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Experience of enriched rehabilitation in the chronic phase of stroke

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ABSTRACT

Purpose: In this study, we explored the experiences of patients who participated in an enriched task-specific therapy (ETT) program in the chronic phase after stroke.

Method: Focus group interviews were conducted with twenty participants with a mean time since stroke of 30 months and mean age 61 years, who completed the ETT program including task-specific training and environmental enrichment. ETT was delivered 3.5–6 h per day, 5½ days per week for 3 weeks in a climate suitable for both indoor and outdoor activities. The training consisted of repetitive mass practice of gradually increasing difficulty. Directly after the intervention, qualitative interviews were conducted in six focus groups. The interviews were analysed with qualitative content analysis.

Results: Three main categories describing the informants' experiences of the ETT program were identified. These categories were; 1. *The program—different and hard* – highlighting the participants view of the ETT as strenuous and different in nature; 2. *My body and mind learn to know better* – describing positive changes in participants' body function and functional ability as well as behavioural changes experienced throughout the ETT; and 3. *The need and trust from others* – emphasizing the perceived importance of trust in rehabilitation clinicians and the support of family and other participants. From these categories, a main theme emerged: *It's hard but possible—but not alone!*

Conclusion: A therapy program including task-specific training and environmental enrichment may provide late-phase stroke survivors with perceived improvements in functional ability, knowledge insights, perceptions of rehabilitation needs and enriching emotional impacts.

➤ IMPLICATIONS FOR REHABILITATION

- ETT is feasible and may lead to perceived improvements in function and a change of mindset, even in the chronic phase after stroke.
- Trust in the competence of the rehabilitation staff is an important factor in compliance with the high-intensity training in the ETT program.
- Given the lack of stimulation and socialization among many individuals with chronic stroke, the social and physical environment are important components of the ETT program.

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Stroke; rehabilitation; environmental enrichment; recovery of function; intense training; interview study

Introduction

With the worldwide declines in the stroke mortality rate over the past two decades have come increases in the prevalence of stroke survivors and the global burden of stroke [1]. A stroke often radically changes the life situation both psychologically and socially as well as physically [2]. The most promising rehabilitation interventions to regain lost motor function consist of task-oriented and goal-directed training and include feedback, repetition, intensity, and specificity [3,4]. Many standard treatment methods and innovative rehabilitation techniques can minimize functional disability after stroke, including constraint-induced movement therapy, robotic exercise, weight-supported treadmill training, cardiovascular training, and goal-directed physical exercise [5]. However, in growing numbers, stroke survivors are left with persistent impairments [2], and many lack stimulation, exercise, and socialization [6]. The stroke rehabilitation field needs to not just select individualised, patient-centred, evidence-based interventions to improve function [7], but also to prevent deterioration of function late after stroke [8].

One promising and clinically feasible intervention is enriched rehabilitation combining environmental enrichment (EE) and task-specific therapy [6,9–11]. In rodent brains, EE that enhances motor, cognitive, sensory and social stimulation is shown to profoundly affect neuroplasticity [12,13]. In a typical EE, animals are housed in conditions chosen to encourage a variety of activities and stimulations. The combination of treatment modalities in clinical EE contexts may also be termed multimodal interventions [6]. The combination of EE and task-specific reach training has recently been shown to more effectively restore forelimb function in rats after stroke, as compared to effective environment enrichment or task specific reach training alone [14]. Coupled with previous investigations on animal models, these findings support the

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premise that combining EE with task-specific training aid the stroke recovery process beyond what is possible with either treatment modality in isolation [6,9,15,16]. Researchers have learnt from animal models of enrichment and attempts have been made to translate the EE approach to human stroke rehabilitation settings [11,17,18]. Even though there is mounting support that various EE approaches and multimodal interventions could stimulate the recovery process after stroke [17,19], EE has yet to be proven effective within the clinical setting [20]. Aligning the preclinical and clinical approaches will allow research to fully address gaps in knowledge and facilitate the implementation of EE to the clinical setting [20]. In an attempt to translate the EE paradigm into a clinical stroke setting we designed an exploratory study with the aim to assess the effectiveness of enriched task-specific therapy (ETT) in individuals with chronic stroke [11]. This showed that a therapy program that combines the physical, sensory, and social stimulation inherent in EE may provide durable benefits across the wide spectrum of motor deficits and impairments, even years after stroke [11].

Qualitative studies are increasingly used in medical and health research [21], including stroke [22], and many focus on issues directly relevant to clinical practice [21]. A qualitative study in an Australian stroke rehabilitation ward explored the participants' experience of translating EE to a routine clinical setting for acute stroke rehabilitation [23]. Among the qualitative themes to emerge were the perceived benefits of participation in EE, such as increased opportunities for enhanced motor, cognitive, and sensory stimulation. Engagement in the EE interrupted the ongoing cycle of boredom and inactivity experienced by many participants and increased feelings of personal control. However, the findings also identified barriers to implementation of the EE, such as not wanting to make the staff busier [23].

As interventions move from simple to more complex, evaluation becomes more challenging [24]. Practitioners, policymakers, and researchers are increasingly interested in the evaluation of complex interventions consisting of multiple interacting components [25]. Moreover, the base of evidence for the effectiveness of an EE paradigm in clinical stroke rehabilitation needs to be increased. No studies have been conducted combining environmental enrichment and intense rehabilitation, why it is important to understand the experience from participants involved. In this study, an extension of our intervention study [11], we used a qualitative research approach to address these issues.

Materials and methods

Study design and participant selection

In this qualitative study, stroke survivors who had just completed an ETT program were interviewed in semi-structured focus groups interviews. The participants were Swedish or Norwegian stroke survivors who had applied to a Swedish rehabilitation agency that provides rehabilitation services in Spain. The eligibility criteria are described in Table 1. The study aim was narrow, and the combination of participants was highly specific for the study question. Therefore, we estimated that 15–20 participants in 5–8 groups would be necessary to gather a variety of experiences and opinions [26].

Theoretical framework

To reach a deeper understanding of the participants' experience of ETT, we used a qualitative approach and focus group interviews. The philosophical standpoint was interpretivistic. The position of interpretivism in relation to ontology and epistemology is, according to Lincoln and Guba, that the epistemological view of interpretivism is subjectivism, and the ontological view is relativism, where reality is subjective and relative [27]. Using a qualitative approach may lead to new insights and a richer understanding of a phenomenon [28–30]. When research literature or theory on a topic is limited, as in this study, the inductive approach is desirable [31]. The inductive approach is a systematic procedure in which an evaluator or researcher interprets the raw data through detailed reading to derive codes, categories, (concepts), themes, or a model [31,32].

Table 1. Eligibility criteria.

At least 6 months and a maximum 10 years after the onset of stroke
Disability grade 2–4 on the modified Rankin Scale[a]
Baseline motor deficit defined as less than a full score on the M-MAS UAS[b]
No other injury, illness or addiction, making the individual unsuitable for participation, including exercise-induced epilepsy, assessed by the referring or prescribing physician.
Cognitive and speech ability that enables being interviewed in group

[a]An ordinal disability rating scale, scored 0–6 (0 = no symptoms).
[b]Modified Motor Assessment Scale developed at Uppsala University Hospital in 1999.

Trustworthiness

To establish the rigor and trustworthiness of the findings in qualitative research, the following criteria need to be addressed: credibility, confirmability, transferability, dependability, and reflexivity [27]. To increase credibility, we included participants with a broad range and degree of motor deficits resulting from stroke. Participants with slight to moderately severe disability and with no to mild aphasia, with different age and different gender, were included. This contributed to a wider variation of the opinions and experiences included in the study. Quotes from the discussions in the interviews are presented verbatim to further increase credibility and confirmability and to describe the relevance and bearing of the subcategories and categories. The transferability and dependability of the study derive from a detailed description of the study context, the intervention, and the selection and size of the sample. The reflexivity—an attitude of attending systematically to the context of knowledge construction, especially to the effect of the researcher, at every step of the research—was enhanced by the different backgrounds, professions, and perspectives of the authors. The retrospective reflexivity refers to the effects of the study on the researcher, and the impact of this was reduced since the moderator was not involved in the analyse process of the interviews.

Study context

The participants were interviewed in seven focus groups, each with 3–4 participants, at the rehabilitation facility immediately after the intervention. Interviews were conducted by a physiotherapist with experience in stroke rehabilitation who was not a member of the rehabilitation team and no previous relationship with the participants. The moderator had little experience from focus group interviews, but was supervised by a person highly experienced in qualitative research. Focus group methodology is a social method that allows a group of people to provide research data through group interactions [33]. Focus groups are thought to be a useful method to obtain information on perceptions and experiences of a homogenous group of people related to a clearly defined topic, and efforts are made to gather information and

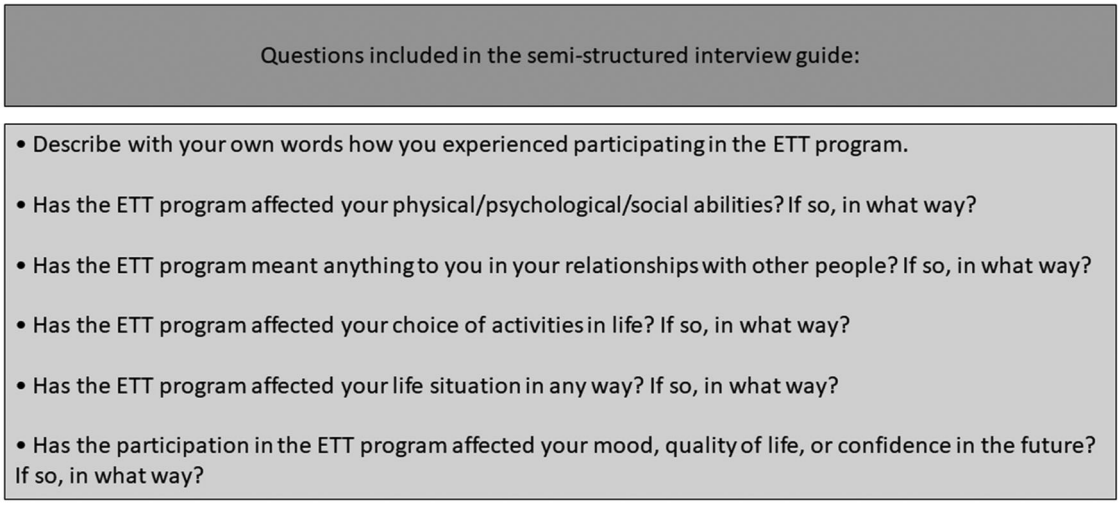

Figure 1. Questions from the semi-structured interview guide.

different opinions from the group members [34,35]. The focus groups were carried out as described by Kreuger and Casey [36]. Our results are reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) [37].

Interview guide

The interviews were semi-structured and based on an interview guide (Figure 1). The questions in the guide provided starting points for the discussion, during which additional questions were raised. The interviewer did not steer the conversation if the interviewees themselves raised a topic.

Intervention: enriched task-specific therapy (ETT)

The ETT was conducted at two rehabilitation facilities in Spain, near Marbella and Malaga, respectively, where the climate is suitable for both indoor and outdoor activities. The principles of the multimodal rehabilitation program were conceived and developed by the medical board of Neurooptima Forsk Rehab. The ETT was individually tailored and took place in a group setting. Participants did the exercises in groups of 4–9 in the same room/place. Physical exercise, led by physical therapists, was scheduled 3.5–6 h per day, $5\frac{1}{2}$ days per week for 3 weeks. The training consisted of repetitive mass practice of gradually increasing difficulty. Individuals with hemiplegia used noncompensatory strategies, such as focusing on not compensating with the nonaffected side of the body and enforcing use of the affected side [38]. The program included functional training for transfers and upper/lower limb (1–3 sessions/day), such as practicing functional use of affected arm/hand, transfers, balance and gait training. It also consisted of impairment-based training (1–3 sessions/day) for upper and lower limb like mobility training, training of isolated movements, stretching and strength training. It also included lectures (1–3 sessions/week) designed to widen participants' knowledge about stroke. Each day included 30 min of submaximal cardiovascular training on a stationary bicycle, treadmill, or cross-trainer. Participants with speech impairments worked with a speech therapist for about 1.5 h a day. The ETT also included enriching beach or village excursions, accompanied by rehab personnel to enable goal-directed training in different environments (a couple of half-day excursions and one full-day excursion). Beyond scheduled activities, participants were encouraged to physically engage in the challenging outdoor environment (every day during, in between and after sessions). The participants also interacted socially with each other and with accompanying family members at training, meals, and social events after the scheduled activities [11].

Data analysis

Content analysis is, according to Baxter and Krippendorff, suitable for analysing communication about individuals' experiences and may better capture the complexity of interventions [39,40]. The data were not analysed until all interviews were done. The interviews were recorded and transcribed by the moderator and S.V, and the content was analysed as described [41]. First, one of the authors (S.V.) listened to each interview several times to get a general idea of the data content and then scrutinized the transcript to identify meaning units—one or more sentence or paragraphs of a narrative—that referred to the participant's experiences of ETT. The meaning units were then condensed, interpreted, and coded. Next, the co-authors read the initial analysis, discussed the condensations and codes, and modified them as needed. The codes were then analysed and grouped by the first author into subcategories. After reading the analysis as a whole, the authors discussed and compared the findings until agreement was reached. Next, categories were expressed from the subcategories, and an overall theme was extracted [41]. The interviews in their original form served as a reference point throughout the analysis.

Ethics

The study was approved by the Regional Ethical Review Board in Gothenburg, Sweden (Ref number: 549-12) and conducted in accordance with relevant ethical guidelines. All participants received detailed study information, signed a written informed consent form, and were told they could withdraw from the study at any time. To ensure confidentiality, the transcripts were coded and the data were presented at the group level. Some participants took part in the ETT program at their own expense. Others had the costs covered by the Swedish Social Insurance Agency, the county council, or employers.

Results

Between 1 September 2012 and 31 July 2015, seven focus groups were conducted with 23 participants; however, only six groups were included owing to technical recording and sound problems in the fifth interview. The interviews lasted for 29–64 min. Twenty informants were included. The mean age was 61 years (sd = 13.1; range 25–84 years), and 40% were women. The mean time since the stroke was 30 months (sd = 34.1). The modified Rankin Scale (mRS) was used to describe the degree of disability or dependence in activities of daily living [42]. The characteristics of the 20 informants are described in Table 2.

Table 2. Characteristics of the included participants.

Participant	Gender	Age (years)	Time since Stroke (months)	mRS
Interview 1				
1	F	73	26	3
2	M	66	9	4
3	M	57	12	3
4	M	61	41	2
Interview 2				
1	F	25	63	2
2	M	43	49	3
3	M	68	156	3
Interview 3				
1	F	39	19	2
2	M	67	6	4
3	F	62	54	3
Interview 4				
1	M	72	23	3
2	M	84	11	4
3	F	61	8	4
4	F	52	29	3
Interview 6				
1	M	66	7	4
2	F	61	14	4
3	F	69	40	4
Interview 7				
1	M	66	14	4
2	M	59	12	4
3	M	68	15	4
Mean (SD)		61.0 (13.1)	30.4 (34.1)	3.4 (0.7)
Median (Range)		64 (25–84)	17.0 (6–156)	3.5 (2–4)
No	F = 8 M = 12			

mRS: modified Rankin Scale; an ordinal disability rating scale, scored 0–6 (0 = no symptoms).

The data analyses identified a main theme, three categories and eight subcategories. The findings are presented in Figure 2.

The program—different and hard!

This category described the multimodal intervention and the experiences of participating in this program. These experiences included the demanding nature of the training, the difference between this intervention with regard to what rehabilitation they had received before; more individualized and more intense.

The subcategory ***Hard, innovative therapy*** describes the strenuous nature of the training. Some participants thought it might have been the hardest thing they had experienced so far. Participants also noted that when they managed to perform a task, the rehabilitation team increased the level of difficulty. One participant put it like this: *"The philosophy is that the things that are easy, that you know how to do, those things you don't have to practice. But the things that are hard, are the most important to manage."* [Male, age > mean, mRS > mean, time since stroke < mean]. Another said *"It borders on the impossible, all the time. If something is too easy, they increase…"* [Male, age < mean, mRS < mean, time since stroke > mean]. Additionally, participants noted that the training was versatile and comprehensive: *"The training was multifaceted. I mean, there are so many different tasks one gets to do during a day. It's very varied."* [Male, age > mean, mRS < mean, time since stroke < mean].

According to the participants, the interventions differed considerably from the rehabilitation they had received at home—an observation captured in the subcategory ***Unlike rehabilitation at home.*** The intervention was more fitted and individualized, they noted, than the rehabilitative interventions at home. One participant stated: *"The big difference is, I think, that it's very customized here. Adapted for each and every one. What you got at home was a standard program. One should kick a little bit there and pull a little here and then it's supposed to be fine. Here it's totally different for everyone, or everyone that's been here."* [Male, age < mean, mRS < mean, time since stroke > mean]. They appreciated the intense, noncompensatory training and commented on the novelty of this approach for them: *"Yes, many new muscles. I feel it, that there are many new muscles that until now have been weak. My rehabilitation until now has been weak. Ive been to both X (hospital) and Y (hospital)[1] and this is the first place where they have focused on my weak side. On all the other places they have only*

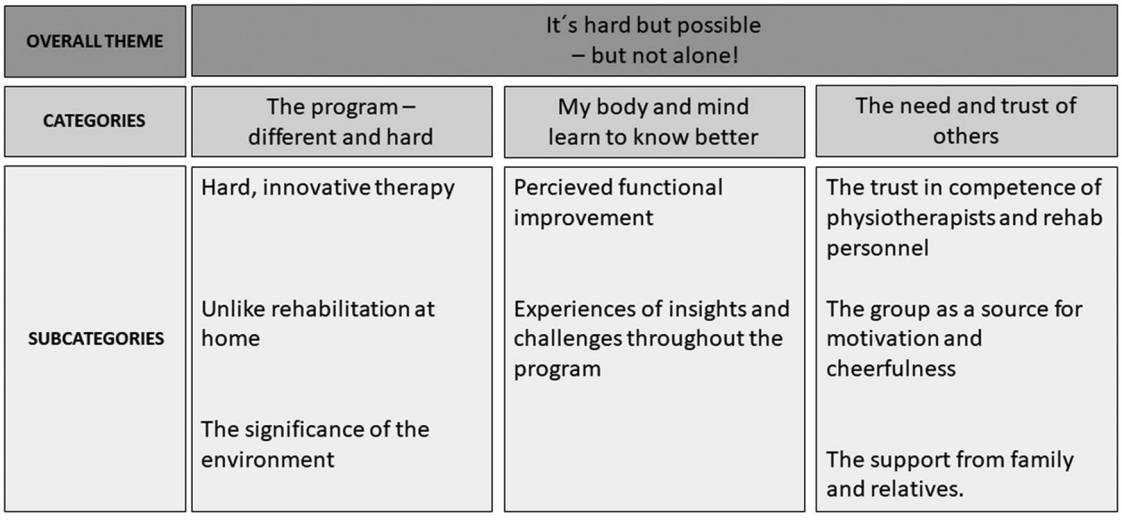

Figure 2. Overall theme, categories and subcategories.

worked on my strong side." [Female, age < mean, mRS < mean, time since stroke > mean].

The subcategory ***The significance of the environment*** describes the respondents' experience of training in an environment that was different from where they received regular care at home. The positive experience of being in a warm place with beautiful surroundings close to the ocean was described: *"This clearly means a lot. Positive surroundings. I only see the colours, the ocean… Most of us have been ill for a long time, and have perhaps not experienced many other things during this time. Maybe you've had to give up travelling or other things that you used to do."* [Female, age < mean, mRS > mean, time since stroke < mean]. The groups identified the environment as a healthy one. One stated: *"And that means a lot because you've been in so many unhealthy environments since the stroke."* [Female, age < mean, mRS < mean, time since stroke < mean]. Some mentioned that they had never imagined being able to experience certain activities again: *"We went to the beach promenade with a crutch and wandered out in the water until it reached the knees. I did never imagine that! An incredibly lovely experience."* [Female, age > mean, mRS < mean, time since stroke > mean].

My body and mind learn to know better

The respondents described changes in their body function and functional ability and also behavioural changes experienced throughout the ETT program. They noted changes in their mindset, the importance of learning more about stroke, and acknowledging and maintaining motivation in the rehabilitation process.

The subcategory ***Perceived functional improvement*** describes the experience of increased functional capacity. For example, *"Well, the thing is that the left hand was more or less dead before. I haven't given it a lot of thought, but now I can turn it and put my thumb against my index finger and stuff like that."* [Male, age > mean, mRS < mean, time since stroke < mean]. The participants noted function improvements both in training settings and in daily life outside the rehabilitation context. One put it like this: *"There have been a lot of things that one hadn't been able to do upon arrival… that has gone very well the last week. Maybe not exercises but rather in practice."* [Male, age < mean, mRS < mean, time since stroke > mean]. Another said: *"Well, my goal back then was to learn to walk with a walker, which I think I have succeeded doing quite well."* [Male, age > mean, mRS > mean, time since stroke < mean].

The subcategory ***Experiences of insights and challenges throughout the program*** describes the experience of shaping new attitudes towards exercise, improvement, and knowledge. They noted the importance of knowing *how* and *why* the rehabilitation was done this way—elements they perceived as essential in motivating themselves to continue the high-intensity training. The participants expressed how tough it was to do exercises that were nearly impossible to accomplish. One participant expressed it this way: *"It has meant a whole lot to gain knowledge also about how the brain works to keep the motivation and stimulation going and… it is the effort that counts. It has carried me a lot. Hmm, especially when it doesn't work."* [Female, age < mean, mRS < mean, time since stroke < mean]. The respondents also highlighted the importance of sustaining the progress they made and viewed future rehabilitative and daily activities as a challenge. *"It became very clear to me that this was only 3 weeks, but there are several more weeks to go… "*[Male, age > mean, mRS > mean, time since stroke < mean]. It became clear from the interviews that it takes hard work to maintain the improved functional capacity. *"This is not a quick fix, but rather a struggle. The thing is that you need to get motivated and encouraged to keep it up. Being damn stubborn. Because if one were to quit now after all that one has achieved, I think it would disappear quite quickly.* [Male, age > mean, mRS < mean, time since stroke > mean].

The need and trust of others

The category **Need and trust of others** describes the importance of different external factors identified by the respondents for a successful rehabilitation. The category highlights the perceived importance of trust in rehabilitation clinicians and the support of family and other participants.

To undertake the ETT program with the intense training included, they had to trust the competence of the rehabilitation staff, represented in the subcategory ***Trust in competence of physiotherapists and rehab personnel***. One participant put it like this: *"And that doesn't mean that the exercises was rather demanding and you thought that… but I knew that she was there (the doctor) and that felt safe in a way."* [Male, age > mean, mRS > mean, time since stroke < mean]. The enthusiasm and positive attitude of the rehab staffs was described as important and motivating: *"We have had very enthusiastic physiotherapists. I think that has meant a lot (the others agree). Happy all the time."* [Male, age < mean, mRS < mean, time since stroke < mean].

During the rehabilitation period, strong connections developed between the group members. Meeting with others in the same situation was perceived as both inspiring and comforting, a sentiment captured in the subcategory ***The group as a source for motivation and cheerfulness.*** The group setting was noted as an important factor in self-motivation, and following the progress of others was both comforting and pleasing: *"And you watch the others and their progress and so, and get inspired by that."* [Male, age > mean, mRS > mean, time since stroke < mean]. The group setting was also important for the attitude towards one's own impairment, and a source of comfort in challenging moments. One stated: *"It has been a fantastic group of very positive individuals that had very positive attitudes although they were more severely disabled than me."* [Male, age > mean, mRS > mean, time since stroke < mean]. Another said *"And you are sweating and you are crying and you are laughing together, goddammit"* [Male, age > mean, mRS > mean, time since stroke < mean]. The bonding between group members was evident. One responder put it like this: *"And I had never expected that going away on a training camp would result in such deep relationships with people that I'd never met before whom I'd probably would never had met, if I had not been here."* [Male, age > mean, mRS > mean, time since stroke < mean].

Another external factor identified by the respondents was ***The support from family and relatives.*** Many participants were accompanied by relatives, whose attendance was described as significant. One participant said *"It feels good that someone has seen what I have done, bridging over to home, I think… "* [Female, age < mean, mRS < mean, time since stroke < mean]. The presence of family or relatives was described as important as they could verify the functional achievements and help translate some of the functional gains to the home environment. *"It was important today when I was accompanied by my wife at the gym and she saw me walk 6 h, no I mean, 6 min with my walker! That was important for her! Very important! She had never seen that before."* [Male, age > mean, mRS > mean, time since stroke < mean].

Discussion

In this study, we sought to elucidate the experience of a combination of environmental enrichment and intense task-specific rehabilitation for individuals in a chronic phase after stroke. The participants reported perceptions of improved function, increased knowledge, new insights and perceptions of rehabilitation needs, as well as enriching emotional impacts. These results support the efficacy of environmental modifications that entail complex, multisensory stimulation in producing functional improvements in a clinical stroke population. Even though the participants were in the chronic phase of stroke, the effect seemed prominent, consistent with previous findings [43,44].

Our aim was to translate basic research on environmental enrichment and intense task-specific training to a clinical chronic stroke setting. Previous studies of patients in the acute [45] and subacute [17] phase of stroke undergoing inpatient rehabilitation aimed to translate an EE model to a clinical environment in different ways. Those studies indicated that as compared to a regular clinical setting, EE may increase the activity level and the social and cognitive engagement of individuals in an acute clinical stroke setting [45], and in the subacute phase, it has been showed that the individuals engaged in EE were more likely to do "any activity" compared to individuals in the control group [17]. Another EE study in a larger inpatient cohort including chronic stroke and several other neurological disorders, showed that an EE program can give significant improvements in functional and cognitive ability [18]. Few studies have added intense training and training outside the ward to the EE paradigm before us, and no earlier study have tried to highlight the experience of this kind of enriched therapy. The findings of this study might contribute to insights and further knowledge about how to best implement EE in clinical practice.

In rehabilitation contexts involving multidisciplinary team care, patient motivation and engagement seem to be associated with positive outcomes [2]. Among our study participants, the theme ***It's hard but possible—but not alone!*** emerged after the EE program. The participants described physical improvements both in the training facility and in activities of daily life, revealing both the perception of enhanced physical performance capacity and an increased likelihood of further recovery. These insights most likely contributed to the participants' perception of their overall health, since the degree of motor function, balance, walking capacity, and independence in activities of daily living is important for the perception of health-related quality of life [46].

The experience of multimodal interventions for stroke survivors has been described in other contexts. For example, in a study of music-and-rhythm therapy [47], the participants came to terms with their changed bodies as a result of the therapy, leading to feelings of being connected with their bodies. In our study, both the experience of *perceived physical improvements* and a change of mindset in terms of *experiences of insights and challenges* was revealed. *Trust in the rehabilitation personnel* and the *Hard, innovative therapy* were also highlighted as important components. In another study [43], a multimodal intervention program with rhythm and music as operating ingredients contributed to positive experiences in terms of motor enhancements. The study also showed the importance of social interactions, challenging exercises, and skilled instructors [43]. Another recent Swedish study explored chronic stroke survivors' experiences of another multimodal intervention, horseback riding [44]. As a result of the therapy, the participants reported increased self-efficacy and self-esteem as well as perceived improvements in balance and gait—all of which could be transferred to everyday life [44]. It remains to be established which component of EE, incorporating a number of behavioural experiences – or ER - in combination with other components (exercise, task-specific training), that promote recovery following stroke [20]. In our study a combination of physical, social and environmental content was applied, but which component of the therapy that the responders experienced as the most beneficial needs to be further investigated. Additionally, the cognitive component of EE may be further developed and refined in future programs, to enhance the therapeutic effectiveness in cognitive domains.

The category **Perceived functional improvement** described the experience of functional improvement as a result of the ETT program. In a study of the experience of rehabilitation late after stroke, patients appreciated physiotherapy, as it was believed to generate functional improvement [48]. That study also revealed that patients considered the therapists to be sources of advice and information, as well as contributors to faith and hope. In our study, the competencies of the physiotherapists and rehab personnel was described as comforting.

The ETT intervention had physical, social, and environmental content and was individually tailored, and the activities were conducted at the limit of each patient's ability. A systematic review of the experience of physical rehabilitation for stroke survivors have reported negative experiences of disempowerment, boredom, frustration, no reflections of personal goals in therapy. In that study, they also found that the rehabilitation could be improved by increasing activity both within formal therapy and in free time [49]. In our study, the participants found the intensity and duration of the therapy sessions to be challenging, and sometimes close to the limit of what they perceived was possible. Nevertheless, they felt confidence in the intensity of the program and trusted the rehab personnel. The perception that gains in functional capacity resulted from their hard work motivated the participants to continue the high-intensity program. The interviews revealed disappointment with regard to the rehabilitation that participants' had received at home: "*Why haven't I received this earlier?*" Evidently, the ETT program met patient needs that are not usually addressed by traditional interventions.

Given the lack of stimulation, and socialization among many individuals with chronic stroke [6], we believe the social and physical environment are important components of the ETT program. Our results also highlight two key elements of the program: *The group as a source for motivation and cheerfulness* and *The significance of the environment*. The use of the outdoor environment using community activities might be a beneficial way to enhance the transition from inpatient to home in order to get the participant to reintegrate back into community activities. A previous study [23] explored the experience of access to EE in stroke survivors undergoing rehabilitation. In their study, the participants' reported increased social interaction. In our study, a very strong connection between participants and identification with other group members was revealed. Even though the content of ETT was individually tailored, the therapy took place in a group setting, and the small group size may have contributed to the familiar atmosphere described by responders.

Methodological considerations

Although this study has implications for our understanding of the effectiveness of enriched rehabilitation, the results must be considered within the context of limitations that may have been present. The interviews were conducted on the last day of the ETT program. Had we interviewed the participants some weeks later,

we could have explored perceptions concerning the effects of the program on their choice of activities, life situation, and relationships with people in the home environment. Unfortunately, reassessment in Sweden was impractical because of the large geographical spread of the participants. In addition, since all participants chose themselves to apply to the ETT program, and payment for the intervention differed (the Swedish social insurance system, employer, partly self-paid), the results might have been influenced by the participants' own expectations. A limitation in this study is that we did not measure whether the ETT resulted in welcome side-effects such as reductions in health care utilization, medication intake or falls. Future studies should explore the cost benefit of enriching intense post-stroke therapies. The credibility of the data was supported by enrolling individuals with a wide variety of disabilities after stroke, including mild aphasia. The interviews were done in small groups of 3–4 participants. The moderator did strive to gather reports from all respondents. Yet, it might have been difficult for some individuals to make their opinion clear in the group setting. The fact that some of the participants had aphasia or a cognitive decline made the interviews heterogeneous. In a previous study by Dalemans et al. [50], it was shown that aphasia severity has a unique contribution to social participation, next to other factors like age, gender and functional performance. By combining individuals with mild aphasia with those without aphasia, we might have unintentionally stifled some of the participants' voices. Some of the discussions became somewhat incoherent; sometimes, when a participant stated something, another respondent would follow in a focus area unrelated to the first statement. However, all comments concerning the experience of ETT were included in the analysis. The quotes in the results came both from single statements supported by the rest of the group or from discussions where different statements described the same experience.

In conclusion, a therapy program that combines the physical, sensory, and social stimulation combined with an environmental enrichment may affect the experience of improved function and lead to different emotional impacts and insights in the chronic phase after stroke.

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1. X, Y: Rehabilitation hospitals, the names of the hospitals have been excluded, to ensure the responders anonymity.

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