PSYCHOLOGICAL INTERVENTION FOLLOWING ACQUIRED BRAIN INJURY: INSIGHTS FROM A MULTIPLE CASE STUDY

CECILIE MARIE THØGERSEN, CHALOTTE GLINTBORG, TIA G. B. HANSEN

Aalborg University, Teglgaards Plads 1, Aalborg, Denmark, contact: ceciliemst@ikp.aau.dk

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Abstract: *A person's life changes dramatically after an acquired brain injury (ABI). Rehabilitation after an ABI often focuses on the physical changes, while little attention is given to the emotional and existential aspects. This multiple case study (N = 8) explored the clinical utility of adding a structured psychological intervention to an existing rehabilitation programme following an ABI.*

The case study had an embedded ABA experimental design that was based on participants self-assessment on standardised scales (HADS, PGIS, WHO-5, SCS and DASS). These measures were obtained pre- and immediately post-intervention, as well as at a 3-month follow-up. During the intervention period, the participant also completed a daily questionnaire. Furthermore, field notes were taken during the intervention period by the therapist, and an evaluation interview was conducted after the intervention. The psychological intervention was based on the BackUp© programme. The embedded data was analysed through visual inspection and thematic analyses.

The participants reported that the intervention was effective in aiding their psychological adjustment. The intervention gave the participants room for reflection and space to share emotional reactions. This helped them participate in the overall rehabilitation programme and enhanced their biopsychosocial outcomes in general.

Based on this multiple case study, psychological interventions may have clinical value when providing comprehensive rehabilitation. An intervention based on the BackUp© programme could be one useful approach. Future studies need to explore other forms of intervention and their benefits to clarify the best psychological interventions for individuals who have suffered an ABI.

Keywords: *psychological rehabilitation, multiple case study, acquired brain injury, intervention*

INTRODUCTION

This multiple case study (N = 8) explores the benefits of a psychological intervention as an add-on to existing comprehensive rehabilitation following an acquired brain injury (ABI). When acquiring an injury to the brain, one's life can change in many respects. ABI survivors often experience physical, cognitive, social, and psychological sequelae. Due to improvements in medical procedures, the survival rate after ABI has increased, but often at the cost of greater impairments, resulting in long and complicated rehabilitation processes (Bystrup at al., 2018). Today, rehabilitation practices aspire to maintain a comprehensive and coherent approach, following a biopsychosocial model (Wade & Halligan, 2004). Yet rehabilitation practices and research are often mainly influenced by the biomedical field, and therefore, the focus on the psychological aspect of rehabilitation is still lacking. Thus, the existential dimensions following critical illness are often forgotten in favour of rehabilitation of physical functioning.

Research shows a lack of focus in rehabilitation targeting psychological difficulties following brain injury, even though emotional distress is reported after ABI (e.g., Downing et al., 2021). Psychological distress after ABI affects the outcome of the entire rehabilitation process (Coetzer, 2004). Therefore, interventions that support psychological adjustment have a critical impact on the individual's capacity to engage in rehabilitation in general (Vaghela et al., 2021). The psycho-

logical dimension of the biopsychosocial model should not be included just to facilitate physical rehabilitation, but also to allow the individual to live his or her life to the fullest by participating and contributing to family and society (Wade, 2020). A growing body of literature has focused on psychological intervention programmes for people with ABI, arguing that psychotherapy has the potential to reduce, for example, anxiety and depression after ABI. Notably, not all ABI survivors experience clinical depression or anxiety, but they may still have the need for psychological support (Glintborg & Hansen, 2021).

State of the art

Internationally, psychotherapy is recognised for its importance in helping the client achieve psychosocial adjustment after acquiring a brain injury (Prigatano, 2013). Research on the effect of psychological intervention as a part of comprehensive rehabilitation is still lacking. A review by Gómez-de-Regil and colleagues from 2019 provided a brief summary of recent research in the field of psychological interventions for ABI survivors. They found that psychological interventions after ABI primarily focused on three areas: cognitive rehabilitation, helping the ABI survivor manage the emotional impact of the injury and rehabilitation, and psychoeducation (Gómez-de-Regil et al., 2019). Cognitive behavioural therapy (CBT) is the preferred therapeutic approach for treating behavioural and emotional disturbances, and for 15 of the 62 included studies, the main outcome was the reduction of symptoms of depression and anxiety (Gómez-de-Regil et al., 2019).

Based on this review, CBT appears to have a potential effect as a therapeutic intervention after ABI, especially on the main issue being addressed during therapy (Thøgersen, 2022; Waldron, 2012). Until recently, the primary focus of most research has been on the reduction of depression or anxiety. However, a trend in current research suggests that third wave cognitive therapies such as Acceptance and Commitment Therapy (ACT) or Compassion Focused Therapy (CFT) can support psychological rehabilitation after ABI (e.g., Sander et al., 2021; Rauwenhoff et al., 2022).

A therapeutic intervention needs to be adjusted to accommodate the clients' cognitive impairments after ABI (Coetzer, 2007; Gallagher et al., 2019). In a review on recommended modifications of CBT to ABI, the following impairments were identified as needing to be addressed in the planning and execution of therapy after ABI: attention and concentration, memory difficulties, communication, and impairments in executive functioning (Gallagher et al., 2019). Similar areas were identified in the review conducted in preparation for the present study (Thøgersen, 2022).

Objectives and research question

To meet the need for more focus on the psychological aspects of rehabilitation and facilitate a psychological intervention for ABI survivors, we developed a psychological intervention programme called BackUp© (Thøgersen et al., 2022; Thøgersen et al., 2023). Through this study, we aimed to contribute new knowledge in a relatively new area of research and further explore the contribution of rehabilitation psychology to rehabilitation after an ABI. This study explores the benefits of a psychological intervention given as a part of a comprehensive rehabilitation programme based on the BackUp© programme.

METHOD

Case studies were carried out at a specialised in-patient neurorehabilitation centre in Denmark with the aim of exploring the benefits of a psychological intervention after ABI.

Ethical approval and consideration

This study was reported to the Regional Research Ethics Committees who found it exempt from full review. Written Informed consent was obtained for all participants at the screening phase.

Included cases

Eight cases were included within the timeframe set for data collection (12 months). To ensure anonymity, we have blurred specific information on the period of data collection. The inclusion of cas-

es was based on the inclusion/exclusion criteria of the intervention programme, as well as the criterion of opportunity. The BackUp© programme is developed for previously working adults who do not have any current substance abuse issues and have the ability to actively communicative and participate in therapy (Thøgersen et al., 2022). Initially, all clients at the rehabilitation centre who met the inclusion criteria of the intervention programme were offered the opportunity to participate in the study. Inclusion was based on the replication logic (Yin, 2018). All clients who had received an offer to participate accepted. All clients at the rehabilitation centre had sustained a moderate to severe brain injury. To secure the participants' anonymity, they were divided into three age groups: Group 1: < 35 years, Group 2: 36-50 years, and Group 3: >51 years. Furthermore, information on occupation and family has been masked.

The eight included cases are presented in Table 1. Prior to admission to the rehabilitation centre, all clients had received intensive comprehensive rehabilitation in a hospital. One participant, Mia, was an outpatient at the rehabilitation centre, having been discharged to her own home for six months.

Intervention

During this study, existing comprehensive rehabilitation based on the biopsychosocial perspective was complemented by a psychological intervention based on the BackUp© programme. The participants received comprehensive rehabilitation during the day, i.e., with respect to all pertinent daily activities. The psychological intervention was provided as an add-on and the therapist participated in the interdisciplinary team supporting the participants' rehabilitation.

The intervention examined in this case study was delivered by a trained clinical psychologist with several years of experience with ABI survivors. The intervention consisted of 12 sessions, held approximately once a week, in accordance with the client's other rehabilitation schedule. All sessions were held in a special therapy room at the rehabilitation centre that is only used for therapeutic purposes.

The intervention given was based on the BackUp© programme with the primary focus of supporting the client's psychological rehabilitation. The intervention programme was adapted to the individual needs of each participant in terms of adjustment to cognitive challenges (Gallagher et al., 2016) and specific wishes for themes to be addressed. The programme was developed within an overall framework of third wave CBT and focuses on the following themes: collaborative initial case-formulation, psychoeducation, negative automatic thoughts, self-compassion, identity reconstruction, identification of values, and importance of relationships. For a comprehensive presentation of the BackUp© programme, see Thøgersen et al. (2022).

Part of this study was conducted during a period with COVID-19 restrictions. Recent research has argued that the COVID-19 pandemic brought on an increase in anxiety and social isolation, and consequently, an increase in psychosocial sequelae after ABI (Wilkie et al., 2021). However, changes in the settings and procedures at the rehabilitation centre were limited. During periods of high incidence of COVID-19 incidence, the therapist used necessary protective equipment. To reduce communicative barriers, a small flexible glass screen was used. The use of protective equipment was accompanied by a therapeutic dialogue regarding the consequences for the therapy. However, all participants soon reported that this situation was the "new normal".

Table 1. *Demographic information*

Case (gender)	Age group	Cause of injury	Months since injury	Rehabilitation focus/goal	Therapeutic focus/goal	Medicine*
Kim (m)	2	TBI, fall	7	Self-reliance in everyday activities; communication; walking function; pain relief	• Identify bodily sensations • Identity reconstruction	Central nervous system – epilepsy, SSRI
John (m)	3	Apoplexy	7	Physical level of functioning; self-reliance in everyday activities; difficulties related to memory and structure.	• Loss of work • Relationship with family	NaSSA, SSRI
Chris (m)	3	Apoplexy	6	Self-reliance in everyday activities; transfers from wheelchair to furniture	• Negative thoughts • Relationships • Future work	SSRI, NaSSA, antipsychotics
Martin (m)	1	Glandular removal of brain tumour	7	Self-reliance in everyday activities; clarify future needs for occupational rehabilitation	• Self-awareness • Identity reconstruction • Values	-
Jane (f)	2	Apoplexy	7	Self-reliance in everyday activities; communication and social activities; occupation	• Identity reconstruction • Mindfulness • Identify bodily sensations	SSRI
Simon (m)	1	Hypoxia due to overdose	7	Walking function, self-reliance in everyday activities	• Mindfulness • Strategies to handle conflicts • Relationships/family	Central nervous system – epilepsy
Mia (f)	1	Apoplexy	13	Walking function; integration of the left side; cognitive rehabilitation; energy management	• Mindfulness • Self-compassion • Values	SSRI, SNRI
Tom (m)	3	Apoplexy.	6	Self-reliance in everyday activities; integration of the left side; walking function; loss of tone in the left arm; communication.	• Meaningful life • Values • Self-compassion	-

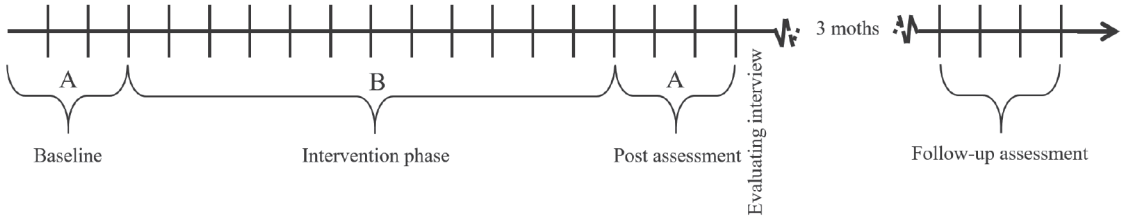
Note: Age groups - Group 1: < 35 years, Group 2: 36-50 years, Group 3: > 51 years
*f, female; m, male; NaSSA, inhibitors of adrenergic receptors; SNRI, serotonin and noradrenaline reuptake inhibitor; SSRI, selective serotonin reuptake inhibitor; TBI, traumatic brain injury; - indicates 'none to report'; * indicates 'with possible relevance during intervention.*

Design

The design of the study is based on recommendations from previous research that explored the benefits of psychotherapy after ABI by means of multiple single case studies with rigorous designs (Hsieh et al., 2012b). Prior to this study, a pilot study was conducted using a similar design (Thøgersen et al., 2022). Therefore, for the present study, adjustments have been made, including the use of multiple assessments during each phase and the inclusion of an additional assessment tool (DASS-42).

The design of the study was a multiple case design with an embedded A-B-A experimental design, comparing a three-week baseline period (A) with a three-week post-intervention period (A), as well as a three-week follow-up period. The follow-up period was three months post-intervention. During the intervention period (B), a self-reporting questionnaire was used to measure daily rehabilitation progress (Thøgersen et al., 2022). After the intervention phase and the post-intervention assessment, an evaluating interview was conducted by the first author, who had also conducted the therapy. The design of the study is illustrated in Figure 1. The following presentation of the method will follow the design of the study.

Figure 1. *Study design*



Alt Text: Study design illustrated using an arrow divided into different parts symbolising months and marked with the study phases: A - Baseline, B - Intervention phase, A - Post assessment, followed by the evaluating interview and the follow-up assessment.

Assessment

The number of assessment points in each phase was decided based on recommendations from Smith (2012) and previous studies (Hsieh et al., 2012a; Hsieh et al., 2012b). The study was to be conducted in a timeframe of three months to ensure feasibility for the minimum length of stay at the rehabilitation centre. Furthermore, to accommodate the needs of the client group, there were three assessment points in each phase of the study. The same argument was considered before making the decision to use a short questionnaire during the intervention phase (Thøgersen et al., 2022). The following five standardised self-report measures were administered during the assessment periods:

The *Hospital Anxiety and Depression Scale* (HADS) was developed by Zigmond and Snaith in 1983, to evaluate symptoms of depression and anxiety and focus on behavioural components during hospitalisation (Snaith, 2003). This brief self-report measure consists of 14 intermixed items addressing depression and anxiety and it is commonly used in rehabilitation after ABI (Whelan-Goodinson et al., 2009; Thøgersen, 2022; Thøgersen et al., 2022). Each item is rated on a 0-3 scale, and a total score is calculated (0-21) for both depression and anxiety. The cut-off scores are as follows: 0-7 indicating normal levels, 8-10 indicating mild levels, 11-14 indicating moderate levels, 15-21 indicating severe levels of symptoms of either depression or anxiety (Snaith, 2003).

The *Depression Anxiety and Stress Scale-42* (DASS-42) (Lovibond & Lovibond, 1995) has previously been used in studies complementarily to HADS and has demonstrated sound psychometric properties for the population (Thøgersen, 2022; Hsieh et al., 2012b; Ownsworth et al., 2008). DASS-42 evaluates symptoms of anxiety, depression, and stress on 42 intermixed items. Each item is scored on a scale of 0-3: the higher the score, the more the statement/item applies. A score is calculated for each subscale indicating the severity of symptoms. The cut-off scores are listed in Table 2.

Table 2. *Cut-off scores for DASS-42.*

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely severe	28+	20+	34+

(Lovibond & Lovibond, 1995)

The *Personal Growth Initiative Scale* (PGIS) evaluates the individual's changes in terms of agency and growth during the rehabilitation process. PGIS is a self-report measure consisting of nine items scored on a six-point Likert scale (from 1 indicating "strongly disagree" to 6 indicating "strongly agree"). Greater overall scores indicate greater growth initiative (Robitschek, 1998).

The *World Health Organization Well-Being Index* (WHO-5) evaluates quality of life through five items scored on a six-point scale ranging from 0-5 (Topp, 2015), with a total score ranging from 0-25. However, it is recommended to multiply the score by four, resulting in a percentage scale. The average score for the Danish population is 68. Recommended cut-offs are as follows: 0-35 indicates a great risk of depression or stress, 36-50 indicates mild risk of depression or stress,

and > 50 suggests no acute risk of depression or long-term stress. A change in the score of 10 or above is considered a clinically significant change (National Board of Health, 2017).

The *Self-Compassion Scale* (SCS) is an established 26-item self-report measure of attitudes to oneself when facing adversity (Neff, 2003). Each item consists of a statement scored on a scale from 1-5. Half the items use a reversed coding. The overall measure is composed of six subscales, which represent self-kindness, common humanity, and mindfulness versus self-judgement, isolation, and overidentification. Only the overall measure is reported here, but subscale scores from baseline assessments were used as a therapeutic tool during the intervention.

In the present study, two participants did not complete the 3-month follow-up. Jane found the self-report measures too cognitively demanding when she was no longer at the rehabilitation centre with the possibility of support from staff. With respect to Chris, the professional caregivers and Chris's family determined that he could no longer participate due to other comorbidities.

Field notes and contextual case material

During the intervention period, the therapist recorded field notes evaluating the intervention, and audio recordings were made of all sessions to ensure compliance with the BackUp© programme. The field notes were (re)written immediately after each session and based on predesigned questions (Table 3).

Table 3. *Predesigned questions to guide field notes.*

Predesigned questions to guide field notes
Date of session
How did the programme match the client's needs during the session?
Therapist's assessment of the client's current condition
Agenda of the session and compliance with the BackUp© programme
Journal notes for the interdisciplinary team
Other comments from the therapist

Furthermore, the researcher was allowed access to and use of medical journal material relevant to the intervention. This included notes and assessments from other professionals in the interdisciplinary team and the rehabilitation centre, as well as medical records and assessments made during previous rehabilitation related to the brain injury.

Evaluation interview

To strengthen the study design, an evaluation interview focusing on the participants' experience of the intervention was conducted immediately after the post-assessment (Domensino et al., 2021). The interview was conducted by the therapist, since it is important for the interviewer to have a comprehensive knowledge of the client's need in order to compensate for their cognitive difficulties (Thøgersen & Glintborg, 2022; Paterson & Scott-Findlay, 2002). All interviews were conducted in the therapy room and lasted between 30 and 70 minutes. They were adjusted to the needs of each participant, for example, in terms of length, use of *prompts,* and *supported conversation for adults with aphasia* (SCA) (Thøgersen & Glintborg, 2022). The interview was semi-structured and focused on four main themes (Table 4).

Table 4. *Main themes of interest during the interview*

Questions
How did the client generally experience the stay at the rehabilitation centre?
How did the client experience the psychological intervention provided by the BackUp© programme?
How did the client experience the psychological rehabilitation at the rehabilitation centre?
What aspects could the client take from the intervention and use during the rest of their rehabilitation?

Data analysis

Each case was analysed in detail to identify outcome themes representative of the data. As the cases are based on an embedded design, the assessment tests and the evaluation interview were analysed individually using relevant methods before performing the case analysis (Yin, 2018).

Assessment test

Quantitative data from self-reported measurements were analysed based on cut-off scores for the assessment test, visual inspection of data, and Tau-U (Parker et al., 2011; Lobo et al., 2017). A calculation of non-overlapping data (Tau-U) will yield an effect size (ES), which should always be

contextualised based on three factors: 1) client needs and objectives, 2) the intervention itself, and 3) the framework for the intervention (Vannest & Ninci, 2015). However, based on the cut-off scores for the assessment tests, symptoms of depression or anxiety were limited at the baseline. Therefore, no further calculation was required since it was deemed to have no contribution to further analyses. Hence, the evaluation of scores were based solely on visual inspection and the cut-offs for the assessment tests.

Missing data in the self-report measures occur when a participant skips one or more questions or overlook a section of the self-report. This was a problem in the case of measures containing several items, as well as during the follow-up survey where support from staff was not available since the participants had already been discharged. If the response rate exceeded 74% on the subscales, a calculation of the mean was included without the missing item(s). Otherwise, the self-report was not included. In three cases, the participant had missed the entire second page of the DASS-42 self-report. Due to the construction of the DASS-42, it was possible to multiply the scores of the subscales in these cases (Lovibond & Lovibond, 1995; Zanon et al., 2021).

Interview and case analysis

All interviews were recorded and transcribed. Analyses of the interviews were partly processed as embedded parts of the study design. All interviews were coded, and initial themes were identified before performing the case analysis. The initial coding was inspired by thematic analysis techniques (Braun & Clarke, 2006). The first author coded all the interviews, and themes were identified in collaboration with the second author through a reflexive process (Braun & Clark, 2021). Afterwards, case analyses were conducted (Yin, 2018). During the case analysis, the themes inspired the processes, but the case analysis was based on the codes of the interviews. Key quotes were included in the narrative case presentations where possible (Yin, 2018). All authors collaborated in order to translate data from Danish to English for the purpose of this paper. However, quotes from participants with aphasia were deemed too lengthy to include in the present study, given their use of supportive communication strategies.

RESULTS – CASE PRESENTATION

This multiple case study set out to explore the benefits of a psychological intervention after ABI. The present study used an embedded experimental design to collect data using several standard self-report measures (HADS, PGIS, WHO-5, SCS and DASS) pre- and post-intervention, as well as at the 3-month follow-up. Furthermore, a first-person perspective was included in the evaluation interviews. In the following subsections, detailed information on all the cases will be presented.

Kim

Kim, a divorced father, suffered a traumatic brain injury (TBI) after a fall. He started psychotherapy seven months after his injury, and one month after arriving at the rehabilitation centre. Kim reported several times that he was taking things as they came. However, he was worried about the future. He was especially concerned about social relations and how to handle activities of daily life in the future such as shopping.

After the injury, his main challenges were expressive aphasia, cognitive impairments, and physical pain. During rehabilitation, his goal was to become independent in everyday activities, improve his communication skills, and feel pain relief. It was hard for him to formulate goals in therapy, but relevant themes were identified in collaboration with the therapist including identifying bodily sensations, identity reconstruction, and social relations.

During therapy, Kim's perspective on his situation changed and he reported positive developments towards his therapy goals such as identifying bodily sensations and identity reconstruction. In the therapy sessions, he needed structure and external control, which the programme helped facilitate. However, it had to be adapted to account for the cognitive difficulties and aphasia that he was experiencing. Kim expressed the view that too much information was given during the sessions. He had trouble producing answers, but physical activity helped facilitate his communication abil-

ities, which is why some sessions were carried out as walks. Homework was very demanding for him: therefore, it was left out early in the process to prevent negative experiences. Both the therapist and Kim reported that the programme provided helpful structure and themes. During the process, Kim had a follow-up reinstatement of the bone flap after a craniotomy. After the surgery, he seemed relieved and participated more actively in the final sessions that were focused on identity reconstruction. Pain was a great challenge for Kim throughout his rehabilitation and had an impact on therapy.

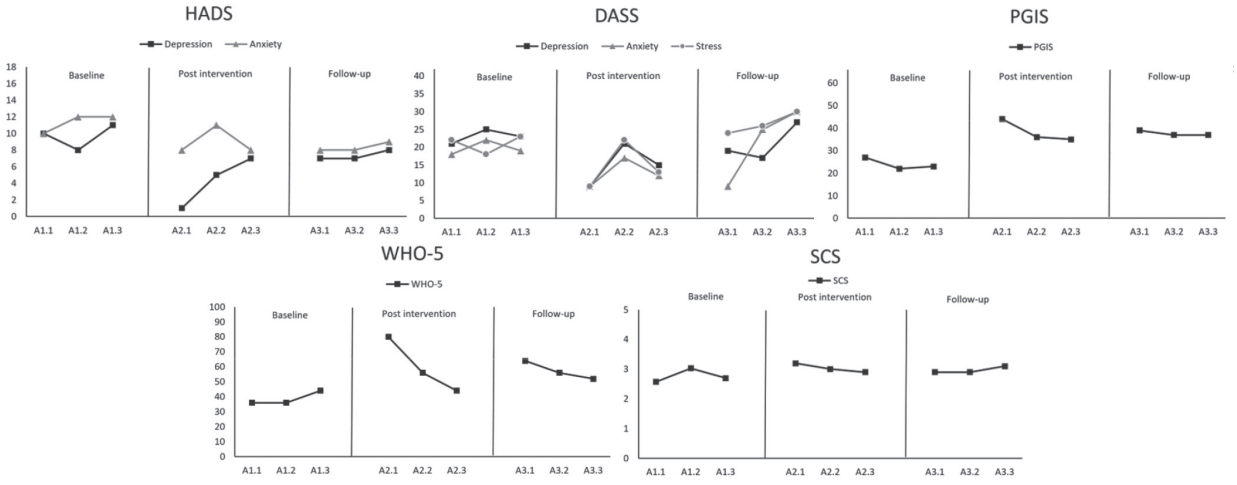
SSRI was administered for several years prior to his injury, but this changed during his rehabilitation due to its possible effect on cognitive impairments.

Table 5. *Assessment scores for Kim*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	10	8	11	1	5	7	7	7	8
HADS A	10	12	12	8	11	8	8	8	9
DASS D	21	25	23	9	21	15	19	17	27
DASS A	18	22	19	9	17	12	9	25	30
DASS S	22	18	23	9	22	13	24	26	30
PGIS	27	22	23	44	36	35	39	37	37
WHO-5	36	36	44	80	56	44	64	56	52
SCS	2.57	3.03	2.7	3.2	3	2.9	2.9	2.9	3.1

A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

Figure 2. *Assessment points for Kim on all self-reported measurements*



A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

Based on the assessment scores, we determined that, in general, Kim showed improvement on the parameters during the therapy. The scores of both HADS anxiety and depression scales dropped to normal or moderate levels after the intervention. The scores on DASS-42 were notably higher than on HADS at all assessment points. This could be due to Kim's physical symptoms, e.g., pain and cognitive impairment related to the initiation of activities. The scores on the WHO-5 scale showed risk of depression or stress at baseline but increased to the normal range post-intervention and at follow-up.

Visual inspections showed an increase in PGIS and stable SCS scores. Kim was generally satisfied with the therapy but could not describe the

outcome in words due to the symptoms of aphasia that he was experiencing.

John

John underwent an apoplexy while he was at work. He considered his job to be the biggest part of his life and his identity. He primarily worked night shifts in a physically demanding job. John was living in the countryside with his wife and kids. Independence was of great importance to him, and he strived to have a positive mindset, but expressed difficult emotions such as anger and frustration in relation to his rehabilitation.

Two weeks after his admission to the rehabilitation centre, he became a part of this study. During the first sessions, he was not able to define therapy goals, but expressed a wish to work through the loss of the ability to fulfil his previous work-related obligations, as well as the changes in his relationships with his family. The family dynamics had changed a lot and he expected even greater changes since he could not go back to his previous job.

During the intervention, the balance between self-awareness and hope was identified as being a key aspect for John. He reported that the most important part of therapy was dealing with values, family, and identity. The therapist similarly reported that John participated more actively in this part of the therapy (the last four sessions) than in previous sessions. Another explanation can be that John participated in two sessions a week during the first half of the course. This was due to practical reasons in his weekly programme, but this changed such that he received one session a week in the latter half of the programme.

Table 6. *Assessment scores for John*

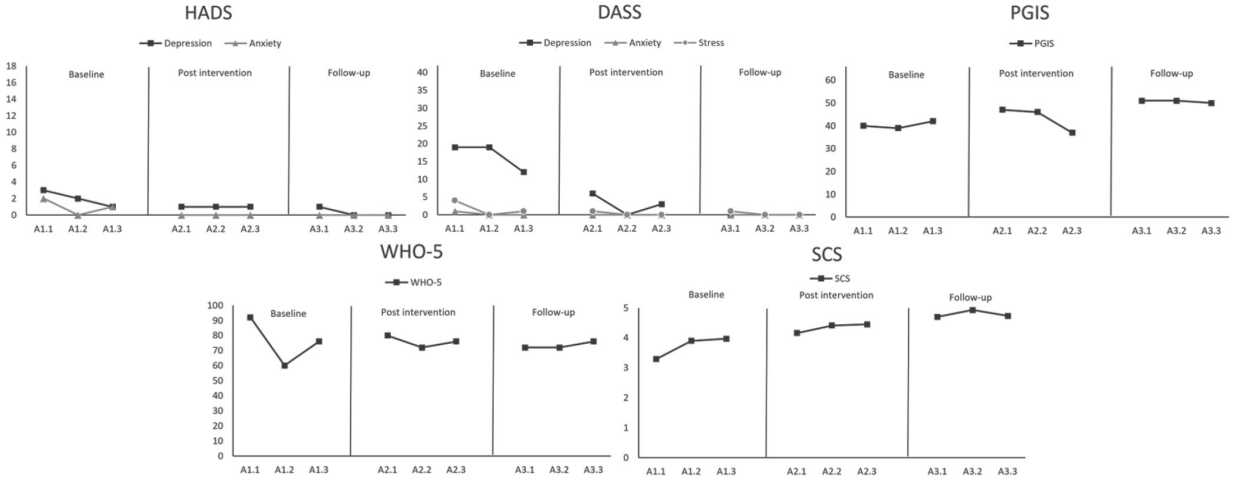
Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	3	2	1	1	1	1	1	0	0
HADS A	2	0	1	0	0	0	0	0	0
DASS D	19	19	12	6	0	3	0	0	0
DASS A	1	0	0	0	0	0	0	0	0
DASS S	4	0	1	1	0	0	1	0	0
PGIS	40	39	42	47	46	37	51	51	50
WHO-5	92	60	76	80	72	76	72	72	76
SCS	3.29	3.9	3.97	4.16	4.41	4.45	4.7	4.93	4.73

A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

Based on John's scores on the HADS and DASS-42 subscales, we found that anxiety and stress were stable and within the normal range at all times. DASS depression scores showed moderate symptoms at the first two assessment points, and mild symptoms at the last point of assessment. The scores were within the normal range post-intervention and at follow-up. Based on visual inspection, an improvement was observed on SCS.

NaSSA and SSRI was initially prescribed immediately after the injury. John wished to end the treatment and did so during the intervention period, at which time the psychologist, the rehabilitation team, and the associated neurologist could evaluate the development with John.

Figure 3. *Assessment points for John on all self-reported measurements*



A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

John had never been in therapy, and he expressed the view that talking about emotions and reactions was very new to him. The process of undergoing therapy, as well as the passage of time, helped him find himself after the injury. The therapy provided a space for his psychological reactions:

John: You don't think much about what you're in right now, even though it fills it all up.

Researcher: So there has been room for that here?

John: Yes.

During therapy, he became closer to his family and more aware of his values, as well as the changes in his priorities in life.

Researcher: […] *the thing about you realising, that there is something else that is important, that you have also been given the opportunity to come home every weekend –*

John: [the family] *have more of my attention*

Researcher: Yes, and has that impacted your motivation?

John: It has

Chris

Chris was in his fifties when he suffered an apoplexy. He was an engineer who worked many hours a week. His job was very important to him, but during his free time, he enjoyed physical activities and being with friends. Chris was married at the time of the injury and had three children. Being someone/something for others was important to him, and he wanted to participate in the study primarily because he wanted to contribute

to research, rather than because he wanted the therapy. However, the psychological part of rehabilitation became more important to Chris than he had expected. He experienced a good synergy between the different interventions.

Researcher: So, the therapy has helped you focus during training?

Chris: Yes. If you are not mentally or psychologically ready, even a skilled physiotherapist cannot make you perform well.

Researcher: The psychological and the physical is connected?

Chris: Yes, yes, it is.

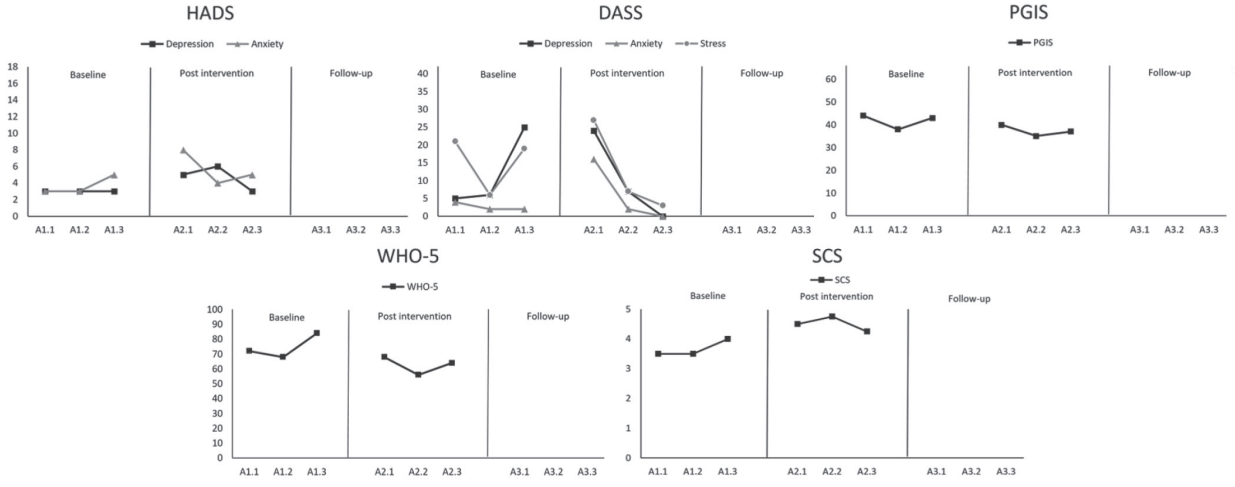
During therapy, Chris wished to work on negative thoughts, his relationship with his family, and his work.

Table 7. *Assessment scores for Chris*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	3	3	3	5	6	3	D	D	D
HADS A	3	3	5	8	4	5	D	D	D
DASS D	5	6	25	24	7	0	D	D	D
DASS A	4	2	2	16	2	0	D	D	D
DASS S	21	6	19	27	7	3	D	D	D
PGIS	44	38	43	40	35	37	D	D	D
WHO-5	72	68	84	68	56	64	D	D	D
SCS	3.5	3.5	4	4.5	4.75	4.25	D	D	D

A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; Drop out at follow-up.

Figure 4. *Assessment points for Chris on all self-reported measurements*



A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; Drop out at follow-up.

Based on a visual inspection, a small increase was seen in symptoms of depression and anxiety on the HADS. However, scores were within the normal range, except for anxiety at A2.1, which was moderate. The scores on DASS-42 peaked immediately before and after the intervention. There was no apparent relationship between the scores on HADS and DASS-42 at these points, and no information was given during the interview either.

Based on visual inspection, Chris reported a small decrease in quality of life (WHO-5) from baseline to post-intervention. The scores fluctuated in the normal range, but the difference in the mean scores for the two assessment times showed a clinically relevant decrease (mean of scores during baseline = 74.67; post-intervention = 62.67) (National Board of Health, 2017). The scores on PGIS suggest a decrease, while the scores and visual inspection of SCS suggested an increase in self-compassion.

Due to adjacent disease after discharge, Chris did not participate in the follow-up assessment.

In the evaluation of reaching therapy goals, Chris reported achieving a better relationship to his own thoughts and feelings of security in his marriage. Generally, he expressed that being in therapy had been amazing. To Chris, the psychological part of rehabilitation was an important part of not just surviving, but also living life after the injury.

During the evaluation interview, he reported having gained new insights and reflections that he could share with his partner. He also wished to invite his partner to participate in a session during his intervention. Psychoeducation on self-awareness made a big impression on Chris:

Chris: I have a completely different basis for deciding things now.

Researcher: Yes

Chris: Something that is much clearer to me now than at that time.

Researcher: Yes, so also more self-awareness

The therapist reported that self-awareness was a big part of Chris's therapy sessions and that cognitive dysfunctions were a challenge for Chris. Concrete thinking, easy deferability, and tangential speech made it difficult to facilitate the therapy in accordance with the programme. These difficulties made homework a challenge for Chris.

Martin

Martin was a young man in his twenties who was just about to start college. After a long period of experiencing increased dizziness, he was diagnosed with a brain tumour. During surgery, he suffered a brain injury. The brain injury resulted in various consequences, such as problems with balance and partial facial paralysis. Rehabilitation professionals reported cognitive problems related to activities of daily living such as cleaning and cooking. However, Martin did not agree. He reported that he had no experience with either cooking or cleaning pre-injury. During his rehabilitation, his primary focus was to return to his life as it was. He could under no circumstances imagine himself with impairments in the future. He was angry and felt that it was unfair that he, at such a young age, should have cancer and a brain injury when he had lived a healthy life. His goal during rehabilitation was to regain lost abilities by focusing on balance and his ability to walk.

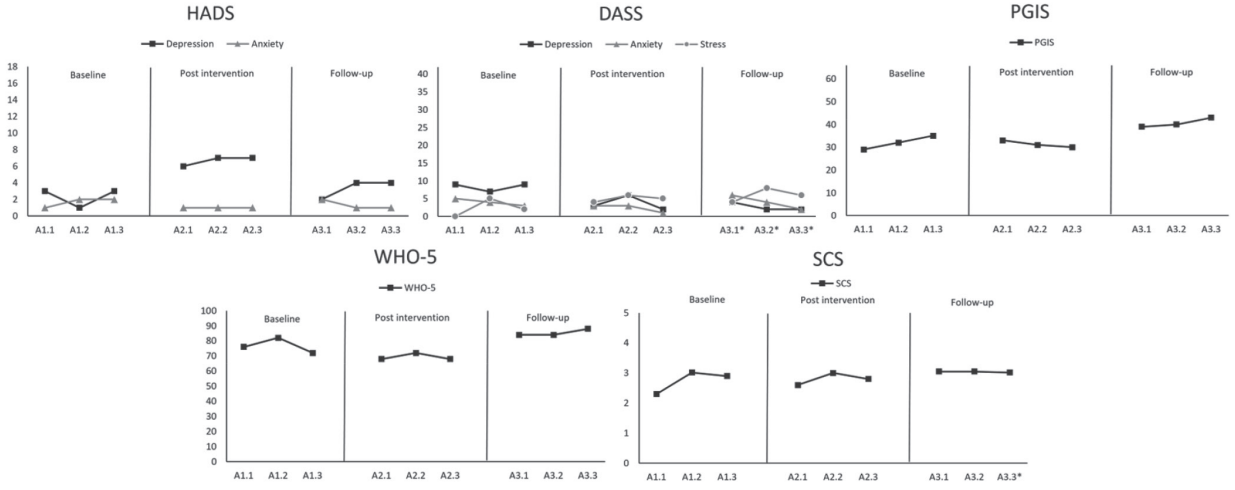
Initially, Martin had a hard time defining what he wished to gain from therapy. He was convinced that his situation was temporary, and he could not imagine that his life would be valuable if he did not return to his former physical functioning and life situation. Halfway through therapy, he had a post-surgery scan, which showed that there was no need for further surgery. Moreover, he had a meeting with a plastic surgeon on possible surgery to relieve his facial paralysis. Afterwards, in therapy, he felt more encouraged to take responsibility for the contents of the sessions by bringing forward the issues that were important to him. During therapy, he worked on his self-awareness and identifying the values and meaningfulness in life, as well as reconstructing his identity in his new situation.

Table 8. *Assessment scores for Martin*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	3	1	3	6	7	7	2	4	4
HADS A	1	2	2	1	1	1	2	1	1
DASS D	9	7	9	3	6	2	4*	2*	2*
DASS A	5	4	3	3	3	1	6*	4*	2*
DASS S	0	5	2	4	6	5	4*	8*	6*
PGIS	29	32	35	33	31	30	39	40	43
WHO-5	76	80	72	68	72	68	84	84	88
SCS	2.3	3.02	2.9	2.6	3	2.8	3.05	3.05	3.02*

*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; * = Missing data bellow the established cut off.*

Figure 5. *Assessment points for Martin on all self-reported measurements*



*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; * = Missing data bellow the established cut off.*

The scores for all subscales for both HADS and DASS-42 were within the normal range at all assessment points. Visual inspection of the WHO-5 scores suggested a decrease in quality of life between baseline and post-intervention. However, based on the cut-off, all scores were above average and differed by less than 10 points. At the time of follow-up, visual inspection showed that the WHO-5, PGIS, and SCS scores had increased.

During therapy, Martin opened up about difficult emotions. The therapy sessions helped him process negative automatic thoughts and gain an understanding of nuanced ways of thinking in order to recognise new perspectives and ease difficult thoughts and worries about the future:

> *Martin: My thoughts aren't as dark as they were before. Before, I tended to generalise. If one thing was bad, I would think "everything is bad". Now it has become a little easier to remind myself that there is a way out.*

The therapy also influenced Martin's attitude to training and thereby, positively affected his rehabilitation in general. In the evaluation, he was able to reflect on how he had been in crisis at the beginning of the therapy and how that may have affected him. He found that the therapy had

helped him become calmer and recognising his circumstances, as well as clearly understand what he has control over in life. Martin wished to continue therapy after the post-assessment, focusing more on values and identity reconstruction.

Jane

Jane was the mother of two children and a wife. One day, after work, she did not feel well and was found by her family having suffered an apoplexy. After the brain injury, she experienced primary cognitive impairments and severe expressive aphasia. Three months after the injury, she arrived at the rehabilitation centre. Here she participated in comprehensive rehabilitation, including group therapy and music therapy during the first four months. By that time, the rehabilitation team and Jane concluded that, due to Jane's communication strategies, she would be able to participate in individual psychotherapy, and thus was enrolled in the present study. As advised in previous studies, Jane and the psychologist met with Jane's speech and language therapist to discuss relevant communication strategies to use during therapy (Thøgersen & Glintborg, 2022).

During her time at the rehabilitation centre, Jane felt lonely and isolated. In rehabilitation, her goal was to become better at talking and participating in social interactions. Initially, her goal for therapy had been to work at identity reconstruction, but due to aphasia, it was revised along the way to account for Jana's ability to feel physical signs of emotions and identify ways to self-regulate. In the evaluation interview, Jane reported a development in relation to her therapy goals and mentioned that the therapy had contributed to her feeling seen and heard in the rehabilitation, despite her aphasia. During the intervention, aphasia had been a great challenge. However, the therapist reported that the programme was a great starting point to make the therapy concrete and behaviourally focused. In addition, physical mindfulness exercises also worked well.

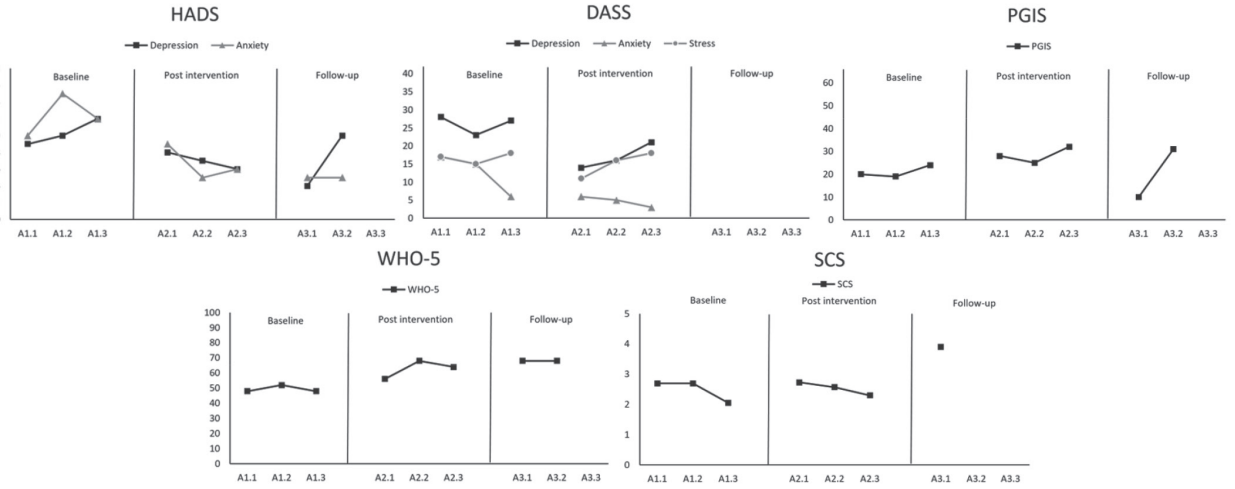
Halfway through the course, Jane stopped treatment with SSRI medications. Furthermore, she and her husband had two shared sessions with the therapist and the music therapist, and this helped support their communication.

Table 9. *Assessment scores for Jane*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	9	10	12	8	7	6	4	10	D
HADS A	10	15	12	9	5	6	5	5	D
DASS D	28	23	27	14	16	21	-	-	D
DASS A	17	15	6	6	5	3	-	-	D
DASS S	17	15	18	11	16	18	-	-	D
PGIS	20	19	24	28	25	32	10	31	D
WHO-5	48	52	48	56	68	64	68	68	D
SCS	2.7	2.7	2.05	2.73	2.57	2.3	3.9	-	D

A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; Jane dropped out during follow-up.

Figure 6. *Assessment points for Jane on all self-reported measurements*



A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; Jane dropped out during follow-up.

Jane reported positive developments on all assessment tests post-intervention. At baseline, her scores were indicative of symptoms of depression and anxiety. However, post-intervention HADS depression and anxiety and DASS anxiety had decreased to the normal range. At the beginning of the intervention, Jane had difficulties recognising physical signs, which she found that the therapy helped her achieve. This may be relevant to the higher score on DASS-42 and HADS. Visual inspection showed an increase in WHO-5 and PGIS scores, and stable scores for SCS between baseline and post-intervention. At the time of follow-up, Jane had moved to a new apartment by herself. She wished to participate in the follow-up by videocall, because she knew she needed assistance with reading the self-reported questionnaires. However, she found the participation too cognitively demanding in this setting. At the first two sessions, she did not complete all questionnaires. Afterwards, she was asked if she wanted to withdraw her participation in the follow-up, to which she said yes.

Jane found that therapy influenced her rehabilitation in general. She felt validated even though it was very demanding due to aphasia. When she thought that a particular conversation was becoming too difficult, one of her strategies was to provide an answer that she thought the therapist expected to hear. This was discussed as a theme in therapy, and a speech therapist assisted the psychologist and Jane to find better strategies. Adaptations in the therapy included behavioural therapeutic approaches and limited homework.

Simon

For Simon, the injury he experienced was an opportunity to move away from a troubled lifestyle. Simon suffered a brain injury after an overdose. Before the injury, he had had a long history of drug abuse, but the injury gave him an opportunity to move away from a problematic environment and motivated him to change his lifestyle. To him, the brain injury was a good thing.

He had a short stay at the rehabilitation centre, focusing on regaining the ability to walk. He also experienced cognitive impairments, but most important to him was his physical rehabilitation. He had experienced previous traumas, which at times represented a barrier not just to the psychotherapy, but to other rehabilitation as well. Simon had been affected all his life by what he described as a turmoil of thoughts. During therapy, he experienced relief from these thoughts and was able to identify turmoil as more of a bodily sensation. Due to the cognitive dysfunction, he experienced, he needed external guides, which was provided in

the programme. The mindfulness exercises were particularly helpful for him.

Simon: There's not that much turmoil in my head anymore

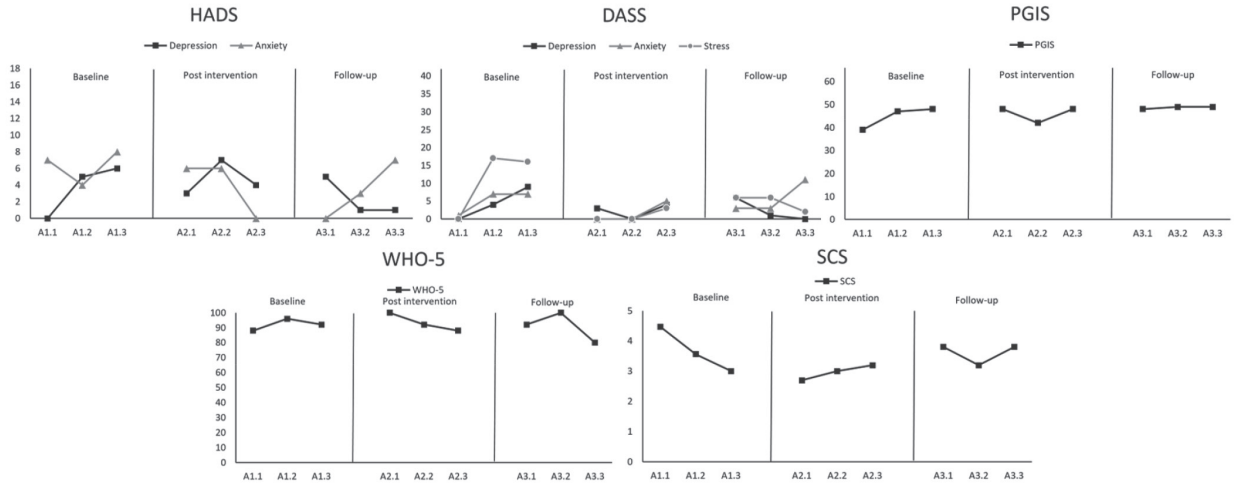
Simon felt that by using mindfulness strategies he could "*feel myself and feel happy*". The therapy gave him new strategies to react and understand his own reactions in social interactions. A key part of the therapy was to support Simon in the process of obtaining help after rehabilitation in relation to his drug abuse and previous traumas. As a result of the therapy, he experienced that he had more energy to take part in other rehabilitation interventions.

Table 10. *Assessment scores for Simon*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	0	5	6	3	7	4	5	1	1
HADS A	7	4	8	6	6	0	0	3	7
DASS D	0	4	9	3	0	4	6	1	0
DASS A	1	7	7	0	0	5	3	3	11
DASS S	0	17	16	0	0	3	6	6	2
PGIS	39	47	48	48	42	48	48	49	49
WHO-5	88	96	92	100	92	88	92	100	80
SCS	4.47	3.56	3	2.7	3	3.2	3.8	3.2	3.8

A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

Figure 7. *Assessment points for Simon on all self-reported measurements*



A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.

Based on the HADS and DASS-42 scores, Simon did not suffer from symptoms of depression or anxiety. However, at the last assessment during follow-up, Simon reported symptoms of anxiety on the DASS-42 within the moderate range. The PGIS scores were stable, but the WHO-5 scores fluctuated, and were high at all assessment points. Visual inspection showed a negative development of self-compassion between baseline and post-intervention.

Simon stated that being in therapy was very demanding and hard, but also a good experience. Because he went into the programme with an open mind, he thought he got a lot from it:

Simon: "It has been good to be in therapy, there really has not been anything bad about it."

Mia

Mia was a mother and girlfriend in her early thirties when she had an apoplexy that left her needing highly specialised rehabilitation. However, she was thankful for surviving the injury. Family life and the relationship with her son was very important to her. Therefore, outpatient rehabilitation at the rehabilitation centre was arranged. This was possible only because she did not need any help in her home. Her rehabilitation goal was to become better at walking and better at energy management.

Mia started participating in the study when she first arrived at the rehabilitation centre. Initially, her wish for therapy was to become better at listening to her own body and emotions, especially in relation to energy management. During the intervention, she became aware of challenges related to social relations, such as the need to better defuse thoughts and feelings, as well as to express more functional behaviour when socially frustrated.

The intervention programme was deemed a good match by both the therapist and Mia. The structure contributed to flow in the sessions and the themes matched Mia's therapeutic goals. Mia perceived mindfulness exercises as rewarding, and she was able to transfer them to other situations. She had regularly practiced mindfulness early on in her life and through therapy, she was able to adapt it to her new situation. Furthermore, she reported that exercises regarding values and self-compassion were highly relevant.

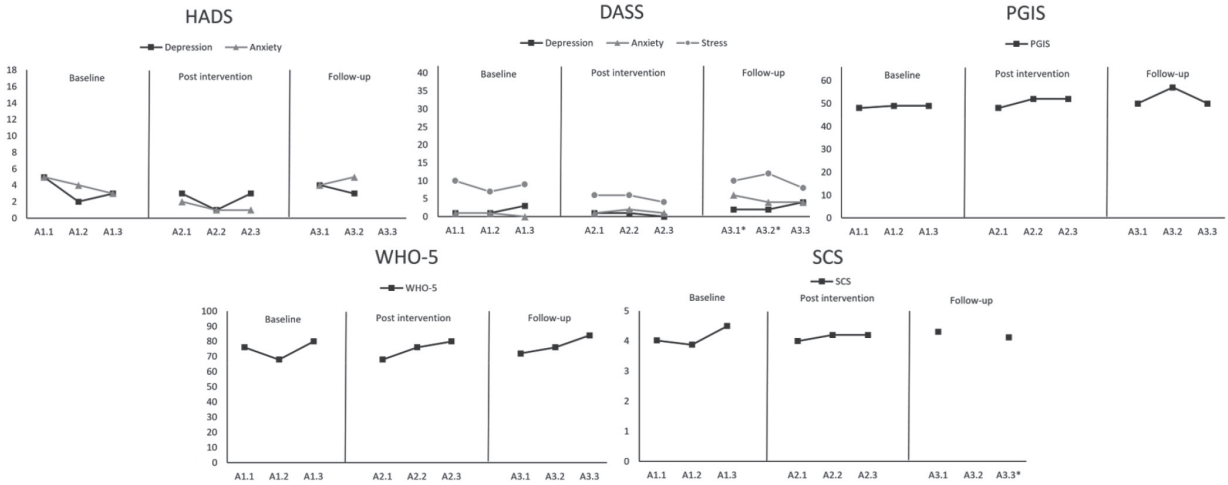
From the self-reported measurements, it could be seen that Mia did not experience symptoms of depression, anxiety, or stress above normal levels at any point during the study.

Table 11. *Assessment scores for Mia*

Assessment test	Baseline			Post-intervention			Follow-up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	5	2	3	3	1	3	4	3	-
HADS A	5	4	3	2	1	1	4	5	-
DASS D	1	1	3	1	1	0	2*	2*	4*
DASS A	1	1	0	1	2	1	6*	4*	4*
DASS S	10	7	9	6	6	4	10*	12*	8*
PGIS	48	49	49	48	52	52	50	57	50
WHO-5	76	68	80	68	76	80	72	76	84
SCS	4.02	3.88	4.5	4	4.2	4.2	4.3	-	4.12*

*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index.; * = Missing data bellow the established cut off; SCS A3.2 = Missing data above the established cut off.*

Figure 8. *Assessment points for Mia on all self-reported measurements*



*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; * = Missing data bellow the established cut off; SCS A3.2 = Missing data above the established cut off.*

Mia's scores on the PGIS, WHO-5, and SCS scales were stable during the case study. The WHO-5 score is always on or above the national average of 68 in the Danish population (National Board of Health, 2017).

Mia wished to become more self-compassionate during therapy. During the interview, Mia reported that therapy helped her rediscover old strategies and redefine them in her new situation, especially mindfulness, because it helped her become more patient with herself. Overall, Mia's assessment scores were stable, with a few small variations.

Researcher: So, maybe you have found your way back to some strategies you've used in the past?

Mia: Mmm, yes

[…]

Researcher: At least it is my impression that you have a lot of strategies to use, it's more about remembering to use them?

Mia: That's it. That's the thing about grabbing the right tool from your toolbox.

Participating in the psychological intervention also influenced her motivation for rehabilitation in general:

Researcher: How do you think your rehabilitation would have been, had you not had this perspective [psychological] *as well?*

Mia: […] *at least the physical part of the rehabilitation might have looked different. This has also helped to push me a little bit. I've always been motivated, but I think it would have been somewhat different. I certainly wouldn't have looked at it like I do now. And I'm much more okay with where I am.*

Mia also mentioned that the fact that she worked on the theme of values during therapy has helped her better prioritise and manage her energy.

Mia: The bottom line is I've gained a lot from the intervention.

Tom

Tom was a man in his fifties who had previously suffered from cancer. After his previous illness, he decided to change his career path and he felt like he had found his calling, because helping others was very important to him. Six months prior to starting rehabilitation, he had suffered an apoplexy.

During his previous illness, he felt neglected by the system, which affected him in his rehabil-

itation. He started therapy at the beginning of his stay at the rehabilitation centre. By that point, he was affected by his brain injury and was experiencing cognitive impairments such as lability and tangential speech. His focus in rehabilitation was to become independent in activities of daily living, better communication abilities, as well as the reintegration of the left side of his body.

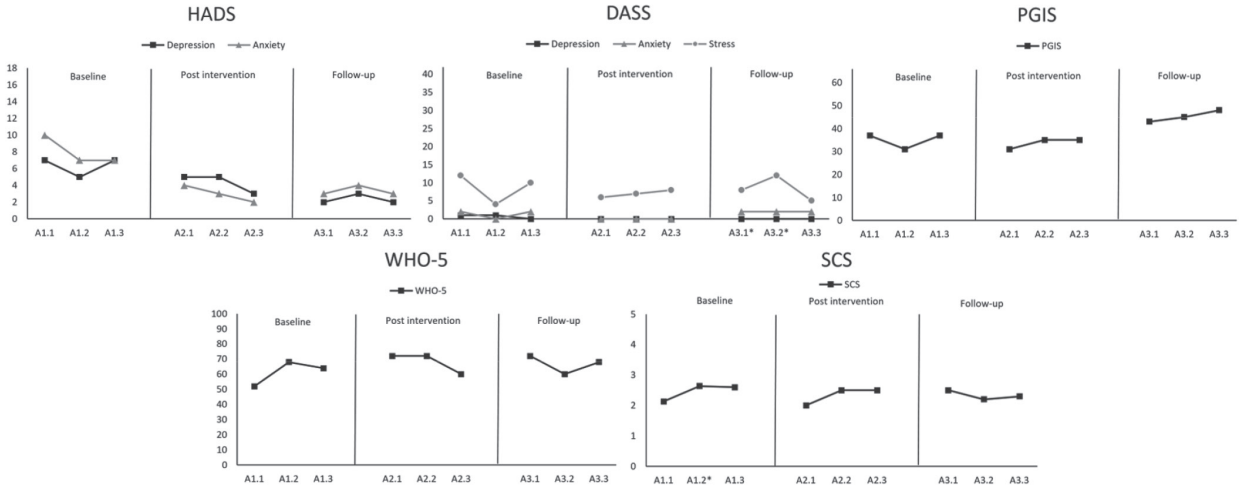
Tom was aware that he was very self-critical, and one of his therapy goals was to become more self-compassionate. Furthermore, he wished to talk about his values and what would make his life meaningful in the future. Through the intervention, he experienced a change of perspective on his situation. The last part of the programme was especially relevant for him in relation to his wishes for the therapy. He took responsibility for the therapy by bringing relevant content and being prepared by reading the workbook before the session. He reported that he found the workbook to be efficient. Bringing up themes himself was difficult, as it required insight or courage to recognise what was important to work with. During the sessions, it was not possible to cover all the material in the programme, because Tom brought a lot to the sessions. In Tom's case, mindfulness worked well as a break between different themes.

Table 12. *Assessment scores for Tom*

Assessment test	Baseline			Post intervention			Follow up		
	A1.1	A1.2	A1.3	A2.1	A2.2	A2.3	A3.1	A3.2	A3.3
HADS D	7	5	7	5	5	3	2	3	2
HADS A	10	7	7	4	3	2	3	4	3
DASS D	1	1	0	0	0	0	0*	0*	0
DASS A	2	0	2	0	0	0	2*	2*	2
DASS S	12	4	10	6	7	8	8*	12*	5
PGIS	37	31	37	31	35	35	43	45	48
WHO-5	52	68	64	72	72	60	72	60	68
SCS	2.13	2.64*	2.6	2	2.5	2.5	2.5	2.2	2.3

*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; * = Missing data bellow the established cut off.*

Figure 9. *Assessment points for Tom on all self-reported measurements*



*A, Assessment point; DASS D/A/S, Depression Anxiety and Stress Scale-42 Depression/Anxiety/Stress; HADS A, Hospital Anxiety and Depression Scale, Anxiety, HADS D, Hospital Anxiety and Depression Scale, Depression; PGIS, Personal Growth Initiative Scale; SCS, Self-Compassion Scale; WHO-5, World Health Organization Well-Being Index; * = Missing data bellow the established cut off.*

Evaluation of the assessment scores indicated no apparent changes after therapy based on the parameters in focus. The scores on HADS were within the normal range at all times, with the single exception of the anxiety subscale in the first baseline assessment. The scores on DASS-42 were also within the normal range and no changes were apparent from the visual inspection. Tom forgot to answer the second page of the DASS-42 during follow-up.

Tom's scores on PGIS were stable between baseline and post-intervention, with a small increase at follow-up, indicating that he experienced better control over his own life. Visual inspection indicated a small increase in quality of life (WHO-5) from baseline to post-intervention, but always within the normal range.

Visual inspection showed stable scores on SCS (with one missing item), but these scores were indicative of low self-compassion, in accordance with Tom's own assessment. During therapy, Tom learned about self-compassion and came to understand the concept better. However, scores on SCS indicated that he needed to implement it into his everyday life.

Generally, Tom felt he gained more from therapy than he expected. Participating in psychotherapy made him feel like he had more energy for training. He became aware of what he wanted to focus his energy on, and he became more conscious of how he had previously spent a lot of energy worrying about things that he had no control over.

> *Tom: For me, and maybe it* [participating in therapy] *is also calming and gives a feeling of surplus.*
>
> *Researcher: Yes*
>
> *Tom: It means that I have mentally and physically been able to do some of the other things that are also required.*

DISCUSSION

This multiple case study sought to explore the benefits of using psychotherapeutic intervention as part of the comprehensive rehabilitation programme after ABI. The case study design investigated possible benefits from several perspectives. The cases were designed with an embedded experiment that evaluated the effect of interventions offered through the BackUp© programme on parameters of depression, anxiety, quality of life, self-compassion, and control over one's own life. However, symptoms of depression or anxiety were not among the inclusion criteria, and only two participants experienced clinically relevant symptoms of depression or anxiety before the intervention. Therefore, it is relevant to question whether the quantitative outcome measures were relevant or if they contribute to the included cases, since most participants reported symptoms in the normal range throughout the study.

Two participants experienced negative effects based on the self-reported measurements and this should be addressed further. In the first case, Simon reported a decrease in his score on the Self-Compassion Scale. One possible explanation for this development lies in his high score at the baseline assessment. Not only were his scores noticeably high, but the caregiver who helped him complete the questionnaire reported that he answered the questions before she had the opportunity to finish reading them out aloud. Before the next assessment, this issue was discussed with Simon, and he was asked to think about each question before answering. It is reasonable to assume that this could have had an impact on his results. However, an alternative explanation is that an increase in self-awareness can lead to poorer self-esteem (Cooper-Evans, 2008). The other participant with noteworthy negative effects according to self-reported measurements was Chris. However, his quantitative results contradict the results from his evaluation interview, where he expressed that he had gained a lot from therapy. One possible explanation is that the lower scores are a consequence of increased insight and self-awareness that he reported gaining during the intervention (Carroll & Coetzer, 2011).

The two participants who reported clinically relevant levels of depression and anxiety during the baseline assessment were Jane and Kim. Based on the visual analysis of the scores on HADS, DASS-42, PGIS, and WHO-5, Jane and Kim ex-

perienced a positive effect from the therapy. It is noteworthy that they both had aphasia. Studies show that people suffering from aphasia after ABI often experience depression and anxiety related to their communicative disorders and social and psychological isolation, which in turn often leads to a perceived loss of identity (Code & Herrmann, 2003). During therapy, neither Jane nor Kim worked with techniques aimed at reducing symptoms of depression or anxiety. They both wished to work with identity reconstruction. In a review of previous studies evaluating the effect of third wave cognitive behavioural therapy after ABI, it was suggested that the therapy only influences what is in focus (Thøgersen, 2022). However, it seems that, for Jane and Kim, working with identity reconstruction might have had a spinoff effect on the symptoms of depression and anxiety they were experiencing. Future studies need to evaluate not only the effect on psychotherapy over time, but also whether psychotherapy targeting areas such as identity reconstruction can increase resilience and prevent depression or anxiety in the future.

The discussion outlined earlier prompts us to consider whether the right parameters were included in the present study. The choice of measures was based on recommendations from previous studies. However, a recent study by Domensino and colleagues argues that standard tests often do not evaluate what the clients find to be most important during rehabilitation (Domensino et al., 2021; Fleminger et al., 2003). Initially, participants in the present study reported that physical rehabilitation was of vital importance. However, by the time of the evaluation interview, they reported that the psychological part of rehabilitation was the most important.

By evaluating the effect of therapy based on depression and anxiety symptoms, there is a risk of replicating the biomedical discourse of symptom reduction. Needless to say, depression and anxiety can be a barrier for participation in rehabilitation and therefore needs to be addressed further. On the other hand, psychological reactions are part of a life crisis, and successful psychological rehabilitation should not be defined by symptom reduction alone. A recent review by Nalder and colleagues suggested that individuals need to gain positive life experiences after ABI that involves social relationships and social acceptance, active participation and agency, as well as developing a sense of self and self-worth (Nalder et al., 2022). Thus, psychotherapy after ABI should support these points, which is possible using the BackUp© programme. Furthermore, therapy should be focused on resilience. General psychology can contribute to a basic understanding of the individual's reactions and hence their motivation and perspective, since this is crucial for rehabilitation (Vaghela et al., 2021). This also became clear during the evaluation interview as the participants reported gaining a new perspective on their situation through therapy, which helped them achieve greater motivation levels and a greater sense of control. Overall, based on the narrative case presentations, it would appear that the intervention had an impact on the participants' rehabilitation. The evaluation interviews showed a correspondence between the therapeutic focus and the benefits that the participants experienced. Through case analysis, it became clear that all participants reported that the therapy had an impact on their therapeutic focus/goal. Although the participants had different therapy goals, a central theme for all participants was identity and meaning in life. Salas & Prigatano (2019) introduced the concept of *levels of care*, arguing that psychotherapy can address different needs, e.g., symptom reduction or re-establishing meaning of life. The effect of therapy needs to be evaluated based on the focus of the therapy, and an evaluation related to re-establishing meaning in life is the most challenging (Salas & Prigatano, 2019). The participants reported that the therapeutic intervention had an overall positive impact on their rehabilitation. Hence, the evaluation of a psychological intervention as part of a comprehensive rehabilitation needs to apply a broad biopsychosocial and holistic perceptive on the benefits of the rehabilitation in general (Vaghela et al., 2021). In accordance with our proposals, based on the pilot study, the findings of the present case study support the argument that the effect of therapy should be evaluated based on therapeutic goals (Thøgersen et al., 2022; Gracey et al., 2007).

Future directions for psychotherapy after ABI

Psychosocial adaptation requires a multidimensional approach (Nalder et al., 2022). Based on the cases described in the present study, psychotherapy after ABI should focus on multiple different themes depending on the needs of the client. Furthermore, the therapy must match the needs of the client and where they are in their rehabilitation process (Domensino et al., 2021). Although the participants in the present study had all been admitted to the same rehabilitation centre less than a year after their ABI, each of them had different needs for the therapy, as manifested in their individual therapy goal or focus.

Brain injury causes loss and grief (Coetzer, 2003). Prigatano (2013, p. 753) argued that "*the problems that brain injury imposes on the personal adjustment of the individual remain rather constant"*. Therefore, we would further suggest that grief and pain should be addressed as a theme in therapy. The goal of the therapy should to a greater extent support the client's rehabilitation during their grief process. ABI survivors who accept their new life circumstances experience less psychological distress (Aaby et al., 2019). As a reflection of this, the participants in our study achieved a new perspective on their situation through therapy.

Limitations

Previous research has recommended rigorously designed case studies to explore psychological rehabilitation after ABI (Thøgersen, 2022; Hsieh et al., 2012b). The focus of the present study was to evaluate the benefits and effect of a psychological intervention, namely the BackUp© programme. Only one feasibility study of the BackUp© programme has been undertaken prior to this study (Thøgersen et al., 2022), and it is not possible to fully validate the intervention programme based on this case study alone. Hence, further studies must be conducted in order to validate this programme.

The present study followed the SCRIBE 2016 guidelines (Tate et al., 2016). However, the study design has some limitations that need to be addressed. In designing the study, a fixed timeframe was chosen as a baseline. Baselines based on a fixed timeframe can represent a problem, since stable baselines are not necessarily achieved during this assessment (Brodens & Abbort, 2021).

In a classic A-B-A design, assessments need to be conducted in all phases of the design. In the present study, an alternative questionnaire was used during the intervention phase. The reason for this was our primary interest in the benefit of the intervention after the entire intervention was completed. Furthermore, it was assessed that answering the questionnaire during the study would be too laborious for the participants. Consequently, the number of data points gathered might have been too few. Nevertheless, clients reported in the evaluation that they experienced too many assessment points, which, taken in conjunction with the dropout during follow-up and the missing data, leads us to believe that the questionnaires were too extensive. Thus, for future studies, it would be appropriate to consider fewer questionnaires, rather than fewer assessment points.

Single case designs provide the opportunity to control for error variance, since independent and extraneous variables can be identified and corrected for and/or otherwise accounted for (Brodens & Abbort, 2021). In the present study, the comprehensive rehabilitation and the prescribed medication can each represent an independent variable, since either can potentially change over the course of the study. However, such changes are interpreted as part of the process of comprehensive rehabilitation, which is one of the reasons why case studies are specifically well suited for studying the benefits of a psychotherapeutic intervention as part of a comprehensive rehabilitation programme.

Finally, the number of subjects included in studies to explore inter-subject replications are typically three to six (Brodens & Abbort, 2021). In the present study, eight cases were included based on the pre-established inclusion criteria. This might represent a problem when reporting the results, since the presentation might be too superficial. On the other hand, the inclusion of a larger number of cases allows for generalisability of results across subjects, since the study aims

to constitute a systematic replication (Brodens & Abbort, 2021; Barlow & Hersen, 1984).

CONCLUSION

This multiple case study sought to explore the benefits of a psychotherapeutic intervention provided as part of a comprehensive rehabilitation programme after ABI. Based on the findings of the eight included cases, this study indicates that a psychotherapeutic intervention based on the BackUp© programme can have a positive impact on general comprehensive rehabilitation and its outcomes. All participants reported that the intervention was meaningful and rewarding. Based on the findings, we recommend that future psychotherapeutic interventions must focus on supporting the client through this life crisis (i.e.,) the acquisition of a brain injury. Further studies are needed to explore and assess the effects of the BackUp© programme, especially those associated with the therapeutic focus.

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