be interested in participating in research studies in the future?

☐ YES  ☐ NO

Q15. Please indicate which of the following would help facilitate your participation in the research process?

☐ PERSONNEL AVAILABLE LOCALLY TO ANSWER RESEARCH QUESTIONS.
☐ CONTINUING EDUCATION CREDITS FOR PARTICIPATING IN RESEARCH PROJECTS.
☐ ON-LINE COURSES ON RESEARCH METHODOLOGY.
☐ WEB SITES LINKING PRACTITIONERS INTERESTED IN LEARNING MORE ABOUT RESEARCH WITH FACULTY ADVISORS.
☐ WORKING WITH MASTER'S CANDIDATES ON RESEARCH PROJECTS.
☐ FORMATION OF GROUPS TO DISCUSS JOURNAL ARTICLES.
☐ OTHER (PLEASE DESCRIBE)__________________________________________
☐ OTHER (PLEASE DESCRIBE)__________________________________________

Q16.A. Do you have access to a computer, either at work or home?

☐ YES  ☐ NO

Q16.B. If "YES," do you have Internet access?

☐ YES  ☐ NO

Q17. If you have Internet access, how many hours per week do you log on to the Internet?

☐ 0 TO 1 HOUR PER WEEK.
☐ 2 TO 4
☐ 5 TO 6
☐ 7 TO 9
☐ 10 TO 20
☐ 21 TO 40
☐ OVER 40 HOURS PER WEEK.

Q18. Why did you respond using the Web site as opposed to the mail survey?

☐ IT WAS FASTER TO COMPLETE THAN HAND WRITING MY ANSWERS.
☐ I DID NOT HAVE TO MAIL MY RESPONSE.
☐ I FELT THAT THE WEB SURVEY WAS MORE CONFIDENTIAL.
☐ OTHER (PLEASE SPECIFY)_____________________________________________
APPENDIX B

COVER LETTER
Dear Occupational Therapist, CHT:

I am writing to you to request your participation in a survey for my master's thesis. By participating in this research, you will assist in identifying current research use of occupational therapists in hand therapy practice, barriers to reading and using published research, and solutions to overcome these barriers. You may participate in this study by two means: (a) fill out the attached survey and send it to the address on the stamped envelop provided, or (b) complete the survey on the World Wide Web (WWW). Mail survey responses will have greater anonymity than WWW responses due to electronic links. Every action will be taken to maintain confidentiality and electronic links will not be pursued. Source codes for the data collection program will be available to the Web survey user to verify confidentiality: No "cookies" will be collected.

If at any time you have questions regarding your rights as a participant, please contact Paul Huizenga, Human Research Review Committee chairman, Grand Valley State University at (616) 895-2472. Questions regarding the nature of this study can be directed to faculty advisor Cathy Pinson, MA, OTR, School of Health Professions, Grand Valley State University at (616) 895-3356/ pinsonc@gvsu.edu or myself, Amy Heathfield, occupational therapy student at (616) 677-3721/ aheathfield@netscape.net. Consent for participation in this study is achieved by responding to the mail or Web survey.

To access the survey via WWW, log on to the Internet and go to www.gvsu.edu/csis/survey.html. When prompted to enter the password, type MRCARTER in the space provided and mouse click on ENTER. Directions for WWW survey will appear. When the survey is completed, mouse click on SUBMIT. Both the paper and WWW survey take approximately 10 minutes to complete. Please return your survey by April 1, 2000. Results of this study will be made available on June 1, 2000. Parties interested in these results may contact me at the above phone number or e-mail address.

Thank you for your time. Your participation will impact future research in the field of occupational therapy.

Sincerely,

Amy De Maagd Heathfield
Occupational Therapy Student
Grand Valley State University