MEDWIN PUBLISHERS
Committed to Create Value for Researchers

Annals of Physiotherapy & Occupational Therapy
ISSN: 2640-2734

Implementation of Evidence-Based Practice in Stroke Rehabilitation

Rowe V*, Settles V, Pospisil C, Mrkonich SK and Merrill Smidt A

Department of Occupational Therapy, Georgia State University, USA

***Corresponding author:** Veronica T Rowe, PhD, OTR/L, Department of Occupational Therapy, Georgia State University, P.O. Box 3995, Atlanta, GA 30302, USA, Tel: 404-413-1893; Email: vrowe4@gsu.edu

Research Article
Volume 4 Issue 2
Received Date: April 01, 2021
Published Date: April 22, 2021
DOI: 10.23880/aphot-16000196

Abstract

Background: Stroke is the largest contributor of adult disabilities in the United States and occupational and physical therapists are vital members of stroke rehabilitation teams. However, with advances in stroke rehabilitation research, there is ambiguity regarding the knowledge of and the application of current research evidence by practitioners in clinical practice.
Method: A quantitative, descriptive survey study design was implemented to determine the reported knowledge of and application of current adult stroke rehabilitation research by therapists in clinical practice. The survey questions covered: the demographics of the therapists, the environmental characteristics of the workplace, and knowledge of and utilization of specific stroke interventions.
Results: Eighty occupational and physical therapists experienced in adult stroke rehabilitation were surveyed. The four most reported stroke interventions included task-oriented training, strength training, proprioceptive neuromuscular facilitation, and passive range of motion. However, rankings of frequency of use did not correlate with knowledge rankings. A statistically significant relationship was found between frequency of use and location of the practice (location setting), but not for profession or years of experience.
Conclusion: The results indicate that knowledge of an intervention does not necessarily indicate its application in clinical practice. The location of the practice may have a significant influence on the frequency of use of stroke rehabilitation interventions. Future studies may address barriers within practice settings that inhibit the implementation of evidence-based practice.

Keywords: Evidence Based Practice; Rehabilitation; Stroke; Survey; Task-Oriented Training

Introduction

In the United States, stroke is the largest contributor to disability and the fourth leading cause of death among the adult population [1,2]. Occupational therapists, occupational therapy assistants, physical therapists, and physical therapy assistants play vital roles in the multidisciplinary team that cares for an individual recovering from a stroke. Utilizing purposeful activities, these rehabilitation therapists help “develop or restore maximal ability in performance of occupational tasks identified as important by the client” [3].

Approaches to stroke rehabilitation are built on several rehabilitation constructs focused on upper extremity motor movement, including but not limited to the theories of motor control and motor learning [4-6]. Rehabilitation techniques utilizing motor control focus heavily on the Brunnstrom approach [7], neurodevelopmental treatment (NDT) [8], proprioceptive neuromuscular facilitation (PNF) [9], and the Rood approach [10]. Task-oriented training (TOT) is a more recently established therapeutic approach that is grounded in motor learning, with a focus on utilizing functional activities [11]. Each of these neurological approaches is found to dominate practice, regardless of the level of expertise of the therapist. However, TOT and NDT have been found to be the most frequently used methods [2].

Studies have shown that during stroke rehabilitation sessions, occupational therapists in the United States primarily focus on the upper extremity (UE) remediation of impairments and specialized functional task reintegration [3]. Amongst stroke survivors, roughly 30 to 66 percent experience impaired motor function six months after stroke onset [12]. Within the scope of motor learning theory, effective stroke interventions for the hemiparetic UE include constraint-induced movement therapy (CIMT), robot-assisted therapy, transcranial magnetic stimulation, and functional/neuromuscular electrical stimulation [13]. However, there is inconsistent evidence on the utilization of these interventions - including task-oriented training - for stroke rehabilitation practice [2,13].

For the increased implementation of evidence-based practice in choosing interventions in clinical settings, therapists must be able to translate their knowledge of evidence-based research into practice. Researchers are consistently creating new knowledge to provide clinicians with more and superior evidence to increase the confidence practitioners have in the effectiveness and quality of various rehabilitation treatments. However, there is some inconsistency on *how* rehabilitation therapists (e.g., occupational therapy practitioners and physical therapy practitioners) should implement evidence-based practice in the clinic - specifically with regards to stroke rehabilitation [14]. Despite frequent advancements in stroke research, the "translation of research into practice remains an ongoing challenge for rehabilitation professionals" [14]. Knowledge translation is focused on closing the gap between what is supported by research evidence and what is implemented in practice [15]. Although TOT is one of the strongest evidence-based interventions (EBIs) for treating individuals with stroke, rehabilitation therapists tend to gravitate more toward NDT-related techniques when retraining functional movements [2]. Factors that have been effective for translating knowledge of TOT into clinical practice and facilitating its continued use include access to information on TOT interventions through free online training and engagement with clinical supervisors within the rehabilitation setting [15,16]. In contrast, the factors that have been prohibitive to knowledge translation include decreased access to necessary equipment [16,17].

To facilitate bridging the knowledge gap between research on the most effective stroke rehabilitation interventions and their implementation in clinical practice, we must first identify what therapists know about evidence-based practice (EBP) and the interventions they are currently employing. Therefore, this study posed the following research question: What rehabilitation interventions are known and employed by occupational therapists and physical therapists working in various settings at adult stroke rehabilitation in the state of Georgia, and specifically, do they have knowledge of TOT, and what is the frequency of use? We used a survey to examine the knowledge of current therapeutic interventions among rehabilitation therapists working in adult stroke rehabilitation and to determine their reported use of EBIs, such as TOT. The survey was also used to assess the therapist's knowledge and use of TOT methods and to identify barriers and enablers to the utilization of EBIs. We hypothesized that the use of TOT by rehabilitation therapists is dependent on their level of knowledge of these interventions, access to information on evidence-based research, and the resources available in the workplace environments.

Methods

Design

A quantitative, descriptive survey study design was implemented to gather information on current clinical practice in adult stroke rehabilitation. Questions in the survey covered demographic information of therapists, environmental characteristics of the workplace, therapists' knowledge of and frequency of use of specific stroke interventions, and specific questions on TOT. The Person-Environment-Occupation (PEO) model was used to structure the survey, including questions on demography (person), workplace setting (environment), and clinical practice (occupation) [18]. A non-experimental design is suitable for our study because we aim to explore the demographic characteristics, environment, and knowledge and frequency of use of specific stroke rehabilitation interventions among therapists.

Participants

The participants were comprised of physical therapists (PTs), physical therapy assistants (PTAs), occupational therapists (OTs), and occupational therapy assistants (OTAs) who had been working in adult stroke rehabilitation in the state of Georgia within the last five years. To reflect current healthcare practice trends, the study excluded those who had not worked with stroke survivors within the previous five years. The sample was recruited via invitation to participate using snowball sampling of existing contacts who are professionals within the state of Georgia. These contacts were encouraged to forward the email invitation to their peers or refer colleagues directly to the researchers. Participants had to report up-to-date registration and licensure to practice within their scope, as required by regulations in the state of Georgia.

Procedures

After receiving approval from the Institutional Review Board, researchers contacted rehabilitation therapists within the state of Georgia, through existing contacts to assist with participant recruitment. The survey was accessed via the Qualtrics platform. Participants agreed to the purpose of the study and its confidentiality clauses and gave informed consent by completing and submitting the survey. The survey remained open to collect responses for eight weeks.

Instrument

The survey included 122 questions divided into four sections:

1. Demographics of stroke rehabilitation therapists
   Sixteen questions eliciting demographic information assessed the characteristics of the sample, which included level of education, current work setting, level of experience in stroke rehabilitation, and some specifics on their clinical practice, such as productivity requirements and evidence-based practice resources provided by employers.
2. Environmental characteristics of the therapy work setting
   To address evidence-based practice within immediate practice settings, including workplace environment, facilitation of learning, and research-based practice feasibility, 31 questions were adapted from the Nursing Evidence-Based Practice Survey© instrument with the stated profession in the original survey changed from nursing to rehabilitation therapy [19]. The original Nursing Evidence-Based Practice Survey© was developed as a practice setting assessment for clinician perceptions and evidence-based practice culture. Factor analysis demonstrates good psychometrics and the 5-factor analysis (Cronbach's $\mu = 0.84$) in this survey identifies these factors and concepts: organizational culture, unit culture, knowledge and skills, time, and attitude [20].
3. Knowledge of and frequency of use of specific interventions
   Fifty questions addressed the knowledge of and frequency of use of various stroke rehabilitation intervention techniques which are currently the most reported in the literature.
4. Knowledge of and frequency of use of TOT in clinical practice
   Twenty-five questions addressed the knowledge of and frequency of use of TOT as a stroke rehabilitation intervention among the participants, including components of TOT most cited in the literature.

In Section 3 and Section 4 of the survey, every question on the frequency of use of an intervention was open only to participants who indicated they had knowledge of that specific intervention. Knowledge (defined as awareness) of specific EBP techniques was captured on a 4-point Likert scale, with responses ranging from (1) Not Aware, (2) Minimally Aware, (3) Somewhat Aware, and (4) Very Aware. Frequency of use of specific techniques was captured on a 5-point Likert scale, with responses ranging from (1) Never (0% of the time), (2) Almost Never (less than 25% of the time), (3) Rarely (25%-49% of the time), (4) Sometimes (50%-74% of the time), and (5) Usually (75%-100% of the time). The survey was refined, and face validity ensured through review by OTs and PTs who are experts in their fields and were unaffiliated with this project prior to implementation of the survey.

Data Analyses

The Qualtrics platform automatically stored the data from the survey responses - which were collected anonymously for analysis. Participant characteristics, including profession, level of education, location of the practice, and years of experience, were summarized using descriptive statistics. Descriptive statistics were also used to examine the level of knowledge and frequency of use of EBIs. Inferential statistics was used to analyze years of experience, profession, and location of the practice setting to explore potential differences in the level of knowledge and use of rehabilitation interventions among practitioners. A Likert scale measured the frequency with which a participant used a given technique in his or her practice. All statistical analyses were performed using IBM® SPSS® Statistics, version 26.0.

Because of the skip pattern design of the survey, statistical analysis of the ratings for frequency of use of an intervention was possible only for the participants who responded "yes" to the questions on previous knowledge for each intervention. Chi-square tests for association were applied to the data on profession subgroups (OTs vs. PTs) and location of the practice subgroups (suburban vs. urban vs. rural) to determine whether the participants differed in knowledge on stroke rehabilitation and specific TOT interventions. One-way analysis of variance (ANOVA) was performed to establish whether between-group differences existed for years of experience and knowledge of the stroke interventions included in the survey. Spearman's rho coefficients were calculated to measure the strength and direction of the association between the years of experience of participants and their frequency of use rating for stroke interventions and TOT methods. Two types of nonparametric tests were used to determine between-group differences in the mean ranks of the intervention use ratings. Wilcoxon Mann-Whitney U tests were performed to determine whether the OTs among the participants differed from the PTs regarding the frequency of use of interventions [21]. Further analysis was conducted using Kruskal-Wallis H tests to determine whether the three subgroups of practice location differed in the frequency of use of interventions [21]. Post-hoc analysis with Bonferroni correction for multiple comparisons was applied for within-group analysis of practice locations. The level of significance was determined to be $p = 0.05$ for all analyses.

Results

A total of 80 responses were recorded to the survey. The results are presented in the same order as in the four sections of the survey.

Section 1 (Demographics):

The respondents represented all levels of entry-level degrees for OT and PT practitioners and certified OTAs and PTAs. The mean number of years of experience in stroke rehabilitation was 12.58 years (*SD* = 10.79). The details of the demographics of the sample are presented in Table 1.

Entry level degree	N	%
BA/BS Occupational Therapy	12	15
MA/MS Occupational Therapy	34	42.5
OTD or other clinical doctorate	6	7.5
Occupational Therapy Assistant	4	5
BS, Physical Therapy	4	5
MS, Physical Therapy	4	5
DPT or other clinical doctorate	12	15
PhD or other research doctorate	0	0
Physical Therapy Assistant	4	5
	years of stroke rehab experience	
Range	**N**	**%**
0-5 years	26	34.67
6-10 years	15	20
1-15 years	10	13.33
16-20 years	9	12
21-25 years	3	4
26-30 years	5	6.67
31+ years	7	9.33

Table 1: Demographic Description of education experience of respondents.

Section 2 (Environmental Characteristics of Work Settings)

Participants reported their level of agreement with statements regarding their work setting, including awareness of research, availability of research material, and support received from management. In general, the findings are examples of barriers to implementing EBP with time and productivity requirements reported as barriers to implementing research. For example, one participant stated that "due to productivity requirements, research is done on personal time." Responses indicate that therapists regard having the support of physicians and management as facilitators of evidence-based research, as beneficial. However, therapists reported that by "rarely showing an interest in EBP for therapy," physicians and managers do not often promote EBP and are often unaware of its utility. Furthermore, therapists reported that management often "unofficially discourages" EBP, as productivity is based solely on the units provided rather than the quality of care.

Section 3 (Knowledge and use of Specific Interventions)

There was a disproportionate distribution of participants for each comparison category across the study. The results of a comparison of knowledge of the four most reported and four least reported stroke rehabilitation interventions and their respective frequency of use are listed in Table 2. The four most frequently reported approaches include TOT, strength training, PNF and passive range of motion (PROM). The four least-reported approaches included virtual reality (VR) training, action observation, robotics, and circuit class training. The percentage of respondents who reported "yes" to knowledge of a stroke intervention was compared with the percentage of respondents who reported using the interventions by adding the frequencies for reported use "sometimes (50% - 74% of the time)" and " usually (75% - 100% of the time)" for each respective intervention.

Knowledge of stroke intervention			Use of stroke intervention	
Intervention	Rank	%	rank	%(>50%)
TOT	1	98.4	1	96.7
Strengh Training	1	98.4	2	91.7
PNF	1	98.4	5	73.8
PROM	1	98.4	3	81.9
VR Training	21	64.5	8	20
Action Observation	22	62.9	4	74.4
Robotics	23	58.1	6	33.3
Circuit Class Training	24	25.8	7	31.3

Table 2: Knowledge and use of stroke interventions ranked.

Section 4 (Knowledge of and use of Task-Oriented Training):

The results of a comparison of the knowledge of specific TOT intervention components and their respective frequency of use are listed in Table 3. In Table 3, the percentage of respondents who reported "yes" to knowledge of specific TOT intervention components is compared with the percentage of respondents who reported using the interventions by adding the frequencies for "sometimes (50% - 74% of the time)" and "usually (75%-100% of the time)" for each respective TOT component.

Components	Rank	%	Rank	%(>50%)
Tasks that are meaning to the patients	1	100	3	98.36
Repetitive Practice	1	100	2	98.39
Functional Tasks	2	98.4	1	100
"use it and improve it" forced use of affected limb	2	98.4	6	93.44
Patients active problem solving	2	98.4	8	91.8
Skill acquisition	3	96.7	7	93.1
Instrinsic drive	4	95.1	4	98.28
Increasing patient selft-efficacy	5	91.9	4	96.36
Capacity Building	6	73.8	9	87.5
Intensity of practice	7	68.9	10	78.57
Guided Discovery	8	37.7	11	60.87

Table 3: Knowledge and use of task-oriented Training Components.

Therapist's Characteristics, knowledge and Use of EBIs

Tables 4 & 5 present the descriptive frequencies derived from comparing the practice locations of the participants to their reported use of EBIs. Overall, most participants who reported their use of stroke rehabilitation interventions and TOT components also reported that they primarily worked in a *suburban* setting. The total number of participants (*N*) varied for each intervention due to the skip pattern, non-forced design. Further analysis was aimed at identifying the statistical significance for between-group differences for interventions that indicated a significant relationship.

Intervention	Urban	Suburban	Rural	Total
	n	n	n	N
TOT	17	35	8	60
Strength Training**	17	36	7	60
PNF**	16	37	8	61
PROM	17	36	8	61
VR Training	14	24	2	40
Action Observation	7	26	6	39
Robotics**	11	22	3	36
Circuit Class Training	7	7	2	16

*N Indicates the total number of study participants who reported both their primary location setting and their use of the specific interventions. For each intervention, *n* represents the number of study participants in each specific location setting who reported their varying use of the respective intervention.

**A Kruskal-Wallis test identified statistically significant between-group differences.

Table 4: Location and use of most and least known stroke interventions.

TOT Components	Urban	Suburban	Rural	Total
	n	n	n	N
Capacity building	4	8	4	6
Guided discovery	6	14	3	23
Intensity of practice**	11	24	7	42
Increasing patient self-efficacy	14	34	7	55
Patient's active problem solving	17	36	8	61
Intrinsic drive	16	35	7	58
Repetitive Practice**	17	37	8	62
Skill acquisition	16	35	7	58
Tasks that are meaningful to patient	17	36	8	61
Functional tasks**	17	36	8	61
"Use it and improve it"**	17	36	8	61

*N Indicates the total number of study participants who reported both their primary location setting and their use of the specific interventions. For each intervention, *n* represents the number of study participants in each specific location setting who reported their varying use of the respective intervention.
**A Kruskal-Wallis test identified statistically significant between-group differences.
Table 5: Location and use of Task-oriented Training components.

Stroke Rehabilitation Intervention Result

Chi-square tests for association did not find significant differences between professional subgroups (OTs and PTs) and their reported knowledge of stroke interventions: $p > 0.05$. The only statistically significant relationship between participants' practice location and knowledge was with VR training: $p = 0.02$. No statistically significant relationship was identified between the participants' years of experience and their reported knowledge of or use of stroke interventions, as tests of ANOVA and Spearman's Rho found $p > 0.05$ for each analysis. Distributions of the use of stroke intervention scores for OTs and PTs were dissimilar, as assessed using descriptive analysis via visual inspection. Specifically, the ranked scores for frequency of use of PROM for OTs (mean rank = 35.45) were statistically significantly higher than for PTs (mean rank = 21.16), $U = 212$, $z = -3.141$, $p = .002$. Furthermore, the ranked scores for frequency of use of robotics for OTs (mean rank = 20.57) were also statistically significantly higher than for PTs (mean rank = 11.25); $U = 54$, $z = -2.383$, $p = 0.027$. A contrasting finding between OTs and PTs was the ranked scores for the frequency of use of strength training for PTs (mean rank = 38.53) being statistically significantly higher than for OTs (mean rank = 26.49); $U = 560.5$, $z = 2.843$, $p = 0.004$.

Statistically significant differences were found in the location (urban, suburban, or rural) where some stroke interventions were reported being used (Table 4). The distributions of the scores for intervention use were dissimilar for all subgroups, as assessed via visual inspection of box plots. For example, the mean ranking for PNF utilization revealed statistically significant differences between the urban, suburban, and rural subgroups: $\chi^2(2) = 6.767$, $p = 0.034$. Subsequently, post-hoc analyses with Bonferroni correction for multiple comparisons revealed statistically significant differences between the scores for the use of PNF for the urban (mean = 25.38) and rural (mean = 44.06) location subgroups ($p = 0.029$). Furthermore, the results for the use of robotics were statistically significant between the different practice location subgroups: $\chi^2(2) = 14.719$, $p = 0.001$; post-hoc comparisons identified statistically significant differences between the use of robotics in the urban (mean = 27.77) and suburban (mean = 13.95) location subgroups ($p = 0.000$). Finally, the results for the use of strength training were statistically different between the practice location subgroups: $\chi^2(2) = 15.838$, $p = 0.000$; post-hoc comparisons revealed significant differences in the use ratings for the urban (mean =18.18) and suburban (mean = 34.46) location subgroups ($p = 0.001$), and the urban and rural (mean = 40.07) location subgroups ($p = 0.005$).

Task-Oriented Training Components Results

Chi-square tests for association did not find significant differences between professional subgroups (OTs and PTs) or practice location (urban, suburban, and rural) on the knowledge of TOT components, $p > 0.05$. Similarly, there were no significant relationships between the participants' years of experience and their knowledge of or use of TOT components, as tests of ANOVA and Spearman's Rho found $p > 0.05$ for each analysis. Furthermore, the OTs and PTs did not differ significantly in terms of the frequency of use of any TOT components, as revealed by Mann-Whitney U tests, $p > 0.05$.

Similar to the overall results for stroke intervention, the Kruskal-Wallis H tests produced dissimilar distributions for the use of TOT components and statistically significant differences for between-group comparisons with practice location (Table 5). The mean rankings of the use of *practice intensity* revealed statistically significant differences between the location subgroups: $\chi^2(2) = 10.846$, $p = 0.004$, and post-hoc analysis identified a statistically significant pairwise comparison in the use of *practice intensity* between the urban (mean = 12.27) and suburban (mean = 25.83) location subgroups ($p = 0.003$). Other statistically significant differences were found for the use of *repetitive practice* ($\chi^2(2) = 8.573$, $p = 0.014$), *functional tasks* ($\chi^2(2) = 8.938$, $p = 0.011$), and the principle of *use it and improve it* ($\chi^2(2) = 13.955$, $p = 0.001$). The post-hoc analyses revealed a significant statistical difference in the use of *repetitive practice* between the urban (mean = 23.85) and rural (mean = 40.00) location subgroups ($p = 0.021$); in functional tasks between the urban (mean = 23.94) and suburban (mean = 33.11) subgroups ($p = 0.025$) and the urban and rural (mean = 36.50) subgroups ($p = .040$); and in the principle of *use it and improve it* between the urban (mean = 19.50) and suburban (mean = 34.44) subgroups ($p = 0.003$) and the urban and rural (mean = 39.94) subgroups ($p = 0.006$).

Discussion

The results indicate that knowledge of a stroke rehabilitation intervention does not necessarily translate to its use in the clinical setting. TOT, strength training, PNF, and PROM ranked as the most commonly known interventions, as reported by the study participants. TOT ranked highest for both knowledge of and frequency of use of an intervention by therapists. A study by Schriner, et al. [2] supports this result, as their TOT techniques were found to be the neurological approach most frequently used in practice. However, action observation, which ranked at the lower levels for knowledge of a stroke rehabilitation intervention among those listed, was used more often (74.4%) than PNF (73.8%).

Similarly, circuit class training was reported as the least well-known intervention (25.8%), although a more significant percentage of therapists used circuit class training in practice (31.3%) (Table 2). These results may indicate that although fewer therapists have knowledge of specific interventions, therapists that *do* have knowledge of the interventions used most often in practice. Low percentages of knowledge of an intervention compared to high rates of knowledge of and use of an intervention justify contemplating whether an increase in the knowledge of an intervention might lead to a rise in its use in clinical practice. Therapists who did know of an intervention found it beneficial to use in practice. However, participants used VR training the least of all interventions (20%), despite 64.5% of therapists indicating they knew of the intervention (Table 2). This low use of VR training may correlate with the cost of VR equipment or the inaccessibility of VR equipment. Contrasting ratios of knowledge of and use of VR training may indicate that therapists might not find the intervention beneficial or feasible for their patients.

The results show similar correlations in the knowledge of and use of TOT intervention components. The *Use it and improve it*, *active problem solving*, and *skill acquisition* components of TOT ranked higher on the awareness scale than the frequency of use scale, indicating that therapists used these interventions less frequently than the interventions reported to be known by more therapists (Table 3). Specifically, *active problem solving* ranked very high as a known intervention, while ranking lower for frequency of use (Table 3). These results support findings that knowledge of an intervention does not necessarily determine its frequency of use in clinical practice.

The location of a practice may influence the use of specific stroke rehabilitation interventions and TOT components among therapists. Of the interventions analyzed for stroke rehabilitation practice, significant differences were found between the different location settings, indicating that the use of strength training, PNF, and robotics by therapists differed significantly between location settings. Stroke rehabilitation interventions (i.e., PNF, and strength training), which ranked high for knowledge of an intervention are implemented more often by therapists in rural areas than by those in urban areas. In contrast, robotics as a stroke rehabilitation intervention ranked low for knowledge of an intervention despite its higher frequency of use in urban settings than in suburban settings. Limited use of robotics in these settings might correlate with greater accessibility to high-tech equipment - such as robotics equipment - in more highly populated environments.

Regarding TOT components, there was a significant difference between the use of *intensity of practice*, *repetitive practice*, *functional tasks*, and *use it and improve it* across the different therapist location settings. *Intensity of practice* was found to have the highest frequency of use in suburban settings, while *repetitive practice*, *functional tasks*, and *use it and improve it* were found to have the highest frequency of use in rural settings. These results suggest that the location setting of the stroke rehabilitation facility can influence the degree to which therapists use specific interventions, potentially due to the resources available in those areas.

Furthermore, the survey explored potential barriers to implementing evidence-based practice. Trends found that therapists were generally aware of evidence-based practice, and they also agreed that evidence-based information is essential to guiding intervention plans and administering effective treatment. Barriers to implementing evidence-based practice included time and productivity constraints, lack of access to research due to high cost and unavailability of clinical trials at the location setting, and lack of interest and support from physicians and managers to implement evidence-based practice in therapy sessions. Previous research supports these findings that various rehabilitation interventions may be challenging to implement in clinical settings. Studies on knowledge translation identified the following as barriers to implementation: a lack of access to knowledge about the intervention, lack of support from clinical supervisors, and the inability to acquire the necessary equipment and have it readily available within the practice [15-17].

By providing preliminary insight into current therapeutic practice in the field of stroke rehabilitation, the findings of this study have the potential to provide information into whether a knowledge translation gap exists in stroke rehabilitation practice. Future research can use the results of this survey on evidence-based practice in current stroke rehabilitation and clinical practice to justify the systematic use of knowledge translation. It would be advantageous to identify which of the interventions considered in this study might best translate into clinical practice. By combining data on current practices and EBIs, future research could explore the clinical reasoning and contextual factors behind the use of these stroke rehabilitation techniques. These results may be beneficial for analyzing the differences between current research and rehabilitation interventions in use.

There are several limitations associated with the collection and analysis of data in this study. The design of the survey limited the level of insight into the practices of the participants. Lack of forced responses and a high dropout rate limited the data available for statistical analysis. Additionally, due to the skip pattern design of the survey, only those who answered "yes" to questions regarding knowledge of an intervention could report their frequency of use. Therefore, using statistical analyses, we could only compare the frequency of use between those who knew of that specific intervention. The varying sample size throughout the survey may present a threat to internal validity. The study design also prevented the equal distribution of participants for each survey question. Consequently, knowledge of an intervention was considered a constant, and it was inappropriate to capture significant differences between frequency of use. Future studies evaluating knowledge translation in stroke rehabilitation interventions to clinical practice should investigate both the interventions used and the factors that influence their use.

Conclusion

A survey of OTs, OTAs, PTs, and PTAs was conducted to ascertain the stroke rehabilitation interventions currently being used in clinical settings within the state of Georgia. The results demonstrated that knowledge of an intervention does not indicate its frequency of use in clinical practice. The results also demonstrate that the location of a practice may strongly influence the frequency of use of stroke rehabilitation interventions - specifically, TOT components. The findings also reveal that therapists report barriers within their practice settings that inhibit the utilization of the findings of evidence-based research. Further research should focus on clinical barriers that may keep therapists from making evidence-based decisions in their therapy practice and how to overcome these barriers.

References

1. Ovbiagele B, Nguyen Huynh MN (2011) Stroke epidemiology: Advancing our understanding of disease mechanism and therapy. Neurotherapeutics 8(3): 319-329.

2. Schriner M, Thome J, Carrier M (2014) Rehabilitation of the upper extremity after stroke: Current practice as a guide for curriculum. The Open Journal of Occupational Therapy 2(1): 6.

3. Gustafsson L, Nugent N, Biros L (2012) Occupational therapy practice in hospital-based stroke rehabilitation? Scandinavian Journal of Occupational Therapy 19(2): 132-139.

4. Shumway Cook A, Woollacott MH (2017) Motor control: Translating research into clinical practice. In: 5th (Edn.), Philadelphia: Wolters Kluwer.

5. Kleim JA, Barbay S, Cooper NR, Hogg TM, Reidel CN, et al. (2002) Motor learning-dependent synaptogenesis is localized to functionally reorganized motor cortex. Neurobiology of Learning and Memory 77(1): 63-77.

6. Winstein C, Lewthwaite R, Blanton S, Wolf L, Wishart L (2014) Infusing motor learning research into neurorehabilitation practice: A historical perspective with case exemplar from the accelerated skill acquisition program. Journal of Neurologic Physical Therapy 38(3): 190-200.

7. Brunnstrom S (1970) Movement therapy in hemiplegia. New York: Harper Rowe.

8. Bobath B (1978) *Adult hemiplegia: Evaluation and treatment.* London: W. Heinemann Medical Books.

9. Knott M (1968) Proprioceptive neuromuscular facilitation: Patterns and techniques. In: Voss DE, et al. (Eds.), New York: USA, Hoeber Medical Division, Harper & Row.

10. Rood M (1956) Neurophysiological mechanisms utilized in the treatment of neuromuscular dysfunction. American Journal of Occupational Therapy 10: 220.

11. Moon J, Kyoung Young P, Hee Jin K, Chang Ho N (2018) The effects of task-oriented circuit training using rehabilitation tools on the upper-extremity functions and daily activities of patients with acute stroke: A randomized controlled pilot trial. Osong Public Health and Research Perspectives 9(5): 225-230.

12. Molier BI, Prange GB, Krabben T, Stienen AH, Kooij VD, et al. (2011) Effect of position feedback during task-oriented upper-limb training after stroke: Five-case pilot study. Journal of Rehabilitation Research & Development 48(9): 1109-1117.

13. Bondoc S, Booth J, Budde G, Caruso K, Desousa M Earl, et al. (2018) Mirror therapy and task-oriented training for people with a paretic upper extremity. American Journal of Occupational Therapy 72(2): 1-8.

14. Juckett LA, Wengerd LR, Faieta J, Griffin CE (2020) Evidence-based practice implementation in stroke rehabilitation: A scoping review of barriers and facilitators. American Journal of Occupational Therapy 74(1): 1-14.

15. Bennett S, Whitehead M, Eames S, Fleming J, Low S, et al. (2016) Building capacity for knowledge translation in occupational therapy: Learning through participatory action research. BMC medical education 16(1): 257.

16. Connell LA, McMahon NE, Harris JE, Watkins CL, Eng JJ (2014) A formative evaluation of the implementation of an upper limb stroke rehabilitation intervention in clinical practice: A qualitative interview study. Implementation Science 9: 90.

17. Connell LA, McMahon NE, Harris JE, Watkins CL, Eng JJ (2014) A formative evaluation of the implementation of an upper limb stroke rehabilitation intervention in clinical practice: A qualitative interview study. Implementation Science 9: 90.

18. Law M, Cooper BA, Strong S, Stewart D, Rigby P, et al. (1996). The person-environment-occupation model: A transactive approach to occupational performance. Canadian Journal of Occupational Therapy, 63(1): 9-23.

19. Thiel L, Ghosh Y (2008) Determining registered nurses' readiness for evidence-based practice. Worldviews Evid-Based Nurs 5(4): 182-192.

20. Adams S, Barron S (2010) Development and testing of an evidence-based practice questionnaire for school nurses. J Nurs Meas 18(1): 3-25.

21. Kielhofner G (2006) Research in occupational therapy: Methods of inquiry for enhancing practice. Philadelphia, PA: FA Davis Company.