Bridging the goal intention-action gap in rehabilitation: a study of *if-then* implementation intentions in neurorehabilitation

Authors:

Paula Kersten, PhD[†]

Kath McPherson, PhD[†]

Nicola Kayes, PhD[†]

Alice Theadom, PhD[†∞]

Alana McCambridge, BSc (Hon) [††]

Affiliations: [†] Person Centred Research Centre, School of Rehabilitation and Occupation Studies, AUT University, Auckland, New Zealand

[††] *Movement Neuroscience Laboratory, Department of Sport and Exercise Science, University of Auckland*

[∞] The National Institute for Stroke and Applied Neurosciences, School of Rehabilitation and Occupation Studies, AUT University, Auckland, New Zealand

Corresponding author: Professor Paula Kersten, Person Centred Research Centre, School of Rehabilitation and Occupation Studies, AUT University, Private Bag 92006, Auckland 1142, New Zealand. Paula.Kersten@aut.ac.nz, Tel +64 9 921 9180

Key words: Neuro-Rehabilitation; Goals; Adults; Intentions; Stroke; Multiple Sclerosis

Abstract

Purpose: To test the feasibility and acceptability of an implementation intention strategy (*if-then* plans) increasingly used in health psychology to bridge the goal intention-action gap in rehabilitation with people with neurological conditions who are experiencing difficulties with mobility.

Method: Twenty people with multiple sclerosis (MS) and stroke, randomised to an experimental and control group, set up to three mobility related goals with a physiotherapist. The experimental group also formulated *if-then* plans for every goal. Data collection: Focus groups and interviews with participants and therapists; Patient Activation Measure (PAM), 10-meter walk test, Rivermead Mobility Index, self-efficacy, subjective health status, quality of life.

Results: Qualitative data highlighted one main theme: *Rehabilitation in context*, encapsulating the usefulness of the if-then strategy in thinking about the patient in the context of complexity, the usefulness of home-based rehabilitation, and the perceived need for a few more sessions. Changes in walking speed were in the expected direction for both groups; PAM scores improved over 3 months in both groups.

Conclusion:

If-then plans were feasible and acceptable in bridging the goal intention-action gap in rehabilitation with people with MS and stroke, who are experiencing difficulties with mobility. This approach can now be adapted and trialled further in a definitive study.

Introduction

Goal planning in rehabilitation is now well accepted practice. However, many questions remain about: the best way this should be done; whether the resources needed to do this are outweighed by the benefits achieved; whether the approach is generalizable to people with cognitive problems, and whether setting goals influences goal directed behaviour [1-5]. It may seem that setting long-term goals and specifying the targeted goal directed behaviour (i.e. explicitly stating an intention) in itself is sufficient to support a person to engage in rehabilitation, or a self-managed rehabilitation programme. In fact, there is increasing evidence that even in healthy populations, having intentions to work towards a goal only moderately predicts the actual goal directed behaviour (28% of variance explained) [6]. In other words, often the very best intentions to do something (e.g. eating healthier, doing more exercise) do not translate into the desired action.

The behaviour change literature refers to this conundrum as the 'intention-behaviour gap' [6]. This gap can occur when people fail to get started (i.e. they don't do any exercises they planned), get derailed (i.e. they began with the exercise programme but gave up), or as a result of negative states (i.e. low mood or low levels of confidence impact on exercising) [4, 7, 8]. Various reasons for this gap between planning and action have been proposed, including the person's skills in regulating cognition, emotions and behaviour [9-11]. Given the evidence that healthy people struggle with this, it is likely that people with chronic disabling conditions struggle with this too. Indeed, disruption to patients' mood, cognition, motivation, a loss of purpose, or sense of self/meaning that can accompany neurological impairment and other symptoms inherent in the condition, such as fatigue, can all impact on goal directed behaviours [12-16].

One strategy that aims to overcome this intention-behaviour gap is that of implementation intentions, which specify what people want to do in order to achieve goals, and provide in more detail the when, where, and how of future action [17]. In other words, implementation intentions pre-specify behaviours that one will perform (e.g. a home exercise programme or community walking) in the service of goal attainment (e.g. to be able to walk the children to school and back) and explicitly state the situational context in which one will enact it [7]. Gollwitzer operationalised implementation intentions as '*if-then*' plans [4, 8, 18, 19]. For example, an *if-then* plan aimed at helping someone to initiate an exercise programme could state: *If* the advertisements come on during the 6 o'clock news *then* I will perform my muscle strengthening exercises. Similar *if-then* plans can be developed to address the other reasons for goal failure identified above for example, preventing people from becoming derailed or pre-specifying contingency plans to manage possible adverse contextual influences (e.g. *if* we are running late with dinner *then* I will perform my muscle strengthening exercises during Seven Sharp [a New Zealand based TV news programme]). It is immediately obvious that these plans are much more specific than a simple goal that might say: I will do my muscle strengthening exercises every day. *If-then* plans are shown to operate through making pre-rehearsed cues or mental representations accessible to the person [4, 20], enabling a more automatic response in certain situations and negating the need to deliberate [21]. They are shown to be more effective when worded using the *if-then* format than other formats [22].

There is now substantial evidence that *if-then* plans are effective in increasing healthy eating and physical activity, as well as smoking cessation in healthy populations [23-32]. Our recent systematic review of this approach with clinical populations revealed four studies that had used this successfully [33]. These studies showed that people who form *if-then* plans achieve better outcomes on medication adherence (in epilepsy and stroke) [34-36], physical capacity (when combined with Mental Contrasting & Cognitive Behavioural Therapy in chronic back

pain) [37], and physical activity (in obese older adults) [38] than controls. However, these two studies had limitations, including lack of blinding [35-38], selection bias, limited outcomes recorded [34], short follow-up [34, 37] and the incorporation of *if-then* plans as part of a complex intervention as opposed to it being a stand-alone intervention [37] .

Our study aimed to test the feasibility and acceptability of this specific implementation intention strategy (*if-then* plans) to bridge the goal intention-action gap in rehabilitation with people with multiple sclerosis (MS) and stroke, who are experiencing difficulties with mobility. These two groups were selected as exemplars of those who are often required to engage in home based rehabilitation.

Methods

We conducted a mixed methods study to enable us to explore the feasibility of *if-then* plans from the perspectives of patients and therapists. This included a qualitative component and a pilot randomised controlled trial (RCT). The pilot trial allowed us to evaluate the suitability of the outcome measures and obtain quantitative data for a power calculation for a future trial.

Participants and sample:

Twenty people were recruited, 10 with MS and 10 with stroke. The sample size was considered sufficient to: 1) explore participants' and therapists' views and experiences of the feasibility and acceptability of the intervention; 2) evaluate the suitability of the outcome measures; and 3) carry out a power calculation.

People were included if they: had a diagnosis of MS or stroke (diagnosed >6 months previous); reported a rehabilitation need concerning mobility (e.g. walking, wheelchair

mobility, transfers, stairs, balance); were not currently engaged in rehabilitation or therapy; lived at home; were aged 18 or above; were able to give informed consent; had communication skills sufficient to complete outcome measures and; adequate cognitive skills necessary for engagement in the intervention (score >6 on Mental Status Questionnaire [39]). We excluded those who were receiving acute hospital or nursing home care or if they had significant co-morbidities (such as rheumatoid arthritis). In addition, those who had recently taken part or were taking part in another research project were excluded to: 1) prevent carry over effects from another intervention to our trial, and 2) and avoid affecting outcomes of other studies. People with MS were also excluded if they had a relapse within the previous three months or commenced a disease modifying drug within the last three months, as it would not have been possible to attribute any changes to the intervention. People with MS and stroke in the Auckland region were invited to participate via the MS Society and Stroke Foundation (via field officers and advertisements), the university's Integrated Health Clinic (previous patients only) and newspaper adverts. Those interested were given an information pack and asked to return a self-reply slip or contact the researcher directly. The researcher discussed the study with potential participants, clarified questions, screened for eligibility, and took informed consent.

Four physiotherapists delivered the intervention and also participated in a qualitative evaluation of the intervention.

Procedures:

Being a pilot study, the project was not powered to examine significant differences between groups. However, we used a stratified (by disease group) randomisation procedure to rule out selection bias and to test out procedures for a larger trial. Once consented, the study's randomisation officer randomised participants using a computer-generated list and contacted

the research physiotherapist with participant details and group allocation. The randomisation officer was not involved in any other aspect of the study.

Interventions

The control intervention (goal setting only) was designed to reflect usual care by a physiotherapist and manualised. Session 1 was conducted face to face in the participants' home except for one participant who chose to be seen at the university. Participants set up to three exercise or activity goals for their self-managed, mobility-related rehabilitation with the therapist. The therapist ensured these were formulated using best practice guidance [40, 41] and that they were specific and measurable. The goals were recorded on a purposely developed data sheet, one copy was held by the participant and one by the physiotherapist. The physiotherapist made a follow-up call three weeks later in which participants' goals were reviewed and adjusted if required. The physiotherapist mailed a record of the outcomes of this session to the participant for their record. Participants in the control group were not guided to develop *if-then* plans.

The experimental intervention (goal setting augmented by *if-then* plans) was also manualised and delivered by a physiotherapist. In session 1, participants received the same best practice goal setting as described above, augmented by targeted *if-then* plans. After developing goals with participants, facilitators and barriers to carrying out each activity or exercise goal were discussed in order to target 'real' or 'meaningful' implementation intentions [16, 21]. Subsequently, physiotherapists supported them to formulate *if-then* plans for every goal. These could include multiple *if-then* plans for any one goal or one *if-then* plan for multiple goals. Both goals and associated *if-then* plans were recorded on the purposely developed data sheet. During the follow-up phone call (conducted three weeks later) goals and *if-then* plans were reviewed and refined if required.

For both groups the home visits were 1 hour in duration and the telephone call contact with patients lasted up to 30 minutes. Physiotherapists were recruited and trained to deliver both the control and experimental interventions and also received training on safety and engaging in clinical research. We chose to teach practicing physiotherapists this new approach to goal setting as: 1) physiotherapists are specifically involved in mobility-related rehabilitation; 2) there is increasing evidence that therapists can effectively incorporate psychological approaches into their patient management [42-44].

Data collection

Focus groups were the preferred method of qualitative data collection as they are an efficient data collection technique to identify key concerns and to enable shared experiences to prompt deeper thinking and debate on a topic [45, 46]. Two patient focus groups were planned, one with participants from the experimental group, the second with those from the control group. However, given slow recruitment, focus groups were only possible for the first seven participants, with individual interviews carried out with those taking part towards the end of the study (n=4). The experimental focus group / interviews explored the feasibility and acceptability of the experimental intervention. The control focus group/interviews explored the acceptability of standard goal setting. Two focus groups were also held with the study physiotherapists (two in each group) to explore the feasibility and acceptability of the experimental intervention compared to standard goal setting. The topic guide is given in table I.

Table I. Topic guide and prompts for participant and therapist focus groups / interviews*

Questions and prompts - participants	Questions and prompts - physiotherapists

• How did you find the goal setting approach used?
  o What did you like?
  o What did you not like?
  o What (if anything) would you change?
	• How did you find the two goal setting approaches used
	  o In what way was it different from what you are used to?
	  o What did you like?
	  o What did you not like?
	  o Did you have a preference?
	  o Was the frequency of the sessions ok?
	  o What (if anything) would you change?

• Do you think it helped you to achieve your goals?
  o How do you think it helped/didn't help achieve your goals?
	• Do you think it helped you establish a collaborative approach to setting the goals?
	  o In what way?
	  o Why not?
	  o How could this be done better?

• How did the goal setting approach impact on how you feel about your goals? • Do you have any comments about the diary you completed as part of the	• Do you think the approaches helped patients achieve their goals? • How did the goal setting approach impact on how you feel about setting goals?

programme?

- Did you remember, was it sufficient or too much, would you prefer different way of recording what you did?

- Did taking part in this research impact on any other areas of your life?
  - Can you tell me a little bit more about that?

- Were the assessments we did appropriate?
  - E.g. questionnaires they completed, walking test

- Do you have any comments about the paperwork you completed as part of the project?
  - E.g. case notes, goals booklets, ensuring patients had copies of the booklets

- What were your experiences of the training and debrief sessions with the research team?
  - E.g. duration, frequency, appropriateness, availability

- Did taking part in this research impact on your practice?
  - Can you tell me a little bit more about that?

---

* Questions served to encourage participants to talk about their experiences, the guide was used flexibly.

The experimental intervention was intended to increase the likelihood that goal intentions would be acted upon, and thereby a greater improvement in mobility than when goals alone were set. This was measured with the 10 meter walk [47, 48] test and the Rivermead Mobility Index [48, 49]. In addition, given the mode of action, we hypothesised that the *if-then* intervention should result in greater engagement by participants in the self-management of their rehabilitation (measured with the Patient Activation Measure [50, 51]). We also anticipated there could be an impact on self-efficacy, health status and health related quality of life (secondary outcomes) (measured with the General Self-Efficacy [52] and the Self-efficacy for Chronic Diseases Scales [53], the SF-36 [54] and the World Health Organisation Quality of Life questionnaire [55, 56]). Table II provides more detail about the outcome measures used. All outcome data were collected at the study centre by a research assistant who was blind to group allocation at baseline, and 6 and 12 weeks after the first session with the physiotherapist.

Table II. Outcomes assessed in the study

Domain measured	Tool	Details of the tool	Examples of studies demonstrating evidence of reliability and validity in rehabilitation
People's knowledge, skill and confidence in managing their health or chronic condition	Patient Activation Measure (PAM-13) [50, 51]	A self-report measure of knowledge, skill and confidence in managing own health or chronic condition (13-items).	[61-63]
Walking speed	10 meter walk test [47, 64]	Objective measure of mobility	[48, 64, 65]
Mobility	Rivermead Mobility Index [49]	Self-reported measure of mobility (15 items)	[48, 66, 67]
General self-efficacy	General Self-Efficacy Scale [52]	Self-reported measure (10-items) of general self-efficacy	[68, 69]
Self-efficacy for chronic diseases	Subscales of the Self-Efficacy for Chronic Diseases Scales [53]: - *Manage your disease* - *Managing your symptoms*	Self-reported measures of behaviour-specific self-efficacy (5 items each)	[16, 70]
Subjective health status	SF-36 V2 [54]	Self-reported measure of health status (36-items)	[71, 72]
Health related quality of life	WHOQOL-BREF measure [55] (New Zealand version [73])	Self-reported measure of quality of life (31-items)	[55, 74]

Data analysis

Focus groups/interviews were audio-taped and transcribed verbatim. Thematic analysis was used to inductively identify emergent issues and categories [57]. This process entailed familiarisation with the data, generating initial codes which were discussed with the team, and defining and naming the themes presented in this manuscript. Pseudonyms will be used throughout the manuscript when presenting quotes, along with the group allocation. Outcomes data were analysed on an intention to treat basis. Summary statistics (median, IQR, range) were used to describe distributions at baseline and changes in outcomes for the two groups. Statistical comparisons on outcome measures between groups were not made at any time points as the study was not powered for such analyses.

Ethics approval was gained from the Northern Y Regional Ethics Committee (NTY/11/04/041) and AUT Ethics Committee (11/177).

Results

In total, thirty four people contacted the researcher, of whom eight were ineligible. Of 26 eligible people, 1 was uncontactable, and 5 declined (a response rate of 77%). Ten participants were randomised to the experimental group (5 with MS and 5 with stroke) and 10 to the control group (5 with MS and 5 with stroke). One person from the control group was completely lost to follow-up due to a relapse of MS and his data are not presented. One person from the control group withdrew at the 12-week follow-up for personal reasons unrelated to the study. At the first follow-up point 1 person from the control group missed the appointment but completed questionnaires and returned these by post. Three people were not included in the analysis of gait speed as they were unable to walk 10 meters (two from the experimental intervention group and one from the control group). There were no statistically

significant differences between demographic characteristics of the experimental and control group at baseline (table III). There were differences between groups in walking speed at baseline with the experimental intervention group walking faster (median = 7.7) than the control group (median 13.3), but this was not statistically significant (Mann-Whitney U test, z = -1.429, P=0.153).

Table III. Demographic characteristics of the experimental and control group

Characteristic	All participants (n=20)	Experimental Group (n=10)	Control Group (n=10)	Differences between experimental and control group
	Median (IQR) Range			MWU
Age	55 (51 to 69) 48 to 87	57 (53 to 70) 49 to 87	54 (51 to 67) 48 to 83	Z=-0.835 P=0.40
	Frequency (%)			Chi-Square
Gender				
Male	6 (30%)	4	2	χ^2=0.95
Female	14 (70%)	6	8	P=0.33
Ethnicity				
Chinese	1 (5%)	0	1	χ^2=2.00
NZ European	18 (90%)	9	9	P=0.37
European	1 (5%)	1	0	
Highest level of education	11 (55%)	5	6	χ^2=0.20
Secondary school	9 (45%)	5	4	P=0.65
Tertiary education				
Marital status				
Single	3 (15%)	1	2	χ^2=1.76
Married	11 (55%)	6	5	P=0.78
Living as married	1 (5%)	1	0	
Divorced	2 (10%)	1	1	
Widowed	3 (15%)	1	2	
Current employment status				
Full-time work	2 (10%)	0	2	χ^2=3.76
Part-time work	2 (10%)	1	1	P=0.44
Unemployed	5 (25%)	4	1	
Retired	6 (30%)	3	3	
Other	4 (20%)	2	2	
Missing	1 (5%)			

Feasibility and acceptability of the intervention

Qualitative data highlighted one main theme, common to both participants and therapists: *Rehabilitation in context*. This theme encapsulated the usefulness of providing rehabilitation in the home setting, the perceived need for a few more sessions to ensure patients were able

to do the planned exercises correctly and safely and progress them when needed, and the usefulness of the if-then strategy in thinking about the patient in the context of complexity. There were no obvious differences in perceptions reported by the two participant groups, except for the comments on the if-then strategies which were unique to the experimental intervention group.

Therapists applied the intervention in a home setting (for all but one participant) to assess the suitability of the environment and context for the exercises. The home environment was perceived as more helpful in building rapport with the participant and developing achievable goal plans that took the context into account.

> *"I would say that actually going home was very very useful. It's an environment where I'm used to seeing clients in and it means that you can actually have a look around the house and determine what's the best thing to hold on to that's going to be safe for them. Can they do the exercises on the stairs, can they hold onto the kitchen bench or bathroom rail, have they got a clear surface. So you can actually assess the environment for safety and set exercises that they can appropriately manage."*
> *(Alison, therapist)*

Patient participants also reported the home setting as very positive; it made them feel supported, allowed individualising of the exercise programme and keeping it simple:

> *"I felt more relaxed and comfortable perhaps .... It's quite an effort for us to get out"*
> *(Susan, experimental group)*

Therapists would have preferred some more sessions. In particular, they suggested the first two sessions should be closer together so they could check participants were exercising safely and that they carried out the exercises correctly. They suggested up to four sessions would be more appropriate, with one or two of these a phone call. They considered the half day training long enough and suggested that video examples and script charts might be useful for future studies.

> *"To actually visually see how they're performing the exercises. Have they really changed, are they doing them correctly, have they gone on to something really quite different, have they functionally improved, can you actually do a progression."(Carol, therapist)*

Patient participants reported that they were more likely to carry out their home exercise plan if they had a follow-up. This follow-up served as a check they were doing the right exercises, and helped to keep them motivated:

> *"You know that she's gonna come and visit so you have to do them" (Janet, experimental group)*

Indeed, some said that as soon as the research was finished they either stopped or reduced the intensity of exercising:

> *"I stuck to those exercises because I knew somebody would be checking up on them... And then lapsed slightly afterwards... So the outside motivation is quite important" (Susan, experimental group)*

The *if-then* strategy was perceived as useful by therapists and experimental intervention group participants. For example, therapists reported it provided a good structure and strategies:

"Working with the If-Then, you were really giving them something very structured that you felt was actually going to really make it work for them"(Lyn, therapist)

"… particularly the If-Then component because you are identifying the barriers, giving them the structure, giving them some very positive strategies to get on with it" (Carol, therapist)

Similar findings emerged from experimental intervention group participants:

"Your terminology IF-THEN plans. I thought fine tuning. Okay I'm not doing this or I can't do it. What else can I adjust to get the same result?"(Janet, experimental group)

In addition, therapists reported the experimental intervention to be straightforward. Indeed, some had started to use it with their own clinic patients.

"That was quite easy and you know quite straightforward process with getting that goal and the If-Then steps" (Becky, therapist)

The approach also facilitated them to think beyond adherence.

"It's not just about adherence and about motivation to be able to do exercise, it's about. It's about other things. It's life complexities." (Alison, therapist)

Suitability of the outcome measures in evaluating benefits of *if-then* plans

Due to the small sample size observed differences between groups could be due to chance. We therefore targeted evaluation of the measures in terms of their feasibility for a full trial. Walking speed decreased in the experimental and the control group (table IV). Three people were unable to complete this test as they were unable to walk 10 meters at baseline. Participants' knowledge, skill and confidence in managing their health or chronic condition

(as measured with the Patient Activation Measure [50, 51]) improved over the 12 weeks in both groups (Table IV). There were no noticeable changes in self-reported mobility (Rivermead Mobility Index [48, 49]) in either group (Table IV).

Table IV. Key outcome measures comparing experimental and control groups (data are only presented for those with data on all 3 assessment points)

Variables		Baseline		Follow-up 1: 6 weeks post-session 1		Follow-up 2: 12 weeks post-session 1	
		Experimental	Control	Experimental	Control	Experimental	Control
10M Walking speed (as fast as possible)*	Median	7.7	13.3	7.2	10.1	7.3	10.6
	(IQR)	(7.0-10.7)	(7.4-33.2)	(6.3-10.0)	(6.3-31.1)	(6.1-10.1)	(6.2-31.6)
	Range	4.7-14.9	5.8-38.1	4.4-16.4	4.4-34.3	4.5-14.6	4.3-33.5
Patient Activation Measure**	Median	63.0	56.4	61.6	66.0	64.6	63.2
	(IQR)	(51.5-71.3)	(52.9-63.9)	(54.7-74.6)	(54.8-80.7)	(49.7-69.6)	(59.1-81.6
	Range	45.2-100	52.9-66.0	52.9-80.0	49.9-82.8	43.4-75.3	56.4-86.3
		N=8	N=6	N=8	N=6	N=8	N=6
Rivermead Mobility Index	Median	14.0	12.0	14.0	11.0	14.0	12.0
	(IQR)	(10.0-15.0)	(10.0-15.0)	(11.0-15.0)	(10.0-15.0)	(11.5-15.0)	(11.0-15.0)
	Range	6-15	8-15	7-15	8-15	9-15	8-15

* Higher scores denotes slower speed

** Higher scores denotes better patients' knowledge, skills and confidence for self-management (PAM); better mobility (RMI)

Findings from the secondary outcome measures are shown in table V. Minimal changes over time were observed in self-efficacy. It appeared that the experimental intervention group deteriorated somewhat whist the control group improved on the self-efficacy measures, but there were mixed results between the three measures. Quality of Life (physical domain) improved in both groups and health status improved in the experimental intervention group.

Table V. Secondary outcome measures comparing experimental and control groups (data are only presented for those with data on all 3 assessment points)

Variables *		Baseline		Follow-up 1: 6 weeks post-session 1		Follow-up 2: 12 weeks post-session 1	
		Experimental	Control	Experimental	Control	Experimental	Control
General Self-Efficacy Scale	Median	34	30	34	31	30	31
	(IQR)	30-38	29-35	30-38	30-36	30-34	28-38
	Range	27-40	27-36	29-40	30-39	29-38	23-39
Self-efficacy for chronic diseases: *Manage your disease*	Median	9	7.8	8.6	8.4	8.4	8.0
	(IQR)	8.5-9.6	7.0-9.0	8.0-9.0	7.0-8.8	7.9-9.2	7.6-9.2
	Range	7.2-10	5.8-9.0	6.4-9.0	6.0-9.2	7.6-9.8	4.4-9.6
Self-efficacy for chronic diseases:	Median	8.6	6.2	8.4	8.0	8.2	8.0
Managing your symptoms	(IQR)	7.0-9.3	6.0-8.8	7.4-9.0	5.8-9.0	7.6-8.7	6.0-9.4
	Range	5.4-9.8	5.4-8.8	5.2-9.4	4.4-9.0	7.0-9.0	4.6-9.4
WHOQOL-BREF	Median	3.3	3.2	3.7	3.5	3.7	3.7
Physical Domain	(IQR)	3.1-4.0	3.0-3.6	3.4-3.9	3.3-4.0	3.6-4.1	3.4-3.9
	Range	3.0-4.4	2.7-4.6	3.0-4.3	3.1-4.3	3.0-4.4	3.3-4.1
WHOQOL-BREF	Median	4.0	3.7	4.0	4.0	4.0	3.6
Psychological Domain	(IQR)	3.8-4.4	3.3-3.8	3.8-4.4	2.8-4.2	3.9-4.5	3.3-4.0

	Range	3.0-4.8	2.3-4.0	2.8-4.8	2.2-4.8	2.7-4.8	2.8-4.0
WHOQOL-BREF	Median	4.2	3.7	4.7	4.0	4.3	3.7
Social Domain	(IQR)	3.2-5.0	3.7-3.7	3.7-5.0	3.0-4.0	3.1-5.0	3.3-3.7
	Range	2.0-5.0	3.7-4.0	2.0-5.0	3.0-4.7	2.0-5.0	3.3-4.7
WHOQOL-BREF	Median	4.3	3.4	4.1	3.6	4.3	3.5
Emotional Domain	(IQR)	3.8-4.4	3.0-3.9	3.8-4.4	2.9-4.4	3.8-4.4	2.9-4.5
	Range	3.0-4.5	2.5-4.0	3.3-4.5	2.9-4.4	3.1-4.8	2.4-4.5
SF-36	Median	34.6	39.7	35.6	41.7	39.8	40.0
Physical Component Score	(IQR)	26.6-44.4	36.9-43.6	33.2-41.9	38.2-43.8	34.0-44.7	35.4-45.6
	Range	24.2-52.3	29.8-48.2	25.0-54.3	35.9-45.6	25.4-47.1	31.0-46.2
SF-36	Median	55.1	57.8	56.9	58.2	55.7	55.0
Mental Component Score	(IQR)	49.5-57.0	51.6-59.6	39.5-63.9	38.2-61.9	41.9-60.4	45.4-62.7
	Range	40.4-57.9	26.2-61.9	31.6-67.2	20.8-63.7	37.5-65.9	33.3-64.4

* Higher scores denotes better self-efficacy, quality of life and health status

Discussion

This is the first study of *if-then* plans implemented with a rehabilitation population. The results showed that a very brief goal setting intervention, consisting of only one face to face and one telephone session with a physiotherapist (up to 1.5 hours in total) was a feasible approach to supporting people in the community. In addition, the qualitative findings showed that physiotherapists found the augmented goal setting approach (*if-then* planning) relatively straight forward and structured. They reported that using the steps outlined in the training manual was easy to move from goals, to identify barriers and facilitators, and then to *if-then* plans. It helped them to focus on supporting study participants with strategies that could help them manage their rehabilitation, as opposed to blaming them for not being adherent. Participants also reported they found *if-then* plans to be helpful in terms of planning and fine-tuning. However, participants and therapists from both groups reported they would have benefited from more sessions. In particular, they felt that additional follow-up would help check that exercises were being carried out correctly and safely, enable them to adjust exercises if needed, and help with motivation. It was noted that participants were modest in their requests, asking for a few more sessions, preferably a small number over a year.

A limitation of the study was our choice of the 10-meter walking test as a proxy primary outcome measure for improvements in mobility. On examination of the goals people set themselves, this was not the best measure of choice. For example, exercises to improve mobility focused on balance, leg muscle strength and walking distance. For a future study we suggest using a broader measure of physical functioning, such as the Physical and Movement subscale of the activity measure for postacute care (AM-PAC) (community form) [58-60]. This has been shown to have average Standardised Response Means of 1.0 for people who improve and people who deteriorate in the post-acute rehabilitation stage. Using a more

conservative effect size statistic of 0.70, results in a sample size of 88 for a future study. Allowing for 20% drop out this means 110 people should be recruited.

Due to slow recruitment individual interviews rather than the planned focus groups were used for some participants. Although this format did not facilitate shared group discussion of experiences, it enabled us to capture their comments in the face of logistic difficulties. We believe the integrity of qualitative data collection was maintained as researchers carrying out these interviews had also been involved in the focus groups. This was also an interesting feasibility issue to uncover, before embarking upon a larger trial, with exit interviews logistically being more feasible.

The patient reported outcome measures used in the study were acceptable to study participants. Firm conclusions cannot be drawn regarding the size of change over time or differences between groups, as the study was not powered to examine this. However, based on the descriptive evaluation of data, the most promising measures employed in this study appear to be the Patient Activation [50, 51], the Self-efficacy for Chronic Diseases tool and the WHOQOL-BREF.

This was a small study of people who had sustained a stroke at least more than six months ago and people with MS who had not had an exacerbation or started disease modifying drugs in the previous three months. Consequently, the findings cannot be attributed to natural recovery or major changes in medication. Given many participants demonstrated improvements on a range of measures this suggests that a very brief intervention may be helpful in supporting people to work towards their rehabilitation goals. Whether this approach could be useful in the post-acute setting would be interesting to explore. Furthermore, the follow-up period was short (12 weeks following the first contact with the physiotherapist) and some people reported that knowing that a physiotherapist would come to

see them again acted as a motivating factor. Future studies are required with a longer follow-up to test for maintenance of goal directed behaviour practice in the long term.

Although this was a small study we used randomisation to evaluate the feasibility for a future definitive study. Logistically this required two researchers for the study, one with responsibility for randomisation and liaison with physiotherapists and the other with responsibility for all assessments. We did not experience problems with this approach and patients did not reveal their group allocation to the blinded assessor. In addition, in this study we decided that therapists should deliver both the experimental and the control intervention so that observed changes could not be attributed to the personality or skills of individual therapists. The risk of this approach is that physiotherapists could have carried over aspects of the experimental intervention into the control intervention. From our case notes review we do not believe this happened. However, it will require very close monitoring in future studies.

Previous studies of implementation intentions in clinical populations have not specifically explored *if-then* plans [33]. This study highlights that *if-then'* plans are feasible and acceptable in bridging the goal intention-action gap in rehabilitation with people with multiple sclerosis and stroke, who are experiencing difficulties with mobility. *If-then* plans show promise as an intervention to support goal attainment and warrant further investigation of their effectiveness in a definitive study.

Acknowledgments

The authors thank the participants in this study without whom this study would not have been possible.

Declaration of Interest statement

The study was funded through a Contestable Research Grant from the Faculty of Health and Environmental Sciences at Auckland University of Technology (CGH 19/11).

References

1. Wade DT. Goal setting in rehabilitation: An overview of what, why and how. Clinical Rehabilitation 2009;23:291-5.
2. Rosewilliam S, Roskell CA, Pandyan A. A systematic review and synthesis of the quantitative and qualitative evidence behind patient-centred goal setting in stroke rehabilitation. Clinical Rehabilitation 2011;25:501-14.
3. Sugavanam T, Mead G, Bulley C, Donaghy M, Van Wijck F. The effects and experiences of goal setting in stroke rehabilitation-a systematic review. Disability and Rehabilitation 2013;35:177-90.
4. Gollwitzer PM. Implementation intentions: Strong effects of simple plans. American Psychologist 1999;54:493-503.
5. McPherson KM, Kayes NM, Kersten P. MEANING as a smarter approach to goals in rehabilitation. In: Rehabilitation Goal Setting: Theory, Practice and Evidence. R.J. Siegert and W.M.M. Levack, Editors. 2014, CRC Press: London. p. 105-119.
6. Sheeran P. Intention-behavior relations: A conceptual and empirical review. In: Stroebe W, Hewstone M. Editors. European Review of Social Psychology. Chichester: Wiley; 2002. p 1-30.
7. Gollwitzer PM, Sheeran P. Implementation Intentions. [cited 23 September 2013]; Available from: http://cancercontrol.cancer.gov/BRP/constructs/implementation_intentions/goal_intent_attain.pdf

8. Gollwitzer PM, Sheeran P. Implementation Intentions and Goal Achievement: A Meta-analysis of Effects and Processes. In: Zanna MP, Editor. Advances in Experimental Social Psychology. 2006. p 69-119.

9. Bandura A. Self-efficacy: The exercise of control. New York: Freeman. 1997.

10. Schunk DH, Zimmerman BJ. Social origins of self-regulatory competence. Educational Psychologist 1997;32:195-208.

11. Siegert RJ, McPherson KM, Taylor WJ. Toward a cognitive-affective model of goal-setting in rehabilitation: Is self-regulation theory a key step? Disability and Rehabilitation 2004;26:1175-83.

12. Levack WMM, Taylor K, Siegert RJ, Dean SG, McPherson KM, Weatherall M. Is goal planning in rehabilitation effective? A systematic review. Clinical Rehabilitation 2006;20:739-55.

13. Asano M, Duquette P, Andersen R, Lapierre Y, Mayo NE. Exercise barriers and preferences among women and men with multiple sclerosis. Disability and Rehabilitation 2013;35:353-61.

14. Mulligan H, Whitehead LC, Hale LA, Baxter GD, Thomas D. Promoting physical activity for individuals with neurological disability: indications for practice. Disability and Rehabilitation 2012;34:1108-13.

15. Simpson LA, Eng JJ, Tawashy AE, English C, Olawale OA. Exercise perceptions among people with stroke: barriers and facilitators to participation. International Journal of Therapy and Rehabilitation 2011;18:520-30.

16. Kayes NM, McPherson KM, Schluter P, Taylor , Leete M, Kolt GS. Exploring the facilitators and barriers to engagement in physical activity for people with multiple sclerosis. Disability and Rehabilitation 2011;33:1043-53.

17. Ziegelmann JP, Luszczynska A, Lippke S, Schwarzer R. Are goal intentions or implementation intentions better predictors of health behavior? A longitudinal study in orthopedic rehabilitation. Rehabilitation Psychology 2007;52:97-102.

18. Gollwitzer PM, Brandstätter V. Implementation Intentions and Effective Goal Pursuit. Journal of Personality and Social Psychology 1997;73:18699.

19. Gollwitzer PM, Oettingen G. The emergence and implementation of health goals. Psychology and Health 1998;13:687-715.

20. Parks-Stamm EJ, Gollwitzer PM, Oettingen G. Action control by implementation intentions: Effective cue detection and efficient response initiation. Social Cognition 2007;25:248-66.

21. Webb TL, Sheeran P. Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. British Journal of Social Psychology 2008;47:373-95.

22. Oettingen G, Hönig G, Gollwitzer PM. Effective self-regulation of goal attainment. International Journal of Educational Research 2000;33:705-32.

23. Arbour KP, Martin Ginis KA. A randomised controlled trial of the effects of implementation intentions on women's walking behaviour. Psychology and Health 2009;24:49-65.

24. Armitage CJ. Effects of an implementation intention-based intervention on fruit consumption. Psychology and Health 2007;22:917-28.

25. Armitage CJ, Arden MA. A volitional help sheet to increase physical activity in people with low socioeconomic status: A randomised exploratory trial. Psychology and Health 2010;25:1129-45.

26. Chapman J, Armitage CJ. Evidence that boosters augment the long-term impact of implementation intentions on fruit and vegetable intake. Psychology and Health 2010; 25:365-81.

27. Chapman J, Armitage CJ, Norman P. Comparing implementation intention interventions in relation to young adults' intake of fruit and vegetables. Psychology and Health 2009;24:317-32.

28. Prestwich A, Ayres K, Lawton R. Crossing two types of implementation intentions with a protection motivation intervention for the reduction of saturated fat intake: A randomized trial. Social Science and Medicine 2008;67:1550-8.

29 Prestwich A, Perugini M, Hurling R. Can the effects of implementation intentions on exercise be enhanced using text messages? Psychology and Health 2009;24:677-87.

30. Prestwich A, Perugini M, Hurling R. Can implementation intentions and text messages promote brisk walking? A randomized trial. Health Psychology 2010;29:40-9.

31. Stadler G, Oettingen G, Gollwitzer PM. Physical Activity in Women. Effects of a Self-Regulation Intervention. American Journal of Preventive Medicine 2009;36:29-34.

32. Stadler G, Oettingen G, Gollwitzer PM. Intervention Effects of Information and Self-Regulation on Eating Fruits and Vegetables Over Two Years. Health Psychology 2010;29:274-83.

33. Kersten P, McCambridge A, Kayes NM, Theadom A, McPherson KM. Bridging the gap between goal intentions and actions: a systematic review in patient populations. Disability And Rehabilitation, 2014. Early online: p. 1-8.

34. Brown I, Sheeran P, Reuber M. Enhancing antiepileptic drug adherence: A randomized controlled trial. Epilepsy and Behavior 2009;16:634-9.

35. O'Carroll RE, Chambers JA, Dennis M, Sudlow C, Johnston M. Improving adherence to medication in stroke survivors: A pilot randomised controlled trial. Annals of Behavioral Medicine 2013;46:358-68.

36. O'Carroll RE, Dennis M, Johnston M, Sudlow C. Improving adherence to medication in stroke survivors (IAMSS): A randomised controlled trial: study protocol. BMC Neurology 2010;10.

37. Christiansen S, Oettingen G, Dahme B, Klinger R. A short goal-pursuit intervention to improve physical capacity: A randomized clinical trial in chronic back pain patients Pain 2010;149:444-52.

38. Belanger-Gravel A, Godin G, Bilodeau A, Poirier P. The effect of implementation intentions on physical activity among obese older adults: A randomised control study. Psychology and Health 2013;28:217-33.

39. Kahn RL, Goldfarb AI, Pollack M, Peck A. Brief objective measures for the determination of mental status in the aged. The American Journal of Psychiatry 1960; 117:326-8.

40. Bovend'Eerdt TJH, Botell RE, Wade DT. Writing SMART rehabilitation goals and achieving goal attainment scaling: A practical guide. Clinical Rehabilitation 2009;23: 352-61.

41. Turner-Stokes L. Goal attainment scaling (GAS) in rehabilitation: A practical guide. Clinical Rehabilitation 2009;23:362-70.

42. Thomas S, Thomas P, Kersten P, Jones R, Green C, Nock A, Slingsby V, Davies Smith A, Baker R, Galvin K, Hillier C. A pragmatic parallel arm multi-centre randomised controlled trial to assess the effectiveness and costeffectiveness of a group-based fatigue management programme (FACETS) for people with multiple sclerosis. Journal of Neurology, Neurosurgery, and Psychiatry 2013;84:1092-99.

43. Sullivan MJL, Adams H, Rhodenizer T, Stanish WD. A Psychosocial Risk Factor-Targeted Intervention for the Prevention of Chronic Pain and Disability Following Whiplash Injury. Physical Therapy 2006;86:8-18.

44. Kayes NM, McPherson, Taylor D, Schluter P. The facilitating activity for well-being (FAB) programme: a pilot study of a new approach to engaging people with multiple sclerosis in goal-directed therapy. 2009 Queenstown, New Zealand: p. 49.

45. Kitzinger J. Qualitative research. Introducing focus groups. British Medical Journal 1995;311:299-302.

46. Krueger RA, Casey MA. Focus groups: A practical guide for applied research. 2000, London: Sage publications.

47. Bohannon RW. Walking after stroke: comfortable versus maximum safe speed. International Journal of Rehabilitation Research 1992;15:246-48.

48. Vaney C, Blaurock H, Gattlen B, Meisels C. Assessing mobility in multiple sclerosis using the Rivermead Mobility Index and gait speed. Clinical Rehabilitation 1996;10: 216-26.

49. Collen FM, Wade DT, Robb GF, Bradshaw CM. The Rivermead Mobility Index: a further development of the Rivermead Motor Assessment. International Disability Studies 1991;13:50-4.

50. Hibbard JH, Mahoney ER, Stockard J, Tusler M. Development and testing of a short form of the patient activation measure. Health Services Research, 2005. 401918-30.

51. Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the Patient Activation Measure (PAM): conceptualizing and measuring activation in patients and consumers. Health Services Research 2004;39:1005-26.

52. Schwarzer R, Jerusalem M. Generalized Self-Efficacy scale. In: Weiman J, Wright S, Johnston M, Editors. Measures in health psychology: A user's portfolio. Windsor: NFER-NELSON 1995: p 35-37.

53. Lorig K, Stewart A, Ritter P, Gonzalez VM, Laurent D, Lynch J. Outcome Measures for Health Education and other Health Care Interventions. Thousand Oaks CA: Sage Publications. 1996.

54. Ware JE Jr. SF-36 health survey update. Spine 2000;25:3130-9.

55. Skevington SM, Lotfy M, O'Connell KA. The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. Quality of Life Research, 2004;13:299-310.

56. Krägeloh CU, Kersten P, Billington DR, Hsu PH-C, Shepherd D, Landon J, Feng XJ. Validation of the WHOQOL-BREF quality of life questionnaire for general use in New Zealand: confirmatory factor analysis and Rasch analysis. Quality of Life Research, 2013;22:1451-57.

57. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology 2006;3:77-101.

58. Coster WJ, Haley SM, Jette AM. Measuring patient-reported outcomes after discharge from inpatient rehabilitation settings. Journal of Rehabilitation Medicine 2006;38:237-42.

59. Jette AM, Haley SM, Tao W, Ni P, Moed R, Meyers D, Zurek M. Prospective evaluation of the AM-PAC-CAT in outpatient rehabilitation settings. Physical Therapy 2007;87:385-98.

60. Jette AM, Ni P, Rasch EK, Appelman J, Sandel ME, Terdiman J, Chan L. Evaluation of patient and proxy responses on the activity measure for postacute care. Stroke, 2012;43:824-9.

61. Skolasky RL, MacKenzie EJ, Riley LH, Wegener ST. Psychometric properties of the Patient Activation Measure among individuals presenting for elective lumbar spine surgery. Quality of Life Research, 2009;18:1357-66.

62. Stepleman L, Rutter M, Hibbard J, Johns L, Wright D, Hughes M. Validation of the patient activation measure in a multiple sclerosis clinic sample and implications for care. Disability and Rehabilitation 2010;32:1558-67.

63. Skolasky RL, Green AF, Scharfstein D, Boult C, Reider L, Wegener ST. Psychometric properties of the patient activation measure among multimorbid older adults. Health Services Research, 2011;46:457-78.

64. Watson MJ. Refining the ten-metre walking test for use with neurologically impaired people. Physiotherapy, 2002;88:386-97.

65. Taylor D, Stretton CM, Mudge S, Garrett N. Does clinic-measured gait speed differ from gait speed measured in the community in people with stroke? Clinical Rehabilitation, 2006;20:438-44.

66. Roorda LD, Green JR, Houwink A, Bagley PJ, Smith J, Molenaar IW, Geurts AC. The Rivermead Mobility Index Allows Valid Comparisons Between Subgroups of Patients Undergoing Rehabilitation After Stroke Who Differ With Respect to Age, Sex, or Side of Lesion. Archives of Physical Medicine & Rehabilitation, 2012;93:1086-90.

67. Hobart J, Cano S. Improving the evaluation of therapeutic interventions in multiple sclerosis: the role of new psychometric methods. Health Technology Assessment, 2009;13(12).

68. Peter C, Cieza A, Geyh S. Rasch analysis of the General Self-Efficacy Scale (GSES) in spinal cord injury (SCI). Journal Of Health Psychology, 2013.

69. Rimm H, Jerusalem M. Adaptation and validation of an Estonian version of the General Self-Efficacy Scale (ESES). Anxiety, Stress & Coping, 1999;12:329.

70. Freund T, Gensichen J, Goetz K, Szecsenyi J, Mahler C. Evaluating self-efficacy for managing chronic disease: psychometric properties of the six-item Self-Efficacy Scale in Germany. Journal of Evaluation in Clinical Practice, 2013;19:39-43.

71. Almborg AH, Berg S. Quality of life among Swedish patients after stroke: psychometric evaluation of SF-36. Journal Of Rehabilitation Medicine: Official Journal Of The UEMS European Board Of Physical And Rehabilitation Medicine, 2009;41:48-53.

72. Krokavcova M, van Dijk JP, Nagyova I, Rosenberger J, Gavelova M, Gdovinova Z, Groothoff JW. Perceived health status as measured by the SF-36 in patients with multiple sclerosis: a review. Scandinavian Journal of Caring Sciences, 2009;23:529-38.

73. Krägeloh CU, Kersten P, Billington DR, Hsu PH-C, Shepherd D, Landon J, Feng XJ. Validation of the WHOQOL-BREF quality of life questionnaire for general use in New Zealand: confirmatory factor analysis and Rasch analysis. Quality of Life Research, 2013;22:1451-57.

74. Hill MR, Noonan VK, Sakakibara BM, Miller WC. Quality of life instruments and definitions in individuals with spinal cord injury: a systematic review. Spinal Cord, 2010;48:438-50.