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Title: An evaluation of discharge documentation after hospitalization for stroke patients discharged home in Australia – A cross sectional pilot study.

Short running title: Stroke patients discharged home

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Abstract

The purpose of this cross sectional study was to evaluate the quality of discharge documentation for stroke patients discharged home. Participants were stroke patients discharged from a regional tertiary acute and rehabilitation hospital in Australia from 2014 to 2015. Compliance with expected discharge documentation and its relationship with readmission was measured using an audit instrument for stroke patients (n = 54), and a post discharge survey of carers was conducted. There were deficits in the documentation of the mechanism of stroke (70%), functional assessments (58%), pending test results (39%), types of support services required after discharge (35%) and patient/carer meetings with the multidisciplinary stroke team (20%). Readmission was associated with lower compliance scores for information provided to patients or their carer. Survey results suggest that carer burden is high for carers of stroke patients discharged home. Documentation of carer/family meetings with the stroke team, functional assessments, medications, and adequate support services needs to be improved. General practitioners and carers need this information, so they can address post discharge needs of these vulnerable patients.

Key words

Stroke, Transitional Care, Discharge, Continuity of Care, Carers.

INTRODUCTION

An increasing number of stroke patients are being discharged home rather than to a facility, due to advances in treatment approaches and response times and associated reductions in

residual disability. There is a high risk for discontinuity in the transition between acute and primary care and potential for serious consequences including post discharge adverse events (Forster *et al.*, 2003; National Lead Clinicians Group, 2012) and possible readmission to hospital (Alper *et al.*, 2015; Cummings *et al.*, 2010). Stroke survivors have a higher risk for discontinuity because they often have residual cognitive and functional disability, and consequently they are less able to compensate for failures in discharge planning and delivery of post discharge services.

Literature Review

Planning and preparation for discharge is focused on making arrangements for the patient to continue to receive required services after discharge, and on providing adequate information and communication to the patient, their carer and the health professionals who are responsible for following up the patient after discharge . Unfortunately, this is not always achieved (Gandara *et al.*, 2009; Johnson *et al.*, 2012; Kripalani *et al.*, 2007).

A review of 73 studies on communication and information transfer between hospital and primary care physicians identified that availability of a discharge summary at the first post discharge visit was 12-34% (Kripalani *et al.*, 2007) and the quality of documentation on discharge summaries has been reported to be poor (Gandara *et al.*, 2009; Johnson *et al.*, 2012; Kripalani *et al.*, 2007). Inadequate discharge documentation gives rise to misinformation, duplication of tests or interventions, delayed or failed referrals, discontinuity of care, adverse medication events and potentially, patient harm (Cummings *et al.*, 2010; Groene *et al.*, 2012). A systematic review of 18 studies reported that increased provider continuity of care is associated with improved patient outcomes and satisfaction (van Walraven *et al.*, 2010).

Risks associated with discontinuity of care at the time of discharge include missed pending test results (Alper *et al.*, 2015; Roy *et al.*, 2005); and unresolved medical issues that

require diagnostic workups, referrals and laboratory tests after discharge (Moore *et al.*, 2007). A recent study of older veterans discharged from the emergency department (n=305) reported that many did not understand their expected course of illness, or contingency plan, or how soon they should follow up with their primary care provider (Hastings *et al.*, 2012).

Stroke patients may be more vulnerable to poor outcomes (Levine *et al.*, 2015) in the absence of adequate follow up to provide assistance for functional and cognitive deficits, and appropriate support services (National Stroke Foundation, 2010). These patients often need to continue with rehabilitation programs and attend other post discharge services, however if they are delayed, or the patients have difficulty accessing them, their recovery may be adversely affected. Carer stress may also occur after a stroke patient is discharged home, and carers begin to understand how much support is required and attempt to adjust to changes in their role and responsibilities (Ghazzawi *et al.*, 2016; King *et al.*, 2010).

At the time of discharge, stroke patients and their carers need to clearly understand their medication regimen because patients may have difficulty remembering to take medications, recent medication changes and the risks associated with their medications. They may also have difficulty opening medication packaging, measuring dosages and attending appointments to have blood tests (such as International Normalized Ratio testing to monitor warfarin therapy) due to residual functional deficits. A recent study of medication reconciliation for patients over 64 years of age discharged home reported that 70% of patients did not understand new dosing at discharge (Ziaieian *et al.*, 2012). In addition, they may use non-prescription agents that may be contraindicated, or reduce the therapeutic action of their prescription medication.

Study Purpose

The purpose of this pilot study was to evaluate transitional care for stroke patients discharged home, using expected discharge criteria, and compare results between an acute care and a rehabilitation hospital, and determine relationships between compliance scores and readmission. Expected discharge criteria were derived from clinical care standards (Australian Commission on Safety and Quality in Health Care, 2015; National Stroke Foundation, 2010).

METHODS

Study Design

This was a cross sectional study in which the proportion of documented discharge summary items for general practitioners (GPs), and information provided for stroke patients discharged home and their carers at discharge were evaluated. The study was conducted at one acute and one rehabilitation hospital in a regional area of New South Wales (NSW), Australia, over a six month period due to limited funding.

Participants

Eligible participants were patients with a discharge diagnosis of stroke who were consecutively discharged home during the study period.

Ethics

Ethical approval was granted to conduct the study by the Hunter New England Health District and University of Newcastle Human Research Ethics Committees.

Data Collection and Instruments

During the data collection period (October 2014 - March 2015) there were 168 patients with a discharge diagnosis of stroke (ICD-10-CM Diagnosis Codes: I60-I64 Intracranial Haemorrhage, Cerebral Infarction and Stroke not specified). Of these patients, 114 were not

eligible due to other discharge destinations or primary diagnoses, and 54 stroke patients were discharged home and were eligible participants for this study.

The discharge documentation for these patients was audited by a trained research assistant using a purpose-developed Discharge Audit Form. The audit form was used to extract demographic data items, expected criteria items in the medical discharge summary, pending test results, ongoing clinical issues, support services required after discharge documented by discharge planners and allied health professionals, and information provided to the patient or carer, based on clinical care standards that describe quality statements for transition from hospital care and safe transfer of care from hospital to community (Australian Commission on Safety and Quality in Health Care, 2015; National Stroke Foundation, 2010). In addition, readmission within 28 days was measured because this is a routinely measured performance indicator in NSW by the Ministry of Health.

A post discharge survey form with an invitation to participate in the survey was also mailed out to carers within one month of discharge to measure outcomes of discharge planning. Participation was voluntary and consent was implied due to the requirement for anonymous responses. The survey contained questions about receipt of a copy of the discharge summary, medication instructions, prescriptions, and medications at discharge. There were also questions about appointments or referrals, community services, limitations on activities, follow up phone calls, home medicines reviews, recommended support groups and follow up with the GP after discharge. The Modified Caregiver Strain Index (Thornton & Travis, 2003) was included in the survey form and results for these carers are reported as scores from a possible range of 0-26. Carers who score more than seven are considered to be suffering a high level of stress.

Data Analysis

Data were analyzed using JMP11 (SAS Institute Inc., Cary, NC,). Participants' characteristics were summarized by using means (or medians) for numerical data, counts and percentages for categorical data, and one way ANOVA for comparison of means between variables. Audit data items were compared by hospital site using Fishers exact test or chi-square tests. Significance level was set at 5% to highlight suggestive evidence of differences between study sites. A compliance score of the items that should have been provided to GPs or patients at discharge was calculated as the percentage of the eligible criteria that were compliant. Missing data items were assumed to be not applicable. This compliance score was then used as a predictor for the outcome of readmission within 28 days and logistic regression was fit to determine the effect of the percentage point increase in the compliance score on the odds of readmission within 28 days.

RESULTS

Participants

Participant characteristics (n = 54) are presented in Table 1. The number of participants discharged from the acute hospital was significantly higher. [Table 1 near here]

Discharge diagnoses included ischemic strokes (4), infarctions (19), hemorrhagic strokes (13) and unspecified strokes (18). Thirty-six patients were discharged home (67%) with no home care program, and 18 (33%) were discharged home with a post discharge home care program. Four patients (7%) were readmitted within 28 days and three of these were discharged from the acute hospital. During the audit process, comments from discharge documents about stroke severity and residual deficits were recorded for 29 acute hospital and 12 rehabilitation hospital discharges. Of these, 17 (41%) were noted to either be minor strokes or to have minimal residual deficit at the time of discharge; 16 (55%) from the acute hospital and 1 (8%) from the rehabilitation hospital (p = 0.006).

Expected Discharge Documentation

All 54 patients had a medical discharge summary on file and 53 contained documentation that the medical discharge summary was provided to the GP. Fifty (93%) discharge summaries had other documents included for the GP such as pathology results and imaging reports. Fifty-two had a nursing discharge summary and 22 (42%) had an allied health discharge summary. Table 2 contains data about the information documented in the medical discharge summaries. [Table 2 near here]

Overall, most of the expected items were routinely documented (> 85%) in the medical discharge summary. However some items were not routinely documented including mechanism of stroke, allied health assessments of functional capacity at discharge and support services required after discharge. Allied health assessments may have been conducted but not added to the discharge documentation at the time of discharge. There were significant differences between study sites for documented investigations, results of other diagnostics, allied health assessments of functional capacity at discharge and support services required after discharge (this result may be due to missing data from the acute hospital documents).

Support Required after Discharge

Types of support services required by these stroke patients were documented for 19 (35%) discharges (5 acute care, 14 rehabilitation hospital). Thirteen of these were post discharge programs or packages of care. There were also eight outpatient services including speech pathology, palliative care, domestic cleaning and community nursing and community meals services.

Pending Test/Investigation Results

Twenty-one (39%) discharges had pending test/investigation results that were documented at

the time of discharge. Types of pending test/investigation results included: Echocardiograms, Holter monitoring, MRIs, carotid Doppler/vascular ultrasounds, renal function tests, barium swallows and blood test results. Only nine (43%) of these 21 pending test/investigation results were flagged for follow up by the GP however, seven others had appointments in outpatient clinics and it is possible these patients were followed up there.

Ongoing Clinical Issues

Ongoing clinical issues at the time of discharge were documented in 44 (86%) records; 27 (52%) from the acute hospital and 17 (33%) from the rehabilitation hospital. The most frequently documented ongoing clinical issues (n = 38) at the time of discharge were cognitive and functional impairment (including difficulty swallowing, speech problems, limb weakness, mobility problems) and problems with activities of daily living.

Compliance with expected documentation – Information for GPs

A compliance score of the items that should have been provided to GPs at discharge was calculated as a percentage of the 16 eligible criteria that were compliant (87% mean compliance with no significant difference between hospitals). Logistic regression was fit to determine the effect of the percentage point increase in the compliance score on the odds of readmission within 28 days (n = 4), and the result was not statistically significant (OR 0.99, p = 0.9).

Information Provided to Patients or Carers

There was documentation of patient/carer meetings with the multidisciplinary stroke team to discuss plans or goals in 11 (20%) records. This was significantly higher for discharges from the rehabilitation hospital (59%) than the acute hospital (3%) (p < 0.001). In addition, there was information in 49 (91%) records about the provision of the medical discharge summary

to the patient or carer. Table 3 contains data about documented information provided to the patient or their carer. [Table 3 near here]

Only 55% were provided with a week supply of medications at the time of discharge, and 26% had a written medication plan from the pharmacist. The provision of medications was significantly higher from the acute hospital and ongoing management instructions were significantly higher from the rehabilitation hospital. Nomination of a carer was documented significantly more often for discharges from the rehabilitation hospital and this may be due to increased residual disability requiring the support of a carer. Only 37% had information provided about indications of complications.

Referrals Provided to Patients or Carers.

Discharge referrals were documented in 50 discharge records. Most referrals were for outpatient clinics (n = 32) and outpatient rehabilitation (n = 18). There were six requests for GPs to arrange cardiac investigations and 11 (20%) requests for GPs to arrange Home Medicines Review.

Compliance with expected documentation – Information for patients or their carers

A compliance score of the items that should have been provided to patients or their carer at discharge was calculated as a percentage of the 9 eligible criteria that were compliant (64% mean compliance with no significant difference between hospitals). Logistic regression was fit to determine the effect of the percentage point increase in the compliance score on the odds of readmission within 28 days (n = 4), and the result was statistically significant (OR 0.87, p = 0.008). This result suggests that readmission was associated with a lower compliance score for information provided to patients or their carer.

Survey Data

Twelve (22%) completed surveys were received and all of the carers reported that they received a copy of the discharge summary form and that their relatives visited their GP after discharge within 3 – 10 days. Most received medication instructions (92%), prescriptions (83%) and medications at discharge (83%). Nine (75%) responded that they were given written information at the time of discharge. Less than half indicated that they received appointments or referrals, information about community services available to them, and information about whether their relative could drive or limitations on their activities. Seven (58%) reported that they received a follow-up phone call from the hospital after their relative was discharged. None of the carers reported that the person they were caring for, received a home medicines review from a pharmacist. Only three carers had been recommended support groups for carers. Five carers (42%) found they needed more services than originally expected. For the Modified Caregiver Strain Index, the carers in this study reported scores ranging from 2 - 20 (median = 7), and seven carers scored seven or more, indicating that almost 60% of carers had high to very high levels of strain.

DISCUSSION

Information provided to GPs

There were clinically important deficits in information provided to GPs. There was inadequate documentation of the mechanism of stroke, allied health assessments of functional capacity at discharge, and support services required after discharge. If pending test results are not flagged for follow up by the GP, these results may be overlooked. The lack of information about functional capacity and available services is also likely to result in poor post discharge support for stroke patients and increasing carer strain. Ongoing medical issues at the time of discharge indicate that stroke patients may require more support services after

being discharged home from acute care than other patients. These are key findings as together they indicate the potential for a lapse in continuity of care after discharge with medical and functional impacts.

It is encouraging to note that the rate of routine provision of discharge summaries to GPs in this study (98%) compares well to the rates reported in a review of previous studies (51 - 77%) (Kripalani *et al.*, 2007) and 79% reported by the National Stroke Audit Report for Clinical Services: Acute Services (National Stroke Foundation, 2008). An audit of 200 stroke discharge summaries in Victoria reported lower results for provision of discharge summaries to GPs (72%) and similar results for excellent documentation of investigations compared with this study (94% and 91% respectively); and lower results for excellent documentation of discharge medications (59% vs 100%), medication changes (59% vs 96%), and follow up plans (84% vs 98%) respectively (Department of Health & Human Services, 2014). In addition, previous studies have reported rates of pending test results (47-65%) at the time of discharge (Gandara *et al.*, 2009; Kripalani *et al.*, 2007; Roy *et al.*, 2005), and this study reports a lower rate (39%), however it is important that all key items are consistently documented to improve continuity of care.

Information provided to Patients and their Carers

There were several deficits in the documented information provided to patients and their carers. Stroke patients meetings with stroke team members and the provision of a week's supply of medications should be routinely documented. Home medicines review would be beneficial for stroke patients who are prescribed lipid lowering and/or blood pressure medications, and this medication review/reconciliation process is recommended by other researchers (Alper *et al.*, 2015; Cummings *et al.*, 2010; Groene *et al.*, 2012; Ziaeeian *et al.*, 2012) and has been reported to be effective in reducing readmissions in the elderly (Cheen *et*

al., 2017). Discharge from hospital is a suitable trigger for a home medications review by a pharmacist, during which the medication list is not just reconciled against the medications the patient is taking, but is also checked for other forms of compliance eg. for issues such as drug-drug interactions and anticholinergic load, and use of medication devices. Many patients and their carers did not receive information about what to do in the event of complications occurring (documented contingency plans) and this is consistent with a previous study of discharged older veterans where 43% did not understand their contingency plan (Hastings *et al.*, 2012).

More positive results indicate that patients and their carers were routinely provided with prescriptions. Ongoing management instructions were provided to 74% of patients and their carers and this result is higher than other studies where only 2 - 43% included post discharge management and follow-up plans (Gandara *et al.*, 2009; Kripalani *et al.*, 2007). Routine follow up phone calls after discharge were provided and all of the patients were followed up by the GP within 3 - 10 days. This compares well with a previous study of older veterans (n = 305) discharged from the emergency department where 25% did not understand how soon they should follow up with their primary care provider (Hastings *et al.*, 2012). The evaluation of the compliance scores for information provided to patients or their carer on readmission within 28 days, identified a significant effect on reduced readmission associated with increasing compliance. This finding is limited by the small sample size but suggests that further work in this area may be indicated.

Although only 12 discharged patients had a nominated carer survey responses were received from five of these, and seven other carers. In the survey responses many carers were not given information about restrictions on activities such as driving or information about available support groups. They often needed more services than they had anticipated and when considered with the high scores reported for carer strain, these results suggest that the

carer burden for recently discharged stroke patients may be quite high, and this may have influenced the response rate for this survey.

The differences between hospitals in this study reflect the focus and approach of these hospitals to the provision of acute care and rehabilitation services respectively, including the results for nomination of carers. However, at the time of discharge GPs' and patients' need for information is the same from any discharging hospital. In addition, stroke patients may have both cognitive and functional deficits at the time of discharge that make them more vulnerable to inadequate information and planning for continuity of care and poor outcomes after discharge (Levine *et al.*, 2015). Their carers may become 'care managers' by default. However without adequate information and support, carers may not recognize the potential for issues such as poly pharmacy and carer burden that may have a negative impact on the stroke patient. Strategies to address these needs for information such as multidisciplinary team meetings with the patient and carer, arrangements for home medicine review, and planning for provision of additional support could improve patient safety, and reduce the risk for poor outcomes and carer strain.

Previous interventions designed to improve transitional care for stroke patients have not produced sufficient evidence to demonstrate benefits in patient outcomes (Bettger *et al.*, 2012). In Australia, the recently introduced Acute Stroke Clinical Care Standard contains two statements specifically designed for stroke patients about transition from hospital care (requiring that stroke patients have an individualized ongoing care plan in the community documented and provided to them and/or their carer prior to discharge and to their GP within 48 hours of discharge); and carer training and support (requiring carers to have a documented formal needs assessment) (Australian Commission on Safety and Quality in Health Care, 2015). The 2015 National Stroke Audit data report states that written care plans were only provided to 56% of stroke patients and carer support needs assessments were only conducted

for 59% (Australian Stroke Foundation, 2015). The results of this study are clinically significant because increasing numbers of stroke patients are being discharged home rather than to long term facilities. This means that they, and their carers are attempting to cope at home with insufficient information and support and this makes them more vulnerable to poor outcomes. As stroke survivors are increasingly being discharged home and post-stroke cognitive decline increases (Levine *et al.*, 2015), the follow up and support required in the community must be responsive to their needs and those of their carers, and communicated adequately to their GPs and health professionals responsible for provision of continuity of care in the community (Department of Health & Human Services, 2014).

Study Limitations

The limitations of this study include the limited time for data collection, numbers of eligible patients, missing data for some audited items and the low response rate to the survey. Nonetheless these data provide useful information about aspects of the discharge process that could be the focus of improvement strategies to achieve better transitional care for stroke patients and their carers.

CONCLUSION

The results of this study indicate that improved provision of information to patients and their carers at discharge is associated with reduced readmissions in this regional area of NSW. There are important areas for action in clinical practice such as routine requests for home medicines review, assessment of carer stress and adoption of strategies that will improve the training and support provided to carers prior to, and following discharge. Improved documentation of meetings with the stroke team, functional assessments conducted, provision of prescriptions and the supply of medications and contingency plans at discharge are other areas that require attention. These strategies have the potential to improve transitional care for

stroke survivors and their carers, and improve the continuity of service provision for them after they are discharged home.

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CONTRIBUTIONS

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Data Collection and Analysis: AK.

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Table 1: Participant characteristics compared by hospitals.

Participant characteristics	Acute Hospital	Rehabilitation Hospital	Total	P value
Male	22 (40%)	3 (6%)	25 (46%)	0.007†*
Female	15 (28%)	14 (26%)	29 (54%)	
Total	37 (68%)	17 (32%)	54 (100%)	
Age (Range 37-89 years)	Mean 68, SD 13.3	Mean 74, SD 10.9	Mean 70 SD 12.8	

† Fishers Exact test used. *P value < 0.05. SD = Standard Deviation.

Table 2: Expected documentation in Medical Discharge Summaries – Information for GPs compared by hospitals.

Information in medical discharge summaries (Number of applicable records from Acute / Rehabilitation hospitals)	Acute Hospital n (%)	Rehabilitation Hospital n (%)	Total Documented n (%)	P Value
Mechanism of stroke (36/17)	28 (78)	9 (53)	37 (70)	0.11†
Deficits (36/17)	34 (94)	17 (100)	51 (96)	1.0†
Investigations (36/17)	36 (100)	12 (71)	48 (91)	0.002†*
Treatment summary (36/17)	36 (100)	15 (88)	51 (96)	0.10†
Progress on ward (35/17)	28 (80)	16 (94)	44 (85)	0.25†
Pathology results (36/17)	33 (92)	17 (100)	50 (94)	0.5†
Results other diagnostics (36/16)	36 (100)	9 (56)	45 (87)	<0.0001†*
Allergies or adverse events (36/17)	32 (89)	17 (100)	49 (92)	0.29†
Significant medication changes (35/16)	35 (100)	14 (88)	49 (96)	0.09†
Medications on discharge (Seven day supply)(36/17)	36 (100)	17 (100)	53 (100)	0
Blood pressure and/or lipid lowering medications on discharge (35/16)	33 (94)	16 (100)	49 (96)	1.0†
Risk factors (36/17)	36 (100)	16 (94)	52 (98)	0.32†
Allied health assessments of functional capacity at discharge (31/17)	11 (35)	17 (100)	28 (58)	<0.0001†*
Discharge and follow up details (36/17)	35 (97)	17 (100)	52 (98)	1.0†
Advance care planning (21/17) ‡	18 (86)	16 (94)	34 (89)	0.6†
Support services required post discharge (13/16) ‡	4 (31)	13 (81)	17 (59)	0.01†*

† Fishers Exact test used. *P value < 0.05 ‡ Large number of missing data items.

Table 3: Specific discharge and follow up instructions/information for the patient or carer documented.

Instructions/ Information (Number of applicable records from Acute / Rehabilitation hospitals)	Acute Hospital n (%)	Rehabilitation Hospital n (%)	Total Documented n (%)	P Value
Carer nominated (37/17)	3 (8)	9 (53)	12 (22)	0.0006†*
Medications provided (7 day supply) (24/14) ‡	17 (71)	4 (29)	21 (55)	0.02†*
Instructions for routine medications provided (33/17)	31 (94)	15 (88)	46 (92)	0.60†
Written medication plan from pharmacist provided (includes medications ceased, changed and added) (37/17)	11 (30)	3 (18)	14 (26)	0.51†
Prescriptions provided and instructions about when supplies will be used up (21/17) ‡	18 (86)	16 (94)	34 (89)	0.61†
Ongoing management instructions provided (therapy/services, frequency, dates) (29/17)	17 (59)	17 (100)	34 (74)	0.002*
Information about indications of complications provided (contingency plan) (20/7) ‡	9 (45)	1 (14)	10 (37)	0.20†
Risk assessments conducted (34/16)	33 (97)	16 (100)	49 (98)	1.0†
Post discharge phone call made (37/17)	28 (76)	14 (82)	42 (78)	0.73†

† Fishers Exact test used. *P value < 0.05 ‡ Large number of missing data items.