

The Impact of a Hand Training Programme in Chronic Stroke Survivors: A Qualitative Analysis of Participant Perceived Benefits

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Abstract— Stroke is a leading cause of death and disability in Canada. Community-based training programs are a frequently used means of rehabilitation in stroke. Eight participants were recruited (three female) aged between 55 and 82 ($M=69.38$, $SD=9.75$), with a length of time post stroke between 5 and 120 months ($M=27.67$). All participants completed a 6-week hand training program using a novel haptic indirect-feedback hand function device. Individual interviews with the participants were conducted following the completion of the program. A qualitative analysis of individual interviews determined that there are several components of participants' perceived benefits. These components include a sense of community, companionship, functional improvements, and motivation. This is reflective of past research in the area of community training programs, and the results from this study support this approach.

Keywords—stroke, qualitative, hand training

I. INTRODUCTION

Community-based programs may offer psychosocial support for individuals with stroke, which is critical for rehabilitation, community reintegration, better health outcomes [1], and quality of life (QOL) [2]. While community-based programming can have many different uses, the key use is to address the specific concerns of the stroke survivor community. In a 2015 study by Demir and colleagues, individuals with stroke indicated that functional problems (e.g. walking, using hands) were their top priority followed by self-care problems (e.g. dressing and cleaning) and psychological/emotional issues (e.g. losing self-confidence and depression) respectively [3]. Both functional and self-care problems depend heavily on hand and arm movements. Thus, one of the many challenges faced by stroke survivors is the rehabilitation of the hand; especially as almost half of stroke survivors experience long-term arm impairment (41-45%) [4]. Indeed, rehabilitation of the hand is critical for improvement in the QOL for stroke survivors. The objective of this project was

to determine the perceived benefits of the participants in a hand training program using a haptic indirect-feedback hand function device (HIFHFD).

II. METHOD

A. Participants

Participants were recruited through posters located in the community. Inclusion criterion for the study was a single stroke in the fronto-parietal regions of the brain, which led to an impairment of the hand/arm more than five months before their enrollment. The participants were required to have adequate hand and cognitive function to perform hand exercises. Participants with severe spasticity or hand function compromised with arthritis and/or those with multiple strokes were excluded from the study.

All participants completed a 6-week community-based hand training program using a HIFHFD, where participants underwent individual hand function training for a total of 18 one-hour sessions. Sessions were completed consistently for all participants. Additionally, participants were paired with one or two companion(s) for the duration of the study. Functional training characteristics such as force, range of motion, coordination and dexterity were randomly altered to enhance hand function. All procedures and protocols were approved by the research ethics boards of Thunder Bay Regional Health Sciences Centre, St. Joseph's Care Group Hospital Thunder Bay, and Lakehead University.

B. Data Collection and Analysis

Individual interviews were conducted with participants following the completion of the training program by the same interviewer, and the questions were standardized; however, interviews also followed any thoughts by participants, and requested the expansion of their thoughts or additional information for greater clarity when necessary.

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Interviews were audiotaped and data was transcribed verbatim and checked for accuracy by two members of the research team independently. An inductive analysis process was employed with line-by-line coding used to identify “meaning units” within transcripts. Meaning units were compared within and across transcripts to develop categories, with categories corresponding to main content areas addressed across individual interviews. Categories were then reviewed and combined into themes.

III. RESULTS

Eight individuals (5 male) participated in the program and completed the interviews. Participants’ aged between 55 and 82 ($M=69.38$, $SD=9.75$). Length of time post-stroke was between 5 and 120 months ($M=27.67$). Dominant themes identified as benefits of the training program by participants were: sense of community and companionship, functional improvements, and motivation.

a. *Sense of community and companionship*: Participants reported experiencing a sense of community with the other participants that was established throughout the program. Despite being an individual program, all participants were scheduled at the same time and in the same room; thus, they were able to socialize upon arrival and departure. Although some current rehabilitation models address the importance of involvement in life situations, they do not adequately address the issues of the nature of the community [5]. The sense of community developed during this program was of importance to the participants and should be further investigated in future studies.

Several patients appreciated the reliability of working with the same companion during training and indicated that they liked knowing that the person/people they were working with fully understood their capabilities. It seems that the primary theme, indicated that participants appreciated the companionship aspect of the program.

b. *Functional improvements*: Participants indicated that functional improvements in hand function obtained during the program greatly contributed to their sense of well-being and improved their QOL.

c. *Motivation*: Participants described experiencing motivation that expanded beyond the boundaries of the rehabilitation session itself. Multiple participants relayed that they felt that attending the program gave them a reason to get moving in the

morning. Some felt that this program helped by providing both structure and goals, that targeted enhancement in hand function.

d. *Limitations*: The study was limited by small sample size; due to limited recruitment. Additionally, there is a risk that a social desirability bias may have occurred as the interviewer was also one of the aforementioned companions.

IV. CONCLUSION

This study provided insight into the response of stroke survivors to a community-based hand training program using this novel HIFHFD, and examined its impact on their QOL. In addition to functional improvements, participants experienced a sense of community, companionship and motivation. Although some rehabilitation models address the importance of involvement in life situations, they do not adequately address the issues of the nature of the community [5]. Given that isolation and lack of motivation are experienced by individuals with stroke, the utility of community-based training programs using haptic devices to address these issues, needs to be further examined.

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