Title: Evaluating the dissemination and implementation impact of a rehabilitation intervention: The Graded Repetitive Arm Supplementary Program (GRASP)

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ABSTRACT

Background: Despite advances in stroke rehabilitation research, a wide gap remains between research and real-world rehabilitation practice due to limited uptake of the research evidence.

Objectives: To evaluate the dissemination and implementation impacts of a rehabilitation intervention

Methods: Systematic evaluation of data sources including academic publishing metrics, publications, and surveys was used to describe the dissemination and implementation impact of the Graded Repetitive Arm Supplementary Program (GRASP). Three categories in the Payback Framework were evaluated: knowledge production and dissemination, benefits to future research and research use, and real-world uptake and implementation.

Results: In the *Knowledge production and dissemination* category, seven publications were associated with the GRASP program done by the GRASP research team, and there were approximately 17,000 download counts of GRASP manuals from the website from 120 countries. In the *Benefits to future research and research use* category, 15 studies and 3 registered clinical trials have used GRASP as an intervention done by other researchers. In the *Real-world uptake and implementation* category, GRASP has informed recommendations in 2 clinical guidelines and 20 review papers, and had high implementation uptake (e.g., 35% (53/154) of UK therapists surveyed had used GRASP; 95% (649/681) who downloaded GRASP had used it). Factors that enhanced implementation uptake included free online standardized protocols and low cost for implementation.

Conclusion: The Payback Framework is useful to evaluate the dissemination and implementation impacts of a rehabilitation intervention. GRASP has been implemented

extensively in clinical practice and community in a relatively short time since it has been developed.

Keywords: Payback Framework, Dissemination, Implementation, Stroke, Rehabilitation, Upper extremity

INTRODUCTION

Translational research moves scientific discoveries from bench research to clinical studies and clinical studies to practice settings and communities.[1] The impact of translational research on healthcare service delivery and subsequently on public health has been slow. It has been estimated that it takes ten years or more to implement evidence-based health interventions from phase 3 clinical trials to real-world practice settings.[2]

Research impact can be defined as 'any identifiable benefit to, or positive influence on, the economy, society, public policy or services, healthy, the environment, quality of life, or academia'.[4] While studies have assessed the overall impact of funded health research studies on various aspects (e.g., health systems, policymaking, society, and economic), these studies were mostly conducted by governments, organizations, and higher education institutes with the aim of allocating funds and resources.[5] Individual researchers have been utilizing traditional bibliometrics such as the number of citations or H-index to assess and monitor academic output and research-related impact of their academic publications. With the ultimate goal of improving healthcare and public health, researchers in health research must facilitate knowledge uptake and expand research benefit beyond academia to stakeholders. Therefore, it is necessary for researchers to systematically measure the impact of a health research on healthcare delivery in real-world settings and policy making. Understanding the impact of health research will enable researchers to identify the current status of knowledge uptake and develop future steps for knowledge translation and dissemination to narrow the long research-to-practice gap.

Stroke is a leading cause of disability worldwide, with over 13 million new cases each year.[6] One of the most common consequences following stroke is upper limb paresis. Approximately 88% of individuals post-stroke display upper extremity (UE) paresis at 6 months

post-stroke[7]. Impairment in the upper extremity causes difficulties in performing daily activities, negatively affecting the quality of life.[8] A variety of interventions have been developed and supported by research evidence to improve UE outcomes, such as constraint-induced movement therapy, mirror therapy, virtual reality, mental practice, and repetitive task practice.[9] Despite advances in stroke rehabilitation research, a wide gap remains between research and real-world rehabilitation practice.[10] Previous studies have identified several barriers that hinder the uptake of research findings into clinical practice, such as complexity of interventions, lack of knowledge or skill, and lack of resources to implement.[11,12] In fact, only 2.5% of published stroke rehabilitation research evaluate the implementation of evidence-based interventions into practice,[13] and the impact of these evidence-based interventions in the real world on broader aspects (e.g., healthcare delivery, policy making, etc.) remains largely unknown.

Graded Repetitive Arm Supplementary Program (GRASP)

One example of an evidence-based rehabilitation intervention is the Graded Repetitive Arm Supplementary Program (GRASP) (http://neurorehab.med.ubc.ca/grasp/) developed by Canadian researchers to improve paretic UE function for people post-stroke based on intensive, repetitive, and task-specific practice. The Hospital GRASP Program published in 2009 was supported by a larger multi-site randomized controlled trial in inpatient stroke rehabilitation settings, where GRASP was used as a self-administered treatment protocol in addition to regular therapy monitored by the therapists at each site using face-to-face delivery for 4 weeks.[14] This study showed that the GRASP group had a greater post-treatment intervention improvement on UE function than the control group receiving education protocol (effect size d=0.45). Other versions were subsequently developed, including a Home GRASP for individuals who have been

discharged home,[15] a group GRASP[16], and a virtual GRASP (done in a group online) with post-treatment effect sizes ranging from 0.57-0.84 for UE motor impairment and function.[17] These GRASP Programs have been shown to be effective in improving motor recovery and increase the use of affected UE during daily activities.

The purpose of this study is to evaluate the dissemination and implementation impact of an evidence-based intervention (GRASP program), expanding beyond traditional research metrics. A number of approaches have been developed to evaluate research impact (4), and the Payback Framework (17) is one of the most commonly used methodological frameworks (4). While the Payback Framework has been used to evaluate entire healthcare systems or organizations, it has not been utilized to assess the impact of specific interventions. This paper is the first to use a methodology framework to systematically assess the impact of an intervention in any population on knowledge production, the research system, and policy service development. Collating and standardizing the reporting of the extent of implementation of an intervention outside of a research context can assist in understanding the reach and significance in real-world settings.

Materials and methods

Conceptual framework

We adapted the Payback framework from its original five categories to produce a three-category conceptual model focused on the evaluation of the impacts of an intervention on the dissemination and implementation in real-world settings (Table 1). The first two categories were similar to the original Payback framework: 1) *knowledge production and dissemination*, and 2) *benefits to future research and research use*. The last category was 3) *real-world uptake and*

implementation which included a subheading on cost-effectiveness and allocation of services adapted from the original Health sector benefits category from the Payback framework. Two new subheadings were added to this third category. One new subheading addressed "informing recommendation for clinical guidelines and review papers" as changing guidelines demonstrates widespread acceptance of an intervention on clinical care and review papers typically reflect the state of knowledge or current practice and provide the evidence for a particular point of view in a field. The other new subheading addressed "Informed development and uptake of services" which produced evidence of the intervention being utilized in current care or the reach of the intervention into current practice.

Table 1 about here

Data sources

Knowledge Production and dissemination

Bibliometric analysis was conducted to understand the *Knowledge Production* subcategory in the adapted Payback framework. Number of peer-reviewed journal articles, the impact factor of a journal that the given article was published in, number of citations, number of access/download counts, and the Altmetric Attention Score were collected for activities involving GRASP. The Altmetric Attention Score and number of access/download counts were collected on the journal website. As variations in databases used to assess citation impact were found among different databases,[18] the total number of time that a given publication has been cited by other publications was collected from two different databases: Google Scholar and Web of Science Core Collection from the date of publication to April 22, 2020. To understand the *Dissemination* subcategory, data from the website download form was collected at the time when the individuals downloaded the manuals from the GRASP website form May 2015 to May 2019.

Benefits to future research and research use

To examine the *Generating future research by other researchers* subcategory, research by other researchers that utilized the GRASP program as an intervention in the study were identified from a search on Web of Science and clinical trial registry databases. Articles (N=100) that cited the original GRASP study[14] on the Web of Science were reviewed to determine if the study used the GRASP program as an intervention. Searches on ClinicalTrial.gov, Australian New Zealand Clinical Trials Registry (ANZCTR), International Standard Randomised Controlled Trial Number (ISRCTN) registry, and European Union (EU) Clinical Trials Register EU using the search term "Graded repetitive arm supplementary program" in the field of other terms were used to identify any registered clinical trials that used the GRASP program as an intervention (retrieved on May 1st, 2020).

Real-world uptake and implementation

Information in the review papers that included the original GRASP paper[14] and clinical guidelines were extracted to examine how the GRASP has *Informed recommendations in clinical guidelines and review papers*. To understand how the GRASP has informed the *Development of rehabilitation services in clinical practice and community uptake*, findings from two published survey studies, one interview study[19–21], and two implementation studies[16,17] were extracted. In addition, a survey was conducted to investigate the knowledge uptake by the users of the GRASP website. Individuals who had downloaded the manuals previously (N= 9707) were sent an email containing the survey link and informed consent process, a brief description of the purpose of the research, and an invitation to complete the survey in July 2019. A follow-up reminder was sent

via email to the individuals who had not completed the survey 2 months later. The survey study protocol was approved by the University of British Columbia Behavioural Research Ethics Board, study number H19-01731.

RESULTS

Table 2 provides a summary of the dissemination and implementation impact of the GRASP program.

Table 2 about here

Knowledge production and dissemination

Peer-reviewed publications. Seven publications were associated with the GRASP program, including the first clinical trial results [14] with the full bibliometric report in Table 3.

Table 3 about here

Dissemination. To facilitate the uptake of the GRASP by knowledge users, the research team created the GRASP website in 2011, where related resources such as manuals and videos have been uploaded and can be accessed at no cost. People who access the program manuals from the website must fill out a short website download form which collects information on the demographics of the person and their intentions in using GRASP. As shown in Table 4, as of June 2019, there had been approximately 17,000 download counts of GRASP manuals from the website from 120 countries in total, with about half of download counts from North America and a third from Europe. The program reached a wide range of knowledge users on the Internet, including rehabilitation therapists and assistants (80%), students (13%), individuals with stroke and their families (5%), doctors (< 1%), and organizations (<1%). As most of the people who

downloaded the manuals from the website were rehabilitation therapists and assistants, the intended setting where the GRASP would be used was mostly related to their work settings (e.g., hospital, community, and home care). The intended format was mainly individual sessions between therapist and patient. A total of 30 presentations have been done at local, national, and international conferences and workshops.

Table 4 about here

Benefits to future research and research use

Generating future research by other researchers. The GRASP program has been used by other researchers, as shown by 15 publications[21-35] and 8 registered ongoing clinical trials. Three studies[22–24] used the GRASP program as an experimental intervention. Of these three studies, one was a study protocol in a one-group quasi-experimental design[22], a second found that GRASP is superior than constraint-induced movement therapy in improving UE function,[23] and a third found GRASP to improve UE function in a one-group pre-post design (effect size d=1.61).[24] Six studies[25–30] and 3 registered clinical trials (ACTRN12616000029493, ACTRN12618000443291, ACTRN12615000665538, and ACTRN12619000596101) combined the GRASP program with noninvasive brain stimulation, telehealth, or knowledge translation interventions to quantify the additional benefits these interventions or the combined intervention.

The GRASP program has also been used as a standard therapy to serve as an active comparator in 6 publications[31–36] and the 4 registered ongoing clinical trials (NCT02688413, NCT01721668, NCT02136433, and ACTRN12619001557123). Of these 6 publications, three publications were study protocols.[33,34,36] Two studies found GRASP to be similarly satisfying and effective to a video game intervention on UE function.[31,32] The third study using less dosage

than the original GRASP protocol found GRASP to be similarly effective to music-supported therapy on UE impairment.[35]

Capacity building. GRASP website and manuals have been generated to help to build capacity across the research system. The GRASP manuals have been translated to 8 languages by clinicians who intended to use the GRASP for their local sites. These resources are available on the website (https://neurorehab.med.ubc.ca/grasp/) at no cost.

Real-world uptake and implementation

Informing recommendations in clinical guidelines and review papers. The GRASP program has been recommended by one national clinical practice guideline, the Canadian Stroke Best Practices and one provincial guideline, the Health Quality Ontario, as a supplementary training program to increase the treatment intensity during hospitalization and at home.[37,38] The original GRASP paper has been included in 20 review papers (13 of these were systematic reviews) where the GRASP is described as a self-directed rehabilitation program after stroke,[39–45] repetitive task practice,[46–48] task-specific training,[49] resistance training program,[50] unsupervised practice,[51] mixed approach using mixed elements (e.g., strengthening, task exercises, and stretching),[43] bilateral training,[52] caregiver-mediated exercises,[53] high-intensity exercise therapy,[54] rehabilitation programs available on the Internet,[55] intervention with a published protocol,[56] or personalized out of therapy protocol.[57]

Informed development of services - clinical practice and community uptake. Two survey studies have demonstrated an increase in using the GRASP program by rehabilitation therapists in the UK since 2014. The first survey study in 2014[20] showed that 22% of UK neuro physiotherapists and occupational therapists had the experience of using the GRASP program,

and 41% of therapists knew of the GRASP program but had never used it. A recent study done by the same research group demonstrated that 35% (53/154) of neuro physiotherapists and occupational therapists use the GRASP program in treating individuals with stroke with mild and moderate impairments.[19] An interview study conducted to understand the implementation of the GRASP in the UK found that the GRASP has been adapted to some degree when used in clinical practice with less dose and wider coverage in clients' UE function.[21] One non-profit organization, the Stroke Recovery Association of British Columbia, an affiliate of the March of Dimes Canada, has been continuously delivering the GRASP program in the community since 2019.[16,17] The GRASP has been suggested by national non-profit organizations, the March of Dimes Canada and the Heart and Stroke Foundation of Canada, as a home exercise program for community-dwelling individuals with stroke.

In total, 681 people responded to the survey that was sent to people who have downloaded the program manual from the website, giving an approximate response rate of 7%. Of these respondents, 95% of them reported that they had used GRASP (N=649). The survey results were presented in Table 5. From those who had used GRASP, the highest number of users were from North America (53%), the second highest was from Europe (27%), and followed by Oceania, Asia, South America, and Africa. GRASP has been used mostly for clinical practice (87%) during individual therapy sessions (72%) and as an adjunct outside of therapy sessions (60%). More than 75% of the GRASP users agreed that the GRASP program provides more intensity in upper extremity rehabilitation, the GRASP program is evidence-based, the program is easy to implement, and the equipment and manual are easy to obtain. Although GRASP has been taken up widely in clinical practice and in the community, we found that it is not always delivered in the way in which it was shown to be effective. The survey results (Table 5D)

showed that approximately one-quarter of the respondents did not ensure their clients log the practice time and did not check their clients' weekly logs.

Improved allocation of services or cost-effectiveness of services. The delivery of GRASP via community programs has improved the allocation of rehabilitation resources, which are typically provided in hospitals and private clinics.[16,17] However, the cost-effectiveness of services has not been assessed.

Table 5 about here

While GRASP has been used widely across the world, we provide one illustrative example of how its dissemination crossed from high to low-income economy countries. The GRASP program has been implemented in an outpatient rehabilitation program by a Canadian OT volunteering in a low- and middle-income country (a small village in southern India) where there are limited rehabilitation resources. The main modifications instituted to contextualize the GRASP for this outpatient program were translating the manual to the local language (Tamil), finding alternative equipment for items that were not easily accessible, and running the program in a group setting.

DISCUSSION

This is the first study to systematically evaluate the research impacts of an evidence-based intervention (i.e., the GRASP program) beyond traditional research metrics using the adapted Payback framework. Using a structured framework and multiple data sources, we demonstrated that the GRASP program has international reach and has impacted on research, guidelines, clinical and community practice, and ultimately individuals with stroke.

We found the adapted Payback Framework useful to describe the dissemination and implementation impact of a rehabilitation intervention in a standardized format for communication. Given how real-world influences of research on society have been given increasing importance and recognition, it is crucial to measure how research achieves impact outside academia. As it is not clear how to systematically capture and report the research influence beyond academic metrics, we specifically chose to focus on the reach and uptake in services or practice to provide useful information about dissemination and implementation beyond the research setting. From multiple data sources, we found that in a relatively short time frame (11 years) since the original GRASP paper has been published in 2009,[14] the impact of the GRASP program has reached beyond the academic field to change rehabilitation service in clinical practice and in community. While data to fill out the Payback Framework came from a number of sources, we recommend a few critical sources that assisted in understanding implementation: a website from which the number of downloads and basic demographics of clinicians or patients downloading the details about the intervention can be collected; survey of those who download the detailed intervention to follow-up as to whether they implemented the intervention; and surveys of different groups of clinicians in the field as to their knowledge or implementation of the intervention. Going forwards, we recommend that rehabilitation researchers utilize the adapted Payback Framework and multiple data sources outlined in this study to evaluate the impact of their research works and plan for the next step to disseminate and translate the research evidence.

The high adoption and implementation of GRASP in the academic field and beyond the academic field (clinical practice and community) may result from the intervention being highly standardized and evidence based. It has been shown that clinical replicability of rehabilitation

intervention in randomized controlled trials is inadequate partly due to insufficient description of interventions.[58] Although usual case has been commonly used as a comparator to other intervention or as a baseline intervention to which new technologies (e.g., noninvasive brain stimulation, robotics, etc.) are added, it often differs with and between studies, which may influence the study results.[59] It is likely that researchers have chosen GRASP as a viable and replicable comparator or to combine with other experimental treatment (e.g., noninvasive brain stimulation or telehealth) as it is designed based on motor learning principles, and it is a standardized program with progressions.[32,35,60] The recommendation of the GRASP program cited in clinical practice guidelines (i.e., Canadian Stroke Best Practices)[38] may be another key factor for high adoption within Canada. Evidence from previous studies published in internationally recognized journals in rehabilitation[14,15] showing the beneficial effects of the GRASP program on UE function after stroke likely contributed to the adoption of GRASP across the world, especially in North America and Europe. These are coincident with the survey results showing that more than 75% of respondents agreed that GRASP is supported by research studies, provides more intensity in UE rehabilitation, and the program is easy to implement.

Another reason for the high adoption and implementation of GRASP is that it can be adapted and tailored easily to meet local needs while being effective. Our previous clinical trials[14,15] and implementation studies[16,17] demonstrated the effectiveness and adaptability of the program in different settings and formats (i.e., face-to-face delivery in hospital setting, home exercise program monitored by phone, group classes in community centers, or virtual delivery). The GRASP instructor's manual and exercise manual (https://neurorehab.med.ubc.ca/grasp/), which provide information on how to implement the GRASP and written and pictorial guidance for each exercise, are also available for the users to facilitate the uptake of the program. These

are coincident with the survey results showing that the vast majority of respondents agreed that GRASP is easy to implement into current practice, the detailed protocol is written in the manual, and manuals are available online at no cost when asked why they selected to use GRASP.

Compared to other evidence-based rehabilitation interventions, GRASP is low-cost and does not require expensive equipment as with robotic training or a large amount of clinical time to deliver the intervention as with constraint-induced movement therapy. While robotic training enables a high-intensity training regime and has shown beneficial effects on UE function in individuals with stroke,[61] robotic training equipment involves a significant capital expenditure for rehabilitation providers (e.g., cost up to several hundred thousand dollars per device), which may impede the uptake and use of such evidence-based rehabilitation intervention. In contrast, the equipment for GRASP can be easily obtained in one's home (e.g., cups, paper clips, coins, etc.) or purchased from a store or online (e.g., grippers, weights) at a small cost. In places where resources are limited (e.g., remote and rural areas, low- and middle-income countries) or for individuals doing exercises by themselves, GRASP is more feasible. While large amounts of clinical time were not required, the intervention does depend on motivation and willingness of patients (and potentially caregivers) to be self-directed with their exercise. The finding that some therapists are not ensuring accountability of their patient's practice could reduce the effectiveness of the intervention.

Multimodal dissemination strategies were used to distribute evidence-based information, including improving the reach of evidence, enhancing the ability to apply evidence, and the combination of the both.[62] Academic knowledge production and dissemination, such as peer-reviewed publications and presentations at local, national, and international conferences, was done to increase the reach of information to researchers and clinicians. Hosting free resources on

the website (e.g., manuals, videos, etc.) and holding knowledge translation workshops were also done to distribute the evidence widely to all stakeholders (e.g., individuals with stroke, their caregivers, researchers, and clinicians) and allow the appropriate use of evidence. To enhance the ability to deliver the GRASP program, we provided additional resources, such as supporting materials that explain the implementation of the program in specific settings and a fidelity checklist in the instructor manuals.

LIMITATIONS

This study has potential limitations. It is important to note that the data for real-world dissemination and uptake is likely under-reported despite using robust methods and the adapted Payback framework to collect data and include a wide range of outcomes to demonstrate the impact of GRASP. Although the sampling error was reduced when the sample size is more than 150 [63], the low response rates of the surveys should still be acknowledged. The response rates were low in the survey of people who downloaded the program manual (N=681) and in two previous survey studies by Connell et al.[20] (N=274) and Stockley et al.[19] (N=156), which were not unexpected for these types of survey.

CONCLUSION

This is the first study using the adapted Payback framework to assess the impact of an evidence-based intervention (i.e., the GRASP program). We demonstrated high dissemination and uptake of the GRASP beyond the academic field in clinical practice and community internationally. Moreover, we identified attributes of the research that enhanced the real-world uptake and maximized the impacts for the clinical practice and community. The findings of this

study could help determine how to assess the impact of evidence-based rehabilitation intervention in the future. Most importantly, the insights that arise from this study could inform researchers on how to facilitate the dissemination and uptake of the research evidence.

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DISCLOSURE STATEMENT

The Authors declare that there is no conflict of interest.

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DATA AVAILABILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

AUTHORS' CONTRIBUTIONS

C.-L. Yang collected, analyzed, and interpreted the data. C.-L. Yang wrote the manuscript. J.J. Eng and L.A. Connell reviewed the manuscript and provided feedback. All authors read and approved the final manuscript.

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Table 1. The adapted Payback categories and subcategories.

Adapted Payback Category	Adapted Payback Subcategory
Knowledge production and dissemination	Peer-reviewed publications
	Dissemination
Benefits to future research and research use	Generating future research by other researchers
	Capacity building
Real-world uptake and implementation	Informing recommendations in clinical guidelines and review papers
	Informed development and uptake of services
	Improved allocation of services or cost-effectiveness of services

Table 2. Summary of the adapted research paybacks

Adapted Payback Category	Adapted Payback Subcategory	Evidence
Knowledge production and dissemination	Peer-reviewed publications	• A total of 7 papers published in peer-reviewed journals. • A total of 354 citations on Goggle Scholar and 195 citations on the Web of Science. See bibliometric report in Table 2.
	Dissemination	• Approximately 17,000 download counts of the GRASP manuals from the website from 120 countries (see details in Table 3) • A total of 30 presentations at conferences and workshops
Benefits to future research and research use	Generating future research by other researchers	• A total of 16 publications that have used GRASP as an intervention. • Three registered trials on ClinicalTrial.gov have used the GRASP as an active comparator.
	Capacity building	• GRASP website, and manuals (Home and Hospital versions) have been created. • The GRASP manuals have been translated to 8 languages by clinicians who would like to use the GRASP for their local sites.
Real-world uptake and implementation	Informing recommendations in clinical guidelines and review papers	• The GRASP program has been suggested as a supplementary training by the Canadian Stroke Best Practice and the Health Quality Ontario. • A total of 20 review papers cited the original GRASP paper.
	Informed development and uptake of services	• 22% of UK rehabilitation therapists had experience of using the GRASP program (Connell, 2014). • 35% of UK rehabilitation therapists have used the GRASP program in treating individuals with stroke (Stockley et al., 2019). • The Stroke Recovery Association of British Columbia implemented GRASP programs (in-person and virtual) in the community. • The GRASP has been recommended as a home exercise program by two national non-profit organizations: The March of Dimes Canada and the Heart and Stroke Foundation of Canada. • 95% of the survey respondents (N=649) who downloaded the manual previously have used the GRASP (see details in Table 4).

	Improved allocation of services or cost-effectiveness of services	• Service typically provided by hospital functions were delivered via community programs (via Stroke Recovery Association of British Columbia) • Cost-effectiveness not established

Table 3. Bibliometric report.

Publications		Number of citations		Access/ Download Counts [b]	Altmetric Attention Score [c]
First author (Year)	**Journal (Impact factor [a])**	**Web of Science**	**Google Scholar**		
Harris (2009)	Stroke (6.046)	99	187	Access: Not available Download: 3,030	3-- Above-average Attention Score compared to outputs of the same age (62nd percentile)
Harris (2010)	Physical Therapy (3.043)	28	54	Access: 2,708 Download: 428	Not available
Connell (2014)	Implementation Science (4.525)	19	32	Access: 5,622 Download: Not available	5-- Good Attention Score compared to outputs of the same age (76th percentile)
Connell (2014)	Physical Therapy (3.043)	16	26	Access: 1,952 Download: 481	4-- Above-average Attention Score compared to outputs of the same age (64th percentile)
Connell (2014)	Archives of Physical Medicine and Rehabilitation (2.697)	17	25	Not available	12-- In the top 25% of all research outputs scored by Altmetric
Simpson (2017)	Disability and Rehabilitation (2.054)	4	12	Access: 1,804 Download: Not available	2-- Average Attention Score compared to outputs of the same age

[a] 2019 Journal impact factor. [b] Access/Download Counts and the Altnetric Attention Score were collected on April 22, 2020 on the journal website. [c] The Altmetric Attention Score is a weighted count of all of the online attention including mentions in public policy documents and references in Wikipedia, the mainstream news, social networks, blogs and more.

Table 4. Respondents characteristics, intended settings, and intended format of the GRASP from people who downloaded the GRASP manuals from the GRASP website.

	%	N
Continents (N = 17529)		
North America	44.87	7866
Europe	29.01	5085
Oceania	19.16	3359
Asia	5.57	977
Africa	0.84	148
South America	0.54	94
Profession and/or background (N = 17535)		
Occupational therapist (OT)	50.58	8870
Physiotherapist (PT)	24.33	4267
Student	13.43	2355
Rehab assistant	4.41	773
Individual with stroke	2.44	427
Caregiver (family member, friend)	2.22	390
Doctor	0.79	139
Organization	0.67	117
Other	1.12	197
Setting where the GRASP is intended to be used (N = 17581)		
Hospital	55.80	9811
Community	22.01	3869
Educational Institution	9.46	1664
Independently	4.48	787
Home care	4.06	713
Other	4.19	737
Intended format of the GRASP (N = 17544)		
Individual sessions b/w therapist and patient	76.84	13480
Independently	11.68	2050
Group setting	8.23	1443
Other	4.89	858

Table 5. Results from a survey sent out to people who downloaded the GRASP manuals.

A. Responses (%) categorized by continents to where the GRASP was intended to use (N=638).		
	%	**N**
North America	52.98	338
Europe	27.43	175
Oceania	14.11	90
Asia	4.23	27
South America	0.78	5
Africa	0.47	3
B. Responses (%) to the purpose and setting of the GRASP from people who have used the GRASP.		
What purpose have you used this program for?		
Clinical practice	86.83	554
Exercise program for yourself/ friend/ family member who had a stroke in the past	12.07	77
Teaching	9.72	62
Research	2.82	18
In what setting do you use this program?		
I am a therapist using the program with clients on a one-to-one basis within their sessions	71.94	459
I am a therapist asking my clients to do the program independently outside of their sessions (as an adjunct)	60.19	384
I am a therapist using the program with a group of clients within their sessions	14.26	91
I am a person with stroke doing my exercises without supervision	4.23	27
I am a person with stroke doing my exercises with supervision	1.57	10
Other	11.13	71
How did you find out about GRASP?		
Colleagues	54.86	350
Internet	25.24	161
Education session	18.97	121
Healthcare provider	18.97	121
Research paper	15.83	101
Conference presentation	10.03	64
Clients	1.72	11
Support group	0.94	6
Friends/family	0.78	5
Other	9.09	58

C. Responses (%) to the "Intervention characteristics" statements from therapists who have used the GRASP.			
	Agree	**Disagree**	**Neutral**
Manuals are available online at no cost	96.37 %	3.63 %	10.27 %

Easy for a patient to do /Easily implemented into current practice	90.21 %	0.63 %	9.16 %
Detailed protocol written in the manual	88.47 %	0.32%	11.22 %
Provide a patient with more intensity in their arm and hand rehabilitation	87.52 %	1.58 %	10.90 %
Equipment is easy to obtain	83.57 %	2.05 %	14.38 %
Supported by research studies	76.78 %	1.58 %	21.64 %
A senior therapist or supervisor supported the use of GRASP	55.61 %	15.48%	28.91%
It was recommended by a healthcare provider	46.45 %	19.12 %	34.44 %
The only program I could find that focuses on hand/arm impairment	32.07 %	25.91 %	42.02 %

D. Fidelity. Responses (%) to "When delivering the GRASP, which of the followings do you do" (N=547)

	%	**N**
Coach the patient and/or family on how to do the GRASP exercises	95.61	523
Involve family and/or caregivers with GRASP if available	84.46	462
Equip the patient with the GRASP book	84.46	462
Encourage and set targets for stroke-affected hand use in everyday home activities	73.3	401
Work through barriers to doing daily GRASP exercises	63.44	347
Progress the patient weekly so exercises are always challenging	58.14	318
Equip the patient with the GRASP equipment	55.39	303
Ensure the patient logs the GRASP practice time	28.34	155
Check the patient's weekly logs	25.78	141