

Health care providers' perceptions of factors that influence the provision of acute stroke care in urban and rural settings: A qualitative study

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Abstract

Objectives: Individuals living in rural areas have comparatively less access to acute stroke care than their urban counterparts. Understanding the local barriers and facilitators to the use of current best practice for acute stroke may inform efforts to reduce this disparity.

Methods: A qualitative study featuring semi-structured interviews and focus groups was conducted in the Australian state of Tasmania. Clinical staff from a range of disciplines involved in acute stroke care were recruited from three of the state's four major public hospitals (one urban and two rural). A semi-structured interview guide based on the findings of an earlier quantitative study was used to elicit discussion about the barriers and facilitators associated with providing acute stroke care. An inductive process of thematic analysis was then used to identify themes and subthemes across the data set.

Results: Two focus groups and five individual interviews were conducted. Four major themes were identified from analysis of the data: systemic issues, clinician factors, additional support and patient-related factors. Acute stroke care within the study's urban hospital was structured and comprehensive, aided by the hospital's acute stroke unit and specialist nursing support. In contrast, care provided in the study's rural hospitals was somewhat less comprehensive, and often constrained by an absence of infrastructure or poor access to existing resources.

Conclusion: The identified factors help to characterise acute stroke care within urban and rural hospitals and will assist quality improvement efforts in Tasmania's hospitals.

Keywords

Neurology, nursing, acute stroke, emergency medicine

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Introduction

Stroke continues to place a heavy burden on our society. On a global scale, stroke accounts for 5.5 million deaths annually, and personally affects one in four people during their lifetime.¹ Within Australia, stroke is the third leading cause of death,² costing the Australian economy in the order of \$5 billion annually.³ Thankfully, the management of acute stroke has evolved from an era of therapeutic nihilism⁴ to one in which numerous evidence-based interventions are readily available. Indeed, contemporary models of acute stroke care typically involve a host of different nursing, medical and allied health professionals, beginning with the delivery of hyperacute therapies and concluding with the patient's rehabilitation.^{5,6} In many developed nations, these treatment

modalities have been collated into sets of guidelines, in an effort to bridge the divide between evidence and clinical practice.⁷ A key example of this is the Australian Commission on Safety and Quality in Health Care's *Acute Stroke Clinical Care Standard*, which outlines the care that patients with stroke should expect to receive within Australian hospitals.⁸

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Regrettably, the care processes which comprise the *Clinical Care Standard* are not used ubiquitously, with individuals in Australia's rural areas seemingly having inferior access to acute stroke care.^{9,10} In order to begin to address this disparity, it is necessary to understand the factors which may influence clinicians' ability to provide care in line with what is considered current best practice.¹¹ Moloczij et al.¹² interviewed nursing and medical staff in a regional Victorian hospital, finding that the clinicians' main barrier to using telemedicine consults with metropolitan centres was their scepticism of the use of thrombolysis. This study and several others in the area of acute stroke¹³ have been exclusively concerned with the delivery of thrombolysis. Very few studies have examined the factors influential to acute stroke management in its entirety,¹⁴ and fewer still have looked at how such factors may differ between urban and rural contexts. The aim of this study was to interview clinicians located in urban and rural settings, to determine which factors influence their ability and willingness to provide guideline-recommended acute stroke care.

Methods

Study design

This qualitative study was undertaken as part of a broader, mixed method sequential explanatory study. Semi-structured interviews and focus groups were used to explore with clinicians the barriers and facilitating factors they experience when providing acute stroke care, and whether there are differences between urban and rural settings.

Participants and settings

This study took place in the Australian state of Tasmania, which has an estimated population of 528,000.¹⁵ Tasmania has four tertiary level health care centres, the largest of which is the Royal Hobart Hospital (RHH), with a maximum capacity of 470 beds.¹⁶ The Launceston General Hospital (LGH), with 300 beds, serves much of the state's north and north east.¹⁷ Both the LGH and RHH have neurology staff on-site. The Mersey Community Hospital (MCH) and North West Regional Hospital (NWRH) are smaller rural hospitals with capacities of 100 and 160 beds, respectively.¹⁸ Acute stroke cases presenting to the MCH and NWRH are handled by general medical physicians. In Australia, regions are classified in terms of their remoteness using the Accessibility/Remoteness Index for Australia 2011 (ARIA+) system, based on access to services.¹⁹ According to this system, the MCH and NWRH are in 'outer regional' areas, while the LGH and RHH are situated in 'inner regional' areas. For the purpose of this study, the MCH and NWRH were regarded as 'rural' hospitals, while the RHH is referred to as an 'urban' hospital.

Participants were purposefully selected clinical staff from the RHH, MCH and NWRH. Clinicians from the LGH were not recruited for this study; the researchers were primarily

concerned with describing the contrast between urban and rural settings, as opposed to the experience of acute stroke care within all four of Tasmania's hospitals. In order to be considered for recruitment, clinicians were required to be involved in the delivery of 'acute stroke care' as defined by the Australian Commission on Safety and Quality in Health Care's *Acute Stroke Clinical Care Standard*.⁸ These included clinicians from a range of health professions, including general medicine, neurology, nursing, pharmacy and physiotherapy.

Staff specialists at all three hospitals were contacted via email and asked for details of a regular meeting in their hospitals which would be an appropriate forum for conducting a focus group. Staff specialists were also asked to nominate potential participants to be involved in individual interviews. Those nominated were contacted and asked to participate in interviews, and to nominate any other clinicians with relevant experience in the provision of acute stroke care. Participants were given the option of participating in a focus group, interview or both. Those who agreed to participate in either a focus group or interview provided their written consent after being provided with an information sheet outlining the aims of the study. All focus groups and interviews were conducted in meeting rooms inside the participants' place of work. No individuals other than the researcher and participants were present during focus groups and interviews.

Data collection

A semi-structured interview guide was used to elicit discussion in both focus groups and interviews (Supplemental Material 1). The interview guide was based on the care processes which comprise the abovementioned *Clinical Care Standard*,⁸ and are detailed in Table 1.²⁰ For each care process, the lead researcher (M.D., a male PhD candidate) asked participants for an explanation of how the process worked, and a description of the factors that helped or hindered this. All interviews and focus groups were audio recorded and transcribed verbatim by a third party. The lead researcher used field notes and memos written following focus groups and interviews to advance and contextualise data analysis. Data collection ceased once data saturation was achieved (i.e. when the barriers or facilitators that emerged from the data became repetitive and there were no more new findings). Reporting of the data was guided by the consolidated criteria for reporting qualitative research (COREQ) (Supplemental Material 2).

Data analysis

The researchers used an inductive approach to thematic analysis, in accordance with the six phases described by Braun et al.²¹ This began with the lead researcher reading and re-reading the transcripts making initial analytical observations about the data. Coding was data-driven and the initial coding helped to organise the data into meaningful groups. Coding was through the software programme NVivo version 12.²² The codes were then sorted to form themes and subthemes.

Table 1. Care processes discussed during focus groups and interviews.

- Transport to a hospital able to provide thrombolysis
- Thrombolysis in ischaemic stroke (with exclusions)
- Presentation and intravenous thrombolysis within 4.5 h of symptom onset
- Thrombolysis within 60 min of hospital arrival
- Time from onset of symptoms to thrombolysis
- Admission into a stroke unit
- 90% of acute hospital admission episode time spent on a stroke unit
- Assessment for rehabilitation by a physiotherapist within 48 h of admission
- Rehabilitation therapy within 48 h of initial assessment
- Treatment for a rehabilitation goal commencing during an acute admission
- Discharge on statin, antihypertensive and antithrombotic medications
- Discharge on oral anticoagulants for atrial fibrillation
- Risk factor modification advice before leaving the hospital
- Dysphagia screening within 24 h
- Dysphagia screen passed before first oral intake of fluids, nutrition or medications

Themes were reviewed and refined and then named and defined. Two other researchers (K.F. and K.M.F.) cross-checked the outcomes of this process.

Ethical considerations

Ethical approval to conduct this study was obtained from the Human Research Ethics Committee of Tasmania (application number H0017665).

Results

A total of five individual interviews and two focus groups were conducted. The researchers deemed that no further focus groups or interviews were required after getting sufficient representation from the various clinical groups (and achieving data saturation) in the initial round. Table 2 provides an overview of the participating clinicians from each region. All of the clinicians who were invited to be interviewed agreed to do so. The first focus group was conducted at the NWRH as part of this hospital's weekly general medical team meeting. Present during this focus group were five members of this hospital's general medical team and one physician based at the MCH. The second focus group was held at the RHH during the hospital's neurology department's weekly meeting, and included six members of the hospital's neurology team, along with one resident medical officer. Individual interviews were conducted with one pharmacist each from the NWRH and RHH, and one physiotherapist each from the NWRH and RHH. In addition, one individual interview was conducted with a senior nurse from

Table 2. Participant characteristics.

Interviews	Urban	Rural
Male	–	1
Female	3	1
Pharmacists	1	1
Senior nurse	1	–
Physiotherapists	1	1
Focus groups		
Male	4	5
Female	4	1
General medical physicians	1	6
Neurologists	7	–

the RHH. All sessions lasted between 30 min and 1 h. There were no clinicians who participated in both a focus group and an interview.

Themes

The following four overarching themes were identified from analysis of the focus groups and interview data: systemic issues, clinician factors, additional support and patient-related factors. Each theme was divided into a series of sub-themes to provide structure and to demonstrate the hierarchy of meaning within the data.

Systemic issues

This theme refers to the way in which the surveyed hospitals were configured to deliver stroke care. Three subthemes within the theme systemic issues were: protocols, infrastructure and staffing.

Protocols. Several clinicians mentioned the role that established protocols play in their provision of acute stroke care. One urban clinician stated that the use of a discharge checklist covering medications and lifestyle modification advice improved their ability to provide patients with these aspects of care. In contrast, rural clinicians noted that the absence of such a checklist from their hospitals was a barrier to providing recommended medications and lifestyle modification advice. Other clinicians based in the large urban hospital referred to several protocols which they believed facilitated stroke care. These were the use of blanket physiotherapy referrals for stroke, multidisciplinary meetings and the use of sequential screening for dysphagia. Finally, a rural-based speech pathologist commented that the timely assessment of patients for dysphagia was facilitated by a stroke protocol which required speech pathologists to service their hospitals' emergency department (ED).

Infrastructure. It was acknowledged that the smaller rural hospitals did not have an acute stroke unit (ASU). Urban neurologists mentioned that their ability to use computed

tomography (CT) perfusion imaging (as opposed to conventional CT imaging) improved their ability to offer thrombolysis. The urban neurologists also mentioned that the capacity of the wider hospital impacted their ability to admit stroke patients under the hospital's ASU. The RHH ASU is situated inside the hospital's medical specialties ward and does not have any quarantined beds of its own. This, in turn, meant that demand for beds from other medical specialties could prevent stroke patients from reaching the ASU. Similarly, the need for the RHH to clear patients from its ED and intensive care unit (ICU) often resulted in patients becoming medical outliers (i.e. where patients were admitted to wards other than their 'home' ward).²³ An urban physiotherapist noted that such patients may have, in turn, experienced delays to their physiotherapy assessments, given that they were not 'flagged' as stroke patients:

If we haven't got enough beds here to put people in; they outlie wherever around the hospital wherever there's a bed. So, there's not a lot of thought goes into it. And then it's all driven by ED because you might have someone, say, for example, over on a ward that's been there for three days and you really want to get them to the Stroke Unit, but if there's someone in ED, no matter if they're a stroke or something else, they get priority because it's all about ED. (Senior Nurse, RHH)

Staffing. Staffing constraints were identified as a barrier to the assessment and treatment of dysphagia in the urban hospital. In this hospital, initial assessments for dysphagia were generally conducted by ED nursing staff, with subsequent treatment handled by speech pathology. A shortage of speech pathologists and a lack of ED nursing staff capable of screening patients for dysphagia were both reported by the hospital's neurologists. The issue of staffing in relation to workload was also identified. Physiotherapists at both urban and rural sites cited their excessive workload as being the main reason why they were unable to assess patients in a timely manner. Urban physiotherapists regarded the use of a weekend physiotherapy service and dedicated stroke physiotherapists as being beneficial to providing patients with timely assessment and treatment. Conversely, in the smaller rural hospitals, staffing physiotherapy on weekends was seen to be inadequate and of little benefit to patients recovering from stroke. This was because the rural hospitals' weekend service was staffed with only one physiotherapist, and priority was given to orthopaedic patients.

Clinician factors

This theme captures how the attitudes and beliefs of clinicians influenced the delivery of acute stroke care. Three sub-themes were established under the theme of clinician factors; these were prescribing styles, clinician preferences and protocol adherence.

Prescribing styles. There were clear differences between regions in terms of how medications were prescribed. General medical physicians from the rural hospitals held varying perspectives on how aggressively certain risk factors (e.g. hypertension) should be treated in the wake of stroke. This was corroborated by a pharmacist from one of the rural hospitals. The same rural pharmacist noted that rural doctors may have lacked familiarity with certain medicines (e.g. newer generation antithrombotic treatments for atrial fibrillation) causing them to defer the task of prescription to outpatient cardiologists or general practitioners (GPs). Neurologists from the RHH attributed their relatively higher rates of prescription to a handful of reasons. One urban neurologist believed that they were 'vigilant' when it came to prescribing recommended medications, and hesitant to rely upon other clinicians (e.g. GPs) to initiate medications:

I guess maybe we're cynical and we realise that if we leave decisions for other people to make regarding medications that they don't always happen. (RHH Neurologist)

The same clinician pointed out that urban neurologists often used magnetic resonance imaging (MRI) scans to determine the source of a stroke. This, in turn, made it easier for the neurologists to identify and target specific risk factors. Another urban neurologist speculated that the supervision available to junior clinicians at the RHH from their superiors might be greater than in the rural hospitals, and that this may have facilitated the prescription of recommended medications.

Clinician preferences. Clinicians from all three hospitals generally agreed that some of the care processes featured in the *Acute Stroke Clinical Care Standard* were not appropriate to be measured in their hospitals. This was particularly the case for the variables relating to the pre-hospital and ED assessment of individuals suspected of having a stroke. ED doctors emphasised that the process of assessing stroke patients in an ED was not amenable to a 'tick box' exercise, such as the F.A.S.T. tool,²⁴ as is suggested in the *Acute Stroke Clinical Care Standard*. ED doctors further noted that stroke cases present with a variety of symptoms, and the process for assessing these patients invariably works through a range of differential diagnoses before arriving at a provisional diagnosis of stroke. On a related note, urban neurologists mentioned that the neurological examinations performed by ED doctors were sometimes inadequate to identify all stroke presentations, leading to a delay in the stroke protocol being activated. One urban nurse also noted that some of the hospital's ED doctors were not entirely supportive of using thrombolysis for acute ischaemic stroke.

Physiotherapists from both regions and one senior nurse from the RHH did not believe it was appropriate to measure 'written care plans' or 'carer needs assessment/training' at their sites. The clinicians agreed that such processes were

more closely aligned with rehabilitation care within the Tasmanian system, which was typically provided on a separate ward. One rural physiotherapist speculated that these indicators were written in the context of larger urban hospitals, which may have less of a demarcation between the acute and rehabilitation care provided to stroke patients. Finally, a senior nurse from the RHH also noted that clinicians involved in hospital bed allocation were at times unaware of the benefits of ASU care over conventional ward care. In her view, this increased the likelihood of stroke patients being allocated to outlying wards instead of the hospital's ASU.

Protocol adherence. Several clinicians mentioned how their colleagues' reluctance to comply with stroke care protocols presented a barrier to delivering best practice care. For instance, speech pathologists from the rural hospitals noted that once patients had been started on the stroke care pathway, it was common to see 'nil by mouth' patients being given food and oral medications. The same phenomenon was reported by an urban neurologist.

Additional support

This theme covers instances where clinicians acted beyond the scope of their usual roles to assist colleagues in providing aspects of acute stroke care. This theme contained subthemes in relation to the role of each hospital's pharmacy department and the RHH's expert clinical nurse consultant (CNC).

Pharmacy. An urban pharmacist highlighted that while it was the primary responsibility of the neurology department to prescribe secondary prevention medications, pharmacists had a facilitating role in this process. By attending ward rounds and multidisciplinary meetings, urban pharmacists had the opportunity to make suggestions about medications which may have otherwise been overlooked by medical staff. The same pharmacist also noted that having the ability to conduct multiple medication reconciliations throughout a stroke patient's admission increased the likelihood of patients being discharged with the necessary and correct medications. A senior physician based at one of the rural hospitals noted that the absence of pharmacists from their ward rounds was a barrier to prescribing the necessary medications for patients. One medical registrar from the NWRH also mentioned that pharmacy would typically only audit patients' medication at admission and discharge, missing opportunities to identify instances where medications had not been charted.

Expert CNC involvement. Clinicians in one of the rural hospitals acknowledged that the absence of an expert CNC and ASU at their site was barriers to providing patients with advice about reducing their risk of another stroke:

This is why a proper stroke unit or a dedicated unit is really important, because everything is geared towards not just the rehab or the medicine, but patient information and patient

education and relatives' education. (NWRH General Medical Physician)

A senior nurse described the facilitating role of the expert CNC in a range of different processes which were not their primary responsibility. This included assisting with allied health referrals, completing dysphagia assessments and ensuring that patients were prescribed all the necessary discharge medications. One urban pharmacist also noted that the hospital's expert CNC engaged with patients and provided them with tailored advice on reducing their risk of secondary stroke.

Patient-related factors

This theme refers to instances where patients' characteristics influenced clinicians' ability to provide the patient with best practice care. Neurologists and a senior nurse from the RHH mentioned how patient behaviour was particularly relevant to the provision of thrombolysis, which requires patients (or their significant others) to identify stroke symptoms and seek medical assistance in a timely manner:

... it's the patient factor, so it's being either witnessed onset or being found early. It's then somebody calling an ambulance you know as soon as they're found. And so, to me that's public education which is hopefully going to improve this year with some extra money. (Urban neurologist)

The same group of clinicians noted that patients who presented with atypical symptoms also presented a challenge to the timely delivery of care. This was particularly the case for posterior circulation strokes, which were often mistaken for more common neurological complaints, and triaged as non-urgent cases as a result. This initial misdiagnosis was associated with delays (and subsequent contraindication) to thrombolysis and delays to dysphagia screening. Finally, one rural clinician reported that providing patients with information on modifying their lifestyle to reduce their risk of stroke was difficult in patients with poor engagement.

Discussion

This study aimed to identify barriers and facilitators to the provision of acute stroke care in urban and rural settings. The overall barriers and facilitating factors are discussed in the context of existing literature below.

Barriers

Bed shortages in the urban hospital were seen to impact clinicians' ability to treat their patients within the hospital's ASU. These findings are consistent with an earlier audit conducted by Australia's National Stroke Foundation. The Foundation's 2017 *Acute Services Report*⁹ highlighted that while 75% of surveyed hospitals had stroke units, only 45% of patients spent the majority (i.e. 90% or more) of their

hospital admission in ASUs. Staffing and workload constraints were viewed by rural clinicians as a barrier to treating patients in a timely manner. These findings align with that of Lindsay et al.,²⁵ who reported that high caseloads and staff shortages were among the main workplace stressors encountered by a cohort of physiotherapists from regional Victoria, Australia. The introduction of a limited weekend physiotherapy service in the smaller rural hospitals to address this issue was seen to be of little benefit, given the emphasis placed on non-stroke patients. This issue of service prioritisation (or rationing) was previously identified by Adams et al.²⁶ as a major barrier to providing physiotherapy services within Australia's rural areas.

The general medical teams of the rural hospitals were somewhat less accustomed to treating acute stroke patients than their urban counterparts. This is likely due to the specialist nature of the urban hospital's neurology team, and the hospital's relatively higher patient volumes. The rural hospitals, however, are staffed by general medical physicians for whom acute stroke cases represent only a small proportion of their admissions. Previous studies have reported associations between higher stroke patient volumes and improved care²⁷ and outcomes.²⁸ This could be achieved in Tasmania by having acute stroke services for both rural hospitals amalgamated into one ASU located in the NWRH,²⁹ as has been suggested by local clinicians previously. The absence of a stroke CNC within the rural hospitals was viewed as a significant barrier to counselling patients about their lifestyle behaviours. This finding adds to an existing body of literature documenting the beneficial effect of specialist nursing care on the care and outcomes of individuals who have experienced a stroke.³⁰ It is foreseeable that with an increase in patient volumes, smaller rural sites such as the NWRH could justify employing a stroke CNC. Delays in stroke symptom recognition (e.g. by patients or their significant others) were associated with delays to thrombolysis. Patient symptom recognition is a commonly reported barrier which has been described at length by previous authors.^{31–33} Similarly, clinicians' recognition of stroke symptoms was viewed by urban clinicians as being a barrier to providing care. This was particularly the case for patients with posterior circulation strokes undergoing investigation in the hospital's ED. The issue of misdiagnosis in posterior stroke and its impact on patient outcomes have been identified by previous authors.^{34–36} An increased use of MRI^{37,38} and the use of novel stroke screening tools^{39,40} are among the interventions which have been proposed to decrease the rate of misdiagnosis.

Facilitating factors

The management of stroke patients within the large urban hospital was facilitated by a comprehensive, vigilant and team-oriented approach towards patient care. The urban hospital also had a strongly protocol-driven approach towards acute stroke care, central to which was the role of the hospital's expert CNC. These protocols (e.g. multidisciplinary

care) are hallmarks of ASU care,^{41,42} and therefore likely reflect the beneficial impact of this hospital's ASU on stroke care. In terms of early rehabilitation, the presence of dedicated stroke physiotherapists and an adequate weekend service within the urban hospital facilitated the timely treatment of patients. The level of pharmacy involvement in care planning influenced the extent to which patients received the necessary medications in both regions. This is consistent with the findings of a recent systematic review,⁴³ which reported that increased pharmacy involvement in stroke care was associated with an increase in the use of evidence-based therapies, medication adherence and risk factor target achievement.

This study contains some limitations which must be addressed. Our study was limited to three hospitals, all of which are located within one state of Australia. Moreover, this study applied definitions of 'urban' and 'rural' to areas of Australia which are technically classified as inner and outer regional areas. Both of the above factors mean that our findings may not be generalisable to other contexts, particularly those in large metropolitan areas and remote areas. Second, although this study sought to involve all clinicians involved in the provision of acute stroke care, this was not achieved in practice. Within both focus groups, the majority of comments were made by senior male clinicians, with relatively little input from junior clinicians. This may reflect the gender distributions within the clinicians' professions, and also the fact that senior clinicians are typically influential people who generally determine clinical practice. The experiences of junior and senior clinicians are likely to differ greatly, meaning that our findings may not be generalisable to all levels of clinicians. Future researchers in this field may consider targeting junior clinicians for individual interviews, as opposed to focus groups held in the company of their superiors. As a final limitation, it should be acknowledged that the interview guide used in this study had not been validated or pilot-tested prior to being used. To the best of the authors' knowledge, this is the first study to interview clinicians in urban and rural settings about the barriers and facilitators they encounter in providing acute stroke care. This information will be useful to policymakers seeking to reduce regional disparities in access to acute stroke care. This study's findings may also assist clinicians to adapting models of acute stroke care from urban hospitals to rural settings.

Conclusion

This study identified barriers and facilitating factors experienced by clinicians responsible for delivering a range of acute stroke care processes in urban and rural settings. Care provided in the study's urban hospital was facilitated by a host of policies and procedures, which centred around the hospital's ASU and the role of its expert CNC. Systemic issues and the misidentification of stroke symptoms – by patients or clinicians – were the primary barriers to patients accessing this pathway. The smaller rural hospitals, in

contrast, were less comprehensive in their delivery of acute stroke care, and would likely benefit increasing patient volumes by merging all acute stroke services into one hospital. Future researchers in this area are encouraged to obtain the perspectives of both junior and senior clinicians.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

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Informed consent

Written informed consent was obtained from all subjects before the study.

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Supplemental material

Supplemental material for this article is available online.

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