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ORIGINAL REPORT

COMPARISON OF INDIVIDUAL, GROUP AND COMBINED INTERVENTION FORMATS IN A RANDOMIZED CONTROLLED TRIAL FOR FACILITATING GOAL ATTAINMENT AND IMPROVING PSYCHOSOCIAL FUNCTION FOLLOWING ACQUIRED BRAIN INJURY

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Objective: **To compare individual, group and combined intervention formats for improving goal attainment and psychosocial function following acquired brain injury.**
Design: **Randomized controlled trial, waiting list controls.**
Participants: **Thirty-five participants with a mean time of 5.29 years (standard deviation = 3.9) since acquired brain injury were randomly allocated into 6 groups involving an intervention or waiting list control condition for 1 of 3 intervention formats.**
Methods: **Interventions were 3 h/week for 8 weeks. Formats included: group-based support (*n* = 12), individual occupation-based support (*n* = 11), and a combined group and individual support intervention (*n* = 12). Participant outcomes were examined at pre-, post-, and 3-month follow-up assessment on the Canadian Occupational Performance Measure, Patient Competency Rating Scale, and Brain Injury Community Rehabilitation Outcome 39 Scales.**
Results: **Overall, the findings indicated that the individual intervention component appeared to contribute particularly to gains in performance in goal-specific areas. The combined intervention was associated with maintained gains in performance and satisfaction. However, gains in behavioural competency and psychological well-being were more likely to occur after the group and individual interventions.**
Conclusion: **These findings generally support the efficacy of brief intervention formats following acquired brain injury, although further research is needed to examine clients' suitability for particular interventions.**

Key words: acquired brain injury, brief intervention formats, goal attainment.

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INTRODUCTION

The long-term outcome of acquired brain injury (ABI) is typically characterized by persisting psychosocial dysfunction, including loss of independent living skills, relationship breakdown and social isolation (1). Although post-discharge services provide support to many individuals with ABI in the initial stage of recovery, a significant number require psychosocial interventions to facilitate and maintain ongoing gains and improve long-term outcome (1). Ideally, such programmes should be tailored according to individuals' goals. However, few interventions for facilitating goal attainment in home and community re-integration following ABI have been systematically evaluated.

Goal setting is recognized as an important factor shaping the rehabilitation process (2). A client-centred approach to goal setting has been found to enhance clients' participation in therapy and facilitate successful outcomes (2, 3). In addition to individuals' goals, it is recognized that metacognitive skills (which include self-awareness of post-injury impairments and strategy behaviours) impact upon rehabilitation outcomes (4), and influence community reintegration and vocational success (5). Metacognitive skills enhance the transfer and generalization of information and strategies learnt in rehabilitation to everyday situations (6). Empirical research has shown that training in metacognitive skills promotes maintenance of behavioural strategies in daily living and improves functional outcomes (7).

Furthermore, recognition of the person's context (the social environment in which learning and applying skills takes place) is important for facilitating and maintaining behavioural gains. Based on the International Classification of Functioning, Disability and Health (8), which emphasizes the dynamic interaction between health, the environment and personal factors, it would appear that rehabilitation outcomes following ABI may be optimal when interventions also address environment factors that have a facilitatory or inhibitory effect (9). The setting or environment for an intervention may include an individual's own home or community, a group therapy setting in a clinic or a combination of these; a comparison between which is the focus of the present study.

Components of psychosocial intervention that target metacognitive and contextual factors include training skills and

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strategies relevant to naturalistic environments. For example, psychosocial components include creating supportive environments for learning about post-injury changes (e.g. peer support), providing feedback regarding performance on everyday tasks, training skills and strategy behaviours in naturalistic environments, and delivering ABI education to the individual's social support network such as family and community services (4). Combining these metacognitive and contextual components is expected to provide an effective means of enhancing the goal attainment and psychosocial outcomes of people with ABI.

Consistent with this view, evidence is mounting from controlled trials to support the efficacy of comprehensive holistic brain injury rehabilitation programmes for individuals beyond the acute rehabilitation phase (10–12). These multidisciplinary team-based, therapeutic milieu programmes are typically conducted for several days a week over a number of months. They deliver an array of cognitive rehabilitation and psychotherapeutic interventions (both group and individualized goal-specific interventions) to address a range of cognitive, behavioural and emotional consequences of ABI (13). However, due to their comprehensive nature, they may not be financially feasible in some rehabilitation settings. It is also unclear how particular programme components influence outcomes. Therefore, it would be beneficial to identify the relative impact of different programme components, particularly group and individual interventions.

The efficacy of individual and group intervention formats has been demonstrated for improving a range of cognitive and behavioural impairments (e.g. memory, anger management) and psychosocial outcomes (14). For metacognitive interventions, an individual occupation-based intervention format using client-centred goal setting and meaningful activities has been designed to increase metacognitive skills and functional performance in naturalistic settings (7, 15). A group therapy format has also been trialled that provides a supportive social environment with peer feedback to learn about post-injury changes and develop self-regulatory strategies (16). However, to date, these metacognitive interventions have been evaluated using case studies or small group studies with no control group (4). Furthermore, a broader intervention combining group-based support sessions and individual sessions has not been evaluated.

The present randomized controlled trial aimed to evaluate different intervention formats for facilitating goal attainment and improving psychosocial outcomes following ABI. The intervention formats included group-based support, individualized occupation-based support, and a combined intervention format. Due to the main focus on client-centred goal setting in the present research, level of goal attainment was the primary outcome assessed. Secondary outcomes in the study included various aspects of psychosocial function (i.e. behavioural competency, socialization, productivity and psychological well-being), some of which were related to the goals set.

The first aim was to compare the relative efficacy of each intervention format. It was hypothesized that participants receiving the combined intervention would experience greater gains at post-assessment than those receiving either the group or individual intervention.

The second aim was to examine maintenance or durability of gains for the group, individual, and combined intervention formats at 3 months follow-up. It was hypothesized that the pattern of changes in outcome observed between pre- and post-assessment would be equivalent to that observed between the pre- and follow-up assessment for the intervention formats.

MATERIAL AND METHODS

Design

A waiting list control design was employed to avoid the ethical and practical considerations associated with a placebo condition or "pseudotreatment" (14, 17). A block randomization method involving a random numbers table was used to ensure that an approximately equal number of participants (i.e. 11–12 individuals) were assigned to each group, with the sequence concealed until the interventions were assigned (18). Using the random assignment by block method, participants who consented to participate were allocated into 6 groups (see method described in (18)); an intervention or waiting list control condition for 1 of 3 intervention formats (i.e. individual, group and combined). The random allocation was designed to control for the heterogeneity of participants' demographic, neurological and functional status characteristics and occurred independently of the clinicians and the independent assessor (i.e. those involved in the intervention or outcome evaluation).

The independent assessor conducted the pre-intervention, post-intervention and follow-up assessments, and was blind to the aims and hypotheses of the study. Whilst efforts were made to "blind" the assessor to group membership it became apparent that 6 participants had mentioned during the post-assessment some details regarding the intervention they received. Participants were aware that there were a variety of treatment conditions, but were unlikely to recognize the specific nature and purpose of these.

Participants

Following ethical clearance from a university human research ethics committee, participants were recruited from a larger convenience sample of 84 individuals with ABI who previously participated in a longitudinal outcome study (19). In this earlier multi-centre study, participants were recruited from outpatient brain injury units and community-based rehabilitation services over a period of approximately 12 months. The inclusion criteria for the present study included: (*i*) participants are medically stable; (*ii*) individuals with a psychiatric disorder or substance abuse disorder must be receiving appropriate treatment outside the research intervention; (*iii*) participants from the outcome study provide consent to be contacted about a future intervention; and (*iv*) participants have adequate verbal communication skills and speak English. Following ethical clearance, 56 participants who fulfilled the inclusion criteria were invited to participate in the current intervention and 35 consented. The most common reasons provided by participants who declined the intervention were that they had returned to full-time work, or were receiving multi-disciplinary rehabilitation funded by an insurance company. A flow diagram of the recruitment and allocation to treatment conditions is presented in Fig. 1.

As shown in Fig. 1, 35 individuals were randomly allocated to an intervention and completed the pre-assessment. This sample included 19 men and 16 women aged between 21 and 62 years of age (M = 43.89, standard deviation (SD) = 12.6). Time since injury for the sample varied between 2 and 18 years (M = 5.29, SD = 3.9). Cause of ABI included traumatic brain injury (TBI) due to a motor vehicle accident (n = 17), fall (n = 2) or assault (n = 2), and other causes, namely, stroke (n = 12)

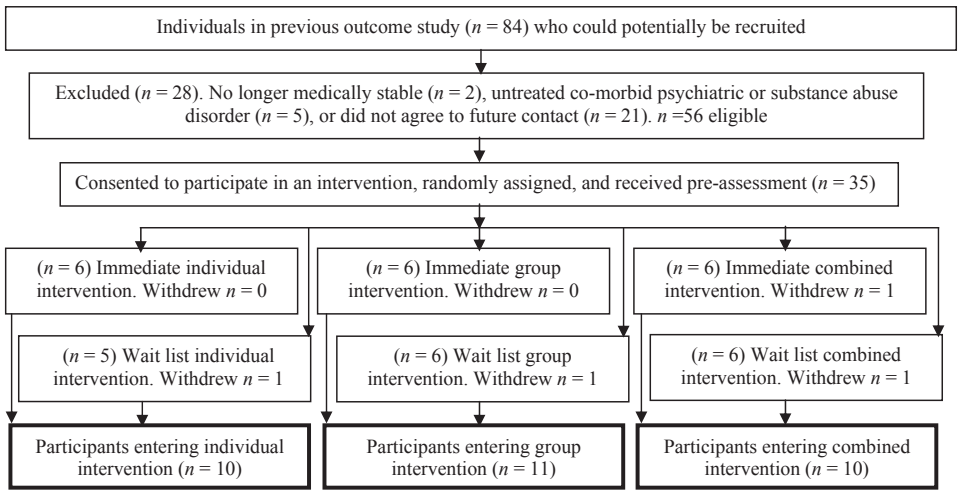

Fig. 1. Recruitment and allocation to treatment conditions

and brain tumour or abscess (n = 2). The causes of stroke included aneurysm (n = 5), arteriovenous malformation (n = 3), intracerebral or subdural haemorrhage (n = 2) embolism (n = 1) and thrombosis (n = 1). Lesion location data obtained from medical reports indicated that diffuse axonal injury or bilateral frontal injuries were common for individuals with TBI (n = 13), with an approximately equal proportion of left- and right-sided lesions observed for other participants' injuries. The mean Glasgow Coma Score for individuals with TBI (n = 21) was 6.81 (SD = 3.9).

A comparison conducted between the individuals who were recruited into the present study (n = 35) and those who did not participate from the previous outcome study (n = 49) identified that there were no significant differences ($p > 0.05$) in terms of: gender, cause of injury, time since injury, level of education, and Glasgow Coma Score for individuals with TBI. Additionally, the groups did not significantly differ on overall psychosocial outcome before the intervention study, as measured by the Sydney Psychosocial Reintegration Scale (20). However, individuals who participated in the present intervention were significantly older (M = 43.89, SD = 12.6) than individuals who did not participate (M = 35.33, SD = 12.9, t = 2.82, p = 0.006).

Participants asked a family member or close friend to participate in the study and complete assessment measures.

Outcome measures

Canadian Occupational Performance Measure. COPM (21) is a client-centred outcome measure which supports the intervention process by identifying problems in occupational performance, assisting goal setting, and measuring change in ratings of performance and satisfaction over time. It involves a semi-structured interview that takes approximately 20–40 minutes to administer. The participant is initially prompted to identify a range of problems experienced in the areas of self-care (i.e. personal care and mobility); productivity (i.e. paid or unpaid work); and leisure (including socialization). The participant rates the importance of each problem on a 10-point scale and 3–5 most important performance problems are then selected on the basis of the highest ratings. For each selected problem, participants then rate both their performance (1 = "not able to do it" to 10 = "able to do it very well") and satisfaction with their performance (1 = "not satisfied at all" to 10 = "extremely satisfied") on a 10-point scale. These identified problem areas form the basis of goals in an intervention. Following the intervention, participants re-rate their performance and satisfaction with respect to the previously identified problems (21).

Scoring the COPM involves adding the respective ratings for each problem area and dividing by the number of problems (21). The test-retest reliability of the COPM for individuals with ABI over a period of approximately eight days has been found to be sound for performance (r = 0.89) and satisfaction (r = 0.88) ratings (22). The validity of the COPM has been demonstrated for various populations (23). Various studies support the utility of the COPM as a client-centred approach to goal attainment in brain injury rehabilitation (2, 3). A positive difference of 2 or more points between the average scores from the initial assessment and follow-up assessment is considered to be clinically meaningful (21).

Acknowledging concerns over the use of caregivers as proxies to identify goals on behalf of an individual (3), in the present study individuals were supported by the independent assessor to develop their own goals and rate their performance and satisfaction, and collateral ratings were then obtained from relatives for the same areas of functioning.

Patient Competency Rating Scale. PCRS (24) was used to measure behavioural competency and to also provide an index of awareness of deficits. It is a 30-item questionnaire with items rated on 5-point Likert scale from 1 ("can't do") to 5 ("can do with ease"). Total scores on the participant and relative versions range from 30 to 150. High scores reflect greater behavioural competency in the areas of functional activities, interpersonal skills and managing emotions. Discrepancy scores are calculated by subtracting the participant total ratings from the relative total ratings, and range from –120 to 120. A large positive discrepancy between the participant and relative ratings (i.e. the participant reports greater competency than the relative) may be interpreted as an awareness deficit. The psychometric properties of the PCRS are sound in terms of test-retest reliability (r = 0.92–0.92), internal consistency (α = 0.91–0.95) (25), and concurrent validity (26).

The Brain Injury Community Rehabilitation Outcome 39. The BICRO-39 (27) scales were specifically developed for use in community-based brain injury rehabilitation. The scales represent a broad range of activities relevant to individuals' goals during community re-integration; however, due to the study's focus on psychosocial outcome, only 3 scales (psychological well-being, socialization and productivity) were included in the analysis. In this study relatives provided ratings on each scale. The psychological well-being scale is rated on a 6-point scale from 5 ("never") to 0 ("almost always") with higher scores reflecting better psychological adjustment. The socialization and productivity scales are both rated on a 6-point scale from 5 ("doesn't do this") to 0 ("several hours a day"). Lower scores reflect better functioning.

Powell et al. (27) reported the psychometric properties for the 76-item version of the BICRO, and subsequently for the short (39-item) version. Test-retest reliability of the BICRO-39 scales was sound with

most coefficients exceeding 0.75. The scales were significantly correlated with the corresponding scales of other psychosocial outcome measures, providing evidence of construct validity (27).

Interventions

Intervention A, Group-based support (8 weeks). A previously developed group intervention (16) was modified to suit the format of the present study. Conducted by a psychologist, this intervention targeted the development of metacognitive skills (self-awareness and use of compensatory strategies) through group-based psycho-education, peer and facilitator feedback, and goal setting. Participants attended one, 3-h group session each week covering topics such as understanding and managing cognitive impairment, social skills and communication, emotional changes and coping, goals, and motivation. Each week, in groups of 5–6, participants discussed their goals and progress with these, and were supported to develop strategies and practice these in the group and during homework exercises.

Intervention B, Individualized occupation-based support (8 weeks). This intervention was modelled on the format described by Katz et al. (15) and further validated by Ownsworth et al. (7). This intervention focused on client-centred goals and associated occupational activities considered important and meaningful to the individual. These activities were performed in participants' home and community and provided the opportunity to train metacognitive skills in natural settings and involve family and other social supports. For example, in a previous study an individual's goal was to prepare meals, thus the intervention focused on training self-awareness of errors and use of self-regulation strategies during cooking, with education provided to his family (7). In the present study activities associated with the goals developed on the COPM formed the basis of metacognitive training with education also provided to relevant social supports. An occupational therapist conducted Intervention B during weekly, 3-hour visits to each participant.

Intervention AB, Combined group and individualized support intervention (8 weeks). This intervention involved the equivalent amount of therapy time as Interventions A and B (i.e. 24 hours in total over an 8-week timeframe) with 12 h spent in group-based support sessions and 12 hours spent in individualized occupation-based sessions. Each week participants attended a group session (1.5 h) conducted by the psychologist and an individual session (1.5 h) with the occupational therapist. The content of the group and individual sessions were similar to those previously described, but condensed into the shorter timeframe. The combined intervention was designed to promote the development of metacognitive skills through activities in both the group context and the participant's home and community environment with the involvement of social supports.

Assessment procedure

An independent assessor (another occupational therapist) conducted the pre-, post- and follow-up assessments with participants during home visits. Relatives were interviewed in person or on the telephone for the COPM and returned the PCRS and BICRO-39 questionnaires by post.

The goals developed by participants in the pre-assessment most typically related to instrumental activities of daily living (e.g. cooking and budgeting), participation in community activities, improving relationships and managing emotions. An inspection of these indicated that the nature of goals set did not differ between intervention groups.

RESULTS

Data analysis

The data were screened and analysed using the Statistical Package for the Social Sciences (SPSS) for Windows, Version 12, according to standard guidelines (28). Missing data occurred for participants who did not have a relative in the study ($n = 3$), thus leading to smaller samples size for the relative-rated measures. Five participants who completed the pre-assessment either did not commence an intervention ($n = 4$) or, alternatively, commenced an intervention (group support) but did not continue to attend the sessions ($n = 1$). Data for these individuals were managed with intention-to-treat analyses involving the pre-assessment data (see 29).

Analyses (one-way ANOVA and χ^2) comparing the demographic and injury characteristics of the 3 intervention groups ($n = 35$) found no significant differences in age, gender, education, time since injury, cause of injury and severity for individuals with TBI ($p > 0.05$). Additionally, one-way ANOVAs were conducted on the pre-assessment data to identify whether the 3 intervention groups were comparable on outcome measures prior to the intervention. An initial analysis examined whether waiting list controls ($n = 17$) demonstrated any changes in goal attainment and psychosocial function after an 8-week period (re-assessment) relative to pre-assessment.

A within-subjects design with planned comparisons was used to investigate the research hypotheses. Comparison I examined pre- and post-assessment changes following the individual ($n = 11$), group ($n = 12$) and combined ($n = 12$) interventions. Comparison II examined the maintenance or durability of clinical gains by comparing pre-assessment scores with 3-month follow-up scores for each intervention group.

A series of paired *t*-tests were used for each comparison. Balancing the need to avoid both Type I and Type II errors with the relatively small numbers in each condition, an adjusted alpha of 0.025 was adopted (28). Mixed two-way ANOVAs were not considered feasible due to the small sample size in each group ($n = 10$–11), and the fact that a treatment effect was anticipated for each intervention. Cohen's *d* was calculated for each *t*-test to identify effect size. In addition to the within-subjects comparisons, a between-subjects analysis of clinically meaningful change between pre-assessment and follow-up assessment was conducted using a chi-square test to examine the proportion of individuals with "improvement" (i.e. ≥ 2 points) and "no improvement" (i.e. < 2 points) on the COPM ratings (21).

Pre-assessment and re-assessment data for waiting list control participants

As shown in Table I, the waiting list controls did not demonstrate significant changes on outcome measures between the initial assessment and re-assessment. However, there was a tendency for satisfaction self-ratings on the COPM to improve over the 8-week interval ($p = 0.039$). The PCRS discrepancy scores were generally small, thus indicating that the present sample had relatively accurate awareness of their deficits.

Goal attainment (COPM)

A comparison of goal attainment pre-assessment data (see Table II) between the intervention groups identified no significant differences on performance self-ratings ($F = 1.42$, $p > 0.05$), satisfaction self-ratings ($F = 0.89$, $p > 0.05$), relatives' performance ratings ($F = 0.85$, $p > 0.05$) and relatives' satisfaction ratings ($F = 2.29$, $p > 0.05$).

Table I. *Summary of pre-assessment and re-assessment scores for waiting list controls (WLC n = 17) participants*

Outcome measure	Pre-assessment Mean (SD)	Re-assessment Mean (SD)	*t*	*p*	*d'*
COPM ratings					
Self-performance	4.72 (1.4)	4.84 (1.2)	–0.66	0.515	0.16
Self-satisfaction	4.17 (2.1)	4.83 (1.8)	–2.25	0.039	0.54
Relative-performance	4.69 (1.4)	4.62 (1.5)	0.29	0.773	0.07
Relative-satisfaction	5.47 (1.5)	5.64 (1.6)	0.81	0.432	0.20
PCRS					
Self	106.59 (17.5)	108.53 (15.2)	–0.97	0.345	0.23
Relative	103.06 (18.1)	104.25 (16.0)	–0.64	0.534	0.16
Discrepancy	6.18 (16.5)	6.69 (10.9)	–0.16	0.873	0.04
BICRO-39					
Socialization	35.41 (7.7)	35.65 (7.8)	–0.16	0.874	0.04
Productivity	21.59 (5.8)	22.41 (5.9)	–0.87	0.436	0.21
Psychological	16.41 (5.8)	16.29 (5.8)	0.17	0.864	0.04

BICRO: Brain Injury Community Rehabilitation Outcome Scale; PCRS: Patient Competency Rating Scale; COPM: Canadian Occupational Performance Measure; SD: standard deviation; *d'*: effect size; *t*: t-test.

As shown in Table II, the pre- and post-assessment comparison identified significant improvement on performance self-ratings following the individual and combined interventions, but not the group intervention. However, performance self-ratings significantly improved between pre- and follow-up assessment for each intervention. The proportion of participants with a clinically meaningful change in self-ratings of performance (i.e. difference of ≥ 2 points) between pre- and follow-up assessment was similar (individual = 45%, group = 42%, combined = 42%; $p > 0.05$).

A comparison of satisfaction self-ratings between pre- and post-assessment identified significant improvement following each intervention (see Table II). The pre- and follow-up assessment comparison indicated significant improvement in self-rated satisfaction for the group and combined interventions, but not for the individual intervention. The proportion of participants with clinically meaningful change in satisfaction between pre- and follow-up for the self-ratings was somewhat higher for the combined intervention (58%) than the individual (36%) and group (42%) interventions, although this was not significant ($p > 0.05$).

Relatives' ratings of performance on the COPM are displayed in Table II. The pre- and post-assessment comparison identified significant improvement for the individual and combined interventions, but not the group intervention. However, the pre- and follow-up assessment comparison identified significant improvement for each intervention. According to relatives' ratings of performance, the proportion of participants with a clinically meaningful change between pre- and follow-up assessment was somewhat higher for the individual intervention (50%) than the other 2 interventions (36%) but the difference was not significant statistically ($p > 0.05$).

A comparison of relatives' ratings of satisfaction with performance between pre- and post-assessment (see Table II) indicated significant improvement for the individual and combined interventions, but not for the group intervention. The pre- and follow-up assessment identified significant improvement for the combined intervention, but not for the other interventions. The proportion of participants with a clinically meaningful change between pre- and follow-up assessment of relatives' satisfaction seems to be lower for the group intervention (27%) than the individual (40%) and combined (36%) interventions, but this difference was not statistically different ($p > 0.05$).

Behavioural competency and psychosocial outcome

A comparison of pre-assessment data (see Table III) between the intervention groups identified no significant differences

Table II. *Goal attainment on the Canadian occupational performance measure for each intervention group at pre-, post-, and follow-up assessment*

Canadian Occupational performance measure (ratings /10)	Pre- Mean (SD)	Post- Mean (SD)	Follow-up Mean (SD)	Pre – post comparison *p*-value[a] (*d'*)	Pre – follow-up comparison *p*-value[a] (*d'*)
Self-performance					
Individual	4.08 (1.8)	6.78 (1.7)	6.29 (1.3)	<0.01 (1.20) †	<0.025 (0.99)*
Group	4.68 (1.5)	6.10 (1.0)	6.13 (1.0)	0.029 (0.76)	<0.01 (1.19)†
Combined	5.04 (1.6)	6.98 (1.2)	7.10 (1.3)	<0.01 (1.74)†	<0.01 (1.33)†
Self-satisfaction					
Individual	3.75 (1.8)	7.22 (1.6)	5.89 (1.7)	<0.001 (1.77)‡	0.041 (0.70)
Group	4.51 (1.7)	5.95 (1.6)	6.17 (1.4)	<0.025 (0.80)*	<0.01 (1.36)†
Combined	4.35 (1.9)	7.47 (1.1)	6.86 (1.4)	<0.01 (1.37)†	<0.01 (1.31)†
Relative-performance					
Individual	3.94 (1.7)	6.53 (1.9)	5.90 (1.6)	<0.01 (1.12)†	<0.01 (1.08)†
Group	4.78 (1.6)	5.93 (1.7)	6.43 (1.4)	0.028 (0.76)	<0.01 (1.01)†
Combined	4.37 (1.7)	5.32 (2.2)	5.84 (2.0)	<0.025 (0.96)*	<0.025 (1.02)*
Relative-Satisfaction					
Individual	4.52 (1.4)	6.94 (1.7)	6.49 (1.8)	<0.025 (0.85)*	0.031 (0.73)
Group	5.92 (1.1)	6.52 (1.5)	6.73 (1.3)	0.117 (0.49)	0.027 (0.77)
Combined	4.52 (1.8)	6.28 (1.8)	6.13 (1.9)	<0.01 (1.60)†	<0.025 (0.98)*

[a]Paired *t*-test, *$p < 0.025$, †$p < 0.01$, ‡$p < 0.001$.
d': effect size (Cohen's d).

Table III. *Summary of psychosocial outcomes for each intervention group at pre-, post-, and follow-up assessment*

Outcome measures	Pre- Mean (SD)	Post- Mean (SD)	Follow-up Mean (SD)	Pre – post comparison *p*-value[a] (*d'*)	Pre – follow-up comparison *p*-value[a] (*d'*)
PCRS Self					
Individual	108.8 (16.5)	110.3 (16.8)	114.7 (18.9)	0.482 (0.22)	0.150 (0.42)
Group	112.6 (16.1)	119.1 (12.6)	119.2 (16.2)	<0.025* (0.84)	0.109 (0.61)
Combined	113.8 (20.2)	116.8 (17.8)	118.0 (18.4)	0.463 (0.17)	0.114 (0.56)
Relative					
Individual	100.6 (26.1)	110.5 (22.5)	105.5 (23.0)	<0.025* (0.86)	0.034 (0.79)
Group	109.1 (14.2)	115.7 (17.3)	114.9 (12.7)	0.058 (0.63)	<0.025* (0.84)
Combined	107.7 (18.3)	113.4 (15.8)	119.1 (14.5)	0.782 (0.13)	0.055 (0.61)
BICRO-39 Socialization					
Individual	36.7 (8.5)	36.1 (8.8)	37.3 (9.8)	0.389 (0.27)	0.676 (0.15)
Group	33.4 (9.4)	31.6 (8.9)	32.4 (8.8)	0.370 (0.27)	0.458 (0.21)
Combined	33.7 (7.6)	32.8 (6.1)	33.1 (6.5)	0.197 (0.48)	0.608 (0.18)
Productivity					
Individual	24.9 (3.9)	21.8 (7.2)	24.3 (4.9)	0.493 (0.22)	0.851 (0.07)
Group	22.4 (6.7)	21.7 (6.7)	20.6 (6.4)	0.450 (0.24)	0.261 (0.34)
Combined	21.3 (4.7)	19.8 (4.1)	19.3 (4.0)	0.832 (0.11)	0.466 (0.18)
Psychological					
Individual	16.3 (3.7)	17.6 (4.1)	17.9 (3.6)	0.333 (0.31)	<0.025* (0.91)
Group	16.3 (4.3)	19.6 (5.1)	20.1 (6.1)	<0.01† (1.29)	0.025* (0.81)
Combined	17.1 (7.5)	17.7 (6.1)	19.4 (5.2)	0.687 (0.14)	0.129 (0.46)

[a]paired *t*-test, *$p < 0.025$, †$p < 0.01$.
BICRO: Brain Injury Community Rehabilitation Outcome Scale; PCRS: Patient Competency Rating Scale; *d'*: effect size (Cohen's d).

on relatives' reports of behavioural competency ($F = 0.72$, $p > 0.05$), self-reported behavioural competency ($F = 0.22$, $p > 0.05$), socialization, ($F = 0.91$, $p > 0.05$), productivity ($F = 1.35$, $p > 0.05$) and psychological well-being ($F = 0.05$, $p > 0.05$).

As shown in Table III, there was an overall pattern of greater gains in behavioural competency and psychological well-being for the group and individual interventions compared with the combined intervention. Although improvement on some measures between pre- and post-assessment was not maintained at follow-up, the reverse pattern was also observed, in that gains which were not significant at post-assessment were at follow-up. There was no significant improvement found on the socialization and productivity scales for any intervention.

DISCUSSION

The main aim of the present study was to compare the relative efficacy of individual, group and combined intervention formats for enhancing goal attainment. The first hypothesis, that the combined intervention would be associated with greater gains than the individual and group interventions, was only partially supported. Specifically, improvement in self and relative COPM ratings of performance and satisfaction was observed for the combined and individual interventions between the pre- and post assessment, but not for the group intervention. However, gains in behavioural competency and psychological well-being were found to occur more frequently following the individual and group interventions than after the combined intervention.

In relation to the second hypothesis, the pattern of gains between the pre- and post-assessment and the pre- and follow-up assessment was generally not consistent. Specifically, gains were maintained at follow-up on various measures for different interventions (e.g. COPM ratings for the combined intervention, psychological well-being ratings for the group intervention), but not for others (e.g. self and relative satisfaction ratings on the COPM for the individual intervention). Furthermore, the reverse pattern was also found where gains that were not evident at post-assessment were apparent at follow-up (e.g. performance self-ratings on the COPM for the group intervention). It is important to note that the clinically meaningful change findings (i.e. the between-group analysis) showed no difference between groups on the COPM, which is inconsistent with the within-group analyses. Therefore, the treatment effects of different interventions need to be interpreted cautiously.

Overall, it appears likely that the individual intervention component (i.e. training on specific tasks in home and community settings) particularly influenced the gains in goal attainment between the pre- and post-assessments. However, the individual intervention was not sufficient to maintain changes in self- and relatives' satisfaction with goal attainment. Bearing in mind that the pattern of changes between the pre- and post-assessment and the pre- and follow-up assessment was not consistent, the finding that greater satisfaction with goal attainment was most likely to occur and be maintained following the combined intervention from the perspective of participants and their relatives supports the view that training metacognitive skills in different naturalistic settings promotes more favourable outcomes (6, 7). These participants discussed their goals and strategies with peers and the facilitator in the group and, concomitantly, directly applied strategies in the home and community setting with support from the therapist, who additionally involved relevant social supports. In terms of

clinically meaningful differences, there was a small tendency for more participants in the combined intervention to report increased satisfaction with their performance at follow-up (58%) than improvement in their actual performance (42%). Such individuals may be more satisfied despite a lack of perceived gains in functional performance because the intervention may have led to greater acceptance of disability.

However, despite making progress with their specific goals, participants in the combined intervention did not demonstrate additional gains in behavioural competency and psychological-well-being. Consistent with previous research, such gains were most likely to occur following the group intervention (16). Whilst it is unclear why the combined intervention did not lead to greater gains than the individual and group interventions, it is possible that more generalized gains in behavioural competency and psychological-well-being were promoted by therapy concentrated for a longer period each week in one setting, particularly the group context in which peer support and feedback may have assisted in learning a broader range of strategies beyond personal goal areas (4).

However, significant gains were not observed following any intervention format in the areas of socialization and productivity on the BICRO-39, thus suggesting that the 8-week intervention formats in the present study were not sufficiently intensive to achieve measurable gains in role participation. Such outcomes have been documented following comprehensive and holistic brain injury rehabilitation programmes (10, 12), although, as mentioned previously, such resource-intensive programmes may not be feasible in some rehabilitation settings. A further issue in the present study is that the participants were randomly allocated to intervention formats. Whilst effort was made to the tailor aspects of each intervention according to individual goals, some participants may have preferred alternative intervention formats for achieving their goals. Thus, individuals' suitability and preferences for the individual, group or combined intervention formats could not be accommodated in this controlled study (see 30). The present intervention study is the first known randomized controlled trial to compare brief intervention formats for enhancing goal attainment. Further research is needed to identify clients' suitability to particular intervention formats, thus enabling clinicians to match individuals to interventions that yield optimal outcomes.

Methodological considerations

Various limitations need to be acknowledged in the present study, including the heterogeneity of participants in terms of cause of injury and time since injury. The random allocation procedure aimed to control for the participant characteristics that potentially influence intervention outcomes which, in addition to demographic and injury variables, included concurrent support from other community services (e.g. case managers and psychological support). Whilst a systematic approach was adopted for recruiting participants from a range of community sources and comparing participants with non-participants, the process of self-selection ultimately influences participation in treatment (30). The analysis identified that older individuals were more likely to participate than younger individuals. Additionally, the larger sample (n = 84) from which the present sample was drawn represented a convenience sample, thus potentially affecting the generalizability of findings.

A further sampling issue relates to sample size. Although comparison of 2 interventions instead of 3 would have increased the number of participants in each intervention, the particular aim of this study was to compare the effectiveness of individual, group and combined interventions to identify the relative impact of different components of broader rehabilitation programmes. However, a larger total sample size would have increased power in the analyses.

An additional limitation of the study relates to the lack of blinding of participants, therapists and the independent assessor. Other researchers have identified the inherent difficulties in blinding for psychosocial interventions (17). Whilst the aims and hypotheses of the study were not made known to the participants it could be argued that non-specific therapeutic effects (e.g. positive treatment expectations or a desire to please) were responsible for the observed clinical gains. However, this seems unlikely because, firstly, participants' self-reported behavioural competency typically did not improve. Secondly, some clinical gains were not observed until the 3-month follow-up assessment. Notwithstanding, future research needs to examine the relationship between treatment expectations and intervention outcome.

The re-assessment of waiting list controls indicated that satisfaction self-ratings on the COPM were not stable prior to the intervention. It is possible that satisfaction with performance is a particularly subjective index, influenced by various factors (e.g. mood state or treatment expectations). Therefore, whilst this index remains important in client-centred outcome assessment, the lack of stability prior to an intervention suggests that changes following an intervention need to be interpreted with caution. A more conservative statistical approach, such as an individual reliable change index, may be warranted to identify genuine and reliable improvement (16). Furthermore, an individual reliable change index may be usefully applied to examine clinically meaningful change on the COPM, as opposed to interpreting change using the 2-point difference as a general guide (21).

Finally, measurement of outcome in the present study relied upon self and relative ratings. The use of relative ratings on the COPM may provide useful collateral data concerning significant others' perceptions of treatment effects and their associated satisfaction with such changes. While these indices are integral to client-centred practice, incorporation of more objective performance indicators (e.g. therapist observation of task performance during everyday activities) in relevant goal areas is recommended in future intervention studies.

Overall, the present randomized controlled trial identified that the individual intervention component appeared to contribute particularly to gains in performance in goal-specific areas. The combined intervention was associated with gains in performance and satisfaction with goal attainment that were maintained at follow-up. Gains in behavioural competency and

psychological well-being were more likely to occur, however, after the group and individual interventions compared with the combined intervention. The findings suggest that interventions which incorporate metacognitive and contextual components show potential for facilitating the goal attainment of individuals with ABI living in the community. However, brief intervention formats, such as those investigated in the present study, may not be sufficient to achieve significant gains in role participation (i.e. social function and productivity). Further investigation of brief interventions for individuals with ABI needs to examine the impact of treatment expectations and clients' suitability to particular intervention formats.

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