
A Follow-up Study of Psychological Problems After Stroke

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Purpose: Psychological problems are common complications following stroke and have an impact on all aspects of recovery. This article investigates levels of psychological distress in patients during hospital admission and after discharge into the community. Early detection and review of poststroke psychological problems may optimize recovery from stroke as recommended in the national stroke guideline. Currently, there are very few follow-up investigations on poststroke mood disorders available that could inform clinical practice. **Method:** Psychological symptoms were defined as poststroke anxiety and depression and were measured using the Hospital Anxiety and Depression Scale (HADS). Revised cutoff scores for this clinical group were applied. Seventy-seven stroke patients were assessed in the hospital. Forty-two patients from this sample were reassessed after their discharge into the community. **Results:** Patients in the hospital sample presented with mean anxiety and depression scores above the recommended cutoff for stroke. Far more than 50% of male and female patients presented with heightened psychological distress. Psychological symptoms were slightly less intense and less frequent in the follow-up after discharge sample. The differences between the HADS outcomes of hospitalized and community patients were nonsignificant but remained beyond cutoff for more than 50% of follow-up patients. **Conclusion:** The study highlights the importance of mood assessments for all stroke patients. The percentage of patients with residual psychological problems was lower than that reported in the literature. However, it is highly recommended for those patients with chronic poststroke psychological distress to have access to specialist psychological interventions. **Key words:** rehabilitation, follow-up, poststroke mood disorders, psychological assessments, psychological distress, psychological interventions, stroke

According to the Stroke Association, about 150,000 people in the United Kingdom have a stroke each year.¹ This equates to 1.5% to 2.1% of the total population.^{2,3} Improvements in acute and postacute stroke rehabilitation in Britain may increase the survival rate and the level of functional recovery in stroke patients. This means there will be a higher percentage of patients who experience chronic poststroke difficulties and disabilities. Depression is a common psychological disturbance that can develop almost immediately following stroke.⁴ Poststroke depression is highly associated with poor cognitive abilities, dysphasia, low-level participation in daily activities, and social isolation.⁵ The higher percentage of stroke survivors with chronic problems increases the risk for poststroke depression in this population.⁶

Rates of poststroke depression differ greatly in the literature. The incidence can range from fewer than 10% to up to 50% of stroke patients in the acute period (within 3 months).⁷ Overall, the range can span from as low as 5%⁸ to 63%.⁹ Robinson¹⁰ states that 19.3% of hospitalized stroke patients and 23% of outpatients present with poststroke depression. Such wide disparities in percentages could be associated with discrepancies in the definition

of poststroke mood disorders and depression in particular, the type of assessment method used, the applied cutoffs, and the time at which the assessments are administered. Fluctuations in the occurrence of poststroke depression indicate a peak of symptoms at about 2 to 6 months (46% of patients) post stroke and fewer new symptoms a year post stroke (12% of patients).¹¹

Anxiety following stroke is under-represented in the literature. However, such disorders are common psychological problems with reported rates in the range of 14% to 21%.¹²⁻¹⁵ Poststroke anxiety is associated with reduced engagement in activities of daily living, and comorbid depression symptoms result in poorer physical and social outcomes.¹⁶

Psychological conditions not only increase stroke patients' suffering in addition to their mobility, communication, and cognitive impairments, but also affect caregiver burden and add to health and social care costs.¹⁷

The clinical guidelines for stroke care in the United Kingdom^{16,18-20} highlight the importance of assessing and monitoring the psychological distress of all stroke patients as soon as they are admitted to a specialist stroke unit. Detecting mood symptoms as early as possible will improve functioning in the long-term and prevent secondary consequences regarding health and psychological well-being.

The literature provides extensive research into poststroke mood disorders, their genesis, causes, consequences, and associations with psychological symptoms and organic stroke causality.²¹ However, there are few studies that investigate early onset of depression either in hospital samples or in long-term follow-up studies.^{4,22} The current study aimed to investigate psychological symptoms in a hospital sample and changes to the symptoms after the discharge of patients into the community. Seventy-seven hospitalized stroke patients were assessed during their acute hospital admission for experienced level of psychological distress using an agreed method as part of the stroke rehabilitation program. Forty-two patients from this baseline sample were followed up after discharge from hospital to investigate changes in their psychological distress compared to baseline.

Method

The research protocol was accepted by the Southampton and South West Hampshire Research Ethics Committee and by Dorset Healthcare NHS Foundation Trusts' research and development department. All patients consented to participating in the study.

Subjects and setting

This study was carried out in a specialized hospital stroke unit. Participants were selected from a group of stroke survivors who underwent the hospital's stroke rehabilitation program. The assessments required for the study were an integral part of their program. The authors benefitted from the clinical records and outcomes that were collected in line with routine rehabilitation practice, mainly concerning preliminary mood and cognitive screening procedures as described below.

The Poole Stroke Unit operates a mood screening pathway to detect signs of mood disturbances as early as possible following admission of patients to the unit.²² This procedure was implemented in response to the requirement to administer mood assessments to every stroke survivor by the national guidelines for stroke mentioned previously. It consists of several stages of mood screenings for all patients immediately after admission to the stroke unit. These procedures, described elsewhere,²³ allow the identification of patients with specific psychological needs. The patients subsequently undergo further mood assessments that include the administration of the Hospital Anxiety and Depression Scale (HADS).²⁴ This takes place within 2 weeks following admission to the stroke unit.

Following these preliminary mood screening procedures,²³ 77 stroke patients (out of 444 admissions in 2009) required further formal assessments using the HADS during their hospital stay. This equated to 17.3% of all admitted patients with primary diagnosis of strokes during this time period.

Inclusion criteria

Patients were eligible to become participants in the study if they fulfilled the following criteria:

- Received diagnosis of a stroke
- Were medically stable
- Were able to sustain attention for 15 minutes
- Did not present with global aphasia
- Completed preliminary mood screening according to the unit's mood pathway
- Had minimum cognitive abilities that enabled them to comprehend and respond to the questions concerning their psychological well-being

Assessments of basic cognitive abilities were part of the stroke program and were carried out by occupational therapists. We then used these clinical findings to decide patients' suitability for this study.

The baseline hospital sample consisted of all patients who underwent a mood screening with the HADS while participating in the hospital-based rehabilitation (N = 77); 39 patients of the sample were male and 38 were female. The age range was from 30 to 95 years. Participants presented with 13 different types of stroke (see **Table 1**).

Table 1. HADS scores of males and females in hospital sample at Time 1

Hospital sample	Mean	SD	Range of scores	% of participants above cutoff
Males (n = 39)				
Depression	7.21	5.61	0–20	56.41%
Anxiety	6.77	4.94	0–18	64.10%
HADS total	13.95	9.82	2–36	–
Females (n = 38)				
Depression	6.76	4.81	0–18	63.15%
Anxiety	7.26	4.43	0–17	71.00%
HADS total	14.38	8.33	3–35	–

Note: HADS = Hospital Anxiety and Depression Scale.

The follow-up after discharge sample was formed by contacting the 77 baseline participants; 42 of those were available for the reassessment. The follow-up sample included 23 males and 19 females. Their age range was from 30 to 95 years. The setting and administration of the questionnaire at follow-up was adjusted according to participants' mobility, health, and social needs. Data collection took place in the outpatient clinic (n = 11) and in participants' homes (n = 3). The questionnaire was administered over the telephone in 22 cases. Six participants preferred to complete the questionnaire on their own and returned it by mail. Out of the 35 patients who were unavailable to participate, 14 had died, 10 had refused, 2 were unable to participate due to sensory and cognitive impairments, and 9 were not able to be contacted.

Follow-up assessments were carried out in the first half of May 2010, which meant different time intervals for participants since the baseline assessments during their hospital admission in 2009. The average length of hospital stay was 3 weeks. Since the baseline assessment, 6 to 11 months had passed for 21 participants and 12 to 16 months had elapsed for 20 participants (missing data in one case).

Instrument

The HADS is a self-report questionnaire for the assessment of anxiety and depression symptoms. The questionnaire comprises an anxiety and a depression subscale. Patients are required to rate their emotions according to how they felt during the previous week. The HADS has been evaluated for the assessment of psychological symptoms in stroke patients. Johnson²⁵ suggested cutoff scores

of 5 or 6 for anxiety and depression. More recently, Sagen et al²⁶ recommended a score of 4 as the most appropriate cutoff for both scales due to sensitivity and specificity values. For this reason, we use the cutoff points suggested by Sagen.²⁶

The HADS was administered as a facilitated interview to support patients with communication and cognitive impairments to take part in the assessment. A similar procedure was applied by other researchers.^{27–29} The questionnaire was enlarged to one item per page, and the interviewer pointed to the answer options while reading them aloud. This form of questionnaire use was previously applied by Haslam et al.²⁸ Clinical assessments undertaken by occupational therapists and speech and language therapists were used to get a global impression of patients' abilities to understand questions and respond to them. Patients with reduced communication or cognitive abilities indicated their answer nonverbally (eg, nodding) or with minimal verbal output (eg, yes/no responses, grunting). Questionnaire administrators (the authors) agreed on a reliable administration and interpretation of patients' responses. Facilitated interviews were conducted face-to-face with all patients during the hospital admission. Questionnaires were administered as face-to-face or telephone interviews at follow-up, except in the cases where patients returned the questionnaires in the mail.

Statistical procedures

The baseline hospital sample was analyzed using frequency analysis to describe stroke types and levels of psychological disturbances. The independent sample *t* test was used to analyze HADS scores

between the genders. HADS scores of the baseline-only subgroup and the follow-up after discharge group at the baseline assessment were analyzed using the independent sample *t* test. The Wilcoxon-Mann-Whitney test was applied to investigate differences between age groups (age variable was not normally distributed), and the Pearson chi-square test was applied for gender differences.

The HADS outcomes of the follow-up after discharge group underwent paired *t* test analysis to compare scores during hospital admission with scores achieved in the community. Descriptive statistics were applied to look at the frequencies of patients' anxiety and depression scores.

Results

Psychological symptoms in hospital sample (Time 1)

The assessments during hospital admission revealed increased anxiety and depression in participants beyond the cutoff for stroke. The mean for anxiety was 7.01 (*SD* 4.7; range, 0 to 18) and the mean for depression was 6.99 (*SD* 5.2; range, 0 to 20). The HADS total mean score was 14.16 (*SD* 9.06; range, 2 to 36). Frequency analysis indicated that 52 patients (67.5%) were above the cutoff for anxiety and 46 patients (59.7%) were above cutoff for depression for stroke patients. There were no

significant differences between scores of males and females on the anxiety ($P = .64$) and depression scales ($P = .71$) in the hospital sample (**Table 1**).

Stroke types and HADS scores of the hospital sample are presented as descriptives for illustration purposes (**Table 2**). The large number of stroke types and small number of participants prevent the use of statistical tests to investigate associations between stroke types and levels of psychological distress. Most participants, regardless of stroke types, had mean HADS scores ranging between 5 and 22.5.

The hospital sample was divided into the group of participants who underwent assessment only during the hospital stay (and subsequently dropped out of the follow-up study) and the group of participants who attended hospital assessment and follow-up (**Table 3**). Patients who participated only at baseline had a HADS mean baseline score of 15.90. Patients who participated at both assessments had a HADS mean baseline score of 12.95. The HADS total scores of both subgroups showed no significant differences ($P = .19$). The subscale results for anxiety and depression show the same pattern of raised scores in the hospital sample compared to the follow-up after discharge sample, but the differences lack statistical significance. Both subgroups were homogenous regarding age ($P = .08$) and sex ($P = .43$).

Table 2. Type of stroke and HADS outcomes in hospital sample^a

Stroke type	N	Depression	Anxiety	HADS total
		Mean (SD)	Mean (SD)	Mean (SD)
Left frontal	6	7.7 (6.4)	11.3 (5.8)	19.0 (12.0)
Right frontal	6	6.7 (7.2)	5.5 (5.4)	11.2 (12.5)
Left middle cerebral artery	6	6.5 (6.0)	8 (4.6)	14.5 (9.8)
Right middle cerebral artery	8	7.1 (3.8)	6.5 (3.5)	13.6 (6.4)
Cerebellum	7	7.1 (4.9)	5.1(4.4)	12.3 (7.3)
Left parietal	3	7.3 (3.5)	5.3 (2.5)	12.7 (6.0)
Right parietal and fronto-parietal	5	8.2 (5.7)	7.0 (5.7)	15.2 (11.2)
Basal ganglia, basal ganglia and thalamic, thalamic	7	6.9 (4.8)	8.6 (5.4)	15.4 (9.7)
Brain stem, brain stem and cerebellum	3	4.7 (5.7)	6.3 (7.5)	11.0 (13.1)
Left posterior	1	0.0	6.0	6.0
Right posterior	1	3.0	6.0	9.0
Haemorrhages	9	8.6 (5.2)	6.6 (4.4)	17.1 (7.6)
Unspecified type	13	8.0 (5.7)	7.2 (4.6)	15.23 (9.4)

Note: HADS = Hospital Anxiety and Depression Scale.

^aN=75; missing data, n=2.

Table 3. Comparison at Time 1^a between hospital sample and follow-up after discharge sample

Time 1	Sample	n	Mean	SD
Depression	Follow-up after discharge	42	6.17	4.77
	Hospital	35	7.97	5.58
Anxiety	Follow-up after discharge	42	6.79	4.65
	Hospital	35	7.29	4.75
HADS total	Follow-up after discharge	42	12.95	8.84
	Hospital	35	15.90	9.23

Note: HADS = Hospital Anxiety and Depression Scale.

^aAssessment during hospital admission.

Psychological symptoms in sample followed-up after discharge (Time 2)

Anxiety and depression mean scores in the follow-up after discharge sample into the community ($n = 42$) were lower at Time 2 compared to Time 1 (Table 4). This difference was nonsignificant (anxiety, $P = .065$; depression, $P = .364$).

Frequency analysis showed that 22 participants (52.38%) of the follow-up after discharge sample presented with above cutoff depression scores at Time 1 compared to 23 participants (54.76%) at Time 2. Twenty-seven participants (64.28%) had above cutoff scores on the anxiety scale at Time 1 compared to 22 participants (52.38%) at Time 2. Sixteen participants (38.10%) reported increased depression symptoms and 21 participants (50%) experienced decreased depression at follow-up. Five participants (11.90%) reported unchanged levels of depression symptoms either at or below cutoff. An increase of anxiety symptoms was reported by 14 participants (33.3%) and a decrease was reported by 28 participants (66.70%) (Table 5).

Discussion

The outcomes of this study demonstrate that an identified subgroup of stroke survivors presented with depression and anxiety scores above the HADS cutoff for stroke survivors in the acute hospital phase and in the community. This is in line with literature findings that emphasize substantial psychological distress, mainly depression, in association with stroke.^{4,21,22}

Seventy-seven out of 444 stroke patients were identified as apparently suffering from psychological distress and were consequently referred for standardized mood assessments according to the mood assessment pathway applied in this stroke rehabilitation unit. This relatively small number of patients who presented with severe depression and anxiety led the unit to an optimistic view of their program. The stroke unit has been applying a number of psychological initiatives that are believed to enable the treatment team to detect mood disturbances at a very early stage and to offer immediate support. These initiatives include the implementation of

Table 4. HADS outcomes in the follow-up after discharge sample ($n = 42$) at Time 1 and Time 2

Outcomes	Mean (SD)	P*	Range of scores	% of participants above cutoff
Baseline depression	6.17 (4.77)		0–16	52.38%
Follow-up depression	5.36 (4.08)	.364	0–18	54.76%
Baseline anxiety	6.79 (4.65)		8–18	64.28%
Follow-up anxiety	5.12 (3.78)	.065	0–17	52.38%
Baseline HADS total	12.95 (8.84)		2–33	–
Follow-up HADS total	10.48 (6.73)	.151	0–29	–

Note: Score differences between Time 1 and 2 were normally distributed.

HADS = Hospital Anxiety and Depression Scale.

*Paired t test, 2-tailed.

Table 5. Increase and decrease of HADS scores in the follow-up sample

HADS	Change in score	n	% of participants
Depression	Increase	16	38.1
	Decrease	21	50.0
	No change	5	11.9
Anxiety	Increase	14	33.3
	Decrease	28	66.7
	No change	0	0.0
Total	Increase	17	40.5
	Decrease	23	54.8
	No change	2	4.8

Note: HADS = Hospital Anxiety and Depression Scale.

a psychological care approach,³⁰ psychosocial groups,^{31,32} and the multidisciplinary mood assessment pathway.²³ All study participants were included in these interventions as part of their rehabilitation program. However, it remains to be seen whether these projects are effective in preventing poststroke psychological problems; due to the complexity of variables, this might be difficult to prove.

In contrast to the majority of stroke survivors admitted to this unit who coped with the psychological aftermath of the stroke, there was an identified group with a high level of psychological problems. Poststroke psychological problems pose substantial risks for patients, because they influence their rehabilitation potential, mood and compliance, cognitive and functional recovery, and social integration.²¹ From a service provision point of view, mood disturbances may also extend the hospital stay, which puts considerable stress on health funding.

Over half of the participants in the hospital sample presented with 2 to 3 score points above the recommended cutoff on the anxiety and depression subscales. The hospital sample presented with higher scores compared to the subgroup of patients who continued to participate at follow-up. Although the difference was statistically nonsignificant, it is a generally known fact that lower mood contributes to increased morbidity and mortality, not only in stroke survivors but also in the general population.^{21,33,34} The sample size in this study does not allow such conclusions; however, it could be hypothesized that the patients with higher psychological distress during hospital admission

were either those who had died or were unable to participate in the follow-up procedures due to poor health or deteriorated cognitive status. On the other hand, it could be that patients with more optimistic psychological constitutions were better motivated to participate in the follow-up study.³⁵ Such subjective criteria are difficult to control for, but objectively both subgroups appeared homogenous. Female gender has shown to be a risk factor for poststroke depression in some research,³⁶ but not in others³⁷; this study found no differences in mood between the gender groups.

The analysis showed that more participants reported a reduction of anxiety and depression symptoms than an increase. This is in line with findings by Zavoreo et al.¹¹ Mean scores of the follow-up after discharge sample were slightly reduced at follow-up, which might be important in a clinical sense for some individuals. Reasons for marginally decreased psychological symptoms might be that patients were comforted by being in a home environment or that the memory of the stroke had lost its critical emotional intensity and patients had adjusted more naturally. Robinson²¹ also reported studies demonstrating lower rates of poststroke mood disorders in the community. Nevertheless, at least one-third of follow-up after discharge patients reported an increase in anxiety and depression levels in comparison to their initial results. More than 50% of the follow-up after discharge patients experienced distress, that is, showed scores above the cutoff as an indication of possible psychological disorders. Stroke-specific psychological treatments were not available for them in this local community.

It appears critical that patients with ongoing psychological problems months after their stroke gain the attention of health care professionals, in particular clinical psychologists. These professional groups need to offer stroke-specific psychological interventions to optimize patients' coping and adjustment and to maintain their general health and functional recovery.

The study results furthermore demonstrate how this stroke rehabilitation unit implemented government guidelines on poststroke mood assessments into clinical practice. The stroke unit can now use the data practically to focus on those patients who require standardized psychological assessments beyond initial mood screenings. The outcomes can be made available for clinical discussions on severity of distress, for the interpretation of psychological problems, and for determining treatment and intervention.

Limitations of this study can be found in areas affecting the methodology. First, due to practical considerations, it was necessary to conduct the study within a structured time frame. This resulted in different follow-up intervals. Although there are no universal time frames for adjustment following a major health problem, a follow-up of 6 months versus a year may have made a difference for some participants. Second, follow-up participants were assessed under different conditions in comparison to the hospital sample. Questionnaire administration procedures had to be adjusted to suit participants' mobility, transport, health, and social requirements. Consequently, not all follow-up patients were reassessed under the same conditions. However, the HADS has good psychometric properties, especially reliability; therefore, the administration of the questionnaire in this manner was considered acceptable. Third, the HADS was administered as a facilitated interview at baseline and in all but 6 cases at follow-up. Such diversion from the common questionnaire administration that requires the examinee to complete the questionnaire independently was only reported in studies mentioned previously.^{28,29} It has become normal practice in some elderly care settings to use the enlarged version.²⁸ This kind of administration has, to our knowledge, not been evaluated elsewhere. It is possible that participants were distracted by the examiner's

facilitation, and this might have distorted their responses. Nevertheless, the examiners considered the choice of instrument and administration practical and useful to help patients with limited cognition and communication. Fourth, only stroke survivors who were assessed during the hospital admission were included in the follow-up group. Consequently, patients who had not demonstrated psychological distress during their inpatient phase were excluded; it was not investigated whether they developed psychological difficulties at a later stage. Last, due to the small sample size, it was not possible to analyze changes in psychological distress in subgroups (eg, sex and age differences, stroke types). It was not possible to control for a number of variables due to the small sample size and setting factors, including psychological history, social integration, cognitive status, mobility, health, and medication.

Despite the above limitations, one can conclude from the study's outcomes that it is important to monitor psychological distress at all stages following stroke. The UK guidelines for stroke rehabilitation need to be applied in a meaningful way considering how psychological problems – especially anxiety and depression following stroke – impact physical and functional recovery long after hospital discharge. Therefore, signs of distress even in a minority of stroke survivors require posthospital treatment either as part of functional rehabilitation or in the form of focused psychological interventions to optimize adjustments to poststroke physical and communication impairments and enhance psychological well-being.

Conclusion

Psychological distress is a common feature following stroke. Symptoms of anxiety and depression occur as early as 2 weeks following stroke and persist many months following discharge from intensive hospital treatments. This study found only a small percentage of stroke survivors selected from all admissions to a local stroke rehabilitation unit to be experiencing psychological distress. Nevertheless, not only the number of people presenting with such symptoms but also the reasons for experiencing psychological problems and the way of expressing

the distress require professional attention. Mental health and physical health risks can escalate into complex conditions. Even if only a few people are severely affected, it is vital to have systems to alert to these cases. Effective treatments then can be implemented for stroke survivors so that they can receive relief from their distress without further complications or risks.

Consequently, effective and validated mood assessment procedures are essential to reliably identify all patients who might experience high levels of psychological distress following a stroke. Government standards provide helpful guidance; however, from a clinical perspective, it is important to give all patients access to psychological assessments and, if required, treatments across all stages in the rehabilitation process.

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