Increasing knowledge of best practices in occupational therapists treating post-stroke unilateral spatial neglect

Anita Petzold

Department of Physical and Occupational Therapy

Faculty of Medicine, McGill University, Montreal, Quebec

October 2010

A thesis submitted to McGill University in partial fulfillment of the requirements of the degree of Master of Science

ABSTRACT

A significant gap exists between evidence-based practice (EBP) and actual occupational therapy practice in the management of a disabling post-stroke impairment - unilateral spatial neglect (USN). With improved patient outcomes linked to the use of best practices, it is crucial to modify clinicians' actual practices in stroke care. To date, no research study has used knowledge translation (KT) to increase knowledge of EBP specific to occupational therapists managing post-stroke USN.

The first manuscript of this thesis explores how the "Knowledge to Action Process" model developed by Graham and colleagues (2006), can be used as a step by step guide in creating an effective KT intervention for occupational therapists working in acute stroke care. It describes how previous research has already addressed the "Knowledge Creation" domain of the model through the creation of *synthesized materials* and *knowledge tools*. Examples of these include review articles and an online website – www.strokengine.ca – where clinicians can quickly obtain synthesized information on best practice stroke assessment and treatment. It then goes on to describe how the first two steps of the "Action Cycle" domain have also been addressed; the main problem between EBP and actual practice has been identified and the evidence on best practice USN management has been adapted for the acute care setting. The subsequent two steps that have not yet been addressed include *assessing barriers to knowledge use* and *implementing an intervention*. The Knowledge to Action Process model stresses that in order for a KT intervention to be effective in changing clinician practices, the facilitators and barriers faced by clinicians treating a specific clientele, in a specific type of setting, need to be identified.

A few studies have assessed the barriers and facilitators to using EBP in rehabilitation clinicians; however none are specific to occupational therapists treating post-stroke USN. Thus, the objectives of the second manuscript were twofold: Phase 1) to identify the barriers and facilitators that affect EBP use by acute care occupational therapists treating individuals with post-stroke USN; and Phase 2) to create, to pilot test, to evaluate the feasibility and to conduct preliminary analyses of effectiveness of a multi-modal KT intervention geared towards increasing EBP knowledge acquisition and self-efficacy for USN assessment and treatment. A sub-objective was to conduct preliminary analyses of the association between potential explanatory variables and change in knowledge acquisition and EBP self-efficacy.

In the first phase, two focus groups (n=9) were held where acute care occupational therapists treating patients with stroke discussed the barriers and facilitators to EBP use faced in practice. Key barriers included lack of time and basic EBP skills, and lack of personal motivation to change current practices and habits. Key identified facilitators included a multidisciplinary stroke team, recent graduation, and having access to learning material and several educational days annually. In the second phase, a multi-modal USN KT intervention was pilot tested on 20 occupational therapists from Quebec and Ontario. Clinicians took part in an 8 week intervention beginning with a 7 hour in-person USN KT training session where clinicians received didactic lectures, participated in practical hands on sessions and were introduced to online resources. This was followed by an 8 week reinforcement period where they continued their learning online. A pre, pre, post assessment of the main outcome - knowledge of best practices in USN problem identification, assessment and treatment, was measured online via the *Knowledge Questionnaire*. The secondary outcome EBP self-efficacy, was assessed using the *EBP Self-Efficacy Scale* immediately prior to and following the in-person training session. All participants improved in

knowledge of EBP USN management and as a group, a statistically significant improvement was achieved. Clinicians improved on all levels of learning including knowledge, comprehension, application, analysis and synthesis. Similarly, significant improvement was found in clinicians' level of EBP self-efficacy following the KT intervention. These results demonstrate that a multi-modal KT intervention based on the Knowledge to Action Process model and identified barriers and facilitators is feasible and effective based on preliminary analysis. However, further investigation of this KT intervention through a randomized control trial is necessary to validate the results on effectiveness obtained in this study.

RÉSUMÉ

Il existe un grand écart entre les données probantes et la pratique actuelle des ergothérapeutes traitant les patients qui ont subi un accident vasculaire cérébral (AVC) et qui sont atteints de la négligence spatiale unilatérale (NSU). Il est très important de modifier les pratiques actuelles de ces cliniciens vu l'amélioration remarquable des symptômes de NSU reliés à l'utilisation des données probantes. À date, il n'existe aucune étude de recherche utilisant l'application des connaissances (ADC) comme moyen d'augmenter les connaissances des données probantes spécifiquement pour ergothérapeutes traitant la NSU.

Le premier manuscrit de cette thèse décrit comment un modèle d'ADC le « Knowledge to Action Process » conçu par Graham et collègues (2006), peut guider le développement d'une ADC efficace pour les ergothérapeutes travaillant avec les patients atteints d'AVC dans un milieu de soins intensifs. Il décrit la façon dont les études de recherches précédentes ont déjà adressés le *domaine de la création des connaissances*. Par exemple, des articles de revues et un site web www.strokengine.ca, ont été créés pour permettre l'accès rapide aux données probantes pour la gestion des patients avec AVC. Le manuscrit poursuit en décrivant comment les deux premières étapes du domaine du *cycle d'actions* ont aussi été adressées. Le problème de l'écart entre les données probantes et la pratique actuelle pour l'NSU a été identifié et les connaissances des données probantes pour ce domaine de pratique ont été adaptées pour le milieu des soins intensifs. Les deux étapes suivantes qui *évaluent les obstacles à l'usage* des données probantes et qui *mettent en œuvre une intervention d'ADC* n'ont pas été adressé à date. Le modèle « Knowledge to Action Process » souligne que l'intervention d'ADC ne pourra être efficace que si les obstacles et facilitateurs vécus par les cliniciens travaillant dans ce domaine sont identifiées.

Il existe aucune étude à date qui identifie les obstacles et facilitateurs à l'utilisation des données probantes pour ergothérapeutes travaillant avec les patients qui ont subi un AVC et sont atteints de la NSU. Les objectifs du deuxième manuscrit sont : Phase 1) d'identifier les obstacles et facilitateurs qui contribuent au manque d'utilisation des données probantes par les ergothérapeutes travaillant en soins aigues avec les patients atteints de la NSU suite à un AVC, et Phase 2) de créer, d'évaluer la plausibilité et d'exécuter des analyses préliminaires d'efficacité d'une intervention d'ADC ayant comme but d'augmenter les connaissances des données probantes et aussi d'auto-efficacité dans l'évaluation et le traitement de l'NSU parmi le même groupe de cliniciens.

Dans la première phase, deux groupes de discussions (n=9) avec ergothérapeutes des soins aigues travaillant avec les individus atteints de NSU suite à un AVC ont eu lieu. Les obstacles les plus importants identifiés par les cliniciens étaient : le manque de temps, le manque d'habileté dans le domaine des données probantes, et le manque de motivation personnelle à changer leur pratique actuelle. Les facilitateurs dominants étaient : avoir une équipe de AVC composée de différentes disciplines, ayant terminée les études récemment et ayant accès aux matériaux d'apprentissages et journées de formation annuellement. Dans la deuxième phase, une intervention d'ADC a été mise à l'essai sur 20 ergothérapeutes provenant des provinces de Québec et de l'Ontario. L'intervention composée de huit semaines a commencé avec une formation de sept heures où les cliniciens ont reçu des cours éducatifs, ont participé à des sessions d'évaluations et de traitements pratiques, et ont été introduits aux ressources sur l'internet. Cette journée a été suivie par huit semaines de renforcement où les cliniciens ont continué leur apprentissage sur l'internet. Deux évaluations préliminaires et une ultérieure des résultats principaux – les connaissances des données probantes pour l'identification du problème,

l’évaluation et traitement pour l’NSU ont été mesurés à travers le « Knowledge Questionnaire » répondu sur l’internet. Le deuxième résultat - d'auto-efficacité pour utiliser les données probantes a été évalué en utilisant le « EBP Self-Efficacy Questionnaire ». Les résultats ont démontré que tous les ergothérapeutes ont amélioré leurs connaissances de la gestion de la NSU et en tant que groupe, une amélioration significative a été atteinte. Les cliniciens impliqués se sont améliorés à tous les niveaux d’apprentissages : les connaissances, la compréhension, l’application, l’analyse et la synthèse. De même, une amélioration significative a été remarquée au niveau d'auto-efficacité pour l’utilisation des données probantes. Ces résultats démontrent qu’une intervention d’ADC basée sur le « Knowledge to Action Process » est réalisable et basée sur l’analyse préliminaire est aussi efficace. Cependant, un essai de contrôle randomisé est requis pour valider les résultats obtenus ici sur l’efficacité de l’intervention d’ADC.

ACKNOWLEDGEMENTS

This has been a wonderful journey and I would like to thank all those involved for your contribution to making this thesis possible. Without you, I would not be where I am today.

I would like to begin by expressing my deepest appreciation to my supervisor Dr. Nicol Korner-Bitensky. You have offered me invaluable support, expertise and guidance throughout this process. You have always been patient, offered encouragement when I needed it most and have pushed me to become the best that I can be as a researcher and clinician. You have truly been an outstanding mentor and I am deeply indebted to you for all you have done.

I would also like to acknowledge the generous help and support received from the members of my supervisory committee: Dr. Nancy Salbach, Dr. Sara Ahmed, Anita Menon and Tatiana Ogourtsova. To each one I express my sincerest gratitude, not only for their generous contribution of time, but also for their expertise and support.

My thesis project was funded by an Edith Strauss Knowledge Translation grant awarded by the School of Physical and Occupational Therapy. Personal funding was received from the Fonds de la recherche en santé du Québec, from the Canadian Occupational Therapy Foundation and from a Patricia Wells Van daele Award. I would like to express my gratitude for this financial support.

My "thank-yous" would be incomplete without thanking my family and friends for all their moral support. To my husband Ivan, thank you for your unconditional love, continual support and for always believing in me. To my parents Kay and Horst, I cannot thank you enough for your love and encouragement, your dedication, and continual support throughout my educational journey. Finally, I would like to thank Skye, Tamara and Julie for their invaluable friendship and for making graduate studies an awesome experience.

CONTRIBUTION OF AUTHORS

The first manuscript of this thesis entitled "Using the Knowledge to Action Process model to incite clinical change", was accepted for publication in the Journal for Continuing Education for the Health Professions, 2010; 33(3):167–171. It was written by me with suggestions and guidance by Dr. Nicol Korner-Bitensky. As a co-author, Anita Menon provided us with insightful suggestions and helped with the content and structure of the manuscript.

The second manuscript entitled "Increasing the use of best practices amongst occupational therapists treating post-stroke unilateral spatial neglect" was written by me with guidance from Dr. Nicol Korner-Bitensky. It is being prepared for journal submission. Co-authors Dr. Nancy Salbach, Dr. Sara Ahmed, Anita Menon and Tatiana Ogourtsova gave us valuable insights into the content and presentation of the manuscript. A questionnaire developed by Dr. Nancy Salbach was used in this study to collect information on explanatory variables and the secondary outcome. I developed the consent forms, submitted the study for ethics approval and developed the content for the KT intervention with assistance from Dr. Nicol Korner-Bitensky. I recruited all participants, collected all data, and analyzed the data under the supervision of Dr. Korner-Bitensky. The day-long USN KT intervention was created and offered to participants by the first author Anita Petzold, with help from Dr. Korner-Bitensky, Anita Menon and Tatiana Ogourtsova.

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PREFACE

This thesis consists of a collection of two manuscripts as described earlier. As per McGill University requirements, these papers have a cohesive, unitary character making them a report of a single program of research. The first manuscript has been accepted for publication. The second manuscript presents the results of a two phase study completed by the candidate and is being prepared for submission to a scientific journal. The Graduate and Postgraduate Studies at McGill University require that the thesis incorporates a literature review and conclusion that is separate from that included in the manuscripts. Thus, it is unavoidable to have material duplication in this report. Anita Petzold wrote this thesis with guidance and editing by Dr. Nicol Korner-Bitensky.

This thesis contains eight chapters. Chapter 1 provides an introduction to the gap that exists between best practices and actual practices in stroke rehabilitation as well as describes knowledge translation in that field. Chapter 2 is a literature review that covers an introduction to knowledge translation, knowledge translation strategies previously tested on occupational therapists, knowledge translation strategies previously tested on physical therapists as well as the barriers and facilitators affecting EBP use. Chapter 3 enumerates the thesis objectives. Chapter 4 consists of the first manuscript entitled: Using the Knowledge to Action Process model to incite clinical change. Here readers are shown how this knowledge translation model can be practically applied in the clinical setting, more specifically, to improve knowledge of USN EBP in stroke rehabilitation. Chapter 5 summarizes the first manuscript and provides a rational for the second manuscript. It is followed by Chapter 6 which contains the second manuscript that describes the multi-phased second study entitled: Increasing knowledge of best practices in occupational therapists treating post-stroke unilateral spatial neglect: A pilot study. Chapter 7 summarizes the findings of both manuscripts and Chapter 8 concludes both manuscripts.

1. INTRODUCTION

Stroke is a leading cause of long-term disability worldwide. According to the World Health Organization, 15 million people worldwide suffer from a stroke each year and of these, 5 million die and another 5 million are permanently disabled[1]. In Canada, more than 50 000 Canadians experience a stroke each year and more than 300 000 are currently living with its effects[2]. For many, stroke sequelae compromise function and participation. A common impairment affecting over 40% of those with stroke is unilateral spatial neglect (USN)[3]. USN is most typically characterized by the inability to orient or respond to stimuli appearing on the contralateral side of the brain lesion[4]. There are three types of USN: 1) personal neglect where one side of the body is neglected, 2) near extrapersonal neglect where the environment within reaching distance is neglected and 3) far extrapersonal neglect where the space beyond reaching distance is neglected[4]. Clinical signs of USN include but are not limited to: shaving or applying make-up to only one side of the face, ignoring food on one side of the plate and collisions with objects in the environment[5]. USN is serious in that it is associated with an increased risk for falls and related injuries, longer rehabilitation, and poorer functional recovery[3].

Despite the abundance of assessment tools[5] and the growing research evidence on effective USN interventions[6,7], many clinicians fail to implement standardized tools and treatment methods when dealing with patients with USN. Indeed, a large cross Canada survey on clinicians' practices by Menon-Nair et al.[8] revealed that less than 30% of Canadian occupational therapists working in in-patient stroke rehabilitation employed best practice assessment use for USN, and only 58% offered any USN interventions. Similarly, in another multi-centered study by the same author (2008)[9], only 13% of patients in acute care hospitals with post-stroke USN were actually assessed with a standardized USN assessment. These results highlight the substantial gap

that exists between evidence-based practice (EBP) and current occupational therapy practice in the assessment and treatment of USN post-stroke. Knowledge translation (KT) is a process used to bridge the gap between EBP and current clinician practices. Despite a KT strategy having potential benefits for improving the use of EBP[10-18], it may have differing levels of effectiveness given the barriers and facilitators that clinicians face in adopting EBP[19,20]. The KT literature suggests that personal and organizational factors can act as either barriers or facilitators that directly influence the successful implementation and maintained use of EBP[19,20].

To our knowledge, no existing study has determined the institutional and personal barriers and facilitators to using EBP specific to occupational therapists treating post-stroke USN. Moreover, no study has yet been conducted testing a KT intervention aimed at increasing best practice knowledge specific to acute care stroke clinicians. Therefore, in order to increase the use of best practices amongst occupational therapists treating post-stroke USN, a pilot project was undertaken. The objectives of this thesis were to: 1) describe how the Knowledge to Action Process model[20] could be used as a guide in developing an effective knowledge translation intervention for acute care occupational therapists working in stroke rehabilitation, and 2) Phase 1: to determine the organizational and personal barriers and facilitators that contribute to the use of EBP in occupational therapists treating post-stroke USN and, Phase 2: to create, to pilot test, to evaluate the feasibility, and to perform preliminary analyses regarding the effectiveness of a multi-modal KT intervention geared towards increasing EBP knowledge acquisition and self-efficacy for USN assessment and treatment in occupational therapists managing post-stroke USN. A sub-objective was to conduct preliminary analyses of the association between potential explanatory variables and change in knowledge acquisition and EBP self-efficacy

2. REVIEW OF LITERATURE

2.1 Knowledge Translation

Knowledge translation (KT) is a process that aims to bridge the gap between EBP and current clinician practices. KT can be defined as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the health care system"[21]. Many other terms are use synonymously with KT: knowledge transfer, knowledge exchange, research utilization and implementation. Although they are all closely related, their definitions differ slightly[20]. For the purpose of this literature review, "knowledge translation (KT)" will be used.

Although the concept of KT has been present in the literature for almost two decades, the majority of studies evaluating its effectiveness in the field of rehabilitation have been published very recently. In attempting to create a KT intervention aiming to increase knowledge of EBP in the assessment and treatment of post-stroke USN, it is important to understand the current evidence regarding effective KT strategies.

2.2 Knowledge Translation strategies for occupational therapists

Various studies have explored different KT methods aiming to increase knowledge and use of EBP in occupational therapists treating a variety of clienteles. Unfortunately, there exist no studies that are specific to occupational therapists treating a stroke clientele. KT methods used in these studies include: learning how to effectively search the literature[10], collaboration between the therapists and researchers[11], mentoring[11], collaborative learning groups[12], an EBP training workshop[13] and online active research groups[14].

In the first case study, Bailey and colleagues[10] used an eight step process to integrate EBP into the daily clinical practice of two student-clinicians. Their EBP class project required them to: to: 1) write a case description, 2) include a problem list, 3) write the fictitious client's desired outcomes and goals for therapy, 4) investigate and select a treatment approach, 5) develop a PICO question (where PICO represents Population, Intervention, Comparison and Outcome), 6) conduct a literature search in an online database, 7) identify the levels of evidence specific to the PICO question, and 8) develop a treatment plan. Once in full-time practice, both clinicians found that the EBP steps learned in class made using EBP easier to use in clinical practice. However, no quantitative data on any outcomes were provided.

In the second case study by Tse et al.[11], two different methods of increasing EBP were carried out on occupational therapists from Australia and New Zealand. The first method described a project collaboration between a junior occupational therapist and the local university aimed to facilitate clinical research. Meetings on the progress of the research were held once a month and e-mail was used in between. The junior therapist also received mentoring by the department manager and attended a series of workshops designed to increase EBP. The second

method included the occupational therapist as part of a multi-sectorial collaboration between the Ministry of Education in New Zealand and a multi-disciplinary team that aimed to improve service delivery to children with disabilities. This exposure enabled the development of research skills. Despite the interesting strategies used, their effectiveness remains unknown as to results were published.

In a single subject study by Welch and Dawson[12], qualitative methods were used to determine if collaborative learning groups (CLG) would increase occupational therapists' competence and confidence in using EBP. An initial diagnostic survey was used on 24 occupational therapists from the UK to determine their desire to learn about EBP. From the initial sample, 6 therapists were selected because they indicated a strong desire to develop their EBP skills and identified a preference for CLG. Formative interviews were conducted understand the therapists' perceptions of EBP, identify research development needs and determine the therapists' views on the structure and content of the CLG format. The CLGs met for one and a half hour sessions on a monthly basis over six months. The following themes were covered in these groups: developing research questions, philosophy of research paradigms, qualitative and quantitative research methods. At the conclusion of the CLG sessions, summative interviews were conducted where the researcher revisited the previously collected formative data and evaluated the effectiveness of the CLGs. Data revealed that the therapists indicated feeling more empowered to incorporate propositional knowledge into their clinical reasoning, engage in critical reflection and challenge their practice after participating in the CLGs. Similarly, the occupational therapists felt an increased sense of confidence in incorporating EBP into their continuing professional development plans. Note that no quantitative data were provided.

In the pre-post study by McCluskey and Lovarini[13], the effectiveness of a multifaceted intervention was tested on 114 occupational therapists working with all types of clientele to determine if it improved their EBP knowledge, skills, attitudes and behaviours. All clinicians received a 2-day EBP training workshop consisting of lectures, practical sessions and small group discussions. The following six topics were the focal point of the workshop: the process of EBP, writing focused clinical questions, searching electronic databases, critical appraisal of qualitative and quantitative research, interpreting statistics and, overcoming barriers/making the change to EBP. Therapists were followed-up with regular e-mails, phone calls, a workplace visit as well as an optional assignment. The main outcome was EBP knowledge measured via the Adapted Fresno Test of Evidence-Based Practice[16] (total score 0 to 156). Secondary outcomes included attitude towards EBP assessed by a questionnaire developed from existing questionnaires previously pilot tested on occupational therapists[17] and EBP behaviours measured via an activity diary. All outcomes were measured at baseline, following the intervention, and at 8 month follow-up. Additionally, the EBP behaviours outcome was collected at five different points in time throughout the 8 months. The results indicated a significant increase in knowledge of EBP methods from pre to post-workshop (mean difference 20.6 points, 95% CI: 15.6 to 25.5) and at follow-up (mean difference 23.1 points, 95% CI: 14.7 to 31.6) on the Adapted Fresno FRESNO test. In addition, there was a statistically significant increase in the proportion of occupational therapists who felt their skills had improved and now felt confident generating a clinical question ($p<0.0001$), using electronic databases alone ($p<0.0001$), critically appraising research ($p<0.0001$) and navigating the internet ($p<0.01$). A lack of time was identified as the main barrier to utilizing EBP by 94% of the participants following the workshop compared to 88% at follow-up ($p<0.002$). Unfortunately, at follow-up there was no increase in EBP behaviour as the majority

(83%-89%) did not participate in any critical appraisal and only 23% - 41% of participants searched electronic databases twice or more over eight weeks. The authors did not mention any changes or increase in the use of EBP in clinical care towards patients.

In a qualitative study by Egan et al.[14], the effectiveness of an online action research group in which online discussions took place, was tested on 51 Canadian occupational therapists to determine if it could enhance their research use. Four groups of 12-14 therapists met online for approximately one year. They exchanged thoughts on the barriers and facilitators to research utilization, and searched for and synthesized relevant research findings. All online discussions were recorded by the researchers and thematically analyzed. After one year, only half of the participants remained in the study. Researchers conducted telephone interviews with each to gain insight on the therapist's experience and the impact of their participation on their research use. The results indicated that the therapists felt more motivated and confident in their ability to search for and use research evidence. Note that no quantitative data was provided.

2.3 Knowledge Translation strategies for physical therapists

From the search results presented above it is clear that the study of uptake of EBP by occupational therapists and the effectiveness of various KT strategies is still a very new field of research with very limited work to date specific to occupational therapists. Thus, the search parameters were broadened to include physical therapists (PTs), a closely allied health professional with a strong presence in the treatment of clients with stroke. A systematic review by Menon et al. [22] on the topic of knowledge translation strategies for rehabilitation professionals describes four randomized control trials (RCTs) which are summarized below. Together these RCTs indicate the use of a combination of active educational methods for the intervention group and a single passive educational method such as dissemination of guidelines or an in-service training for the control group. To elucidate, the common active strategies used included opinion leaders[15], interactive EBP educational-based programs[16,17], training on evidence-based treatments and functional outcome measures, role playing[18], and several follow-ups by e-mail, phone or actual in person visits[15,18].

In the study by Rebbeck and colleagues[15] an active EBP educational method was compared to a passive one to determine which better improved patients' outcomes and therapists' knowledge of best practice guidelines. 27 PTs were randomized to either the implementation or control group. The implementation group received education on EBP, training given by opinion leaders on evidence-based assessments and treatments, dissemination of guidelines and an educational outreach follow-up. The control group received the dissemination of guidelines. 103 patients treated by these PTs at the time of the study were also included. The implementation group improved significantly more compared to the control group in their actual and self-

perceived knowledge of the EBP guidelines (p=0.001) and they also implemented guidelines significantly more often in their clinical practice (p=0.05). Conversely, there were no significant between group differences for patient outcomes on disability and perceived clinically meaningful change as measured by the Core Outcome Measure (Whiplash) (p=0.85) and Global Perceived Effect Scale (p=0.95) respectively. The authors suggest that the implementation program did not produce significant differences in patient outcomes because the therapists' current practices were already close to the endorsed guidelines.

In the study by Stevenson and colleagues[16], the use of opinion leaders, a known KT strategy, was compared to a standard in-service on managing low back pain to determine which better improved therapists attitudes towards EBP, method of continuing EBP education and identification of local opinion leaders. 30 musculoskeletal PTs were randomized to either the experimental (n=17) or control group (n=13). Both groups received printed materials and five hours of training. The experimental group received five hours of interactive EBP education by opinion leaders with a focus on critical appraisal and literature searching while the control group received a standard 5-hour in-service on the management of common knee pathologies. At post-intervention the experimental group had increased confidence in undertaking literature searches and critically appraising articles as compared to the control group. This was measured using a structured interview administered by the primary author. However, there were no significant between group differences (p>0.05). The most common methods included courses and in-services whereas the least used were literature searches, reading journals and conferences. In addition, no significant between group difference for the identification of local opinion leaders (p>0.05) was found.

In a subsequent article by the same authors[17], other outcomes such as treatment approaches, intensities and perceived importance of the various treatments were detailed. Examples of treatment approaches included hands-on therapy, encouraging the patient to participate in activities and return to work, as well as providing a home exercise program. The clinicians documented the approaches they used along with the intensities and the importance they allotted to each. Some of these approaches were recommended as best practices for treating low back pain. There were no significant between group differences in the PTs' treatment approaches or intensities as well as in their perceived importance of treatment approaches at follow-up. However, there were trends showing a greater perceived importance and adherence to treatment approaches in line with the best practice guidelines for low back pain in the experimental group. Despite a trend towards significance, the study's small sample size indicates that the study was not sufficiently powered to detect such a small difference.

In the study by Bekkering and colleagues[18], 113 PTs and 500 patients with non-specific low back pain were recruited to determine if an active educational strategy would improve PTs' guideline adherence. PTs were randomized into either the active (n=52) or the passive strategy groups (n=61) and their respective patients were also randomized into either group. The passive strategy consisted of mailing several items: the best practice guidelines and a self-evaluation form on practice behaviours. The active strategy consisted of five hours of training divided into two sessions. The first session included an overview of the guidelines, printed material, education on EBP and role playing. The second session conducted four weeks later consisted of a discussion on the PTs' experiences in implementing the guidelines and on their current management methods. The results indicated that the group receiving the active strategy correctly implemented the guidelines more than the group receiving the passive strategy as assessed by extracting

information from the patients' charts. The group receiving the active strategy also correctly limited the number of treatment sessions (OR 2.39; 95% CI:1.12-5.12), set functional treatment goals (OR 1.99; 95% CI: 1.16-3.72), used mainly active interventions (OR 2.79; 95% CI: 1.19-6.55), and gave adequate patient education (OR 3.59; 95% CI: 1.35 to 9.55) more often than did the passive strategy group. The group receiving the active strategy also demonstrated greater adherence to all four criteria listed in the previous sentence (OR 2.05; 95% CI: 1.15-3.65) than did those in the passive group. There were no significant differences between patients in either group in terms of age, sex, working status measured prior to treatment, using the Quebec Back Pain Disability Scale[23] score or on pain intensity as measured using a numerical rating scale (0-10) at follow-up.

2.4 Barriers and facilitators affecting EBP use

Various KT strategies have been described above with a wide range of results. Despite a KT strategy having potential benefits for improving the use of EBP, it may have differing levels of effectiveness given the barriers and facilitators that clinicians face in adopting EBP[19,20]. The KT literature suggests that personal and organizational factors can act as either barriers or facilitators that directly influence the successful implementation and maintained use of EBP. Personal factors include, but are not limited to, previous EBP education, knowledge of effective searching and critically appraisal of the literature, and general attitude towards EBP[19]. Organizational factors include departmental support, available resources, and time available to search through literature[19].

While conventional thinking may have suggested that a general KT intervention can be used in all types of settings, it is now becoming widely accepted that in order for a KT intervention to be effective, the facilitators and barriers faced by therapists treating a specific type of clientele in a specific type of setting need to be known[20]. This allows the intervention to be tailored to meet the specific needs of participants[20]. Thus, to meet my study's objectives, more information is required regarding the factors affecting occupational therapists' use of EBP when treating patients with stroke.

Dysart & Tomlin[24] surveyed 209 occupational therapists to determine which personal and organizational factors contributed to a higher use of EBP amongst clinicians. Results indicated that educational training at the level of a Masters degree, prior research experience, or less than 5 years of work experience ($p < .05$) were the factors significantly associated with a higher use of EBP. In terms of personal barriers, a majority of clinicians (59%) reported difficulty using

electronic databases and 38% perceived research results as unclear and difficult to understand. Organizational factors such as a lack of managerial support and lack of time were identified by 66% and 76% of clinicians respectively as major barriers to implementing EBP. Cameron et al.[25] surveyed 131 American occupational therapists and had the same objectives as the study described above. Personal factors such as higher education contributed to a higher use of EBP and with greater years of practice the use of EBP decreased[25]. In a review of the literature, Koch et al.[26] determined that clinician barriers to research utilization by therapists included negative attitudes toward research, views of research as being irrelevant to practice and inadequate training to understand and use research. Organizational barriers to research utilization included lack of administrative support and difficulty accessing research[26]. While these studies provide important information on general barriers and facilitators faced by therapists in a wide range of settings, no study has as yet described factors affecting occupational therapists' patient management specific to stroke rehabilitation.

When it comes specifically to the treatment of individuals with stroke, the use of EBP is crucial given that treatment of stroke is complex as it involves potential impairments in multiple systems including cognition, visual perception, motor abilities and behaviour. In the study by Salbach et al.[19], 270 physiotherapists were surveyed to explore the facilitators and barriers to EBP use specific to stroke rehabilitation. Factors found to be significantly associated with lesser use of EBP included a higher number of years of practice, being female, working in rural settings or in an organization with fewer than 5 full-time clinicians, and working in a non-teaching institution. Other major barriers to EBP included a low sense of self-efficacy in EBP defined as "a judgement of one's ability to organise and execute activities in the domain of EBP"[19] as well as a lack of knowledge on how to execute EBP.

3. THESIS OBJECTIVES

- **Manuscript 1:**

  To demonstrate how the Knowledge to Action Process model can be used to increase the use of best practices in the management of post-stroke USN.

- **Manuscript 2:**

  Phase #1) To identify the facilitators and barriers that affect the use of EBP by acute care occupational therapists treating individuals with post-stroke USN.

  Phase #2) To create, to pilot test, to determine the feasibility and to conduct preliminary analyses of effectiveness of a multi-modal KT intervention geared towards increasing EBP knowledge acquisition and self-efficacy for USN assessment and treatment. A sub-objective was to conduct preliminary analyses of the association between potential explanatory variables and change in knowledge acquisition and EBP self-efficacy.

4. USING THE KNOWLEDGE TO ACTION PROCESS MODEL TO DEVELOP AN EFFECTIVE KNOWLEDGE TRANSLATION INTERVENTION FOR OCCUPATIONAL THERAPISTS

4.1 MANUSCRIPT 1:

Petzold A, Korner-Bitensky N, Menon A. **Using the Knowledge to Action model to incite clinical change.** *Journal of Continuing Education in the Health Professions.2010;33*(3):167-171.

Anita Petzold, BSc OT, MSc Candidate, School of Physical and Occupational Therapy, Faculty of Medicine, McGill University, Montreal, Quebec.

Nicol Korner-Bitensky, PhD, Associate Professor, School of Physical and Occupational Therapy, Faculty of Medicine, McGill University, Montreal, Quebec.

Anita Menon, BSc OT, MSc, PhD Candidate, Department of Health Policy, Management and Evaluation, Faculty of Medicine, University of Toronto, Toronto, Ontario.

Word count: 3187

Correspondence:

Anita Petzold

School of Physical and Occupational Therapy, Faculty of Medicine, McGill University

3630 Promenades Sir-William-Osler

Montreal, Quebec, H3G 1Y5

Email: anita.petzold@mail.mcgill.ca

Phone: (514) 398-5457

Fax: (514) 398-8193

ABSTRACT

Introduction: Knowledge translation (KT) has only recently emerged in the field of rehabilitation with attention on creating effective KT interventions to increase clinicians' knowledge and use of evidence-based practice (EBP).The uptake of EBP is a complex process that can be facilitated by the use of the Knowledge to Action Process model. This model provides a sequence of phases for researchers and clinicians to follow in order to optimize KT across various fields of practice.

Methods: In this article we use an example from a series of national studies in stroke rehabilitation to demonstrate how the Knowledge to Action Process model is being used to increase the use of best practices in the management of a very prevalent post-stroke impairment, unilateral spatial neglect.

Results: The series of research projects and actions described herein each address a specific phase of the model. The reader is introduced to a specific example with the goal of generalizing the process to his or her own domain of interest. Gaps in our research agenda are also highlighted and future initiatives to complete the process are described.

Discussion: It is important that KT is maximized in health care to improve patient outcomes. As demonstrated here, the Knowledge to Action Process model provides an excellent guide for clinicians, managers, and researchers who wish to incite change in patient care.

Key Words: knowledge translation, evidence-based practice, knowledge transfer, research utilization, continuing professional development

INTRODUCTION

The literature on knowledge translation (KT) suggests that the uptake of evidence-based practice (EBP) or evidence-informed practice is based on a complex process requiring consideration of many organizational and clinician factors.[1,2] Graham and colleagues have developed the Knowledge to Action Process model[3] which provides a sequence of phases for researchers and clinicians to follow in order to optimize KT across various fields of practice. The Knowledge to Action Process model (see FIGURE 4.1), which will herein be referred to as the Process, contains two main phases. The first phase is Knowledge Creation, where knowledge sifts through a funnel, from inquiry (asking the right questions) to synthesis (pulling together research and information from other sources) and to the development of products (delivering the right information in the right format), in order to become refined and presumably more useful for end users.[3]

The second phase is the Action Cycle, which describes the dynamic process of how knowledge can be practically applied by clinicians according to planned action theories. In this phase, research questions are designed to address problems identified by users, and research results as well as the dissemination of those results are tailored to suit the needs of specific audiences.[3]

METHODS

Descriptive methodology was used in this article. In this reflective piece we illustrate, using an example from stroke rehabilitation, how clinicians and researchers can use the Process (FIGURE 4.1) to create a phase-by-phase interdisciplinary clinical agenda aimed at enhancing use of best practices in their particular area of expertise. Stroke rehabilitation provides a salient example

given the rapid increase in research regarding stroke rehabilitation best practices and the findings that use of these best practices improves patient outcomes.[4] More specifically, we will illustrate how the application of this Process model can benefit clinicians and program managers who want to incite clinical change. We will use a specific aspect of stroke rehabilitation, management of unilateral spatial neglect (USN) to exemplify how the model can be used. We have chosen this topic as the basis for our discussion given a national study that we conducted in 2005-2006, where we found evidence that assessment and intervention for post-stroke USN was well below optimal standards of care.[5,6]

Unilateral Spatial Neglect

USN is a common impairment affecting over 40% of those with stroke, and is characterized by the inability to orient or respond to stimuli appearing on the side contralateral to the brain lesion.[7,8] Clinical signs of USN include, but are not limited to, collisions with objects in the environment, ignoring food on one side of the plate and shaving/applying make-up to only one side of the face.[7] USN is associated with an increased risk for falls and related injuries, longer rehabilitation, and poorer functional recovery.[9] Thus detecting and treating USN is important given its high prevalence, and the negative outcomes when left untreated, especially since many psychometrically sound assessment tools and effective treatments exist.[8,10]

Identifying Problems

If we refer to the Process, specifically the Identify Problem phase, understanding the current gap between best practices and actual practices is a crucial first phase.[3] To tackle the problem identification phase, our team conducted two multicenter studies in 2005-2006 that identified actual management of USN post-stroke. The first study focused on acute care management of

USN using chart audits[5] to identify clinician management. Next, a national survey of stroke rehabilitation clinicians working in inpatient rehabilitation settings was conducted to elicit information on assessment and treatment of USN.[6] The first found that only 13% of patients with post-stroke USN were assessed with a standardized USN assessment.[5] The second revealed that less than 30% of Canadian occupational therapists working in inpatient stroke rehabilitation employed best-practice assessment use when it came to USN, and only 58% offered any USN intervention.[6] This original research led us to use the Process to guide our subsequent research endeavors in the field of knowledge translation as related to management of post-stroke USN. In the years that followed we began to conduct focus groups and interviews between researchers and clinicians regarding the possible reasons behind the problems/gaps that we had seen. Clinician feedback suggested the need for a synthesis of the information on the USN assessment tools, specifically detailing those tools that would be most appropriate for use in various clinical settings such as acute versus rehabilitation, and, for identifying tools that could be used quickly for the purposes of screening versus those that would be most appropriate for in-depth assessment. In addition, the clinical community expressed a lack of knowledge regarding the recent evidence on the effectiveness of USN-specific treatment interventions. From this feedback we identified a clear need for the creation of user-friendly information that pertained directly to USN assessment and intervention and that could be applied in specific clinical settings. This identified need is in keeping with the argument put forth in the Process regarding the importance of Knowledge Synthesis and the creation of Knowledge Tools/Products, as seen at the tip of the internal triangle of FIGURE 4.1.

Knowledge Creation

How does a clinician go about deciding which intervention(s) to use with a patient experiencing USN? The clinician could use one of the USN treatments already available in their clinical setting; however, it is uncertain whether this treatment would be effective or not. Alternatively, the clinician may access various forms of written materials, including best-practice guidelines, which do exist for USN. The Canadian guidelines indicate that USN must be detected within 48 hours of admission using standardized and valid assessments.[11] The Canadian guidelines also provide clinicians with a list of recommended standardized assessments.[11] The American guidelines state that USN is serious but goes on to state: the literature does not suggest any single intervention for addressing neglect, although a multifaceted approach with a strong educational component can help patients adapt to these deficits.[12] The European guidelines state that there is good evidence for using cognitive rehabilitation in patients with spatial neglect and that delivery of these cognitive interventions should be done mainly by a formal neuropsychological service or an occupational therapist.[13] Having read these guidelines, it is unlikely that the clinician will have a thorough understanding of how to proceed with best-practice USN management. If still in doubt regarding the best intervention choices, the clinician may decide to search through articles and online databases. Indeed, if this is the action that the clinician chooses, he or she will find a large number of primary studies on USN. The Process captures these primary studies in the first section of the knowledge creation domain as Knowledge Inquiry (FIGURE 4.1).[3] The Knowledge Inquiry phase requires clinicians to possess strong critical appraisal and statistical analysis skills in order to critique the individual articles.

With time constraint being one of the dominant limiting factors to EBP use[14,15] *and with a substantial portion of clinicians clearly not comfortable performing this level of knowledge*

inquiry,[14,16] *is it reasonable to expect clinicians to use the raw literature to make treatment decisions?* Indeed, our research findings suggest that clinicians are not making use of the latest evidence when it comes to USN treatment decisions.[5,6] If our goal was to increase clinician's knowledge about USN and use of EBP, then we would have to find ways to facilitate clinician learning and uptake of best practices by providing easily accessible and current information on USN management. Toward this goal we sought funding support from key organizations involved in stroke-related rehabilitation including the Canadian Stroke Network and the Heart and Stroke Foundation of Canada/Ontario to help support the creation of a knowledge synthesis Web site and clinician learning tools. Simultaneously, we used more traditional avenues of knowledge dissemination such as peer-reviewed journals to publish articles aimed at assisting clinicians to choose appropriate screening/assessment tools.[17,18] With funding support and key involvement from a group of international researchers and clinicians in stroke, we created Web sites that focused on USN interventions and the evidence of their effectiveness (http://strokengine.ca/index.php?page=topic&id=32),[8] and on the assessment tools that clinicians could use to detect USN (www.strokengine.ca).[10] In addition, we created an interactive e-learning module (http://elearning.strokengine.org.module.php)[19] that allows clinicians to observe an actual patient with USN and to take an interactive quiz related to best-practice assessment and intervention.

Action Process

Creation of a series of Web sites is not sufficient to ensure use of best practices; an intervention plan for knowledge application based on the various phases of the Action Cycle needs to be developed. The literature on KT suggests that personal and organizational factors can act as either barriers or facilitators that directly influence the successful implementation and maintain use of

best practices.[1,2] According to the Process model, it is critical to identify the barriers to knowledge use specific to the KT intervention, and then to adapt the knowledge to the local context (FIGURE 4.1). To elucidate, for a KT intervention to be effective in changing clinician practices, the facilitators and barriers faced by clinicians treating a specific clientele, in a specific type of setting, need to be identiÞed.[3] This notion led us to take a subsequent research step, specifically one aimed at identifying the barriers and facilitators to EBP for management of post-stroke USN. Recently, two focus groups of stroke clinicians provided us with key themes regarding the barriers and facilitators faced in daily practice related to USN management, specific to their local context, acute care management of USN. The results of this study will be published in the near future. This information can now guide the creation of a targeted KT strategy related to the Process phase described as the Select, Tailor, Implement Interventions (FIGURE 4.1).[3]

The first question we posed as we delved into the creation of a KT intervention was whether the current knowledge about the effectiveness of KT interventions aimed at clinicians could guide us. From the literature on physicians and nurses the evidence suggests that active multimodal strategies are more effective than single or passive strategies in changing practices.[20] Only recently has this same query been addressed in the rehabilitation literature, with similar findings suggesting the need for a multimodal intervention approach.[21.24] Knowledge from this recent literature, merged with the themes gleaned from the focus groups, is guiding the content for the next step, specifically, a multimodal study investigating effectiveness of the strategy in changing clinician behaviors.

Discussion: Monitoring Knowledge Use/Evaluating Outcomes

What phases of the Process have we not yet tackled in attempting to close the USN best-practices

gap? Testing the effectiveness of the intervention is only the beginning toward the next series of phases defined in the Process, which include Monitoring Knowledge Use and Evaluating Outcomes.[3] If the multimodal intervention being tested is found to be effective in enhancing clinicians use of best practices for post-stroke USN, then the goal will be to introduce a dissemination program that encourages the use of the KT intervention across stroke units nationally and internationally. Once that goal is met, the ultimate success will be measured by whether the intervention reduces the gap between best versus actual practices that we documented in 2005-2006.[6] Thus, the Monitoring Knowledge Use phase (FIGURE 4.1) speaks to the importance of identifying whether best-practice change has occurred. For us, this means conducting a follow-up study that poses the same questions to stroke clinicians across the nation that we posed in 2005-2006 regarding problem identification, assessment, and intervention practices.[6] All of these efforts aimed at changing clinician practices are geared toward one common goal - improved patient outcomes.

The final step in the Process that is often ignored in the creation of a KT strategy is the Sustainability of Knowledge Use.[3] It is critical to ensure that the practice changes, once initiated, are not lost over time. It is also important to understand the reasons behind clinicians changes in practice behavior. Toward this end we have recently created a standardized tool, the PERFECT,[25] that elicits information on practice change and the barriers and facilitators that incite change. The tool is an interview-administered questionnaire containing 4 main sections (problem identification, assessment, treatment, and referral practices), each used to elucidate information on change in clinical practice and the barriers and facilitators to both actual and desired change.[25] The tool has been created to foster reflection by clinical teams who wish to focus on practice change.

LIMITATIONS

We have shown how the Process can be practically applied; however, it took the researchers several years and substantial amounts of funding well over 1 million dollars in order to carry out the various phases. Department managers who wish to use the Process as a model to increase the use of best practices in their clinical setting will most likely not have the same time or resources available. However, it is hoped that this reflective article presents a series of concrete phases, parts of which can be used by clinical teams to fit the needs of their local context.

CONCLUSION

Changing clinical practices to match those of best practices is a worthwhile effort that until recently has received little attention in the health research literature, especially in the field of rehabilitation. Attention on maximizing KT is warranted to ensure that the monies spent on creating new knowledge on best practices are justified. The Process proposed by Ian Graham and colleagues provides a structured and logical way for clinicians, managers, and researchers to incite change, with the ultimate goal of providing best practices to patients.

DISCLOSURES: Anita Petzold is funded by a fellowship award from the Fond de la Recherche en sante du Quebec (FRSQ), and Nicol Korner-Bitensky by a senior career award from the FRSQ. Anita Menon is funded by a doctoral award from the CIHR program (Innovations in Patient Safety and Knowledge Translation) at the Faculty of Medicine, University of Toronto. This work was funded by an Edith Strauss Knowledge Translation Grant from the School of Physical and Occupational Therapy at McGill University. We would also like to acknowledge the Canadian Stroke Network/CIHR for their continued support.

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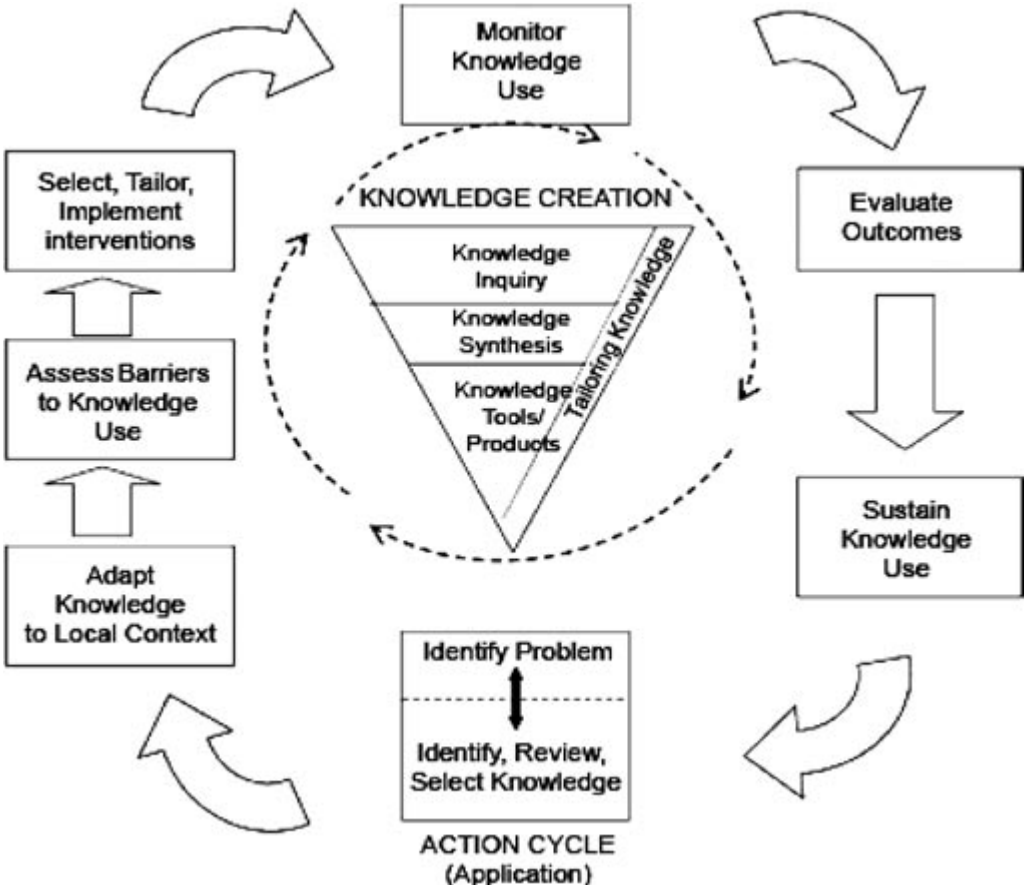
Figure 4.1: Knowledge to Action Process Model



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5. INTEGRATION OF MANUSCRIPT 1 AND 2

The Knowledge to Action Process model provides a solid framework on which an effective KT intervention can be constructed. It emphasizes the need for a tailored KT intervention to maximize effectiveness. This can only be achieved by identifying the facilitators and barriers specific to the type of setting and clientele treated and addressing them within the KT intervention. While the literature does contain several studies that have identified barriers and facilitators to EBP use with various clientele, no studies have yet been conducted specific to occupational therapists working with a stroke clientele.

With this in mind, the second study was designed. Through the use of focus groups, Phase 1 of this study identifies the facilitators and barriers that affect EBP use by acute care occupational therapists treating individuals with acute post-stroke USN. It also determines which KT strategies these therapists perceive as useful to enhance their knowledge of USN best practices. Using the knowledge gained in this first phase, the second phase was designed. Phase 2 attempts to create, to pilot test, to determine the feasibility and conduct preliminary analyses on effectiveness of a KT intervention aimed at increasing USN EBP knowledge acquisition in occupational therapists managing post-stroke USN. The KT intervention is based on the Knowledge to Action Process model, but also draws from key information obtained from the first study as well as previous research on KT presented in the literature review. If the proposed KT intervention is feasible to administer and demonstrates preliminary effectiveness, this study can act as a stepping stone for future KT research in the field of stroke rehabilitation.

6. INCREASING KNOWLEDGE OF BEST PRACTICES IN OCCUPATIONAL THERAPISTS TREATING POST-STROKE UNILATERAL SPATIAL NEGLECT

6.1 MANUSCRIPT 2:

Increasing knowledge of best practices in occupational therapists treating post-stroke unilateral spatial neglect: a pilot study

Authors: Anita Petzold, Nicol Korner-Bitensky, Nancy M. Salbach, Sara Ahmed, Anita Menon, Tatiana Ogourtsova

Anita Petzold, BSc OT, MSc Candidate, School of Physical and Occupational Therapy, Faculty of Medicine, McGill University, Montreal, Quebec.

Nicol Korner-Bitensky, PhD, Associate Professor, School of Physical and Occupational Therapy, Faculty of Medicine, McGill University, Montreal, Quebec.

Nancy Salbach, PhD, Assistant Professor, Department of Physical Therapy, Faculty of Medicine, University of Toronto, Toronto, Ontario

Sara Ahmed, PhD, Assistant Professor, Faculty of Medicine, School of Physical and Occupational Therapy, McGill University, Montreal, Quebec.

Anita Menon, BSc OT, MSc, PhD Candidate, Department of Health Policy, Management and Evaluation, Faculty of Medicine, University of Toronto, Toronto, Ontario.

Tatiana Ogourtsova, BSc OT, MSc, School of Physical and Occupational Therapy Faculty of Medicine, McGill University, Montreal, Quebec.

Correspondence:

Anita Petzold

School of Physical and Occupational Therapy, McGill University

3630 Promenade Sir William Osler, Montreal, Quebec, H3G 1Y5

Email: **anita.petzold@mail.mcgill.ca**

Phone: (514) 398-5457

Fax: (514) 398-8193

ABSTRACT

Introduction: A gap exists between evidence-based practice (EBP) and actual practices in the management of post-stroke unilateral spatial neglect (USN). To date, no study exists examining the effectiveness of a knowledge translation (KT) intervention on modifying occupational therapists' practices in the management of post-stroke USN.

Methods: In Phase 1 two focus groups elicited the barriers and facilitators that affect EBP use by acute care occupational therapists treating individuals with post-stroke USN. In phase 2 an 8 week multi-modal KT intervention, consisting of a 7 hour in-person training session and an 8 week reinforcement period guided by results from Phase 1, was created and pilot tested. USN EBP knowledge acquisition and EBP self-efficacy were the outcomes of interest.

Results: Phase 1) Key barriers identified include lack of time, lack of basic EBP skills, and personal motivation to change current practices and habits. Key identified facilitators include a multidisciplinary stroke team, recent graduation, and having access to learning materials.
Phase 2) The USN KT intervention was pilot tested on 20 occupational therapists. Results indicate a statistically significant improvement in knowledge of USN EBP ($p<0.000$) and EBP self-efficacy ($p<0.045$).

Conclusion: Use of a multi-modal KT intervention based on expressed barriers and facilitators to EBP use can significantly improve occupational therapists' knowledge of USN EBP. This information should help advance best practices in post-stroke USN management as well as KT interventions in the rehabilitation field.

Key Words: knowledge translation, evidence-based practice, stroke rehabilitation, occupational therapy, unilateral spatial neglect

INTRODUCTION

15 million people worldwide experience a stroke annually and of these, 5 million are left with a disabling impairment[1]. Over 40% of those with stroke are left with unilateral spatial neglect (USN)[2], an impairment that is characterized by the inability to orient or respond to stimuli appearing on the contralateral side of the brain lesion[3]. There are three types: personal, near extrapersonal and far extrapersonal neglect[3]. Clinical signs include but are not limited to: shaving or applying make-up to only one side of the face, ignoring food on one side of the plate, and collisions with objects in the environment[4]. The severity of USN stems from its association with an increased risk for falls and related injuries, longer rehabilitation, and poorer functional recovery[2].

Fortunately, an abundance of standardized screening and assessment tools exist for detecting post-stroke USN[4]. Best practice management includes early detection (within 48 hours of admission) using standardized and valid USN assessments[5]. Commonly, the detailed assessment of USN is performed by occupational therapists given their training and expertise in the management of visual perception disorders[6]. According to the 2008 Canadian Best Practice Recommendations for Stroke Care by the Canadian Stroke Strategy[5], the recommended screening and assessment tools for USN include the Comb and Razor Test, Behavioural Inattention Test, Line Bisection Test (solely for USN), Rivermead Perceptual Assessment Battery, Ontario Society of Occupational Therapy Perceptual Evaluation and Motor Free Visual Perceptual Test. Once USN is detected, best practice management includes provision of effective treatments: limb activation, prisms, eye patching, trunk rotation and visuomotor imagery[6] as well as virtual reality[7].

Despite an abundance of assessment tools and the growing research evidence on effectiveness of USN interventions, many clinicians fail to implement standardized tools and treatment methods. Indeed, a large cross Canada survey on clinicians' practices[8] revealed that less than 30% of Canadian occupational therapists working in in-patient stroke rehabilitation used standardized USN assessments; only 58% offered USN interventions. Similarly, in another multi-centered study by the same research group (2008)[9], only 13% of patients admitted to an acute care hospital for stroke were assessed with a standardized USN or visual perception assessment. These results highlight the substantial gap that exists between evidence-based practice (EBP) and current occupational therapy practice for patient management of USN in both acute care and rehabilitation settings.

Knowledge translation (KT) is a process used to bridge the gap between EBP and actual practices. KT can be defined as "a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the health care system"[10]. Although the concept of KT has been present in the literature for almost two decades, few studies evaluating its effectiveness in the field of rehabilitation have been published. A recent systematic review[11] summarizing the effectiveness of KT intervention specific to rehabilitation professionals suggests that multi-modal active educational methods such as opinion leaders[12], interactive EBP educational-based programs[13,14], training on evidence-based treatments and functional outcome measures, role playing[15], and several follow-ups by e-mail, phone or actual in person visits[12,15] are more effective than a single passive educational method such as dissemination of guidelines or an in-service training for increasing knowledge and use of best practices.

Despite KT strategies having potential benefits, they may differ in effectiveness based on barriers and facilitators that clinicians face[16,17]. For example, the KT literature suggests that personal and institutional factors can act as either barriers or facilitators to successful implementation and sustained use of EBP[16,17]. The known personal factors include previous EBP education, knowledge of effective searching and critically appraising the literature, and general attitude towards EBP[16]. Research has shown that clinicians with a low sense of self-efficacy in carrying out these activities are "less likely to perform these activities than people who perceive their level of skill to be higher" and less likely to use EBP in their clinical practice[16]. Institutional factors include departmental support, available resources, and time available to search through literature[16]. Interestingly, Graham et al.[17] suggest that interventions geared towards increasing the use of EBP are optimized when the facilitators and barriers specific to the clinician and their work environment are identified. KT interventions can then be tailored to the needs of that specific group of clinicians[17].

With the ultimate aim of improving patient outcomes[18], it is imperative that we gain a better understanding of the reasons behind the documented lack of EBP in USN management in order to help close the gap between current and best practice. Thus, the objectives of this research agenda were two-fold. In the first phase the objective was to identify the facilitators and barriers that affect EBP use by acute care occupational therapists treating individuals with acute post-stroke USN. In the second phase the objective was to create, to pilot test, to evaluate the feasibility and to conduct preliminary analyses of effectiveness of a multi-modal KT intervention geared towards increasing EBP knowledge acquisition and self-efficacy for USN assessment and treatment. A sub-objective was to conduct preliminary analyses of the association between potential explanatory variables and change in knowledge acquisition and EBP self-efficacy.

METHODS

A multi-phase study was undertaken to achieve the abovementioned objectives. The methods for Phase 1 will be presented in their entirety followed by the methods used in Phase 2.

METHODS: Phase 1

Research design

Qualitative descriptive research[19] in the form of focus group methodology was used to explore occupational therapists' perception of barriers and facilitators affecting their knowledge and use of EBP in USN management. In addition, clinicians were asked to specify which KT strategies they thought should be included in Phase 2 in which a KT intervention would be developed and piloted. Focus group methodology was chosen as the discussion topic was not sensitive and use of focus groups typically lead to insights beyond those attained through individual interviews[20].

Participants

Occupational therapists were eligible if they: were registered as an occupational therapist with the provincial licensing body (Ordre des ergothérapeutes du Quebec- OEQ); had at least three months of experience working with a stroke clientele in an acute care hospital; treated a minimum of two adults with stroke per month; spoke either English or French; and, provided consent. Clinicians were identified via the OEQ database as all practicing occupational therapists from Quebec, Canada are required to register with the OEQ. Purposive sampling was used to ensure a broad representation of clinicians including both recent and senior graduates, those working in teaching and non-teaching institutions, as well as those in the English and French sector.

Focus groups methods

Ethics approval was obtained from McGill University's Faculty of Medicine Institutional Review Board. Focus groups of 6 clinicians lasting 2 hours were held at McGill University, Montreal, Quebec, Canada. Separate groups were conducted in English and in French. Written informed consent was obtained at the clinician's arrival, prior to the start of the focus group (Appendix A). Structured focus group methodology was used[20]. An experienced moderator led the groups along with two assistants. Each session began with a clarification of the purpose of the study as well as the importance of confidentiality. Clinicians then received a short introduction on the research findings suggesting the gap between EBP and actual practices in post-stroke USN management. The moderator then posed each prepared question from a focus group guide. As the clinicians discussed their ideas, one assistant audio-recorded and took field notes, while the second recorded comments on a flip chart. To ensure that the essence of each discussion point had been fully captured, the clinicians' recorded comments were read back to them after each question. Clarifications and additional comments were added as necessary. The audio-recordings were analyzed in their respective languages.

Focus group questions

Focus group questions focused on institutional and personal barriers and were generated with guidance from the PERFECT [21] as well as from previous focus groups on a similar topic[22, 23]. The PERFECT is a standardized tool that explores change in practice behaviour, reasons for change, as well as facilitators and barriers to change in the practices of health professionals. Examples of questions include: "Think of your clinical practice over the past six months, please describe any changes you have made with respect to your assessment practices?"; "What were

the reason(s) for this change in assessment practice?"; and "What, if anything, helped bring about this change in assessment practice?"[21].

While the PERFECT had undergone extensive pilot-testing[21], the additional focus group questions (see Figure 6.1) were also pilot tested on two clinicians to ensure their clarity and where deemed unclear, were modified accordingly. During the first part of the session, questions around the barriers and facilitators experienced by clinicians were posed. During the second half, clinicians were asked to reflect on KT strategies they thought were useful and should be included in a subsequent pilot study testing a KT intervention.

Sample size considerations

The goal was to identify all of the clinicians' perceived barriers and facilitators to EBP use specific to post-stroke USN as well as KT strategies. Thus, focus groups were conducted until saturation occurred, that is until no new ideas were generated.

Analysis

Responses from clinicians were analyzed using thematic groupings. The research team used content-based analysis techniques to identify emerging themes related to each question posed during the focus groups. Next, relevant quotes and statements that depicted themes were categorized according to topic areas. Salient comments were abstracted as well to illustrate the themes that emerged. Descriptive statistics were also used to characterize the clinicians according to their personal and work characteristics.

METHODS: Phase 2

Research Design

The objective of this pilot study was to create, to evaluate the feasibility and to conduct preliminary analyses of effectiveness of a multi-modal KT intervention geared towards increasing EBP knowledge acquisition and EBP self-efficacy in 20 occupational therapists. A quantitative study consisting of a three period repeated measures design was used. It included two pre-intervention assessments conducted one week apart, followed by an 8-week KT intervention and finally, a post-intervention assessment. Clinicians completed a timed online Knowledge Questionnaire at each of the three measurement points. The KT intervention consisted of a 7 hour in-person interactive training session based on Graham's Knowledge to Action Process model[17] (Figure 4.1) with subsequent reinforcing strategies used in the 8-week reinforcement period in which clinicians continued their learning through access to online educational resources and a discussion forum (See Figure 6.2).

Participants

Occupational therapists treating individuals with acute stroke were recruited according to the same inclusion criteria as in Phase 1. Two additional exclusion criteria were applied over those included in the focus group study: participation in other research related to USN and working part-time.

Recruitment procedures

Occupational therapists from two major Canadian cities, and surrounding regions: Montreal, Quebec and Toronto, Ontario, were recruited. A list of occupational therapists working in acute

care hospitals was obtained online from the websites of the licensing orders in Quebec (OEQ) and Ontario College of Occupational Therapists. Each clinician was assigned a study number and potential clinicians were randomly sampled using a computer generated random numbers table. Clinicians were contacted by telephone by a trained research assistant who described the purpose of the study using guidelines as per the Total Design Method by Dillman et al.[24] to maximize recruitment. Recruitment took place daily over a two-week period using the phone number of the last registered workplace of each clinician. Attempts to contact the clinician continued until he or she was reached or until the recruitment period was over. Some clinicians were reached on the first attempt; others were reached after as many as 6 attempts, and still others were never reached. Eligibility was verified over the telephone and if eligible, the clinician was invited to participate.

KT intervention

The "USN KT intervention" began with a 7 hour in-person interactive training session followed by an 8-week reinforcement period where clinicians continued their learning online. The intervention aimed at increasing occupational therapists' knowledge of USN best practices in four areas: problem identification, assessment, treatment and knowledge of USN. A secondary aim of the intervention was to increase EBP self-efficacy to seek out new information.

Creation

The USN KT intervention was created based on multiple sources and learning theories[25] defined as "a process that brings together cognitive, emotional, and environmental influences and experiences for acquiring, enhancing, or making changes in one's knowledge, skills and values"[26]. First, feedback was used from the focus groups conducted in Phase 1 regarding effective educational strategies. Second, evidence was used from a recent systematic review on

effective KT strategies specific to rehabilitation clinicians which determined that a combination of active multi-modal educational methods is likely the most effective means of increasing EBP[11]. Finally, components of the Knowledge to Action Process model[17] (Figure 4.1) were used. More specifically, knowledge synthesis and knowledge tools[17] as well as targeting the KT intervention to maximize uptake of best practices[17] helped guide the creation of the USN KT intervention.

Content

Learning theories[25] guided the preparation of the content for the 7 hour training session as well as during the 8-week reinforcement period. To elaborate, the 7 hour training session included didactic lectures, practical sessions based on the learner centred model, as well as dissemination of summarized information and web-based learning for continued education. The learner centered model places more responsibility in the hands of the students, and requires the instructor to serve as a facilitator of knowledge[25]. The didactic component included a refresher on the basic neuroanatomy of USN, best practice assessment and effective interventions as well as the latest research regarding patients' with USN inability to fixate on objects[27]. Because an increased sense of self-efficacy is linked to a higher use of EBP[16,28], a didactic lecture was devoted to increasing the clinicians' sense of self-efficacy. Clinicians re-learned the basics of EBP: how to search the literature, how to use the PEDro scale to appraise articles, what different levels of evidence exist etc. Clinicians also explored their own clinical habits using the PERFECT[21] and discussions surrounding self-efficacy took place. The practical, hands-on sessions included opportunities to learn how to administer assessments and treatments with equipment such as prism glasses and eye patches. Various educational tools and materials were created or adapted specifically to

enhance learning. Examples include instructions on how to administer the various assessments and treatments (see Figure 6.3) as well as copies of the presentations used throughout the day. In addition, clinicians received a quick reference pocket card (Figure 6.4) created for this study that contained key information on USN best practice assessment and effective treatments in accordance with the "Knowledge Tools" domain found in the Knowledge to Action Process model[17] (Figure 4.1).

Occupational therapists also had the opportunity to explore an online resource for clinicians related to stroke rehabilitation: www.strokengine.ca[29]. The USN module of this website found at: http://strokengine.ca/index.php?page=topic&id=32[6] provides quick access to synthesized research on assessment tools and treatment options, best practices as well as a "clinician how-to" for USN management that teaches clinicians how to administer various screening/assessment tools and interventions. It also contains a USN E-learning module http://elearning.strokengine.org/module.php[30] with interactive quizzes where clinicians were also able to view a series of videos on the administration of various assessment tools on actual patients. StrokEngine's creation and continued updating is funded by the Canadian Stroke Network a Canadian Institute of Health Research, Network of Centers of Excellence[31]. Please refer to Figure 6.5 for an agenda of the various activities that occurred during the 7 hour in-person USN KT intervention.

To encourage continued learning and interaction during the 8-week reinforcement period, an online teaching environment on Web-CT (an internet classroom) was created and gave clinicians access to learning materials, a discussion forum and a live chat feature. Educational materials were occasionally posted by the main researcher such as a new randomized trial on the

effectiveness of prism therapy[32]. Clinicians were also encouraged to ask each other questions related to difficult cases and share information on particularly interesting cases using the interactive chat feature. The researchers sent reminder e-mails every two weeks to encourage participation in the Web-CT discussion boards and in reading the educational material provided. Clinicians were instructed to keep a log of their time spent on Web-CT and StrokEngine, as well as a record of their activities such as reading a new study article, and to send this log to the research coordinator every two weeks. A student tracker option on Web-CT also kept a log of their total time spent on the online application, but not the activities they carried out. Clinicians were free to spend as much or as little time as they desired on these activities.

Measures

Personal and work environment characteristics were assessed via a questionnaire adapted from Jette et al.[33] and used in previous research on stroke clinicians entitled "*Barriers to Evidence-Based Physical Therapist Practice for People with Stroke"* [16]. The questionnaire will herein be referred to as the Barriers Questionnaire. The primary outcome, knowledge of USN best practices, was assessed via a structured Knowledge Questionnaire eliciting best practice knowledge on USN problem identification, assessment and treatment in relation to a patient with USN depicted in a case vignette. It was administered twice pre-intervention and once more post-intervention. EBP self-efficacy, the secondary outcome, was assessed using the EBP Self Efficacy Scale[16] prior to and following the 7 hour in-person training session. Each is discussed in detail below. See Figure 6.2 for a timeline of questionnaire administration.

Barriers to Evidence-Based Physical Therapist Practice for People with Stroke

This self-administered questionnaire elicits clinician and work environment characteristics[16]. The questions have been extensively tested for clarity and validity by Jette et al.[33] and used in several previous cross-Canada studies [8,34,35]. The 47 items on the questionnaire can be categorized into four sections all of which are rated on a 5-point Llkert scale ranging from *strongly agree* to *strongly disagree*, except for the items in the last section. Subsections include: 1) Opinion on EBP for example: "*EBP improves the quality of patient care*", 2) EBP education for example: "*I learned the foundations for EBP as part of my academic preparation*" 3) availability of resources such as access to research in the workplace and 4) clinician and work characteristics[16] including years of clinical experience with a stroke clientele and whether research is conducted in their work setting. Clinician and work characteristics were collected as they have been previously shown to explain in part best practice behaviours[16,36,37]. The Barriers Questionnaire takes approximately 30 minutes to complete excluding the EBP Self-Efficacy subscale[16].

Evidence-based Practice Self-Efficacy Scale

The EBP Self-Efficacy Scale is a subsection of the Barriers Questionnaire[16] and takes approximately 5 minutes to complete. It has been assessed for clarity and tested in a group of clinicians working in stroke rehabilitation[16]. EBP self-efficacy is defined as a clinician's perceived ability to execute EBP activities[16]. The Scale consists of 12 questions dealing with EBP activities where clinicians rate their confidence on a scale from *cannot do at all* (0%) to *certainly can do* (100%) in increments of 10% for each question. The average item-level scores yields a total score that can range from 0% to 100%, wherein higher scores indicate better self-efficacy. Questions begin with a typical self-efficacy framework of "*How confident are you in*

your ability to:...- "formulate a question based on the clinical problem to guide a literature search"? or, - "*critically appraise the literature for reliability and relevance*"?

Knowledge Questionnaire

The primary outcome, knowledge of USN best practice management was assessed using the 20-item Knowledge Questionnaire (scored out of 100) at each of the three measurement points. The Knowledge Questionnaire included elements adapted with permission from Menon et al. (2010)[21] and was created by the research team with guidance from experts in questionnaire design and stroke. It was then pilot tested on a convenience sample of 4 clinicians and validated on experts in questionnaire design and stroke to ensure there were no omissions or unclear questions. Where unclear, questions were modified. The final version contains four sections that elicit information based on a case vignette on the clinician's knowledge regarding: 1) USN problem identification (2 questions relating to the vignettes), 2) USN assessment use (9 questions; 5 questions relating to the vignettes and 4 dealing with the clinician's actual practices), 3) USN intervention use (3 questions: 2 relating to the vignettes) and 4) clinician knowledge of USN and best practice recommendations (6 questions, none relating to the vignettes). Please refer to Table 6.2 to view an abridged version of the questions from the Knowledge Questionnaire.

Question formulation for the Knowledge Questionnaire was based on the different levels of learning outlined in Bloom's Taxonomy[38]. To assess learning across various levels of complexity the 20 questions were created (Table 6.2) to cover a range of learning levels including knowledge, comprehension, application, analysis and synthesis and evaluation[38]. For example, question #1 requires synthesis of information "*In reviewing Mrs. T's case, which concern(s), if any, do you have regarding potential problems related to visual perception*?" Four analysis

questions are included such as Question #9 which indicates "*In an ideal world with ample time/equipment/space, which intervention(s) would you choose to use with Mrs. T given the type of USN she has*?" Seven questions relate to application. For example question #10 "*Are there any USN assessment tool(s) that you typically use to assess a patient like Mrs. T*?" Two questions deal with comprehension such as question #2 "*Which type(s) of USN, if any, do you think Mrs. T should be assessed for*?" Finally, 6 questions relate to the knowledge category, an example being question #3 "*Please name one area of the brain, which when affected by stroke, can lead to USN*" (Table 6.2).

Case Vignettes

Three case vignettes were created together by 3 experts in stroke rehabilitation. One was created for each of the three times at which clinicians were assessed. Each case vignette describes a typical patient with stroke and gives cues as to which type(s) of USN the patient has. For example, the first vignette gives cues to a possible near extrapersonal neglect as indicated by the difficulty the patient has in locating the phone on the table to her left. The use of vignettes has been found to be a valid measure to determine actual practices of clinicians and best practice guideline adherence[39].

The vignettes are presented below.

> Vignette #1: *Mrs. P is a 68 year-old retired teacher. She was admitted with a right hemisphere stroke to the acute care hospital where you work. On your initial assessment 2 days post-stroke Mrs. P is sitting in a regular chair. You enter the room on Mrs. P's left and observe that she doesn't notice your entry. At that point*

the phone rings and Mrs. P has difficulty locating the phone on the table to her left but then sees the phone and manages to grasp the receiver using her left hand.

Vignette #2: *Mr. C is a 52 year-old truck driver. He was admitted to the acute care hospital where you work with a mild left hemisphere stroke. On your initial assessment 3 days post-stroke, Mr. C is dressed and reading the morning paper in his chair. In conducting your assessment you determine that he is independent in all ADLs. On your request, Mr. C walks down the corridor with you and you notice that he seems inattentive to the food cart that is in the hallway on his right and bumps into it with his right hip. While walking, he mentions that he is anxious to get back to work. According to Mr. C's chart, he has a Mini-Mental State Examination (MMSE) cognitive score of 30/30.*

Vignette #3: *Mrs. T is a 75 year-old retired secretary and is currently the primary caregiver for her husband who has Parkinson's disease. She was admitted with a right hemisphere stroke to the acute care hospital where you work. On your initial assessment 3 days post-stroke, Mrs. T is sitting up in bed eating her lunch. You notice that she has only eaten the food on the right half of her plate. You ask her if she does not like the potatoes and vegetables (located on the left side of her plate) and she responds "what vegetables?" You also notice that she has only threaded her housecoat over her right arm and that her hair is nicely brushed, but only on the right half of her head.*

Procedures

Ethics approval was obtained from McGill University's Faculty of Medicine Institutional Review Board. For those who agreed, informed consent was obtained electronically during the first pre-intervention assessment. Clinicians were advised that they would complete a Knowledge Questionnaire at 3 points in time, 2 weeks prior and 1 week prior to the start date of the USN KT intervention and the third, 8 weeks later, at completion of the KT intervention. Vignette #1 was used in conjunction with the first Knowledge Questionnaire, Vignette #2 with the second, and Vignette #3 with the third. A reminder e-mail was sent prior to each time point. On each assessment date, the clinician was e-mailed instructions, the website link and a password. Clinicians had 30 minutes within the next two days to complete the Knowledge Questionnaire. If the clinician did not complete the Questionnaire within the allotted time, a reminder was sent.

On the morning of the 7 hour in-person USN KT intervention, written informed consent was obtained from each clinician (Appendix B), the Barriers Questionnaire[16] was completed as well as the EBP Self-Efficacy Scale[16]. Immediately following the 7 hour in-person USN KT intervention, the EBP Self-Efficacy Scale was re-administered. All measures were self-administered.

Sample Size

Sample size calculations were performed based on EBP USN knowledge acquisition, the primary outcome, which was measured using the Knowledge Questionnaire. The goal was to determine the preliminary effectiveness of the intervention as well as to determine an effect size around the primary outcome. Sample size calculations were performed using PC-Size software[40]. A sample of 17 clinicians would be sufficient to detect an actual improvement (effect size) in EBP

knowledge of a minimum of 15 points on the Knowledge Questionnaire, with power of 80% and an alpha of 0.05 using a two-tailed test. The Knowledge Questionnaire contains 20 questions with each question worth anywhere from 3 to 8 points. It was assumed that a 15-point difference out of 100 was a clinically significant improvement above that expected by chance alone. To account for potential withdrawals, 21 occupational therapists were recruited.

Data Analysis

Descriptive statistics were used to describe occupational therapists according to their clinician and work characteristics. As a preliminary analysis of intervention effectiveness and to gain an estimate of effect size, a pre-post comparison of clinicians' scores on the Knowledge Questionnaire was done using a repeated measures ANOVA[41] to signal changes between the mean of the two pre-intervention scores and the post-intervention score. To explore associations between each clinician and work characteristic and the level of EBP knowledge change from mean pre to post-intervention, a Spearman Rank Correlation analysis was performed[41]. To analyze improvement within the four subcategories of the Knowledge Questionnaire (problem identification, assessment, treatment, and knowledge of USN and best practices) as well as knowledge change by type of learning (knowledge, comprehension, application, analysis and synthesis) according to Bloom's Taxonomy[38], a repeated measures pre-post comparison of clinicians' item responses was performed using the Wilcoxon Signed Rank Test [41] to signal changes between the mean score of pre 1 and pre 2 and the post-intervention score on the Knowledge Questionnaire. This analysis of individual items on the Knowledge Questionnaire was done to explore change in score in certain sub-categories or levels of learning (e.g. change in knowledge versus change in application).

A paired t-test was used to compare the pre to post scores on the EBP Self-Efficacy Scale[16]. To determine the correlation between EBP self-efficacy and change on the Knowledge Questionnaire, a Pearson product-moment correlation analysis was done[41]. An analysis of study feasibility was assessed by the amount of time spent with online continuing education as well as dropouts over the 8 weeks. In order to determine if the amount of change on the Knowledge Questionnaire was associated with intensity of follow-up participation ascertained through Web-CT`s student tracker, a Spearman Rank Correlation analysis was performed[41]. Similarly, to determine if there is a correlation between the post EBP self-efficacy score and a dichotomous outcome of whether or not a clinician logged on to Web-CT/StrokEngine during the reinforcement period, a Spearman Rank Correlation analysis [41] was performed.

RESULTS: Phase 1

Two focus groups were held with 9 occupational therapists participating: 6 in the group held in English and 3 in the group held in French. Table 6.1 presents the clinicians' personal and work characteristics. None reported using a standardized protocol for assessment and treatment of USN in their facility.

Thematic analysis of clinicians' comments on facilitators and barriers to EBP knowledge and use revealed natural groupings forming the broad categories of institutional and personal factors. Responses grouped into four categories: institutional barriers, personal barriers, institutional facilitators and personal facilitators.

Institutional barriers and facilitators

Five main themes around institutional barriers emerged: organizational, resource, co-worker, managerial and patient factors. A prevalent organizational factor mentioned by most clinicians was the structure of the hospital unit, specifically working on a medical floor posed greater challenges versus working on a stroke unit.

> "It's very different working on a stroke unit compared to a regular medical floor. On stroke units, all you see is stroke so the care is very specialized and coordinated amongst team members. There are often specific protocols to follow which you don't have on a medical floor."

Another theme emerged around lack of resources, specifically lack of available time to spend on treatments for patients.

> "It's bad because we spend so much time charting or in meetings and that is time taken away from being with patients. If we had less charting, we would actually have time to offer treatments for USN and not just assess it."

A third theme mentioned by a few clinicians, was co-worker factors, more specifically, the difficulty posed by a lack of knowledge of USN by other team members and a lack of understanding of the occupational therapists' treatment goals.

> "Nurses and PABs (auxiliaries) don't know about USN so if we rearrange a patient's room for example in order to compensate or as a treatment for USN, it is completely undone by the next day. It's very frustrating to have to explain to workers on every changing shift that the patient has USN and that we're trying to treat it."

The fourth theme dealt with managerial factors. All clinicians felt great pressure to perform.

> "We have to see as many patients as we can each day even if that means lowering the quality of services we provide."

The final theme emerged around patient factors, specifically how it is sometimes difficult to attempt best practices with a particular patient.

> "It's hard to work with a patient who is completely unmotivated or even refuses assessment. It's even worse if there is a language barrier involved."

Five main themes emerged in terms of institutional facilitators including organizational, continued learning, managerial, resource availability and patient factors. When asked about organizational facilitators, several clinicians mentioned being part of a university affiliated hospital.

> "Being part of a university affiliated hospital is good as it forces us to keep up with the research and use it in practice; it's our mandate. Also having student placements helps because they teach us new things that have evolved since we were in school."

The following were the specific facilitators related to continued learning described by all clinicians: the presence of a stroke team or strong multidisciplinary team, having dedicated educational days set aside each year, having access to learning materials such as computers, journals, and stroke rehabilitation specific synthesized online information such as www.strokengine.ca[29] and http://ebrsr.com[42].

> "We don't have time to sit in front of a computer and read article after article. That's why online sites like StrokEngine and EBRSR are great because we can get the updated information we need quickly."

> "Having educational days where we can go to a seminar or conference is great because you learn so much about a topic that is interesting and relates to your clientele."

The third theme dealt with managerial factors, specifically that learning or use of EBP is maximized when enforced by management.

> "We're definitely much more likely to read articles or incorporate EBP into our practice if it's a mandate from the manager."

The fourth theme emerged around patient factors and how a supportive family is a great asset to both the patient and occupational therapist.

> "It's great when the family is present and supportive. You can involve them in the treatment process since we don't always have the time to give as much treatment as is necessary."

The final theme mentioned by a few clinicians encompassed resource factors, specifically how external help such as an occupational therapy assistant is necessary.

> "In acute care we don't have the time to provide every patient with the frequency of treatments they need. An occupational therapy assistant would be great because then they could carry out the treatments that we plan for the patient."

Personal barriers and facilitators

When asked about personal barriers, three main themes emerged namely attitudes, education factors and personal life factors. Within the attitudes theme, the majority of clinicians mentioned that a lack of willingness to change practices and lack of interest in research and adopting best practices can act as a personal barrier.

> "I am all for using best practices and updating my practice as the years go by, but some of my colleagues are set in their ways and don't want to change the assessment tools or treatments they give patients."

> "Some clinicians just don't like reading about research and they don't think it's their job. So they don't use new research in their everyday practice."

The second theme emerged around education factors. Every clinician said they lacked basic EBP skills.

> "I only learned a little bit of EBP in school, just the basics but since I haven't used it I've forgotten. I don't know how to appraise an article and I don't usually understand more difficult statics either."

The third theme dealt with personal life factors and how one's age or home situation can act as a personal barrier as perceived by others.

> "If you aren't married with kids, you are more likely to be able to go to conferences or read up on articles at night."

> "I can see that the older therapists who are closer to retirement don't care to put in as much effort to stay up to date with research because they're retiring soon."

Three key themes emerged around personal facilitators. These include personal habits, belief, and educational factors. The first theme dealt with personal habits and how organization can lead to increased knowledge of EBP.

> "Working in acute care you need to have good time management skills in order to balance a large caseload yet still have time left over to stay up to date with research."

The second theme mentioned by a few clinicians was personal beliefs related to best practice and the importance thereof.

> "If you believe in best practices and their positive impact on the patients, you're more likely to use them."

Education factors were the last personal theme echoed by all clinicians. Facilitators to knowledge and use of EBP were identified as having higher education such as a Masters degree, being a more recent graduate who received EBP training in school and, having an inquisitive practice style whereby you constantly seek new information.

Interventions to increase clinician knowledge

When asked the question "please share your opinion on what an ideal intervention geared towards increasing a clinician's knowledge of and use of standardized assessments and effective interventions would look like" clinicians discussed many strategies which grouped into the following themes:

- Practicing assessments and interventions on other clinicians will help to integrate new knowledge
- Accessing online modules that provide a quick and easy reference to synthesized evidence, quizzes, case studies, videos, pictures and practical examples etc.
- Pre- and post-testing of knowledge regarding best practices so that the clinician can quantify learning
- Follow-up period after a conference/learning session to share experiences and receive feedback (e.g. online forum)
- Obtaining a certificate of recognition at end of a course/seminar
- Pocket cards summarizing essential clinical management information
- Learning that is "enforced by management"

DISCUSSION: Phase 1

This study is the first that we are aware of that highlights the institutional and personal barriers and facilitators to using EBP specific to occupational therapists treating post-stroke USN.

Several identified institutional barriers to EBP such as a lack of staffing and time along with budget restraints, have been found in other studies on rehabilitation professionals across the continuum of care treating general medicine as well as stroke [16, 28]. Similarly, personal facilitators found in this study such as higher education and being a more recent graduate, have been found in other EBP studies[16,36,37]. Conversely, our study found numerous institutional barriers specific to occupational therapists in acute stroke rehabilitation that have not yet been identified. Working on a medical floor instead of a stroke unit for example, was a major institutional barrier mentioned by many clinicians. Stroke units are comprised of an expert interdisciplinary team of health professionals working cohesively and closely to provide a comprehensive program for each patient[29]. It has been shown that clinicians working on a stroke unit follow best practice

guidelines to a greater extent resulting in better patient outcomes as well as reduced mortality[43]. Unfortunately, most hospitals represented by our clinicians did not have a stroke unit. Indeed, implementing a stroke unit is a difficult process that requires resources, staffing and funds[44].

On the other hand, clinicians mentioned that easy access to synthesized stroke research facilitates their learning and use of EBP in daily practice. This represents a facilitator that can be enhanced, according to Graham et al.[17] through the dissemination of knowledge tools. Clinicians also mentioned that hosting student placements was a great institutional facilitator as it helped to increase their own knowledge. This association between clinicians having increased knowledge and receiving students has also been found in several other studies assessing clinicians' practices in stroke across the continuum of care[8,34,35,45].

The main personal barrier agreed upon by all clinicians was a lack of basic EBP skills which include the ability to search for articles, critically appraise them and understand the different levels of evidence. These results were also found in several other studies[16,36,37]. For example, in a survey of 270 physical therapists treating people with stroke, over 30% mentioned lack of research skills and understanding statistical analysis as a major barrier[16]. This barrier however, can be modified if clinicians received further EBP education either during their training or through continuing education courses. A standardized tool: "Evidence-based practice confidence Scale (EPIC)"[46], was recently developed by Salbach and colleagues (2010) and validated to measure a clinician's sense of self-efficacy in executing EBP activities.

Future directions

Now that the barriers and facilitators to EBP use in acute stroke care have been identified, the subsequent step would be to select, tailor and implement a KT intervention in accordance with

the Knowledge to Action Process model[17]. As the KT intervention for the pilot study was designed, the abovementioned modifiable barriers and facilitators were taken into account.

RESULTS: **Phase 2**

The USN KT training session was held in May 2010 in Montreal, Canada. From the 44 occupational therapists randomly selected to participate from Quebec and Ontario, 35 were reached by telephone using vigorous recruitment strategies within the two week recruitment period. Two clinicians were ineligible as they saw too few patients with stroke per month and 12 (36%) refused to participate. Of those who refused, five were unable to participate because they could not receive permission to take a full day or two (for those travelling from out of province) off work, four had personal reasons such as having prior commitments on the day of training, and three indicated they were not interested.

Feasibility

The remaining 21 occupational therapists agreed to participate and 20 completed the study (one clinician withdrew for medical reasons). Most clinicians completed the timed 30 minute pre, pre, post online Knowledge Questionnaire within the 48 hour allotted period of time. However, reminder e-mails needed to be sent to two clinicians for the first pre-intervention assessment and six clinicians for the post-intervention assessment.

Clinician knowledge of best practices

Most clinicians were female, held a bachelor's degree and worked in a teaching institution (see Table 6.3). At baseline, most clinicians scored higher on questions from the Knowledge Questionnaire related to time to initial evaluation and providing treatment to patients exhibiting

USN symptoms (See Figure 6.6). On the other hand, the mean score for questions pertaining to identifying the problem, screening and assessment were quite low (Figure 6.6).

The mean scores for each question on the Knowledge Questionnaire at each assessment point are shown in Figure 6.6. As a group, clinicians scored higher on the post-intervention questions than on those of the combined pre assessments. The average scores on both the first and second pre- intervention Knowledge Questionnaire did not differ and were low, 39.65 (±11.25) and 38.05 (±11.17), whereas the mean post-intervention score was significantly higher than the mean of the two pre assessment scores ($F= 192.159$; $DF =19$; $p<0.000$) (see Figure 6.7). On 17 out of the 20 Knowledge Questionnaire items, overall mean scores on the second pre assessment were similar to those obtained on the first pre assessment. However, a trend was observed for three questions (#8, #9 and #10) dealing with selecting the appropriate screening and assessment tools based on the type of USN the patient had, where the second pre assessment mean scores differed greatly from those of the first pre assessment. On these questions, 14, 7 and 8 clinicians respectively received partial or full points on pre test 1 (vignette cues suggesting personal and near extrapersonal USN), but scored zero on pre test 2 (vignette cues suggesting far extrapersonal USN only) (Figure 6.6). The remaining clinicians received no points on the above questions for either pre tests.

The range of change in scores from pre to post-intervention on the Knowledge Questionnaire are presented in Figure 6.8. All clinicians improved in their scores by post-intervention anywhere from 15 points to 42.5 out of a total possible score of 100. Change was observed in questions from each of the subcategories of the Knowledge Questionnaire: problem identification, assessment, treatment, and knowledge of USN and best practices. The most

frequent change (18/20 clinicians) was observed in an analysis question (Question #8) that asked what screening tools the clinician would use to evaluate a patient with a certain type of USN. The least frequent change (1/20 clinicians) was observed in an application question (Question #13) that asked if clinicians treated patients who exhibited USN symptoms (Table 6.2).

Results from the Wilcoxon Signed Rank Test show the amount of improvement in knowledge from mean pre to post on each question from the Knowledge Questionnaire (significance is set at $p \leq 0.01$) (see Table 6.2). When analyzed by sub-category, all clinicians improved in knowledge in all problem identification questions. For example, 95% of clinicians could differentiate between the three types of USN following the intervention compared to only 58% before. Clinicians significantly improved in four out of eight questions in the screening and assessment sub-category. One comprehension question that failed to reach significance asked for the ideal timeframe to initial assessment. Prior to intervention, only 15% of clinicians differentiated a USN screening tools (e.g. Line Bisection Test, Comb and Razor Test) from a USN assessment tool (e.g. Rivermead Behavioural Inattention Test) compared to 95% post-intervention. In terms of responses related to treatment, clinicians significantly improved on their knowledge of effective interventions on one out of three questions (Table 6.2). The application question for which improvement was not significant from mean pre to post, dealt with whether or not clinicians provide any treatment to patients who exhibit USN symptoms. 90% of clinicians were able to identify effective USN treatments post-intervention compared to 15% pre-intervention. Significant improvement was also found in four out of six questions in the basic knowledge of USN and best practices category. Significance was not reached for the two knowledge questions dealing with having heard of and read the Canadian Best Practice Guidelines for stroke. 100% of clinicians could identify online resources for synthesized material

on USN assessment and treatment as well as best practices in stroke following the intervention versus 40% prior to the intervention (Table 6.2).

When the results of the Wilcoxon Signed Rank Test were analyzed according to the levels of learning outlined in Bloom's Taxonomy[38], clinicians improved more on certain levels of learning than others (Table 6.2). Clinicians significantly improved on the one synthesis question which required them to identify any potential problems related to visual perception in relation to the case vignette. 15% of clinicians correctly identified the problem pre-intervention compared to 90% post-intervention. Similarly, improvement was found on all three analysis questions requiring clinicians to list the screening tools, assessments or interventions they would choose in relation to the case vignette in an ideal world with ample time and resources. Clinicians improved on four out of six knowledge questions. Significant improvement was noted on one out of the two comprehension questions and on two out of the seven application questions (Table 6.2).

When factors associated with knowledge change (clinician and work characteristics) were correlated with actual knowledge change on the Knowledge Questionnaire, differences in knowledge gain were detected based on these explanatory variables. Correlations were calculated with only 7 explanatory variables given the small sample size and presence of uneven distribution in some cases (e.g. gender was not tested as the female to male ratio was 19:1). Of the 7 variables that were studied, only 3 were found to be associated with a detectable difference knowledge change. Clinicians holding bachelor degrees and those who did not supervise students had greater mean changes in score on the Knowledge Questionnaire compared to those who held master's degrees and supervised students. Similar pre-intervention scores were found in those with bachelors and masters degrees but not for clinicians who supervised student versus those

who did not (42.87 vs 26.75). Those who worked in a stroke team also had greater mean changes in knowledge than those who did not.

Self-Efficacy in Evidence-based Practice

A significant positive change (t=-2.144, DF=19, p=0.045) in the mean EBP Self-Efficacy Scale scores were seen from pre to post-intervention (see Figure 6.9). There was a weak positive correlation between scores on the post EBP Self-Efficacy Scale and scores on the Knowledge Questionnaire (r =0.187).

Participation in follow-up

Fifty percent (n=10) of clinicians submitted their bi-weekly log sheets documenting their activities and time spent on the Web-CT platform as well as on www.strokengine.ca[29]. These clinicians spent anywhere from no time to a maximum of 30 minutes on Web-CT during a given week. Compliance to follow-up was also estimated from a student activity tracking option on Web-CT that confirmed that 10 clinicians (50%) never logged on to Web-CT within the 8 weeks. Six clinicians logged on only once, one logged on twice and another clinician logged on four times. One clinician used Web-CT 8 times and another logged on 15 times. The total average time the group spent on Web-CT during the reinforcement period was 18 minutes. Activities carried out on Web-CT included reading posted educational materials (research articles and stroke best-practice guidelines) as well as reading and commenting on discussion board posts regarding patient cases. Comments on the discussion board included "*I have recently been working with a client that seems to show neglect on both the right and left. On the Albert's test she missed the lines on both the far right and left sides. Help*!" and "*Can someone please explain*

what it means by omission of 2 or more lines on one half of the page indicates USN on the Line Bisection Test?"

These same 10 clinicians who reported logging on to Web-CT also reported reading on USN on www.strokengine.ca[29]. They spent anywhere from 15 minutes to 2 hours on StrokEngine, but were not able to do so each and every week. Clinicians spent significantly more time on StrokEngine than on Web-CT. The total average time the group spent on StrokEngine over the 8 week period was 45 minutes. The 10 clinicians who did log on to Web-CT or StrokEngine had a higher first pre-intervention mean score compared to those who never logged on (42.83 versus 34.87). This difference in score continued post-intervention as the average score on the post-intervention Knowledge Questionnaire for those who logged on to Web-CT or StrokEngine was 69.41 versus 61.37 for those who never used these online resources. The Spearman correlation coefficient was -0.089 between clinicians' post EBP self-efficacy score and having logged onto Web-CT or StrokEngine.

While clinicians were not required to contact the research team and opinions on the intervention were not solicited, five clinicians voluntarily e-mailed the research team with their feedback. All were positive comments on the usefulness of the information provided for their continued learning and clinical practice such as "I would like to thank you for the course. It was inspiring and exciting to be at McGill and see all the excellent work you are doing to improve EBP with OTs. I have been all over www.strokengine.ca over the past 2 days!" and "I would like to take a minute to congratulate and thank you and your team for the great education experience you offered us! This is precious knowledge for our clinical work and your dedication, energy and high professional standards are a real inspiration, especially for an "old" therapist like me!"

DISCUSSION: Phase 2

This is the first study to our knowledge, to pilot test a multi-modal USN KT intervention aimed at increasing USN best practice knowledge in occupational therapists.

Our USN KT intervention provided clinicians with learning opportunities that significantly improved their overall knowledge of best practices in post-stroke USN management. However, within each level of learning category, certain questions demonstrated less learning on the clinician's part (Table 6.2). When further analyzed, the ceiling effect was found to be the cause of the lack of statistical significance for eight questions on the Knowledge Questionnaire described in the results. For those select questions, most clinicians had already scored the maximum number of points on the double baseline measurement and thus could not further improve on the post-intervention assessment.

Clinicians significantly improved their knowledge on several key components essential for best practice USN management. Interestingly, a large percentage of clinicians were unaware of the three types of USN[3] (personal, near extrapersonal and far extrapersonal neglect) prior to the KT intervention. Each type has different functional limitations associated with it. For example, in personal neglect the patient may wash only one side of their body[4]. Personal neglect has implications for functional independence in basic activities of daily living (ADLs). In near extrapersonal neglect, a patient may ignore food on one side of the plate and would be unable to read which can have serious implications for ADLs, and instrumental activities of daily living. Finally, far extrapersonal neglect can lead to collisions with objects in the environment which has serious implications for community mobility and driving[4]. If a type of USN goes unnoticed, it will not be assessed and therefore, not treated leading to potentially serious consequences[2].

The largest improvement in knowledge was made within the assessment subcategory as clinicians significantly improved their understanding of the difference between a screening tool and an assessment tool. Typically, screening tools are quick tests that highlight areas of concern and guide the clinician in choosing a formal lengthy assessment which has the capacity to detect clinical change over time[4]. Prior to the USN KT intervention, the majority of clinicians were utilizing screening and assessment tools interchangeably. An interesting finding was the observed trend that many clinicians could correctly choose the appropriate screening and assessment tools for near extrapersonal neglect, but were unable to do so for far extrapersonal neglect (Figure 6.6). A possible explanation is that few screening and assessment tools exist for personal neglect and only one standardized assessment tool exists for far extrapersonal neglect[4]: the Catherine Bergego Scale[47]. Thus it is likely that clinicians have been trained on the more common near extrapersonal paper and pencil tests.

Change in clinician knowledge regarding the effectiveness of interventions used in the treatment of USN was moderate. Most clinicians (95%) already offered USN interventions to patients requiring them prior to the USN KT intervention. Half of clinicians knew of some effective USN interventions prior to the USN KT intervention. Given that there exists only a select few interventions that have been proven to improve USN symptoms: prisms, eye patching, limb activation, visuo-motor imagery, trunk rotation [6] as well as virtual reality[7]; it is likely that clinicians learned about several effective interventions during their university training (for the more recent graduates) or during continued learning (for more senior clinicians).

Clinicians improved their knowledge of resources useful in quickly obtaining best practices for USN and stroke management. Clinicians familiarized themselves with

www.strokengine.ca[29] a comprehensive website that offers synthesized research findings on best practices for stroke related assessments and treatments. Since a major barrier to EBP use mentioned in the focus groups in Phase 1 was time constraint and quick access to synthesized information on stroke rehabilitation was pointed out as a facilitator, increased awareness of resources such as these should be a priority. One possible avenue researchers have to market their knowledge tools[17], is to involve the professional orders who can inform their members of these resources.

Our results showed that those who held bachelor degrees and did not supervise students had greater mean change scores on the Knowledge Questionnaire. This is concurrent with previous research demonstrating that those with higher education (master degrees) and who supervise students, had higher knowledge of EBP [8,34,35]. Thus, those clinicians with bachelor degrees and who do not supervise students may have had more to learn and thus had more room to improve than the other participants. However, results also indicated that those who worked on a stroke team also had greater mean change scores. It would be interesting to further study this variable in a larger sample powered to find significance in variables such as this that have previously been shown to be associated with EBP[8,16,28,34,35].

EBP self-efficacy improved significantly from pre to post. It is important for clinicians to feel confident in carrying out EBP activities as an increased sense of self-efficacy is linked with an increased execution of EBP activities[16,28]. Higher scores on the post EBP Self-Efficacy Scale were found to be negatively correlated with clinicians logging on to the continuing education websites (Web-CT and StrokEngine). This is perhaps because clinicians who had higher self-efficacy felt more confident in their EBP skills and did not feel the need to improve their EBP

knowledge and skills, whereas those with lower self-efficacy scores felt the need to increase their knowledge of EBP in stroke management.

Half of the clinicians did not log on to Web-CT or learn from StrokEngine during the reinforcement period. These findings are similar to those found by McClusky et al. (2005)[48] who tested a KT intervention on 114 occupational therapists working with all types of clientele. They reported that only 41% of their clinicians searched electronic databases twice or more over the 8 week follow-up period. Lack of time is a prominent barrier[16] and most likely a large contributor to the little time clinicians spent on these online educational sites and why 50% never logged on. However, given the results that those who did log on to Web-CT or StrokEngine had higher mean pre and post-intervention scores on the Knowledge Questionnaire, the clinician's practice style trait may have also been a contributing factor. According to a survey conducted in 2007 on 243 stroke rehabilitation clinicians[49], being a "seeker" is one of four possible practice style traits that a clinician can possess. A seeker bases their practice on published evidence and frequently uses electronic resources for learning [49]. It is plausible that the 10 clinicians who did log on to the online continued learning resources were seekers.

The implementation of a reinforcement or follow-up period is important as it allows the researchers to gain an estimate of actual knowledge acquired and sustained through time which is in accordance with other KT studies[50-52]. Several studies have found an increase in knowledge immediately following a KT intervention[48,52,53]. A follow-up period is essential if the goal is to increase clinicians' knowledge and ensure that they can sustain it and even acquire new knowledge on their own in the future.

LIMITATIONS

The focus group study sample may have underrepresented the normal range of possible clinician experiences thus impacting on how soon saturation was reached. For example, no comments were mentioned about USN assessment tools or treatments, possibly because none of the participants had regular experiences with these. For the Knowledge Questionnaire, some may argue that case vignettes and questionnaires overestimate or underestimate clinical practices. However, cases depicting patients have been shown to be a valid means of estimating practice variations[39]. Possible limitations of using an online completion method for the Knowledge Questionnaire include clinicians looking to outside sources for answers as well as possible distractions while completing the test which may negatively impact on their score. However, this method was considered optimal as it increased study feasibility as clinicians were dispersed across Quebec and Ontario, eliminated costs associated with a face-to-face interview administered questionnaire and allowed clinicians to answer the questionnaire at their convenience. Last, because this was a pilot study, the sample size in Phase 2 was small. Despite this restraint, significance was found for both the primary and secondary outcomes, thus the sample size was sufficient to meet the objectives of this study.

CONCLUSION

This study's findings suggest that the use of a multi-modal KT intervention based on expressed barriers and facilitators to EBP use and Graham's Knowledge to Action Process model[17] can significantly improve occupational therapists knowledge of USN EBP in problem identification, assessment and treatment. This information should help advance best practices in post-stroke USN management as well as KT interventions in the rehabilitation field. Future studies are needed to validate these findings in a randomized control trial to see if the KT intervention does indeed lead to improved knowledge compared to a control group. Studies are also required to test if increased knowledge of EBP leads the adoption of best practices into daily clinical practice and if this in turn translates into improved patient outcomes.

Acknowledgements:

Anita Petzold is funded by a fellowship award from the Fond de la Recherche en sante du Quebec (FRSQ), and Nicol Korner-Bitensky by a senior career award from FRSQ. This work was funded by an Edith Strauss Knowledge Translation Grant from the School of Physical and Occupational Therapy at McGill University. We would like to thank all of the occupational therapists who participated in this research study as well as Julie Lamoureux for her statistical support. We would also like to acknowledge the Canadian Stroke Network/CIHR for their continued support.

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Table 6.1: Clinicians' personal and work characteristics (n=9)

Characteristic	n
Gender (female)	8
Age:	
19-25 years old	4
26-35 years old	5
Bachelor degree	9
Years of experience:	
<1	2
1−5	5
6−10	1
11−15	1
# of patients with stroke seen/month	6−10
# of patients with USN seen/month	1−3
# of clinicians using a standardized USN protocol	0

Table 6.2: Knowledge Questionnaire items and associated results from the Wilcoxon signed rank test

Question Category -level of learning		**Signed Rank**	**p – value**
Problem identification			
Q1 - S	Which concern(s), if any, do you have regarding potential problems related to visual perception for Mrs. P?	+8	0.010
Q2 - C	Which type(s) of USN, if any, do you think Mrs. P should be assessed for?	+14	0.005
Assessment			
Q4 - AP	How soon post-stroke (if at all) do you typically perform your initial evaluation to identify USN?	+6.5	0.017
Q5	If you do not perform an initial evaluation for USN, skip to question #9.		
Q6 - AP	How do you go about evaluating a patient for USN at the initial evaluation?	+5	0.046
Q7 - C	In an ideal world, how soon post-stroke would you perform your initial evaluation to identify USN?	+2	0.281
Q8 - AP	Which USN *screening* tool(s) would you typically use to evaluate a patient like Mrs. P?	+16	0.000
Q9 - AN	In an ideal world, which specific *screening tool(s)* would you use to evaluate Mrs. P given the type of USN she has?	+19	0.000
Q10 - AP	Are there any USN *assessment tool(s)* that you typically use to assess a patient like Mrs. P?	+13	0.001
Q11 - AP	If you have performed an initial evaluation that identifies USN, do you typically evaluate the patient again?	+6.5	0.038
Q12 - AN	In an ideal world, which specific *assessment tool(s)* would you use to evaluate Mrs. P given the type of USN she has?	+18	0.001
Treatment			
Q13 - AP	Do you provide treatment to patients who exhibit USN symptoms?	+1	0.317
Q14 - AP	If yes, specify which treatment(s) you typically use.	+9	0.026
Q15 - AN	In an ideal world, which intervention(s) would you choose to use with Mrs. P given the type of USN she has?	+17	0.001
Knowledge of USN and best practices			
Q3 - K	Name at least one area of the brain which when affected by stroke can result in USN.	+11	0.011
Q16 - K	List the USN interventions you believe are effective.	+12	0.000
Q17 - K	According to best practices, how soon after the occurrence of a stroke should screening for USN take place?	+15	0.005
Q18 - K	List any online resources for clinicians that you are aware of that contain best practices for stroke rehabilitation.	+10	0.002
Q19 - K	Were you aware that Canadian Best Practice Stroke Guidelines exist for stroke?	+3	0.083
Q20 - K	If you answered "yes" to question #19 – have you seen these Guidelines?	+4	0.059

Legend:

Significance set at $p \leq 0.01$

S= Synthesis, C= comprehension, AP=Application, AN=Analysis, K=Knowledge

W+=190

Table 6.3: Characteristics of clinicians and work environment (n=20)

Characteristic	n (%)
Clinician:	
Gender (female)	19 (95)
Age range	23-51
Highest degree obtained:	
Bachelors	14 (70)
Entry-level Masters	4 (20)
Masters	2 (10)
Years of stroke experience:	
<3	6 (30)
4-10	9 (45)
>11	5 (25)
Supervises students	16 (80)
Work:	
# of stroke seen per day	
<2	4 (20)
2 to 5	12 (60)
6 to 10	4 (20)
Teaching institution	19 (95)
Stroke research conducted	10 (50)
Presence of a stroke team	9 (45)

Figure 6.1: Focus group questions

Introductions, facilitators & barriers

1) *Let's go around the table and briefly introduce ourselves by first names only.* Since you all work in an acute care stroke setting, I'd like for each of you to also tell us about your practice related to post-stroke USN. For example, you may want to describe how many patients you see with stroke in any given month and how many of them have USN, whether there is a protocol used in your setting in terms of assessment and treatment etc.

2) Now we are going to talk about the factors in your institution that you feel help facilitate practice by you or your colleagues. What organizational, managerial, resource or material factors help you achieve your desired practice?

3) Now we are going to discuss a different type of facilitator – personal facilitators. When you look at your colleagues, what personal factors, that is, their personalities, beliefs, education or experiences, do you think help them to optimize their practice in the use of standardized, timely assessment and effective interventions?

4) That was a great discussion on the facilitators to practice. Now we are going to shift gears and talk about the barriers that hinder practice making it different from our desired practice in the management of post-stroke USN. That is what aspects of your institution, its policies and procedure, the management or other healthcare workers act as barriers to you or your colleagues?

5) Now we are going to discuss a different type of barrier – personal barriers. When you look at your colleagues, what personal characteristics that is, personalities, beliefs, education or experiences etc, hinder their practice?

Knowledge translation strategies

6) Now I would like to switch your thinking and ask you to remember some different educational strategies (e.g. conferences, in services, web-based searches, library support etc) that you have found useful. What different kind of learning setting have you been exposed to and what did you find helped you learn and what didn't? We can just go around the table and state a few learning tools that helped us in the past.

7) You have all mentioned many barriers and facilitators to our desired practice use earlier in this focus group. Keeping these and the educational strategies we have just discussed in mind, please share your opinion on what an ideal intervention geared towards increasing a clinician's knowledge of and use of standardized assessments and effective interventions would look like. What components are needed in order to ensure good learning as well as what could help to decrease the barriers and increase the facilitators? I'll give you 5 minutes to think about this question then we'll go around the table.

Figure 6.2: Phase 2 timeline

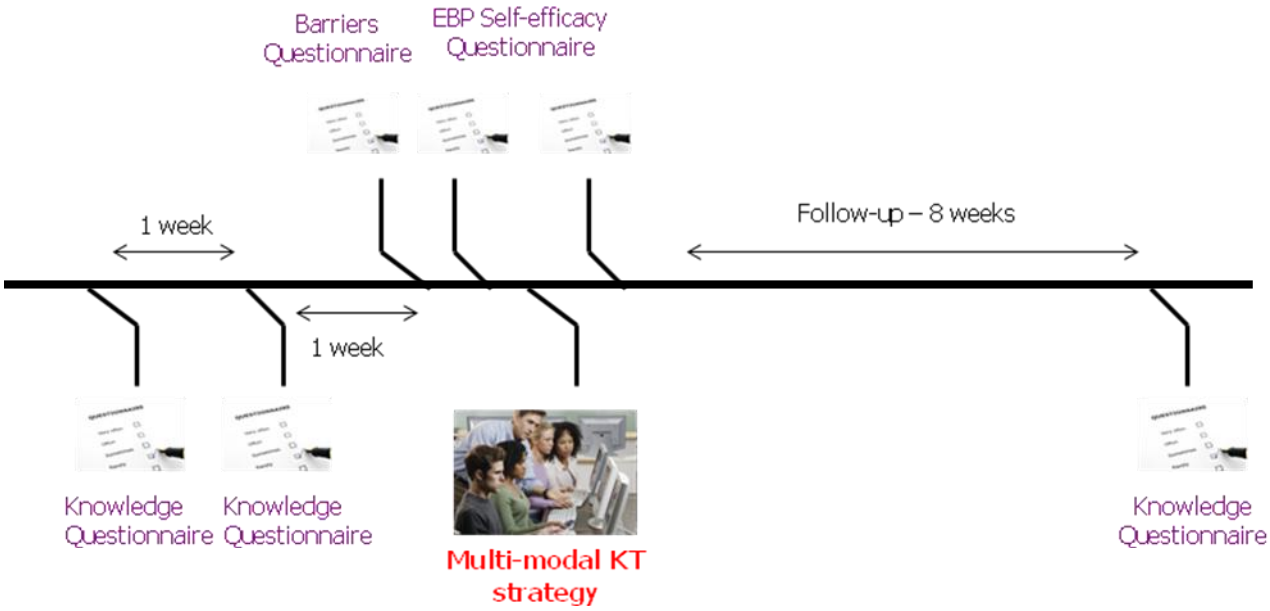
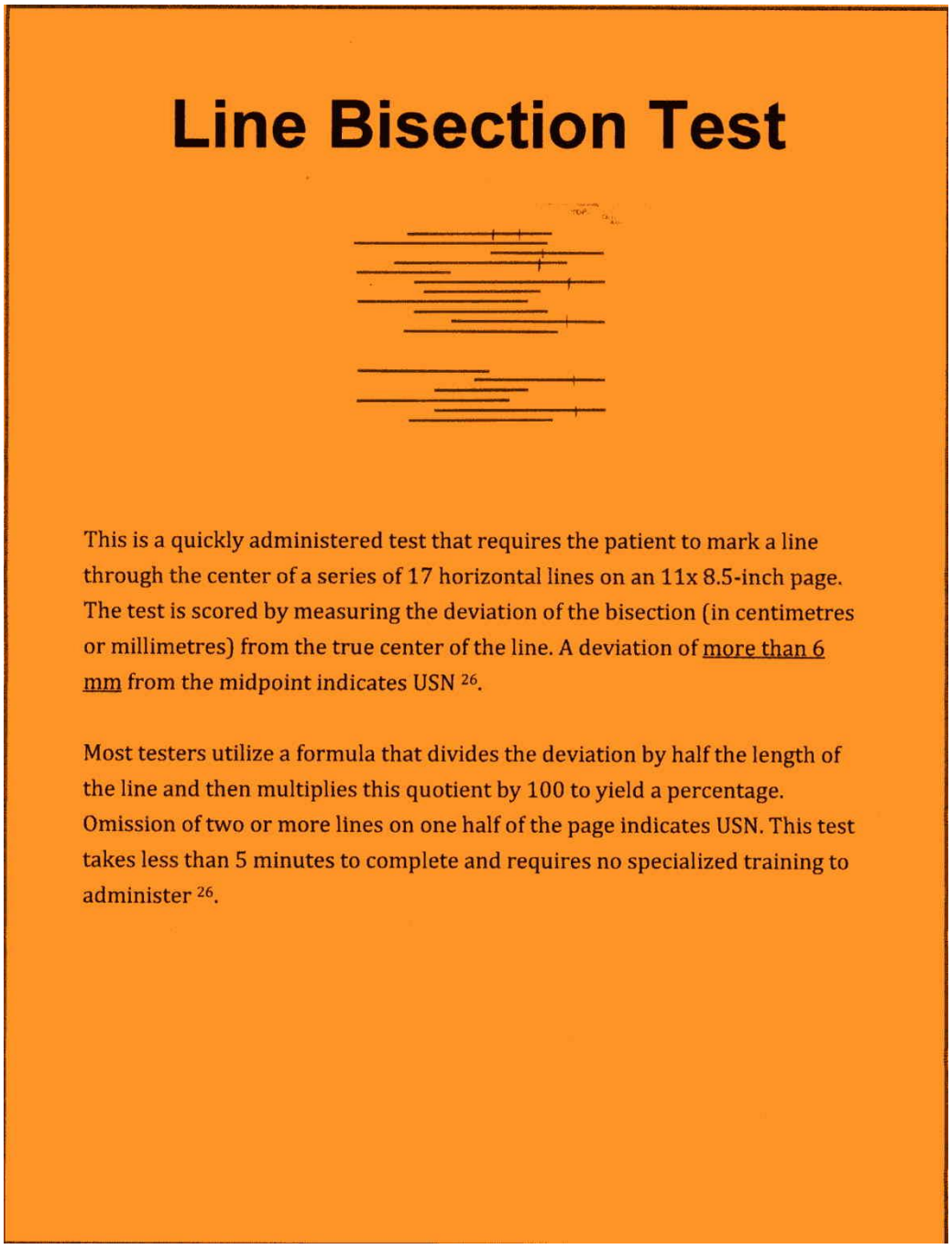


Figure 6.3: Assessment and treatment instruction sheets used during the practical hands on sessions

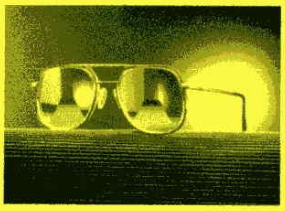


Line Bisection Test

This is a quickly administered test that requires the patient to mark a line through the center of a series of 17 horizontal lines on an 11x 8.5-inch page. The test is scored by measuring the deviation of the bisection (in centimetres or millimetres) from the true center of the line. A deviation of more than 6 mm from the midpoint indicates USN [26].

Most testers utilize a formula that divides the deviation by half the length of the line and then multiplies this quotient by 100 to yield a percentage. Omission of two or more lines on one half of the page indicates USN. This test takes less than 5 minutes to complete and requires no specialized training to administer [26].

Fresnel Prisms

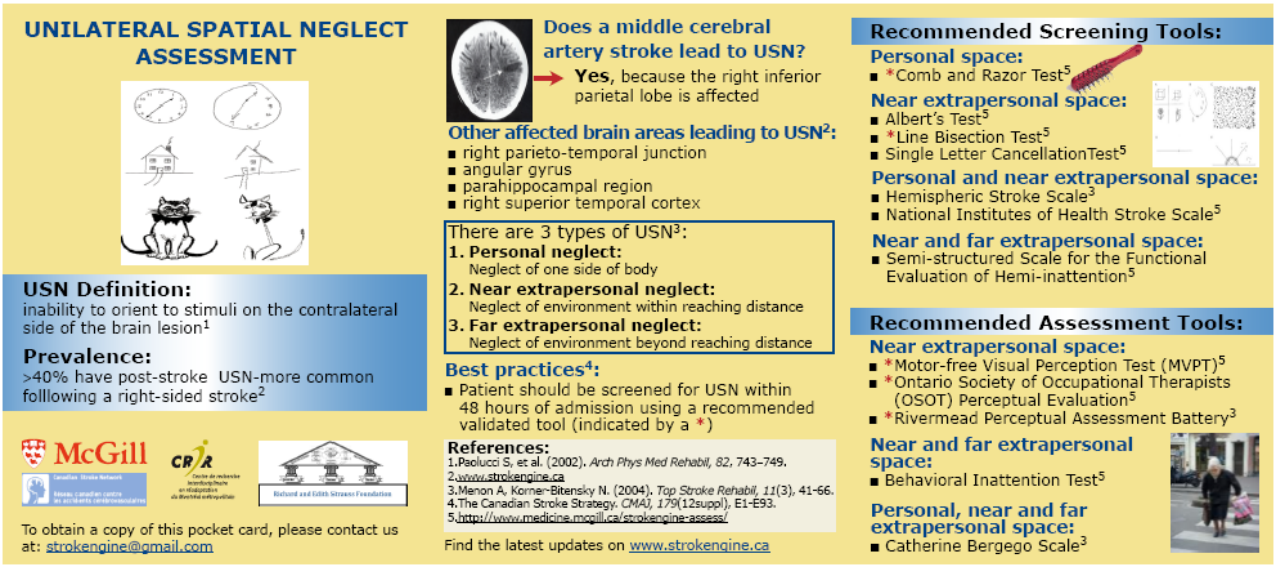


Administration procedures: To administer fresnel prism therapy, the patient must wear the prisms (deviates their visual field 10° to the right) on their glasses or on goggles. Next, the therapist must engage the patient in a visual scanning task where they repetitively point or reach for two different targets located at each side of their field of vision.

Treatment schedule: According to research, the intensity of repetitions varied from 30 to 100 per treatment. The frequency of treatment also varied from 5 sessions of 10 minutes over 2 weeks, to two 20 minute treatments per day for 2 weeks or 30 minutes of scanning performed daily, 5 times per week for 2 weeks [10-13].

Please try on the Fresnel prism glasses and repetitively touch each end of the table with your left hand (use the hand of the side affected by USN). Notice how your field of view is deviated towards the right. This helps patients perceive the area on their left as it is shifted to the right.

Figure 6.4: USN Pocket card



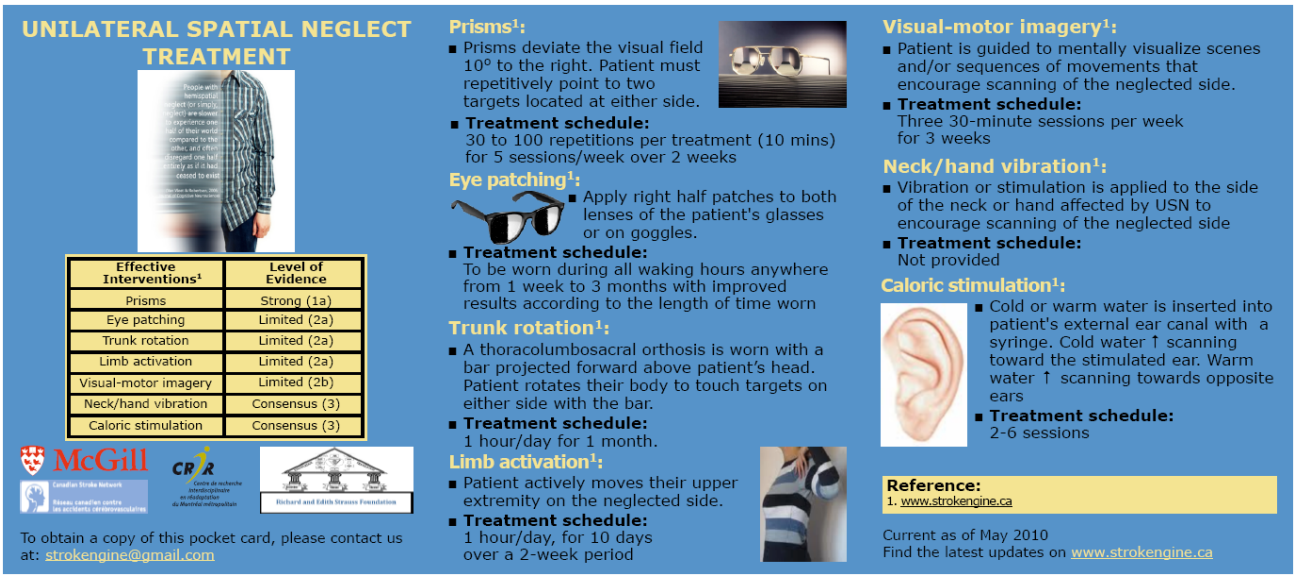


Figure 6.5: Agenda for 7 hour in-person USN KT intervention

8:30-8:50	Signing consent form, completing the Barriers and Self-Efficacy Questionnaires
8:50-9:00	Introduction and overview of the course
9:00- 9:30	Current management of USN in Canada
9:30-9:50	Refresher on the basics of USN and latest USN research regarding lesion location
9:50-10:00	A clinician's personal experience in USN management
10:00-10:15	**BREAK**
10:15-11:00	Introduction to www.strokengine.ca and completion of USN e-learning module
11:00-11:15	Feedback session on USN e-learning module
11:15-12:00	Accurate problem detection: screening versus assessment
12:00-12:45	**LUNCH BREAK**
12:45-1:00	Dissemination and review of assessment pocket cards
1:00-1:30	Interactive practical session – assessment "how to"
1:30- 2:10	Critical appraisal of USN literature – EBP skills
2:10-2:40	Overview of effective USN treatment modalities and best practices
2:40-2:45	Dissemination and review of treatment pocket cards
2:45-3:00	**BREAK**
3:00-3:45	Interactive practical session – treatment administration "how to"
3:45-4:00	Introduction to Web-CT
4:00-4:15	Completion of post EBP Self-Efficacy Questionnaire
4:15-4:30:	Wrap-up and clinician comments

Figure 6.6: Mean question scores from the Knowledge Questionnaire at each assessment point (n=20)

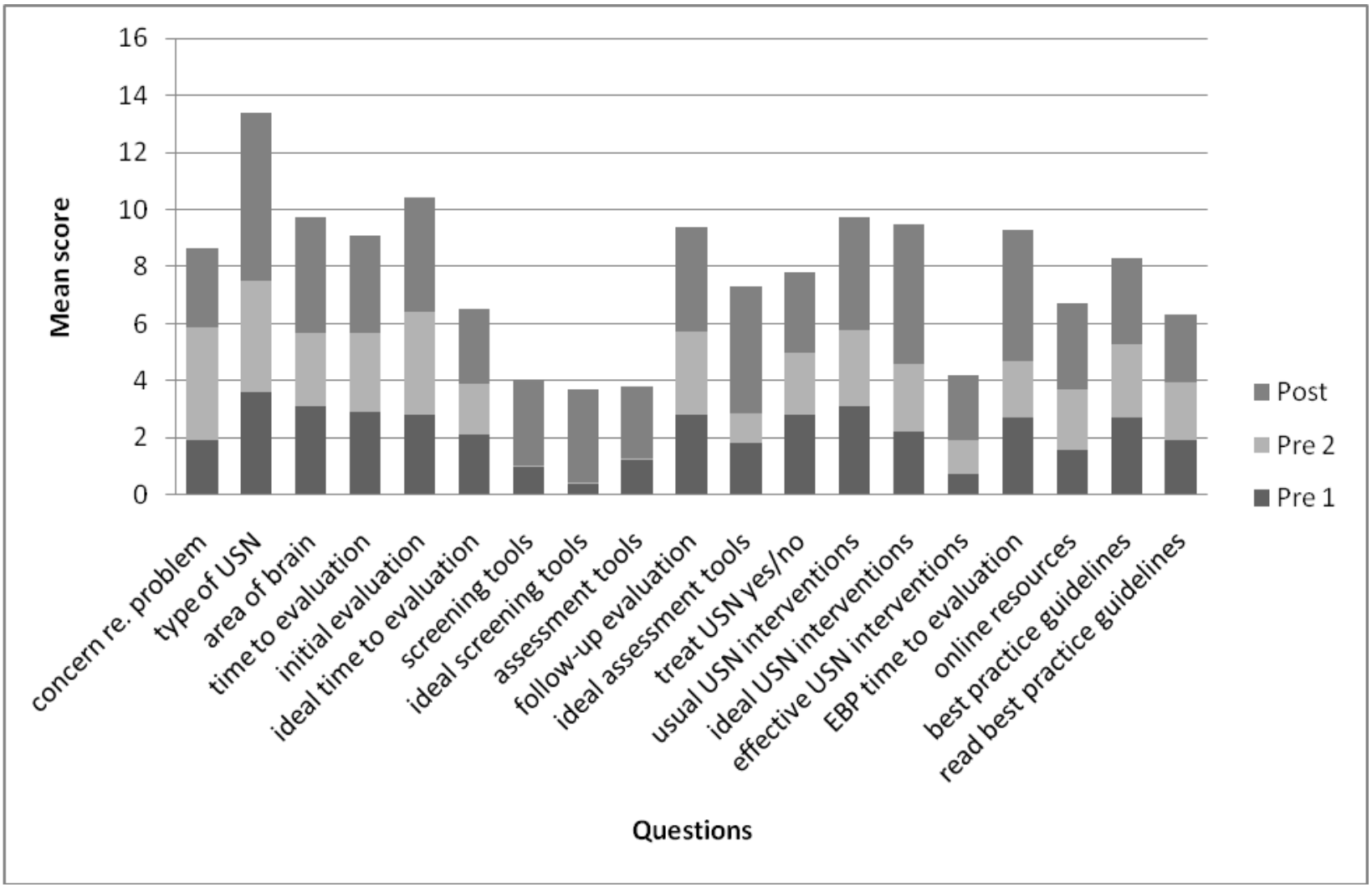


Figure 6.7: Mean scores and quartiles on the Knowledge Questionnaire at each assessment point (n=20)

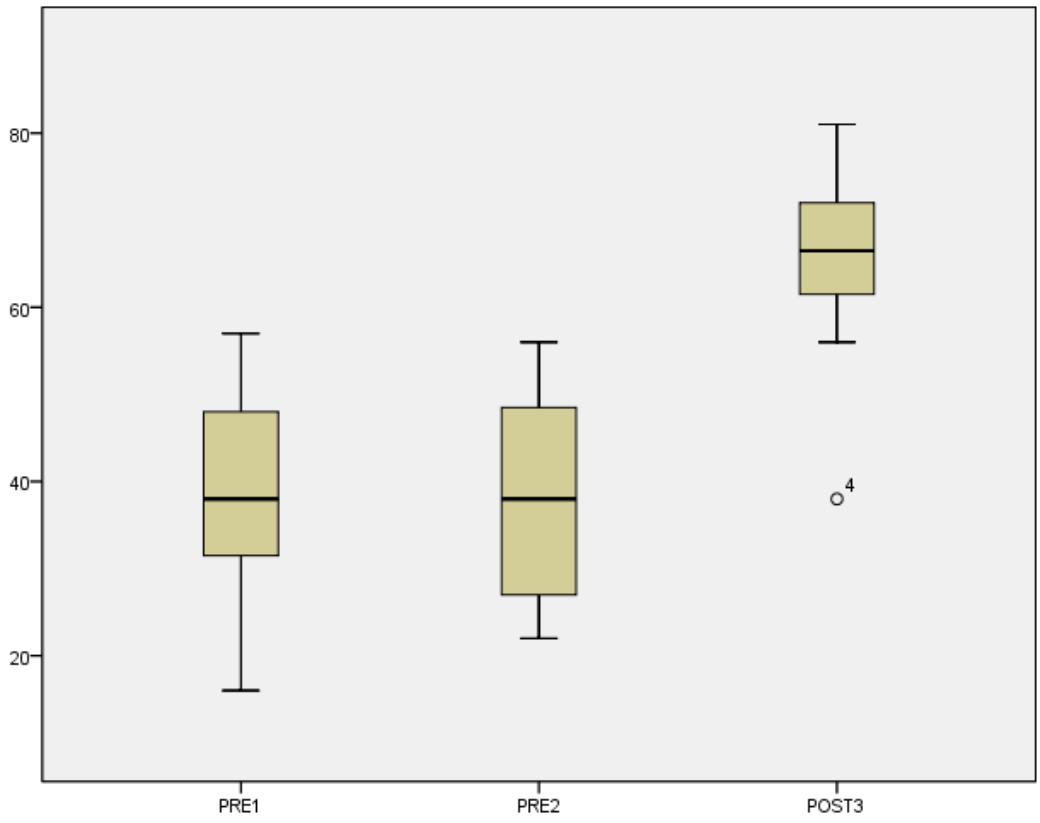


Figure 6.8: Change in score on the Knowledge Questionnaire from mean-pre to post-intervention (n=20)

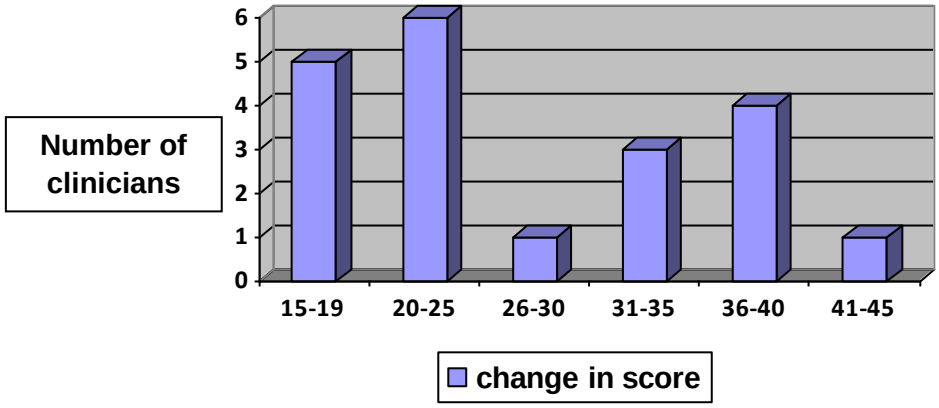
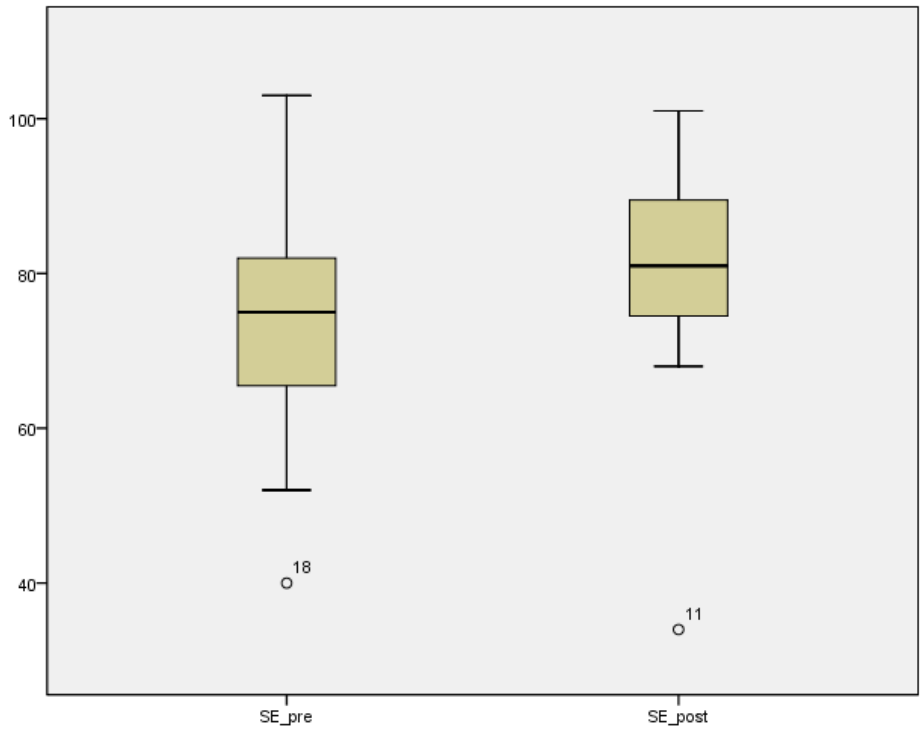


Figure 6.9: Mean scores and quartiles on the EBP Self-Efficacy Scale at each assessment point (n=20)



Appendix A: Focus group consent form

McGill University

Consent to Participate in a Focus Group

Title of Study: Determining the barriers and facilitators to evidence-based practice use by occupational therapists treating acute post-stroke unilateral spatial neglect

Principal Investigator: Anita Petzold, BSc (OT) & Dr. Nicol Korner-Bitensky, Ph.D

Department: School of Physical and Occupational Therapy, Faculty of Medicine

Study Site: McGill University

Study Contact telephone number: (514) 398-5457

Study Contact email: anita.petzold@mail.mcgill.ca, nicol.korner-bitensky@mcgill.ca

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What are some general things you should know about research studies?

You are being asked to take part in a focus group and your participation is voluntary. You may refuse to join, or you may withdraw your consent to be in the study for any reason and at any time. Research studies are designed to obtain new knowledge. This new information may help people in the future. Details about this study are discussed below.

What is the purpose of this focus group?

Through the means of a focus group, our goal is to identify the barriers and facilitators occupational therapists face when treating people with unilateral spatial neglect (USN) post-stroke. As a focus group member you will be asked questions such as: "*What is the most common organizational restraint that prevents you from using evidence-based practice in your daily work*?" AND "*What knowledge translation methods would you find useful in helping clinicians increase their knowledge of evidence-based practice?"*.

How many people will take part in this focus group?

If you decide to participate in the focus group, you will be one of approximately six to eight people. We are holding two separate focus groups, one in English and one in French, so a total of about 16 individuals will participate. You are free to choose to participate in the focus group that corresponds to the language you are most comfortable in. The focus groups will be conducted in Hosmer House, Room 101, at McGill University, Montreal.

How long will my part in this focus group last?

The group will last approximately 2 hours. The group will be held after work hours, in the late afternoon or early evening depending on which is most convenient for participants.

What will happen if I take part in the focus group?

You will be asked to discuss the barriers and facilitators to evidence-based practice use in the management of patients with post-stroke USN. The questions will be directed towards the group and not towards individual participants. You may choose to answer or not at any point during the discussion. The group leaders will take notes on a large board so that everyone can follow along and will then read the notes back to you to make sure that they have correctly captured your thoughts and ideas. There is no need to read or prepare anything before you come to the focus group. It is your opinions that we are interested in. As well, the group will be audio-taped. The auditory tapes will be used only for scientific purposes and shall remain confidential; this means that identifying information will never be abstracted from the tapes and any publication or presentation resulting from this study will be free of any personal identifiers.

What are the possible benefits from being in this focus group?

Research is designed to benefit society by gaining new knowledge. You may not benefit personally from participating in this group. However, the information that is obtained from this focus group will be used scientifically and may possibly help clinicians in the future.

What are the possible risks or discomforts involved from being in this focus group?

We do not anticipate any risks or discomfort to you from participating in the focus group. We will emphasize to all participants that comments made during the focus group session should be kept confidential.

Will I be able to withdraw from the focus group?

You may withdraw from the focus group for any reason, at any time.

Will it cost me anything to be in this study?

There will be no costs charged for your participation.

Will I receive any compensation for being in this study?

Refreshments will be served.

How will my privacy be protected?

Every effort will be made to protect your identity as a participant in this study. Your name will not be identified in any report or publication of this study or its results.

What if I have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you would like additional information or have any questions or concerns regarding the focus group, please contact Dr. Nicol Korner-Bitensky: School of Physical and Occupational Therapy, McGill University, telephone (514) 398-5457.

What if I have questions about my rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact,

anonymously if you wish, Ms. Ilde Lepore of the Faculty of Medicine's Institutional Review Board at (514) 398-8302 or by email to ilde.lepore@mcgill.ca.

Participant's Agreement

I,_____, agree to participate in the focus group described above. I give permission to the research team including, Dr. Nicol Korner-Bitensky, Anita Petzold, Sara Ahmed, Nancy Salbach, Anita Menon, Franceen Kaizer and Tatiana Ogourtsova to use the information that I provide in the group discussion to identify the barriers and facilitators to using best practice management with patients who have post-stroke USN. All questions that I had regarding the focus group have been answered to my satisfaction. I have read and understand the procedures of the focus group and willingly give my consent to participate in this focus group.

_____ _____

Participant's Signature date

_____ _____

Witness date

I _____ hereby certify that I have explained to _____ the nature of the focus group and the known risks of participating in the focus group, and that they have the option of withdrawing from the focus group at any time.

_____ _____

Signature date

Appendix B: Knowledge Translation Intervention consent form

McGill University

Consent to Participate in a Knowledge Translation Intervention

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Title of Study: Increasing occupational therapists' use of best practices in the management of unilateral spatial neglect post-stroke

Principal Investigator: Anita Petzold, BSc (OT) & Dr. Nicol Korner-Bitensky, Ph.D

Department: School of Physical and Occupational Therapy, Faculty of Medicine

Study Site: McGill University

Study Contact telephone number: (514) 686-0239

Study Contact email: anita.petzold@mail.mcgill.ca, nicol.korner-bitensky@mcgill.ca

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What are some general things you should know about research studies?

You are being asked to take part in a knowledge translation intervention and your participation is voluntary. You may refuse to join, or you may withdraw your consent to be in the study for any reason and at any time. Research studies are designed to obtain new knowledge. This new information may help people in the future. Details about this study are discussed below.

What is the purpose of this intervention?

Our goal is to develop an intervention that clinicians find helpful in increasing their knowledge of best practice guidelines and evidence-based practice in the management of people who have post-stroke unilateral spatial neglect (USN). As a study member you will be asked to participate in a day-long in-person session lead by the above mentioned researchers. Subsequently, there will be a follow-up period of 8 weeks where you will be able to learn more about best practice management online at your convenience.

How many therapists will take part in this intervention?

If you decide to participate in this intervention, you will be one of 20 therapists from Montreal and the surrounding regions. You are free to choose to participate in the intervention which will be held in English. The training session will be conducted in Hosmer House, Room 101 at McGill University, Montreal.

How long will my part in this intervention last?

The intervention session will last for one day (7 hours including breaks) after which there will be a follow-up period of 8 weeks. The session will not interfere with your regular work times.

What will happen if I take part in the intervention?

At 3 occasions during the study period you will be asked to complete an online questionnaire that discusses management of patients with post stroke USN. This questionnaire will take approximately 30-40 minutes to complete. On the day of the intervention, you will be asked to fill out a questionnaire pertaining to barriers and facilitators to evidence-based practice use as well as an evidence-based practice

self-efficacy questionnaire. Together, these will take approximately 20 minutes to complete.

Your answers will be anonymous and kept confidential. There is no need to read or prepare anything before you answer the questionnaires. Education will then be provided through means of lectures, small groups and hands-on sessions during the day-long training session.

What are the possible benefits from participating in this intervention?
Research is designed to benefit society by gaining new knowledge. You may not benefit personally from participating in this group, however, you will learn knowledge that can benefit your patients. The information that is obtained from this intervention will be used scientifically and may possibly help clinicians in the future.

What are the possible risks or discomforts involved in participating in this intervention?
We do not anticipate any risks or discomfort to you from participation. You may take a break at any time during the training session and choose not to complete the online tutorials offered during the follow-up period.

Will I be able to withdraw from the focus group?
You may withdraw from the study for any reason, at any time. However, if you do decide to participate, you should do so only if you are prepared to complete the 8 week period.

Will it cost me anything to be in this study?
There will be no costs charged for your participation.

Will I receive any compensation for being in this study?
Lunch will be provided and morning and afternoon refreshments served. For those coming from Ontario, you will be reimbursed up to $150 for your travel expenses.

How will my privacy be protected?
Every effort will be made to protect your identity as a participant in this study. Your name will not be identified in any report or publication of this study or its results.

What if I have questions about this study?
You have the right to ask, and have answered, any questions you may have about this research. If you would like additional information or have any questions or concerns regarding the knowledge translation intervention, please contact Dr. Nicol Korner-Bitensky: School of Physical and Occupational Therapy, McGill University, telephone (514) 398-5457.

What if I have questions about my rights as a research participant?
All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, Ms. Ilde Lepore of the Faculty of Medicine's Institutional Review Board at (514) 398-8302 or by email to ilde.lepore@mcgill.ca.

Participant's Agreement

I,_____, agree to participate in the intervention described above. I give permission to the research team including, Dr. Nicol Korner-Bitensky, Anita Petzold, Sara Ahmed, Nancy Salbach, Anita Menon, Franceen Kaizer and Tatiana Ogourtsova to use the information that I provide in the questionnaires for research purposes. All questions that I had regarding the intervention have been answered to my satisfaction. I have read and understand the procedures of the intervention and willingly give my consent to participate.

_____ _____
Participant's Signature date

_____ _____
Witness date

I _____ hereby certify that I have explained to _____ the nature of the intervention and the known risks of participating in the intervention, and that I have the option of withdrawing at any time.

_____ _____
Signature date

7. THESIS SUMMARY

The results of the studies presented in the two preceding manuscripts offer valuable information for occupational therapists, rehabilitation professionals and researchers focusing their work on KT. It is particularly useful in the development of an effective KT intervention aiming to increase knowledge of best practices in stroke rehabilitation. This section summarizes and discusses the main findings.

The first manuscript demonstrated how the Knowledge to Action Process model[20] is currently implemented to increase the use of best practices in the management of a prevalent post-stroke impairment: USN. It demonstrates how each phase of the model can be executed through examples from a series of previous national studies in stroke rehabilitation. The "Action Cycle" domain begins with the *problem identification* phase[20]. Previous research identified the problem of a large gap existing between best practices and actual practices in the assessment and treatment of USN. Lack of knowledge and access to EBP information was found to be part of the cause[6,9]. This leads us to the "Knowledge Creation" domain where the *knowledge synthesis* and *knowledge tools* phases were addressed through previous research by the respective creations of published articles[5] and an online website (www.strokengine.ca[4]). With this knowledge creation, the following phase in the "Action Cycle" domain requires the information to be adapted specifically for acute care clinicians. For a KT intervention to be effective, it is crucial that the barriers to knowledge use be known and addressed in the intervention[20]. This comprises the *assess barriers to knowledge use* phase for which no previous research has been conducted. Similarly, the subsequent phase in which one must *select, tailor and implement an intervention*,

has not yet been addressed in other studies specifically for occupational therapists treating stroke. This gap in KT research for stroke rehabilitation has led to the design of the second manuscript.

The second manuscript contains a multi-phase study which was undertaken to address the abovementioned gap. Phase 1 identified the barriers and facilitators that affect EBP use by occupational therapists treating individuals with post-stroke USN (n=9). Phase 2 created, evaluated the feasibility, and performed preliminary analyses regarding the effectiveness of a multi-modal KT intervention. It aimed to increase EBP knowledge acquisition and self-efficacy for USN assessment and treatment in this same clinician group (n=20). This is the first study to identify the factors related to EBP use and pilot test a KT intervention on acute care occupational therapists managing post-stroke USN.

In Phase 1, several USN and stroke-specific institutional and personal barriers and facilitators were identified. The main institutional barriers included working on a regular medical floor versus a stroke unit, too much time spent on non-patient care, lack of knowledge of USN by other staff. The main personal barriers included not being willing to change practices, lack of interest in research or adopting best practices, and lack of basic EBP skills. Key institutional facilitators included being part of a university affiliated hospital, the presence of a stroke team or strong multidisciplinary team, having educational days set aside each year and having access to synthesized learning materials. Key personal facilitators included believing in best practices and their necessity, being organized with the ability to manage a large caseload while still making time for continuing education, and being a more recent graduate. Some of these factors represent modifiable barriers or facilitators that can be enhanced. These specific factors were targeted in the USN KT intervention that was created in Phase 2.

In Phase 2, the 8 week USN KT intervention comprising of a 7 hour in-person training session and an 8 week online reinforcement period showed very promising results. Participants significantly improved on USN EBP knowledge acquisition and significantly increased their level of EBP self-efficacy. The success of the KT USN intervention is believed to be due to its foundation on the Knowledge to Action Process model, its incorporation of interventions targeting the aforementioned barriers and facilitators as well as its multi-modal components. Executing this study was feasible as most clinicians received permission to take time off work, completed the assessments promptly and half participated in the reinforcement period.

In conclusion, the results of this study have important clinical relevance. With the knowledge of specific barriers and facilitators to EBP use in stroke rehabilitation, the creation of an effective KT intervention for USN management was possible. This KT intervention can act as a stepping stone for further research in KT and its core constructs can potentially be used in other areas of rehabilitation. This study has also opened the door to exciting avenues of future research exploring the relation between increased knowledge of best practices and increased use of best practices with the ultimate goal to improve patient outcomes.

8. CONCLUSIONS

While the use of best practices has been shown to improve patient outcomes, unfortunately, EBP is not commonly used by occupational therapists working with clients who experience post-stroke USN[6,9]. By identifying the specific barriers and facilitators to EBP that occupational therapists face in treating individuals with stroke, we were able to determine key components necessary in constructing a KT intervention. In addition, the Knowledge to Action Process model provided us with an excellent framework on which to build an effective KT intervention. The multimodal USN KT intervention tested here was found to be effective in increasing clinicians' knowledge of EBP in USN management as well as in increasing their sense of EBP self-efficacy which has been shown to be linked with increased use of EBP. Although this pilot study shows significant learning on the clinician's part, its results should be validated with a larger randomized control trial. These preliminary findings have great potential in advancing KT in the field of stroke and offer promise for improved patient outcomes.

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