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Rehabilitation Psychology

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Factors Influencing Self-Selected Mental Health-Related Recovery Goals Poststroke: An Observational Study

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Objective: To assess characteristics of individuals who wanted to address mental health needs during hospital admission for stroke through structured, person-centered goal setting, and to describe the types of mental health-related goals. **Method:** Analysis of aggregated baseline data from a randomized controlled trial (Recovery-focused Community support to Avoid readmissions and improve Participation after Stroke). Trial participants were recruited from 11 Australian hospitals. Within 10 days of stroke admission,

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reasonable request. Mindful that our identities can influence our approach to science (Roberts et al., 2020), the authors wish to provide the reader with information about their backgrounds. With respect to gender, when the article was drafted, seven authors self-identified as women and four authors as men. With respect to race, nine authors self-identified as white, one author as South Asian, and one author self-identified as African.

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Shaun Hancock served as lead for conceptualization, formal analysis, investigation, methodology, and writing—original draft. Jan Cameron served in a supporting role for conceptualization, investigation, and writing—review and editing. Tharshanah Thayabaranathan served in a supporting role for conceptualization, investigation, and writing—review and editing. Rene Stolwyk served in a supporting role for conceptualization, investigation, and writing—review and editing. Natasha A. Lannin served in a supporting role for writing—review and editing. Monique F. Kilkenny served in a supporting role for formal analysis and writing—review and editing. Nadine E. Andrew served in a supporting role for writing—review and editing. Ian Kneebone served in a supporting role for writing—review and editing. Muideen Olaiya served in a supporting role for formal analysis and writing—review and editing. Maree Hackett served in a supporting role for formal analysis and writing—review and editing. Dominique A. Cadilhac served as lead for supervision and served in a supporting role for conceptualization, investigation, and writing—review and editing.

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participants selected two to five recovery goals from five categories (health, mind and body, everyday activities, out-and-about, and health care). Baseline data included demographics, anxiety/depression status, health-related quality of life, unmet needs, and self-efficacy after stroke. Characteristics associated with selecting mental health-related goals were determined using multivariable logistic regressions. **Results:** Among 465 participants (33% female, *Mdn* = 67 years), 50 (11%) selected a mental health-related goal. Content of most mental health-related goals focused on improving mental health (73%) and controlling another lifestyle factor (20%). Selection of mental health-related goals was associated with being under 65 years of age, *OR* = 2.1, 95% confidence interval (CI) = [1.1, 3.9]; history of mental health concerns, *OR* = 4.7, 95% CI = [2.5, 8.9]; elevated symptoms of depression or anxiety, *OR* = 6.6, 95% CI = [3.3, 13.0]; or reporting an unmet mental health need, *OR* = 5.5, 95% CI = [2.7, 10.9]. **Conclusion:** We highlight important characteristics associated with self-selecting mental health-related goals after stroke. Greater understanding of barriers for older individuals and those with elevated symptoms of depression/anxiety setting mental health-related goals is warranted.

Impact and Implications

Aged under 65 years, those with a history of anxiety or depression, those at risk of depression or anxiety after stroke, those experiencing an unmet mental health need, or more unmet needs were associated with selecting mental health-related recovery goals within 10 days of stroke admission. Among those at risk of anxiety or depression after their stroke, patients were less likely to select a mental health-related goal if they had worse self-reported health. Future studies should investigate the reasons why physical recovery takes precedence over psychological recovery.

Keywords: mental health, person-centered care, self-management, eHealth, stroke rehabilitation

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Stroke is a leading cause of disability that imposes a large burden on the survivors (Stark et al., 2021). This burden includes the ongoing risk of recurrent stroke, and reduced physical, cognitive, and mental health, as well as poor quality of life postdischarge (Stark et al., 2021). Many hospital systems attempt to reduce the length of stay following a stroke to reduce the costs and improve acute bed flow (Stroke Foundation, 2023). However, brief hospital stays may result in survivors of stroke and their support people being poorly prepared for the transition to home. Patients have previously voiced a sense of abandonment and concern as part of their transition back into their lives in the community (Ting et al., 2019). During this transition, survivors of stroke often feel they have unmet needs, including wanting to know more about stroke, physical recovery, or where or how to access emotional support (Andrew et al., 2014; Guo et al., 2021; Olaiya et al., 2017).

Emotional adjustment after a stroke is a dynamic and highly individualized process that may lead to a variety of outcomes for patients (Sewell et al., 2025; Taylor et al., 2011). The adjustment period can occur over different time frames for individuals (Taylor et al., 2011). Grief and anxiety are considered a normal part of adjusting to the loss of function and independence (Taylor et al., 2011). However, various mental health difficulties can impact a patient's ability to function or participate in rehabilitation, and reduce their perceived recovery from stroke (Hackett et al., 2014; Nelsone et al., 2023). For this article, we evaluated the presence of mental health difficulties as elevated symptoms of depression or anxiety. Elevated symptoms of depression or anxiety refers to the presence of a large number of self-reported symptoms obtained from validated assessment tools with a rating scale and psychometrically tested cutoff thresholds to guide clinician decisions, such as the Hospital Anxiety Depression Scale (HADS). Elevated symptoms of depression or anxiety can have a variety of impacts post-stroke, including worse recovery (Ahn et al., 2015; Nelsone et al.,

2023), reduced independence in daily activities (Babulal et al., 2015), poorer quality of life, and strained relationships with family and friends (Cumming et al., 2014). Of particular concern, most survivors of stroke have reported unmet mental health needs once they have returned to the community (Andrew et al., 2014; Olaiya et al., 2017). This was defined as the survivor's perceived need for further help or treatment with their mood, or emotional state. In fact, one in two community-dwelling people living with elevated symptoms of depression or anxiety after stroke are not receiving any mental health treatment (Tjokrowijoto, Stolwyk, Ung, Kneebone, et al., 2023). Person-centered goal setting poststroke involves developing an individualized plan to support recovery, and could be used to assist with ongoing mental health recovery needs (Gonçalves-Bradley et al., 2016). Goal setting is recommended in the Australian clinical guidelines for stroke management, and is an effective way of achieving behavioral change, promoting person-centered care, and facilitating better self-management (Rosewilliam et al., 2011; Stroke Foundation, 2024). Person-centered goal setting is a process during which patients (and next-of-kin) are involved in the collective decision making of what, how, and when to manage the medical and emotional aspects of their condition (Rosewilliam et al., 2011). Person-centered goals can cover various areas, including improving physical functioning and mental health, reducing stroke risk factors, and performing usual activities. The most common goals set during rehabilitation after stroke relate to physical functioning (e.g., mobility, self-care, hand function, continence, and basic communication; Levack et al., 2011; Rice et al., 2017). Person-centered goal setting may be beneficial for individuals with elevated symptoms of depression or anxiety by building good therapeutic relationships and making recovery feel more manageable (Jacob et al., 2022). Further, previous research has shown that person-centered goal setting can improve psychological well-being and positive affect in people living with polyarthritis

(Arends et al., 2020), and acquired brain injury (Ownsworth et al., 2008). However, mental health-related recovery goals are unlikely to be chosen or developed by survivors of stroke despite many patients exhibiting elevated symptoms of depression or anxiety poststroke, and discussing this with clinicians (Levack et al., 2011). Further, clinicians have acknowledged that elevated symptoms of depression or anxiety affect patients' engagement in setting personal goals (Leach et al., 2010; Parsons et al., 2018).

The intervention evaluated in the Recover-focused Community support to Avoid readmissions and improve Participation after Stroke (ReCAPS) trial was developed as an innovative self-management support program to address unmet needs that might arise in the first 12 weeks after discharge from hospital. This program has been tested in a pilot randomized controlled trial (RCT), where it was found to be feasible to deliver, and acceptable by people with stroke in providing self-directed support and health information (Cadilhac et al., 2020). The methods for the ReCAPS trial have been reported previously (Cadilhac et al., 2022; Kilkenny et al., 2024). In this substudy, using observational data from the Phase III ReCAPS trial, we specifically examined the characteristics of individuals who chose to address their mental health needs through structured, person-centered goal setting, and described the mental health-related goals that were selected within 10 days of stroke admission. We assessed the association between selecting mental health-related goals and demographic variables (e.g., age, sex), stroke characteristics (e.g., stroke type), and medical history (e.g., history of mental health concerns), consistent with previous studies (Royston et al., 2009; Tjokrowijoto, Stolwyk, Ung, Kilkenny, et al., 2023). We hypothesized that younger patients or prestroke mental health concerns would be more likely to select a mental health-related goal.

Method

Design

This is a cross-sectional analysis of pooled baseline data from the ReCAPS trial. ReCAPS was a prospective, Phase III, multicenter, RCT, with a 1:1 allocation ratio, and blinded assessment of outcomes (Cadilhac et al., 2022), involving a standardized approach to person-centered health and recovery goal setting (Barnden et al., 2022). Participants in the intervention and control groups were assisted by a trained researcher to select two to five meaningful recovery goals that they would like to work on after leaving the hospital. Participants in the intervention group were also provided support to work on the goals with personalized electronic messages sent for a period of 12 weeks via a short messaging system (SMS) or email (Cadilhac et al., 2022). The electronic health messages were tailored to individual goals to support self-management and enhance stroke-related health education (Cadilhac et al., 2018). The trial was registered with the Australian and New Zealand Clinical Trials Registry (ACTRN12618001468213). Monash University Human Research Ethics Committee (MUHREC) approved the trial (Project 16435) which was carried out in accordance with the provisions of the World Medical Association Declaration of Helsinki (World Medical Association, 2022), and conforms to the International Committee of Medical Journal Editors Recommendation for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (ICMJE, 2024). The Strengthening the Reporting of Observational Studies in Epidemiology checklist for cross-sectional

studies was used to report the results (see Table 1 in the online supplemental materials; von Elm et al., 2007). Details of the screening and recruitment flow, and effectiveness of the ReCAPS intervention on unplanned hospital presentation (emergency department/admission), and goal attainment within 90 days of randomization will be reported elsewhere.

Participants

Patients admitted with stroke were approached by hospital clinicians across 11 Australian metropolitan acute-care hospitals and provided sufficient information about the trial to make an informed decision about their willingness to participate. Participants were recruited between September 2019 and December 2023. Participant eligibility required all the following:

- aged ≥ 18 years of age,
- confirmed diagnosis of stroke,
- discharged directly to a home setting from a participating stroke unit within 10–14 days of admission,
- having access to the internet,
- self-identify as using SMS/email technology,
- able to communicate in English,
- having a baseline modified Rankin Scale (mRS) score of 0–4,
- having cognitive capacity to provide consent,
- not enrolled in another clinical trial which would result in contamination for either trial.

Procedures

The procedures for data collection and goal setting were completed in two stages. The first stage was conducted within 10 days of stroke admission at which time baseline health measures were collected. Participants were supported by a trained researcher in identifying two to five goals based on identified areas of health or function they wished to address over 12 weeks. A structured menu (Barnden et al., 2022) helped participants select goals from five broad topics. These topics aligned with the International Classification of Function categories (World Health Organisation, 2001). The broad menu topics included: (a) health and secondary prevention (i.e., improving/controlling stroke risk factors); (b) mind and body (i.e., improving health or body function, such as mental health); (c) everyday activities (i.e., improving the ability to do everyday activities); (d) out and about (i.e., participation in society, such as return to driving/work); and (e) healthcare and support (i.e., access information/support services).

The second stage was conducted 7–14 days after the participant's hospital discharge. A trained researcher contacted the participants and assisted them in converting their goal statements into an objectively quantifiable format using the Specific, Measurable, Action-based, Realistic, and Time-specific (SMART goal) metrics (Barnden et al., 2022). Participants could also discontinue a goal if it was no longer relevant, had already been achieved, or the participant no longer wished to work on it. Participants in the intervention group were invited to add, revise, or replace any of their health recovery goals during the 7–14 days follow-up call.

Mental Health-Related Goals

To describe the type of mental health-related goals developed, we analyzed the goal statements developed in the first (participant-stated

goals) and second stage (SMART goals) of the goal-setting process. A mental health-related goal was defined as any goal from the “feeling less depressed, anxious or angry” panel within the ReCAPS structured menu (which was under the broad topic of mind and body) or any other goal that expressly stated wanting to improve mental health.

Data Collection

Baseline data were collected through research electronic data capture (Harris et al., 2009) by direct self-report of participants or via a trained researcher. Health surveys included medical information (type of stroke, date of admission and discharge, medications at discharge) obtained from their medical records, and self-reported health and sociodemographic details (marital status, educational attainment, living arrangements, past medical history, physical and lifestyle characteristics, use of electronic devices/Apps). Baseline data were collected prior to randomization within the trial. The presence of “mental health symptoms before stroke” was analyzed as those who reported a history of anxiety or depression at any point before the stroke, and/or a consultation with a psychologist/psychiatrist within the past 12 months. Self-reported measures analyzed in this study are listed below. To ensure statistical efficiency and minimize bias, missing data items for the self-reported measures were imputed using the “half rule,” in which the subject’s mode was used to impute the missing values if at least half of the items within that measure were answered (Bell et al., 2016). If $\geq 50\%$ of the items within the measure were missing responses, the measure score was assigned as missing.

Anxiety and Depression

The 14-item HADS is an interviewer or self-completed screening questionnaire that assesses nonphysical symptoms of depression and anxiety (Zigmond & Snaith, 1983). It consists of two subscales; seven items for depression (HADS-D) and seven items for anxiety (HADS-A). Each item is scored from *did not apply to me* = 0, to *applied to me very much* = 3. Subscale scores were categorized as 0–7 *no problems*, 8–21 *elevated symptoms* (Zigmond & Snaith, 1983). Further, a combined two-level score (HADS-A and/or HADS-D) was also calculated using the HADS-A and HADS-D subscales, where “*no problems*” was considered a score 0–7 in the HADS-A and HADS-D, and *elevated symptoms of depression or anxiety* was considered a score of ≥ 8 in the HADS-A and/or HADS-D.

Health-Related Quality of Life

The EuroQol 5D-3L (EQ-5D-3L) uses a three-point ordinal response for participants to indicate their quality of life across five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression (The EuroQol Group, 1990). Each dimension was analyzed separately: *no problems* (a score of 1), *some problems* (2), and *extreme problems* (3). Those indicating some or extreme problems were combined to form one category. The EQ-5D-3L contains a visual analogue scale (EQ-5D-VAS) where participants indicated their overall health state (*worst* = 0 to *best* = 100).

Self-Efficacy After Stroke

The Stroke Self-Efficacy Questionnaire (SSEQ) contains 13 items using an 11-point ordinal scale that measures self-efficacy judgements

in specific domains of functioning and aspects of self-management after stroke (from *no confidence* = 0 to *very confident* = 10; Jones et al., 2008). Higher scores indicate better self-efficacy. A total score for SSEQ was calculated by summation of each item score.

Unmet Needs

The Longer-term Unmet Needs after Stroke (LUNS) is a 22-item screening tool used to identify the longer-term unmet needs of survivors of stroke living at home (LoTS Care LUNS Study Team, 2013). It covers information needs, services, emotional and social consequences, and unaddressed health problems. Each item is a yes/no response, where “yes” indicates an unmet need, while “no” applies to either no need or the need is met. The total number of unmet needs is calculated by summing the number of “yes” responses, therefore a higher score indicates more unmet needs. The mental health-related need was worded “I often feel quite low, angry or worried and would like to find out what help is available.”

Data Analysis

The contents of the mental health-related goal statements in the text format were summarized using Microsoft Excel v16 (Microsoft Corporation, 2019). Descriptive analysis of the goal statements was undertaken to identify common patterns and important categories using a deductive approach (Ritchie et al., 2003).

Quantitative data on participant demographics and clinical characteristics were analyzed using STATA Version 18 (StataCorp, 2023). The following steps were undertaken to identify factors associated with selecting mental health-related goals. First, univariable logistic regression models were conducted for each variable, in each category of demographic variables, stroke characteristics, and medical history. Variables with a p value $< .2$ were selected for inclusion in the multivariable model. To account for potential residual confounding, sex and mRS were included in the multivariable models, regardless of their significance in the univariable model. A staged multivariable logistic regression analysis was then conducted to assess the relative contribution of each category of variables selected from the univariable model. Stage 1 included demographic variables only. In Stage 2, variables related to stroke characteristics were added to demographic variables, while in Stage 3, variables related to medical history were incorporated. Pseudo- R^2 was used to assess whether variables related to stroke characteristics (e.g., stroke type) and medical history (e.g., prestroke mental health concerns) explain a meaningful additional proportion of the variance in the odds of selecting mental health goals, beyond what is accounted for by demographic variables alone. Associations between selecting a mental health goal and self-reported measures at baseline were determined using multivariable logistic regression models, adjusted for key variables (i.e., age, sex, stroke type, disability after stroke, and mental health concerns before the stroke) because of small cell sizes. These analyses were also limited to setting a mental health SMART goal (sensitivity analyses) and to participants with HADS-A or HADS-D ≥ 8 (subgroup analyses). All analyses were undertaken using STATA/SE 15.0 for Windows (StataCorp, College Station, Texas, United States), and p values $\leq .05$ were considered statistically significant.

Transparency and Openness

All data exclusions and manipulations, measures, and statistical analysis software are reported. Materials and analysis code for this study are available upon reasonable request.

Results

Overall, 465 participants recruited from 11 hospitals completed their baseline assessments. Most participants were male (67%), had an ischemic stroke (92%), or lived with someone (71%; Table 1). Twenty-two percent of participants ($n = 104$) reported a mental health concern before the stroke which included one or more of the following: a history of depression ($n = 73$, 16%), a history of anxiety ($n = 63$, 14%), a visit to a psychologist, or psychiatrist within the 12 months before their stroke ($n = 13$, 3%).

At the first goal-setting stage, 50 participants (62% male, 98% ischemic stroke) selected 51 mental health-related goals (Table 2). These goals were mostly related to improving mental health ($n = 37$, 73%), such as feeling less anxious, stressed, or depressed. The second most common type of goal related to wanting to control another lifestyle factor to improve their mental health ($n = 10$, 20%). Ten (20%) participants who identified a mental health-related goal during the first goal-setting stage, no longer wanted to work on their stated goal when the goals were reviewed within 7–14 days of discharge from hospital. Therefore, no mental health-related SMART goal was developed for these participants.

Further, three participants who did not initially identify a mental health-related goal during the first goal-setting stage chose to develop a mental health-related SMART goal during the second goal-setting stage. Therefore, 43 participants developed 44 mental health-related SMART goals. Most of the mental health SMART goals ($n = 30$, 68%) related to self-management techniques to improve mental health, 12 (27%) related to seeking help from a professional (e.g., their general practitioner or a psychologist), and three (7%) related to seeking information to assist with their mental health. The only statistically significant factor associated with not developing a mental health-related participant-stated goal into a SMART goal was a history of high blood pressure (see Table 2 in the online supplemental materials).

The ORs from the univariable analyses for participants selecting a mental health-related goal are presented in Table 1. In the staged logistic regression for participant characteristics (Table 3), demographic factors accounted for 3% of the variance in Model 1 ($\chi^2 = 7.9$, $p = .02$). The addition of stroke characteristics (Model 2) accounted for an additional 1% ($\chi^2 = 12.2$, $p = .02$), and the addition of a history of mental health concerns (Model 3) for a further 7% of the variance ($\chi^2 = 34.4$, $p < .001$). In the full multivariable regression model, those who were aged under 65 years, $OR = 2.1$, 95% confidence interval (CI) = [1.1, 3.9], $p = .02$, and had mental health concerns before the stroke, $OR = 4.7$, 95% CI = [2.5, 8.9], $p < .001$, were more likely to select a mental health-based goal shortly after discharge than their counterparts. No multicollinearity was identified between the variables (condition index = 3.6).

Table 1

Participant Characteristics at Baseline and Factors Associated With Selecting a Mental Health Goal

Variable at baseline	Overall, $N = 465$, n (%) ^a	Mental health goal selected		Univariable odds of selecting a mental health-related goal	
		Yes, $N = 50$, n (%) ^a	No, $N = 415$, n (%) ^a	OR [95% CI]	p
Demographics					
Under 65 years of age	197 (42)	30 (60)	167 (40)	2.2 [1.3, 4.1]	.01
Female	152 (33)	19 (38)	133 (32)	1.3 [0.7, 2.4]	.42
Australian cultural background	332 (71)	34 (68)	298 (72)	0.8 [0.4, 1.6]	.57
Tertiary education	267 (58)	31 (62)	236 (58)	1.2 [0.7, 2.2]	.56
Married/in partnership	320 (69)	33 (66)	287 (70)	0.8 [0.5, 1.6]	.60
Living alone	86 (19)	10 (21)	76 (19)	1.2 [0.5, 2.4]	.72
Never smoked	206 (45)	20 (40)	186 (45)	1.2 [0.7, 2.3]	.47
Engaged in regular exercise	232 (50)	27 (54)	205 (50)	1.2 [0.7, 2.1]	.56
Engage in regular consumption of alcohol	320 (70)	37 (74)	283 (69)	1.3 [0.7, 2.5]	.47
Body mass index, <i>mdn</i> (Q1, Q3)	28 (24, 32)	26 (25, 31)	28 (24, 32)	1.0 [0.9, 1.0]	.36
Stroke characteristics					
Ischemic stroke	431 (93)	49 (98)	382 (92)	0.2 [0.3, 1.8]	.16
Modified Rankin Scale after stroke					
None or no significant disability (0–1)	277 (59)	27 (54)	250 (60)	1.3 [0.7, 2.3]	.41
Slight disability (2)	151 (33)	18 (36)	133 (32)	0.8 [0.5, 1.5]	.57
Moderate to moderately severe disability (3–4)	37 (8)	5 (10)	32 (8)	1.3 [0.5, 3.6]	.57
Medical history					
Acute coronary syndrome	57 (12)	6 (12)	51 (12)	1.0 [0.4, 2.4]	.96
Atrial fibrillation	97 (21)	9 (18)	87 (21)	0.8 [0.4, 1.8]	.62
High blood pressure	282 (61)	25 (50)	257 (62)	0.6 [0.4, 1.1]	.11
Diabetes	78 (17)	6 (12)	72 (17)	0.7 [0.3, 1.6]	.34
High cholesterol	235 (50)	26 (52)	209 (50)	1.1 [0.6, 2.0]	.79
Mental health concerns before stroke ^b	104 (22)	27 (54)	77 (19)	5.2 [2.8, 9.5]	<.001

Note. Bold indicates a significant result. CI = confidence interval; Q1 = Quartile 1; Q3 = Quartile 3.

^aData are summarized as frequency and proportion, except where otherwise indicated. ^bHistory of depression or anxiety at any point before the stroke, and/or consultation with psychologist or psychiatrist in the past 12 months.

Table 2*Categories and Subcategories of Mental Health-Related Recovery Goals Selected by Participants*

Stage	Category	Example	Subcategory
Participant stated goal at baseline (within 10 days of stroke admission)	Improve mental health ($n = 37$)	“To feel less anxious and manage anxiety post stroke.”	Anxiety ($n = 29$) Anger ($n = 8$) Stress ($n = 8$) Depression ($n = 11$) Mood ($n = 1$)
	Control another lifestyle factor to help mental health ($n = 10$)	“To be less anxious by having all medical issues resolved.”	Manage blood pressure ($n = 2$) Manage medical issues ($n = 2$) Manage lifestyle ($n = 1$) Improve sleep ($n = 1$) Improve outlook on life ($n = 1$) Manage social life ($n = 2$) Increase reading ($n = 1$)
	Receive information for mental health ($n = 2$)	“Wants to have information on how to feel less anxious.”	Receive information about reducing anxiety ($n = 1$) Receive information from general practitioner to treat anxiety ($n = 1$)
	Category of goal unclear ($n = 2$)	“Need help to care for myself too.”	
Revised SMART goal at 7–14 days after discharge from hospital	Seek professional help ($n = 12$)	“In 12 weeks, to independently seek professional support for anxiety and have had 3 tele-health visits with a professional at home.”	Neurologist ($n = 1$) Medical professional ($n = 8$) Therapist/psychologist ($n = 2$) Social worker ($n = 1$) Professional help no specified ($n = 1$)
	Employ self-management technique ($n = 30$)	“In 12 weeks, I will not have experienced any low/depressed periods on any day as I will be using the strategies that the social worker has given me and that I have come up with myself when I notice depressed feelings starting, to prepare for it and stop it in its tracks.”	Control emotions (technique not specified) ($n = 14$) Coping strategy ($n = 1$) Body check ($n = 1$) Mindfulness ($n = 4$) Positive self-talk ($n = 1$) Medication ($n = 3$) Social support ($n = 1$) Improve sleep ($n = 2$) Improve outlook on life ($n = 1$) Take control of life ($n = 1$) Reading ($n = 1$) Slow breathing ($n = 1$) Faith ($n = 1$) Techniques to remember daily tasks ($n = 1$)
	Seek information ($n = 3$)	“I need to find out what strategies might work for me as I haven't researched them yet.”	Health information ($n = 2$) Self-management strategies ($n = 1$)

Note. Participant stated goals and SMART goals could fit into more than one category and subcategory. SMART = Specific, Measurable, Action-based, Realistic, and Time-specific.

In the full multivariable regressions assessing the association between selecting a mental health-related goal and each self-reported measure, those who reported elevated symptoms of depression, $OR = 2.9$, 95% $CI = [1.3, 6.7]$, $p = .01$, or anxiety, $OR = 6.0$, 95% $CI = [3.0, 11.8]$, $p < .001$, or either depression or anxiety, $OR = 6.6$, 95% $CI = [3.3, 13.0]$, $p < .001$, reporting an unmet mental health need, $OR = 5.4$, 95% $CI = [2.7, 10.9]$, $p < .001$, or more unmet needs, $OR = 1.1$ per unmet need, 95% $CI = [1.0, 1.2]$, $p = .03$, were associated with selecting a mental health-related goal shortly after discharge (Table 4). Similar results were obtained when we assessed the association between developing a mental health-related SMART goal and self-reported measures (see Table 3 in the online supplemental materials).

Importantly, of the 89 participants who reported elevated symptoms of depression or anxiety, only 30 participants (34%) selected a mental health-related goal shortly after discharge. Further logistic regression analysis was undertaken on this subset of participants to examine how these participants differed in their health status (Table 5). In this

subgroup, reporting better overall health on the EQ-5D-VAS, $OR = 1.4$ per 10 units, 95% $CI = [1.0, 1.8]$, $p = .03$, was associated with selecting a mental health-related goal shortly after discharge.

Discussion

To our knowledge, this is the first study to examine factors associated with nominating goals to address mental health as part of stroke recovery. We used data from a large Phase III trial and found that 20% of participants had elevated symptoms of depression or anxiety at the baseline assessment but only 11% of all participants selected a mental health-related recovery goal to work on within 10 days of stroke admission. The small uptake of mental health-related recovery goals found in the current study is consistent with previous research, which reports that most patient goals relate to physical functioning (Levack et al., 2011; Rice et al., 2017). Improving physical functioning rather than mental functioning is often reported as a focus by survivors of stroke and healthcare professionals during the acute phase of

Table 3*Association Between Participant Characteristics at Baseline and Selecting a Mental Health-Related Goal*

Variable at baseline	Odds of selecting a mental health goal [95% CI]		
	Model 1	Model 2	Model 3
Demographics			
Under 65 years of age	2.3 [1.2, 4.1]	2.3 [1.3, 4.2]	2.1 [1.1, 3.9]
Female	1.3 [0.7, 2.4]	1.3 [0.7, 2.4]	1.0 [0.5, 2.0]
Stroke characteristics			
Hemorrhagic stroke		0.2 [0.03, 1.6]	0.4 [0.05, 2.9]
Slight to moderately severe disability (mRS 2–4)		1.4 [0.7, 2.5]	1.0 [0.6, 2.0]
Medical history			
Mental health concerns before the stroke ^a			4.7 [2.5, 8.9]

Note. Bold indicates a statistically significant result. Model 1 comprised demographic variables ($n = 464$). Model 2 comprised demographic and stroke characteristics ($n = 464$). Model 3 comprised demographic, stroke characteristics and mental health concerns before the stroke ($n = 464$). CI = confidence interval; mRS = modified Rankin Scale.

^a History of depression, anxiety, and/or consultation with psychologist or psychiatrist in the past 12 months.

recovery (Simpson et al., 2018). An additional explanation for the low uptake of mental health-related recovery goals shortly after their stroke is that survivors may not develop concerns about their mental health until after they have returned home, and realized the extent of physical and social limitations (Haddad et al., 2019; Tjokrowijoto et al., 2024).

It is important to determine the optimal timing to address the mental health needs of survivors of stroke. Previous observational research has indicated a high variance in the trajectory of mental health after stroke (Ayis et al., 2016; Liu et al., 2023; Sagen-Vik et al., 2022). A significant proportion of survivors of stroke can develop mental health disorders during the chronic phase of recovery (i.e., more than 3 months poststroke; Ayis et al., 2016). Nelsone et al. (2023) demonstrated that anxiety is common for at least 1 year after stroke, and can lower perceived stroke recovery. As such, screening and managing poststroke mental health should continue for many years (Hackett & Pickles, 2014). Early goal setting after stroke can promote behavior change, self-management, and improve functional outcomes (Rafsten & Sunnerhagen, 2023; Sugavanam et al., 2013). Within the current trial, participants were only able to select goals within 10 days of stroke admission, and develop these goals within the 7–14 day post-hospital procedures. Therefore, participants were unable to select or develop mental health-related recovery goals after this time. While researchers have suggested educating healthcare professionals on how to discuss mental health with their patients, and establishing care pathways for managing patients who have mental health needs (McLean et al., 2019; Worrall-Carter et al., 2012), no clinical trials have been conducted in this area. Investigators may seek to evaluate education strategies for discussing mental health with patients after stroke, and consider if mental health-related recovery goals at different time points after stroke are more appropriate.

Our findings reveal some potentially important self-reported measures associated with patients selecting a mental health-related goal as part of their stroke recovery. Those who reported unmet mental health needs, and more unmet needs generally, were more likely to select a mental health-related recovery goal. These results align with previous research, in which elevated symptoms of depression after stroke have been associated with the occurrence and number of unmet needs (Olaiya et al., 2017; Stokman-Meiland et al., 2022). The inclusion of the Longer-term Unmet Needs Survey within the current trial was, in part, a way to discuss unmet mental health

needs and recovery with patients after stroke. The results of the current study may suggest that prompting patients with a question about mental health unmet needs is a potentially effective strategy for discussing mental health recovery goals. However, the feasibility and efficacy of this approach needs to be examined further.

We also found that among those reporting elevated symptoms of depression or anxiety, participants were less likely to select a mental health-related goal if their self-perceived overall health status on the EQ-5D-VAS was worse. Symptoms of anxiety and depression have been associated with worse overall health in survivors of stroke (Atigossou et al., 2023; Thayabaranathan et al., 2018) and reduced perceived recovery (Matsuzaki et al., 2015; Nelsone et al., 2023). Our findings of an association between participant characteristics and selecting mental health-related goals align with previous research. Younger adults, those with a history of mental health concerns, and those with a history of mental health service use have previously been more likely to seek help for their mental health (Dong et al., 2022; Tjokrowijoto, Stolwyk, Ung, Kilkenny, et al., 2023). Older adults often report more negative attitudes toward mental health treatment, compared to middle-aged adults (Gonzalez et al., 2005; Magaard et al., 2017), especially if they have lower mental health literacy, or negative stigma associated with mental health services and the high costs for treatments (Elshaikh et al., 2023; Reynolds et al., 2020). Patients who have not experienced a mental health disorder before their stroke can report limited awareness and understanding of mental health problems and the availability of support services (Tjokrowijoto et al., 2024). Patients with premorbid mental health disorders are also more likely to be aware of the potential value of seeking help with mental health (Kelleher et al., 2024; Tjokrowijoto et al., 2024). A greater understanding of the barriers to older individuals and those newly experiencing elevated symptoms of depression or anxiety setting mental health-related goals is warranted. Further research into mental health-related goals after stroke is required to guide clinical practice.

Strengths and Limitations

A strength of the study was the large sample of survivors of stroke available from the ReCAPS trial for this substudy. All participants were offered the same goal-setting menu and had the opportunity to set between two and five goals, which included mental health-related

Table 4*Association Between Selecting a Mental Health Goal and Self-Reported Measures at Baseline*

Model	Self-reported measure used as the dependent variable in each model	Overall, <i>N</i> = 465, <i>n</i> (%) ^a	Mental health goal selected		Univariable regression, <i>OR</i> [95% <i>CI</i>]	Multivariable Regression 1, <i>OR</i> [95% <i>CI</i>]	Multivariable Regression 2, <i>OR</i> [95% <i>CI</i>]
			Yes, <i>N</i> = 50, <i>n</i> (%) ^a	No, <i>N</i> = 415, <i>n</i> (%) ^a			
1	Discharge information						
	Medication for mood	77 (16)	16 (32)	61 (15)	2.8 [1.4, 5.2]	2.6 [1.3, 5.2]	1.0 [0.4, 2.2]
2	Anxiety and depression (HADS)						
	Elevated symptoms of depression (HADS-D 8–21)	44 (10)	13 (26)	31 (8)	4.3 [2.1, 9.0]	4.0 [1.8, 8.8]	2.9 [1.3, 6.7]
3	Elevated symptoms of anxiety (HADS-A 8–21)	76 (16)	27 (54)	49 (12)	8.7 [4.6, 16.3]	8.3 [4.3, 16.0]	6.0 [3.0, 11.8]
4	Elevated symptoms of depression or anxiety (HADS-D or HADS-A 8–21)	89 (19)	30 (60)	59 (14)	9.0 [4.8, 16.9]	8.8 [4.5, 17.0]	6.6 [3.3, 13.0]
	Health-related quality of life (EQ-5D-3L)						
5	Problem with mobility	101 (22)	12 (25)	89 (21)	1.2 [0.6, 2.4]	1.1 [0.5, 2.3]	0.8 [0.4, 1.7]
6	Problem with self-care	44 (9)	4 (8)	40 (10)	0.8 [0.3, 2.4]	0.8 [0.3, 2.6]	0.7 [0.2, 2.3]
7	Problem with usual activities	180 (39)	26 (53)	154 (38)	1.9 [1.1, 3.5]	1.8 [0.9, 3.4]	1.7 [0.9, 3.3]
8	Problem with pain/discomfort	133 (29)	17 (35)	116 (28)	1.4 [0.7, 2.6]	1.2 [0.6, 2.4]	1.0 [0.5, 2.0]
9	<i>Mdn</i> VAS score (Q1, Q3)	75 (60, 85)	72.5 (60, 80)	75 (60, 85)	0.9 [0.8, 1.0] ^b	0.9 [0.8, 1.1] ^b	1.0 [0.8, 1.1] ^b
	Self-efficacy after stroke (SSEQ)						
10	<i>Mdn</i> (Q1, Q3)	124 (113, 129)	117 (110, 126)	124 (113, 129)	1.0 [1.0, 1.0]	1.0 [1.0, 1.0]	1.0 [1.0, 1.0]
	Unmet needs (LUNS)						
11	Mental health unmet need	60 (13)	22 (44)	38 (9)	7.8 [4.0, 14.9]	7.1 [3.7, 13.9]	5.5 [2.7, 10.9]
12	Medical checkup unmet need	43 (9)	7 (14)	36 (9)	1.7 [0.7, 4.1]	1.6 [0.7, 3.9]	1.7 [0.7, 4.3]
13	Stroke knowledge unmet need	193 (42)	26 (52)	167 (40)	1.6 [0.9, 2.9]	1.4 [0.8, 2.5]	1.2 [0.6, 2.3]
14	Worry about fall unmet need	56 (12)	10 (20)	46 (11)	2.0 [0.9, 4.3]	2.3 [1.1, 5.1]	1.7 [0.8, 3.9]
15	Personal care unmet need	30 (6)	6 (12)	24 (6)	2.2 [0.9, 5.7]	2.0 [0.8, 5.3]	1.7 [0.6, 4.8]
16	Concentration unmet need	74 (16)	14 (28)	60 (15)	2.3 [1.2, 4.5]	2.1 [1.0, 4.3]	1.8 [0.9, 3.8]
17	Leisure activities unmet need	31 (7)	8 (16)	23 (6)	3.2 [1.4, 7.7]	2.9 [1.2, 7.2]	2.2 [0.8, 5.8]
18	<i>Mdn</i> number of unmet needs (Q1, Q3)	2 (1, 4)	3 (2, 6)	2 (1, 3)	1.2 [1.1, 1.3]	1.2 [1.0, 1.3]	1.1 [1.0, 1.2]
	Goals						
19	<i>Mdn</i> number of patient-stated goals at baseline (Q1, Q3)	4 (3, 5)	4 (3, 5)	4 (3, 5)	1.3 [1.0, 1.7]	1.2 [0.9, 1.6]	1.2 [0.9, 1.6]
20	<i>Mdn</i> number of patient goals developed into SMART goals at 7–14 days after discharge (Q1, Q3)	3 (2, 4)	4 (3, 4)	3 (2, 4)	1.2 [0.95, 1.6]	1.1 [0.9, 1.5]	1.1 [0.9, 1.5]

Note. Bold indicates a statistically significant result. Multivariable Regression 1 was adjusted for age, sex, stroke type, and disability after stroke only. Multivariable Regression 2 was adjusted for age, sex, stroke type, disability after stroke, and mental health concerns before the stroke. HADS = Hospital Anxiety and Depression Scale; EQ-5D-3L = EuroQol-5 dimension-3 level; VAS = Visual Analogue Scale, a higher score indicates better overall health; SSEQ = Stroke Self-Efficacy Questionnaire, higher scores indicate greater levels of self-efficacy; LUNS = Longer-term Unmet Needs Survey; *CI* = confidence interval; Q1 = Quartile 1; Q3 = Quartile 3; SMART = Specific, Measurable, Action-based, Realistic, and Time-specific.

^aData are summarized as frequency and proportion, except where otherwise indicated. ^bPer 10 units.

goals as an option. Further, standardized training and procedures for goal setting were used within the ReCAPS trial, so there was little variation for when or how SMART goal statements were developed. However, recruitment through an RCT may have resulted in selection bias, as those with higher education and health literacy are more likely to participate in trials (Kripalani et al., 2021).

Further limitations also need to be acknowledged. The ReCAPS trial was conducted during the early phase of recovery, when participants may have limited awareness of their disabilities. Therefore, this program may have been introduced too early in the process of adjustment for many participants to consider mental health-related goals (Sansonetti et al., 2024). Reduced self-awareness of impairments (including psychological health) and denial of disability (Orfei et al., 2007) may have influenced patient's willingness to engage in behaviors that might facilitate adjustment (Taylor et al., 2011). However, these concepts were not captured within the present study. Further, the HADS was used to capture and characterize the absence or presence of anxiety or depression symptoms and their association with addressing mental health goals. However, a limitation of our study is that we did not collect measures for other

psychological challenges such as stress, trauma, and substance abuse issues that could potentially influence the self-selection of mental health goals after stroke. Recovery goals that may have provided some mental health benefits but did not specifically mention that the goal was for mental health were not coded as mental health-related recovery goals. For example, goals to increase exercise, use meditation, or improve sleep or diet may mediate mental health. However, these goals were not counted as mental health-related recovery goals unless an intention to control their mental state/emotions when undertaking these activities was specifically stated. As such, the number of goals that could improve mental health may have been underrepresented. Additionally, survivors of stroke with communication difficulties or an inability to speak English were excluded because of constraints of time and budget. Experiencing communication difficulties because of a stroke may limit a persons ability to express their mental health concerns (Taylor et al., 2011). Therefore, if ReCAPS is found to be effective, it will be important to explore the possibility of modifying the program so that more people can receive the potential benefit. Another limitation of this study is that selection of covariates for analysis was informed

Table 5*Association Between Selecting a Mental Health Goal and Self-Reported Measures at Baseline, Among People With Mental Health Symptoms*

Model	Self-reported measure used as the dependent variable in each model	Univariable regression, OR [95% CI]	Multivariable Regression 1, OR [95% CI]	Multivariable Regression 2, OR [95% CI]
1	Discharge information			
	Medication for mood	1.9 [0.7, 4.8]	2.1 [0.8, 5.8]	1.3 [0.4, 3.9]
	Health-related quality of life (EQ-5D-3L)			
2	Problem with mobility	0.8 [0.3, 2.1]	0.8 [0.3, 2.1]	0.5 [0.2, 1.5]
3	Problem with self-care	0.3 [0.1, 1.3]	0.3 [0.1, 1.4]	0.3 [0.1, 1.8]
4	Problem with usual activities	1.0 [0.4, 2.5]	1.1 [0.4, 2.8]	1.0 [0.4, 2.9]
5	Problem with pain/discomfort	0.7 [0.3, 1.7]	0.7 [0.3, 1.8]	0.6 [0.2, 1.5]
6	Visual Analogue Scale	1.3 [1.0, 1.6]^a	1.3 [1.0, 1.6] ^a	1.4 [1.0, 1.8]^a
	Self-efficacy after stroke (SSEQ)			
7	Total score	1.0 [1.0, 1.1]	1.0 [1.0, 1.1]	1.0 [1.0, 1.1]
	Unmet needs (LUNS)			
8	Mental health needs item	2.0 [0.8, 4.9]	2.0 [0.8, 5.2]	1.3 [0.5, 3.5]
9	Medical checkup unmet need	1.0 [0.3, 3.7]	1.0 [0.3, 3.6]	1.0 [0.2, 3.8]
10	Stroke knowledge unmet need	0.9 [0.4, 2.1]	0.8 [0.3, 2.0]	0.6 [0.2, 1.6]
11	Worry about fall unmet need	1.0 [0.4, 2.7]	1.1 [0.4, 3.1]	0.8 [0.3, 2.3]
12	Personal care unmet need	1.8 [0.5, 6.6]	1.7 [0.5, 6.6]	1.4 [0.3, 5.8]
13	Concentration unmet need	0.8 [0.3, 2.2]	0.8 [0.3, 2.1]	0.5 [0.2, 1.7]
14	Leisure activities unmet need	1.7 [0.6, 5.1]	1.8 [0.6, 5.9]	1.5 [0.4, 5.0]
15	Number of unmet needs	1.0 [0.9, 1.2]	1.0 [0.9, 1.2]	1.0 [0.9, 1.1]
	Goals			
16	Number of patient-stated goals at baseline	1.1 [0.7, 1.7]	1.1 [0.7, 1.7]	1.2 [0.8, 1.8]
17	Number of patient goals developed at randomization	1.1 [0.7, 1.6]	1.1 [0.7, 1.6]	1.2 [0.7, 1.9]

Note. Bold indicates a statistically significant result. Multivariable Regression 1 was adjusted for age, sex, stroke type, and stroke severity only. Multivariable Regression 2 was adjusted for age, sex, stroke type, disability after stroke, and mental health concerns before the stroke. EQ-5D-3L = EuroQol-5 dimension-3 level; VAS = Visual Analog Scale, a higher score indicates better overall health; SSEQ = Stroke Self-Efficacy Questionnaire, higher scores indicate greater levels of self-efficacy; LUNS = Longer-term Unmet Needs Survey.

^aPer 10 units.

by prior studies rather than by a theoretical framework. Finally, our findings were based on patients admitted to Australian metropolitan hospitals and may not be generalizable to other settings.

Conclusion

Few participants selected a mental health-related recovery goal to work on after their stroke. Further investigation on the reasons why physical recovery takes precedence over psychological recovery is warranted. Being aged under 65 years, having a history of mental health concerns, elevated symptoms of depression or anxiety after stroke, and reporting unmet needs are associated with selecting mental health-related goals to focus on during stroke recovery. Future studies should investigate these enablers, which may inform practical ways to support individuals in setting mental health-related recovery goals.

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