



Original Research

Implementing a Pain Assessment Survey and Team Approach Method to Effectively Assess and Treat Pain in Poststroke Patients



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KEYWORDS

Pain;
Rehabilitation;
Stroke

Abstract Objectives: To monitor and treat pain effectively in stroke patients in an inpatient rehabilitation facility using an efficient Pain Assessment Survey.

Design: The study was conducted as a 2-part project. Part 1 was a preintervention study conducted to assess the prevalence of pain in poststroke patients using a Pain Assessment Survey. Factors such as central and peripheral mechanisms, psychological factors, and autonomic input were used to study the surveyed population. Other potential risk factors, such as age and sex, were also incorporated into statistical gathering. The correlation between the presence of pain and poststroke patients was assessed, and an enhanced pain assessment was created and implemented in the admission process of poststroke patients. This helped comprise part of the second portion of the study, the postintervention study.

Setting: Participants were chosen from an inpatient rehabilitation facility. Each part of the project was conducted over a 6-month period.

Participants: Patients (N=184) were randomly selected. Eighty-two patients were included in the preintervention survey, and 102 patients were included in the postintervention survey. Those who had pain prior to stroke that remained unchanged or if the pain was secondary to another diagnosis were excluded from the study.

Intervention: Patients with complaints of poststroke pain (PSP) were intervened immediately upon admission using a team approach. This included all personnel involved in the patient's care to resolve pain before discharge. Different types of medications and non-medical modalities were used for pain control.

Main Outcome Measure: The prevalence of PSP in poststroke patients.

Results: The preintervention survey revealed a pain prevalence of 31.7%, whereas the postintervention study showed a prevalence of 11.8% in poststroke patients on admission. The odds that a poststroke patient would be discharged without pain and with a proper pain assessment and management was 96.2, with a statistically significant *P* value of .0015.

List of abbreviations: IRF, inpatient rehabilitation facility; PAS, Pain Assessment Survey; PSP, poststroke pain.

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Conclusion: The team approach to pain management resulted in all patients being successfully treated and discharged pain free. This further demonstrates the importance of using both a pain assessment survey and team approach to assess PSP in poststroke patients.

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Serious outcomes such as disabilities and death are just some complications of stroke, and even those patients who survive the attack are at risk of long term-effects. Post-stroke pain (PSP) is a common complication that can affect as many as one-third of stroke patients and can occur any time from immediately after to up to several months after the event.¹ According to Henry et al,² in the United States alone, a minimum of at least 56,000 of the 700,000 new stroke cases per year develop PSP. This can be especially problematic as these patients may no longer be in their establishment of care when their symptoms arise.² This pain, however, does not always have a typical trigger. In a study by Appelros et al,³ for example, some patients developed a range of changes in their physical sensations, from a heightening called touch allodynia (pain that is evoked by nonpainful stimuli such as light touch or cold temperatures) to even an overall decrease. The pain can range significantly in terms of severity and quality and can include articular pain, musculoskeletal pain, painful spasticity, headache, and neuropathic central poststroke pain.^{3,4} Because of the variability of these symptoms and timing of onset, diagnosing PSP can prove to be a difficult task. PSP is often accompanied by impaired quality of life, depression, suicidality, and cognitive dysfunction.⁵ In a study by Bowsher,⁴ a direct correlation was noted between the delay of symptom onset and PSP misdiagnosis. It was also seen that although strokes occur more often in the elderly population, 69% of the patients who reported pain were of a younger age (median, 57y). It was mentioned, however, that this could be due to a decreased likelihood of elderly stroke patients to be referred to a caregiver for their pain.⁶

PSP is multifactorial; it can range from a central origin to worsening of preexisting painful conditions.⁷ The relationship between pain and these variables can be quite complex. Evidence from the nonstroke literature suggests that treatment of pain is associated with improvement of cognition and quality of life.⁸ Effectively treating PSP will not only improve the patient's quality of life, but will also improve rehabilitation.⁹

PSP is unfortunately often undertreated. In 1 retrospective study, it was found that two-thirds of those with central pain had either inadequate pain treatment or were prescribed no treatment at all.⁵ Although there are many reasons for undertreatment of PSP, a major challenge lies in its identification and assessment.⁹ Patients often do not disclose the pain, which leads to undertreatment and a decrease in their quality of life. Therefore, tenacity to improve the quality of life in stroke patients and their smooth transition thereafter requires the clinician to not only be aware of the complications, but also be diligent in investigating for them. Developing a Pain Assessment

Survey (PAS) for assessing PSP in all poststroke patients is an option for tackling this problem.

The focus of this study was to create an effective PAS to assess and treat pain in poststroke patients in an inpatient rehabilitation facility (IRF). During the first 6 months, the prevalence of pain was studied. We found a strong correlation between presence of pain in poststroke patients, which is in agreement with the related literature. A pain assessment was implemented during the admission process of poststroke patients to attempt to diagnose PSP as early as possible. Diagnosed patients were intervened to resolve pain with medications and nonmedical modalities (heat and ice, kinesio tape, and electrical stimulation) before discharge to improve the patient's quality of life.

Methods

Overview

The study was a 2-part project in an IRF, and although it was preplanned as an interventional one, the registration and involvement of an ethic's committee was not required. All patients were given a pre-intervention survey and were then educated on their potential clinical course; prior to discharge they were

Demographic
Female sex
Older age at stroke onset
Premorbid
Alcohol use
Statin use
Peripheral vascular disease
Depression
Clinical
Spasticity
Reduced upper extremity movement
Sensory deficits
Stroke-related
Ischemic stroke
Thalamic localization
Brainstem localization

Fig 1 List of various reported risk factors that contribute to poststroke pain. Data from Harrison and Field.¹⁰



Quick Assessment of Pain Following Stroke

Patient Name: _____ Age: _____ Gender: _____ Brain: Left/ Right

Date of Admission to Rehab: _____ Date of CVA: _____ Distribution: _____

Type of Stroke: Ischemic Hemorrhagic Thrombotic Embolic

1) Are you currently experiencing any pain post-stroke? YES / NO

If Yes, please circle location(s) on the right:

2) Is this pain Pre-Stroke or Post Stroke?

Pre- Stroke / Post- Stroke

3) How much pain are you experiencing?

1 – 4 5 – 7 8 – 10

Date since pain began: _____

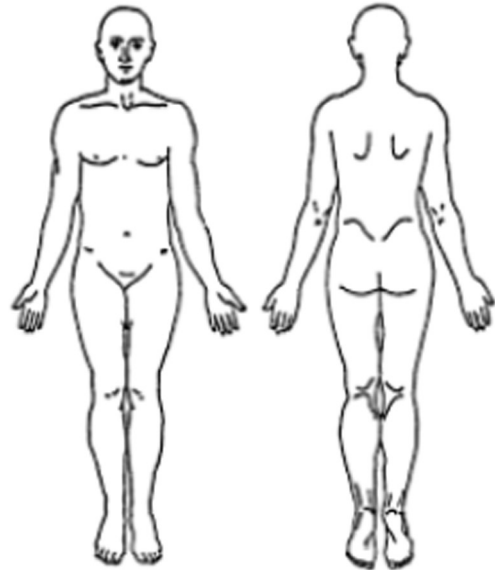
4) Pain Characteristics:

Dull / Sharp / Burning / Aching

Radiating / Non- Radiating

Nociceptive / Neuropathic

Other: _____



5) What measures have been taken to control the pain?

Medication Therapy Specify Other: _____

6) How well has it controlled the pain? 1 – 4 5 – 7 8 – 10

7) Is the pain tolerable? YES / NO

8) Has anyone in pain management seen you since the pain began? YES / NO

9) Which interventional modality has been most helpful for controlling your pain?

10) Has the pain resolved? YES / NO

Fig 3 Postintervention Pain Assessment Scale.

and if there was worsening after was also gathered. They were also asked about both medical (medicine, injections, pain creams, wraps, stockings) and nonmedical (ice packs, herbs, religious prayer, massages) pain relieving modalities and the extent of relief they received from each. The information was gathered using a preintervention PAS, as seen in [figure 2](#).

Intervention

A strong correlation was seen between the presence of pain and poststroke patients in the first survey. The results were discussed during team meetings to educate nurses, residents, and attending physicians. They were also presented during grand rounds to bring attention to other

Table 1 Demographics of the test patient population followed in this study

Characteristics	Preintervention Survey		Postintervention Survey	
	No. (n=82)	%	No. (n=102)	%
Age				
21-50	2	2.4	12	11.8
51-65	22	26.8	34	33.3
>65	58	70.7	56	54.9
Sex				
Male	42	51.2	43	42.2
Female	40	48.8	59	57.8

departments treating poststroke patients outside of physical medicine and rehabilitation. After these discussions, intervention was made to have all poststroke patients complete a pain assessment (fig 3) during IRF admission. All patients experiencing PSP were then intervened upon by a multidisciplinary team consisting of a physical therapist, occupational therapist, pain management team, neuropsychologist, nurse, resident physician, an attending physician, and anyone else involved in patient's care for pain management. A team approach was taken to improve pain and quality of life.

Postintervention assessment

For the next 6 months, a pain assessment form was filled out by the admitting resident physician for poststroke patients. The form included information about the patient's demographics, stroke type, pain location, pain description, pain scale, pain relieving modalities, and if the pain presented before or after the stroke (see fig 3). In addition, the form included questions about the resolution of pain and if a pain management team had been involved with the patient. Finally, pain tolerability was assessed because the goal of the intervention was to resolve the pain.

The first step of the pain control plan involved consulting the pain management team. Recommendations made by this service were followed, and both medical and nonmedical modalities were used to control pain. A pain management specialist (an MD or MBA with a residency focused on pain management) was in charge of leading the team. It was important to ask if the patient had been seen by a pain management doctor prior to admission in the postintervention PAS.

Patients were asked about their pain scale and any improvement daily. Initially, only medical pain management modalities were used. If pain did not improve, however, trials of nonmedical modalities were implemented. Medications used for pain control included acetaminophen, naproxen, gabapentin, tramadol, and lidocaine patches. Nonmedical modalities for pain control were heat and ice, kinesio tape, paraffin wax, and electrical stimulation. Weekly team meetings included discussions about findings ways to help improve or prevent pain. If there was not significant improvement in

Table 2 Locations of PSP reported by the patient population

Preintervention Survey		Postintervention Assessment	
n (%)	Pain Location	n (%)	Pain Location
9 (34.6)	Shoulder	7 (58.3)	Shoulder
4 (15.4)	Head	2 (16.7)	Foot
4 (15.4)	Leg	1 (8.3)	Forearm
3 (11.5)	Hand	1 (8.3)	Ear
3 (11.5)	Foot	1 (8.3)	Facial
2 (7.7)	Arm		
1 (3.8)	Chest		

the pain scale, the pain management strategy was changed and reevaluated.

Results

Between both parts of the study, there were a total of 184 patients. The preintervention survey included a total of 82 poststroke IRF patients. There was a total of 71 patients with ischemic strokes and 11 with hemorrhagic strokes. The postintervention assessment included a total of 102 patients (16 hemorrhagic, 85 ischemic, and 1 both).

Demographics

As expected, the majority of the studied population (approximately 70.7%) demonstrating PSP were older than the age of 65 years. Only 2.4% were between the ages of 21 and 50 years, and the remainder (26.8%) were between 50 and 65 years. There was a slight dominance of pain presenting in the male population (51.2%) compared with females (48.8%) (table 1).

Prevalence

The preintervention survey revealed a pain prevalence of 31.7%, compared with only 11.8% in the postintervention assessment.

Table 3 Average pain scale rating of PSP in the pre- and postintervention surveys on a scale of 1-10

Preintervention Survey		Postintervention Survey	
Pain Location	Pain Scale Average	Pain Location	Pain Scale Average
Knee	7	Foot	9
Head	6.5	Forearm	9
Shoulder	5.7	Facial	9
Hand	5	Shoulder	7
Arm	3	Ear	6
Thigh	3		
Chest	2		

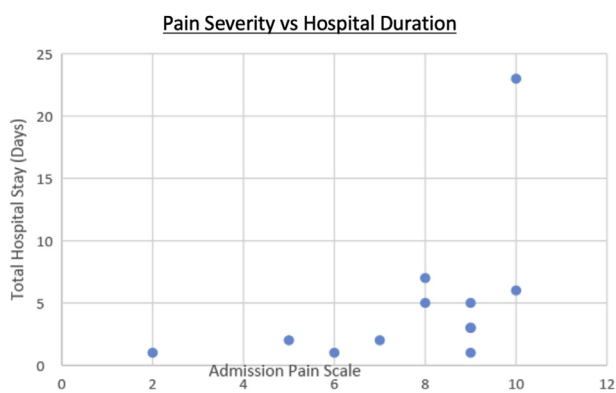


Fig 4 Graph comparing the reported severity of pain on admission with the length of the relative hospital stay in days.

Location and pain average

Preintervention survey

The shoulder was the most common location of pain (table 2). Knee pain averaged higher than shoulder pain in terms of severity (table 3).

Postintervention assessment

The shoulder was the most frequent source of pain (see table 2), but unlike the preintervention survey, the most severe pain was reported as being in the foot, forearm, and face. Pain averages in the postintervention assessment were higher compared with pain averages in the preintervention survey (see table 3).

The Pearson's correlation coefficient (fig 4) between pain scale at admission and length of hospital stay was found to be 0.5. The overall pain average at admission was 7.6, and the average length of stay was 4.8 days. This positive correlation provides an association between these variables. Although correlation does not mean causation, patients with more pain seemed to require a longer stay at the hospital, as they required invasive pain management. As shown in this study, patients who reported a pain scale of 8 or higher required up to 5 or more days of pain management intervention to resolve their pain, whereas those with a pain scale of lower than 6 required 2 days of

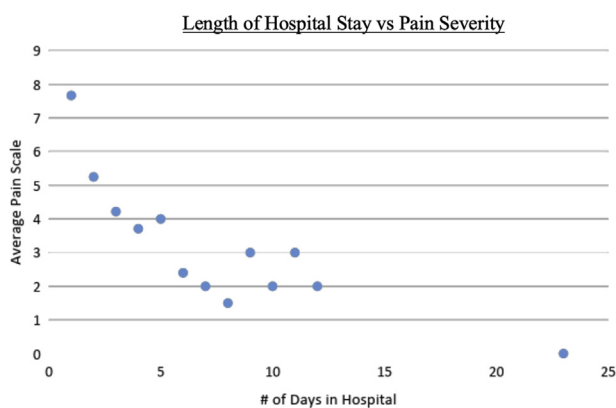


Fig 5 Graph showing the downtrend of pain severity as the length of patient hospital stay increased.

intervention at most. Although some of these examples of pain can eventually alleviate on their own time, the symptoms may linger for much longer without adequate intervention.

Treatment

On admission, a medical pain management approach was initially made by administering acetaminophen. Heat and ice packs were then given as nonmedical management if pain persisted. All patients were only discharged after a pain scale of 0 was achieved. Figure 5 shows the downward trend in average pain per day as pain control modalities were administered. The Pearson's correlation coefficient was -0.66 with a statistically significant *P* value of .007.

The odds that a poststroke patient would be discharged without pain with a proper pain assessment and management was statistically significant with a *P* value of .005. As seen in the preintervention study, in which PSP was only assessed but not treated, 26 out of 82 (31.7%) patients were discharged with pain.

Discussion

The presence of pain in both the pre- and postintervention assessments further enforces the importance of working up pain in poststroke patients. Because assessing pain in poststroke patients is difficult and leads to undertreatment, the odds ratio shows the efficacy of using a PAS to diagnose PSP.

Previous studies have shown various risk factors (see fig 1) for PSP, which were compared with the risk factors in the current study. Previous studies have found that PSP was reported most commonly in the shoulders.^{11,12} Our preintervention PAS yielded similar results, with 32% of patients reporting pain and 34% of patients with PSP reporting the shoulder as the most common location. This finding was further supported by the postintervention assessment, in which 58.3% of the patients experiencing PSP localized it to the shoulder.

In previous studies, female sex was considered a risk factor. Although the postintervention assessment was in agreement with this, the preintervention PAS demonstrated that pain was reported more frequently in the male population. A positive correlation between age of stroke onset and incidence of the pain was identified.¹³ The postintervention assessment results reinforced this, as all patients with PSP were aged 51 years and older. A population-based study has shown a relationship between ischemic stroke and pain.¹⁴ Based on the postintervention assessment, the most predominant type of stroke related to the pain was the ischemic type.

PSP is one of the most common complications undermining the quality of life in stroke survival patients.¹⁵ It is also an important contributor to the length of hospital stay in this population.^{16,17} This positive correlation between pain scale on admission and length of hospital stay was seen in this study. Prolongation of hospital stay has many debilitating effects, including increased risk of nosocomial infections, delirium, and negative feelings that have detrimental effects on psychological well-being and coping,

as well as added financial expenses.¹⁸⁻²⁰ This further demonstrates the importance for a clinician to assess for PSP from the time of admission to eventual discharge. The lack of active inquiry for pain has been shown to result in nondisclosure²¹ and lead to inadequate treatment.²²

In this study, a PAS was developed to address this issue. Having poststroke patients complete the PAS on admission and having their pain addressed properly resulted in all patients being discharged pain free. We hope this would lead to improved quality of life and cognition among this population.

Study limitations

There are a few limitations that should be noted for this study. Rather than using a randomized control trial, the preintervention study used a retrospective study and group, which could have increased the chance of recall bias. In a retrospective study, it becomes more difficult to evaluate the pain accurately, as it can be over- or underreported. Increasing the sample size and the blinding of patients could have helped to improve the study's overall power and validity. Pain level is subjective and difficult to accurately assess. Although ideal, discharging patients only when their reported pain severity is 0 may not be a completely realistic criterion.

Conclusions

Pain in poststroke patients is prevalent and undertreated mainly because of a lack of assessment. Based on this study, a conclusion can be made that a PAS included in the admission process is an effective way of identifying and evaluating PSP. Treating pain is complicated and every patient requires an individualized plan with a multidisciplinary approach. A team consisting of pain management specialists, attending and resident physicians, nurses, and physical and occupational therapists should be involved in the treatment plan. In this study, this approach was highly valued as all poststroke patients had no pain at discharge. The goal of the study was to create an efficient pain assessment to evaluate and resolve pain effectively in poststroke patients. A pain assessment was conducted for each patient, followed by the implementation of a pain management plan. Because the pain-free goals were reached successfully, this study shows that the PAS was an effective way to diagnose PSP. As pain affects quality of life and rehabilitation, these results demonstrate the importance of treating PSP.

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