Development and Evaluation of a Stroke Education Quality Improvement Initiative

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Abstract

Stroke is the leading cause of disability and fifth leading cause of death in the United States, though preventable in 80% of cases. One in four stroke patients will have a recurrent stroke, which may lead to lifelong deficits impacting quality of life and independence. A standardized stroke patient education protocol was developed and implemented to improve patient stroke education through improved nurse education. Patient and caregiver stroke education in the inpatient setting has proven to be an effective way to prevent a recurrent stroke, prevent hospital readmission, and improve patient outcomes. Significant nurse education has been found to improve patient stroke education to nearly 100%. A multifaceted approach has been found to effectively educate nurses working on stroke units. For this initiative, stroke education was provided to 29 neurological-trauma unit Registered Nurses (RNs) through an evidence-based protocol developed by the project lead. A breakroom poster with the developed protocol was placed in the staff breakroom and left for 3 months. A pre/post-test was developed and administered to 19 RNs to evaluate improvement in stroke education knowledge. Review of stroke patient charts was conducted to determine the occurrence of patient stroke education meeting the mandated requirements. There was a statistically significant improvement in nurse education that was determined through a paired t-test. Sixty-Seven percent of RNs reported using the Stroke Inpatient Education Protocol, with 50% of them finding this tool helpful. Stroke education on the stroke unit was improved from 35% to 63% but did not meet the goal of 80%. Providing RNs with adequate patient stroke education is necessary to improve stroke patient outcomes. Continued education for RNs should be provided in a variety of ways to achieve improved nurse stroke education. This continued education should be provided at regular intervals to ensure retention.

Development and Evaluation of a Stroke Education Quality Improvement Initiative

Stroke continues to be the leading cause of disability and fifth leading cause of death in the United States (U.S) even though it can be prevented in up to 80% of cases (Wilson & Ashcraft, 2019). The authors estimate that stroke costs the U.S. over $40 billion annually, affecting nearly 800,000 people each year with 650,000 survivors. Bridgwood et al. (2018) discussed that those who have suffered from a stroke are at an increased risk of a future stroke. Patient and caregiver stroke education in the inpatient setting has proven to be an effective way to prevent a recurrent stroke and improve patient outcomes (Heiberger et al., 2019). Providing stroke education is also necessary to maintain accreditation as a Primary Stroke Center (PSC) through Det Norske Veritas-Germanischer Lloyd (DNV-GL), an accrediting body focused on providing quality care and clinical excellence (DNV-GL, 2019). This quality improvement (QI) initiative implemented a standardized stroke patient education protocol to improve stroke patient outcomes.

Problem Statement and Background

Recurrent strokes occur in 25% of patients (Centers for Disease Control [CDC], 2020). Engel-Nitz et al. (2010) estimate that recurrent strokes are 38% more costly and associated with higher rates of morbidity and mortality. Adequate stroke education may help prevent a recurrent stroke, therefore reducing hospital readmission rates (Faulkner et al., 2017; Leonhardt et al., 2018). A patient affected by a stroke may have deficits that range from transient symptoms to life-long deficits that impact the ability of the patient to live independently (Heiberger et al., 2019). The resulting deficits of the stroke, whether ischemic or hemorrhagic, are dependent upon the affected area of the brain (American Stroke Association [ASA], 2019). The result may be

total or partial paralysis, sensory impairment, problems with vision, cognitive impairment, aphasia, loss of bowel and bladder control, among others.

Stroke survivors and their caregivers are not receiving adequate education throughout their inpatient stay (Heiberger et al., 2019). Patient's ability to recall educational information has the potential to improve medical compliance and clinical outcomes, including prevention of a future stroke. Insufficient stroke education has the potential to result in a recurrent stroke, leading to additional health problems and a greater chance for death or disability (Park & Ovbiagele, 2016). Education on activation of Emergency Medical Services (EMS), the warning signs of stroke, stroke risk factors, discharge medications, and follow up appointments must be provided to each stroke patient to improve patient outcomes (DNV-GL, 2019). However, cognitive deficits may result from a stroke, impacting the ability of the patient to process and retain the educational information. Involving the caregiver in the patient's stroke education is necessary to improve clinical outcomes, especially if the stroke has left the patient with cognitive deficits.

PICOT Question

In the neurological-trauma unit, how effective is improved stroke education through a standardized stroke education protocol compared to no change in the current education in improving registered nurse (RN) knowledge regarding stroke education and correct documentation of stroke education provided to stroke patients?

Literature Review

Methods

The databases used for the literature search included: Cumulative Index to Nursing and Allied Health Library (CINAHL), MEDLINE, The College of Saint Scholastica's Searching Online Library Academic Resources (SOLAR), EBSCO MegaFILE, and PubMed. The search

terms used in the development of the literature review included: *stroke, nurse education, stroke nurse education, stroke education, primary stroke center, stroke education significance, patient stroke education, patient stroke outcomes, education for stroke patients, stroke education for patients and/or family members, best practice for stroke education, implementation of a stroke education program, Plan-Do-Check-Act, quality improvement.* The Boolean search modifiers were used in combination with the search terms to modify results as necessary.

Certain literature was excluded, including: literature not written in English, from greater than 10 years ago, and sources that were not peer reviewed. Articles from greater than 10 years ago were excluded to ensure literature was relevant. Systematic reviews were not included, but were used to locate articles at their original source. Articles were included if: peer reviewed, included an adult population, written in English, full text articles, and written within the past 10 years. If an article was over 10 years old, it was considered for inclusion if it strongly supported the project. This criteria helped ensure the most relevant, up to date information was evaluated. See Appendix F for Literature Review Matrix Table.

Literature Review Synthesis

Over 5% of Minnesota deaths are related to stroke, making it the sixth leading cause of death in the state (Minnesota Department of Health [MDH], 2019). Minnesotan's experienced over 11,000 hospitalizations for strokes in 2016, and approximately 2.4% of adults in Minnesota reported they had experienced a stroke in their lifetime. The most recent statistics show over $418 million in total charges in Minnesota in 2013. This condition is costly, and can be deadly.

One requirement set forth by the DNV-GL is that patient/family education is individualized and general risk factors for stroke are identified and discussed with the patient/family (DNV-GL, 2019). Documentation must be individualized based on race and age at

the minimum. As discussed previously, it is necessary that the education addresses: activation of EMS, importance of follow up after discharge, discharge medications, stroke risk factors, and the warning signs and symptoms of stroke to maintain accreditation as a PSC.

The evidence has shown that patient education on stroke impacts their recovery and may help prevent a future stroke (Leonhardt et al., 2018). Patient education can also lead to improved self-care (Fuhrman & Plehn, 2018). An inpatient stroke education class was found to reduce hospital readmission rates, demonstrating the importance of stroke education (Thomas et al., 2019). The authors provided a pre- and post-test for the course, finding 100% of patients improved in their scores in response to the inpatient course.

A subsequent study incorporated post-stroke education as a part of the treatment program to prevent a recurrent stroke. Education focused on exercise incorporation and diet modification, medication adherence, and stroke warning signs and symptoms (Faulkner et al., 2017). Outcome measures included hospital readmission and recurrent stroke. The group who received the stroke education had significantly fewer recurrent strokes (P<0.003), and nearly statistically significant fewer hospital admissions (Cohen's d = 0.54). This clearly demonstrates the importance of stroke education to prevent future strokes and reduce hospital readmissions.

A multifaceted approach has been found to effectively educate nurses working on stroke units (Barrere et al., 2010; Case, 2017; Kim et al., 2019; Reynolds et al., 2016). Patient stroke education by nurses was improved from 42% during the first quarter of the year to 86% during the fourth quarter of the year through a multifaceted intervention including didactic sessions, live presentations, self-learning modules, videos, handouts, and self-review posters implemented by Barrere et al. (2010). Implementation of a standardized protocol for nurses to follow to provide patient stroke education found a significant improvement in documentation of stroke patient

education (p=0.001), provision of an educational brochure (p=0.000), and repeated educational sessions (p=0.049) (Bjartmarz et al., 2017). Nurses also reported improved patient and family teaching as a result of the standardized protocol.

Emerging Themes

Strokes are a common and disabling occurrence throughout the United States that can be prevented. Those who suffer a stroke are at an increased risk for a recurrent stroke (Leonhardt et al., 2018). Stroke education is necessary, and an effective way to prevent a recurrent stroke from occurring. This education must be individualized based on each patients pre-existing conditions and individual risk factors for a recurrent stroke. Caregivers should be included in this education as stroke patients may be overwhelmed and may have lasting cognitive deficits.

RNs are in an ideal position to provide stroke education in the inpatient setting. RNs must have adequate education to provide stroke education to stroke patients and their caregivers. A multifaceted approach has been found to be an effective way to educate nurses, including: didactic sessions, live presentations, self-learning modules, videos, handouts, and self-review posters (Barrere et al., 2010; Case, 2017; Kim et al., 2019; Reynolds et al., 2016).

Organizational Project Information

This health program took place in a large bed hospital in a metropolitan area within Minnesota. The unit chosen for this project was a neurological-trauma unit where the majority of patients have received a neurological diagnosis or have experienced trauma involving the brain or spine. This hospital is accredited as a PSC by the DNV-GL.

Inclusion and Exclusion Criteria

All Registered Nurses (RNs) who are regularly scheduled staff on the neurological-trauma unit were included in the interventions of this project. These were the most appropriate

participants as providing stroke education to their patients was a work expectation. The adult patients, 18 years of age or older, on the neurological-trauma unit with a diagnosis of "ischemic stroke," "subarachnoid hemorrhage," "intracerebral hemorrhage," or "stroke not otherwise specified" were included as a part of the outcome measures as a secondary population. All other patients were excluded.

Float pool staff were excluded from the intervention and outcome measures as they do not regularly participate in the care of stroke patients on the neurological-trauma unit. The included nurses were provided with education on this initiative during pre-shift huddles and the float pool nurses were less likely to receive this education.

Interprofessional Team

This project involved interprofessional collaboration throughout its development and implementation. The stroke program coordinator for the hospital, neurological-trauma unit manager, and patient care supervisor were involved in the identification of the problem. These staff members also contributed information regarding past barriers to patient stroke education, as well as helped to identify areas of improvement within the unit. The Ongoing Quality Committee (OQC) of the neurological-trauma unit was also included in identifying potential interventions for this initiative. The OQC group includes one charge nurse, four floor nurses, and one nursing assistant, all from the neurological-trauma unit. Neurological-trauma floor nurses were involved as participants.

Stakeholders involved in this project included: floor nurses, unit leadership, OQC members, patients and their caregivers, as well as the facility. Unit leadership and the hospital count on the unit to maintain PSC accreditation to continue being a competitive facility for treating stroke patients. To maintain this accreditation, provision and documentation of patient

stroke education was necessary. Patients and their caregivers were more likely to have improved outcomes as a result of this health program, and floor nurses gained improved knowledge of providing and documenting stroke education.

Gap Analysis and Needs Assessment

Prior to implementation of the initiative, documentation of stroke education was at 35% on the identified unit, with a goal of >80%. Documentation of education needed to be improved to maintain accreditation by DNV-GL. It was determined that nurses likely had provided the education, but did not document this provided education. Potential reasons leading to lack of documentation in the electronic health record (EHR) may include: time constraints, staff turnover, shift work, short length of stay (LOS), cognitive deficits from stroke, and forgetfulness by staff (Strudwick et al., (2018). Additional reasons may have included: documentation workload, functionality, EHR navigation challenges, system performance, and unclear standards for use of the EHR.

Theoretical Framework and Change Theory

Plan-Do-Check-Act Cycle (PDCA)

The PDCA cycle is a four step cycle that can be implemented to carry out change (American Society for Quality [ASQ], 2020). This cycle may be used when starting a new improvement project, implementing change, and working toward continuous improvement (ASQ, 2020). The first step is to plan, occurring when an opportunity for change is recognized (ASQ, 2020). Subsequently, in the "do" phase, the change should be carried out on a small scale and tested (ASQ, 2020). After implemented on a small scale, the change should be "checked," where the results are analyzed and any learning from the change is identified (ASQ, 2020). Based on what is learned in the "check" step, action should be taken (ASQ, 2020). During this

"act" step, if the change did not work, the cycle can be gone through again with a modified plan (ASQ, 2020). If the change was successful, this change should be incorporated into wider changes (ASQ, 2020). Any learnings should be used to plan for new improvements, beginning the cycle again (ASQ, 2020).

PDCA Cycle in QI. Vann and Diegel-Vacek (2019) discussed utilization of the Plan-Do-Check-Act (PDCA) quality improvement model to improve nurse's documentation of patient education in stroke patients in the acute care setting. In this study, educational in-services were held with floor RNs to increase knowledge and professional competence, and results found improvement in knowledge of stroke education. The authors discussed that improvement in nurse's knowledge of stroke led to higher quality education as well as increased documentation. The PDCA cycle was used to guide the development and implementation of this initiative, including the nurse education plan.

Therapeutic Alliance Model (TAM)

The TAM has been used to address a power shift from the healthcare provider to a collaborative relationship between the patient and caregiver (Barofsky, 1978). This alliance has been defined as a dynamic process in which the patient and healthcare provider interact to collaborate and carry out mutual goals in a shared partnership. This alliance is made up of three goals: agreed upon goals, agreed upon sets to meet these goals, and a development of trust, respect, and empathy between the healthcare provider and patient.

TAM in QI. Byers et al. (2010) incorporated the TAM while using motivational interviewing to form a collaborative relationship between the healthcare provider, patient, and caregiver. An individualized, protocol-driven approach was used to address stroke education and post-discharge care. Collaborative goals were broken down into smaller tasks to meet the needs

of discharge planning. Individualizing care and educating the stroke patient and caregiver within a therapeutic alliance was found to improve stroke knowledge and satisfaction regarding stroke education post-discharge. The development of a therapeutic alliance between the patient, caregiver, and healthcare provider has the potential to lead to behavior change and increased satisfaction. It is necessary for a therapeutic alliance to be built between the nurse educator and nurse, as well as the nurse and patient/caregiver to ensure this relationship is seen as collaborative.

Goal and Objectives

Goal

The goal of this quality improvement initiative was to develop a standardized stroke education process using evidence-based information.

Objective 1

By December 31st, 2020, a pre/post-test was to be developed to gather baseline data on the knowledge of patient stroke education by the neurological-trauma unit RNs.

Objective 2

By December 31st, 2020, a standardized protocol was developed that guided the neurological-trauma RNs provision of patient stroke education.

Objective 3

By December 31st, 2020, a poster was to be developed that included the mandated stroke education points and standardized stroke patient education protocol.

Objective 4

By December 31st, 2020, an updated shift handoff report that includes the mandated stroke education by the neurological-trauma unit RNs was developed.

Objective 5

By December 31st, 2020, a survey was created to determine if the standardized protocol was being utilized to guide the provision of stroke education based on the information from the standardized stroke patient education protocol and updated shift handoff report.

Objective 6

By January 31st, 2021, the pre-test was to be administered to all of the neurological-trauma unit RNs.

Objective 7

By January 31st, 2021, an updated shift handoff report was utilized in daily practice by neurological-trauma unit nurses.

Objective 8

By February 1st, 2021, the breakroom poster would be placed on the bulletin board for staff review.

Objective 9

By February 28th, 2021, nurses on the neurological-trauma unit will have improved knowledge of stroke education by achieving a score of ≥90% on the post-test.

Objective 10

By February 28th, 2021, neurological-trauma unit RNs followed a standardized protocol that guided the provision of stroke education during the inpatient hospital stay.

Objective 11

By April 30, 2021, stroke education met the mandated requirements by RNs >80% of the time.

Logic Model

Several assumptions were made for this quality improvement project, including: Improving RN knowledge of stroke education led to improved stroke patient outcomes and using a standardized protocol was better than not using a standardized protocol and led to more accurate documentation. Multiple inputs were a part of this project for its support, including the stroke program coordinator, 29 floor RNs, and the electronic health record. Activities included: Development of the pre and post-test, the standardized protocol, the staff break room poster, and education provided during shift huddles. Outputs included: Administration of the RN pre/post-test, implementation of the standardized protocol, email of the RN opinion survey on the standardized protocol, and a chart review to determine the accuracy of the stroke education documentation. Outcomes for this project included: Improved RN knowledge of the provision and documentation of stroke education, improved accuracy and completeness of documentation of stroke patient education, and the development of a useful and effective tool to guide the provision and documentation of stroke education in the future

Methodology and Analysis

Pre-Implementation

Prior to implementation of this initiative, pre-work needed to be completed to develop the pre/and post-test, post-intervention survey, a standardized protocol to guide the provision of stroke education, and the poster to place in the staff breakroom. The below objectives were part of the pre-implementation of this initiative.

Objective 1 Implementation

The pre/post-test (Appendix B) was developed by combining information provided by the stroke program coordinator with evidence-based information. This evidence-based information has proven to be effective in guiding the provision of stroke education. The stroke program

coordinator provided the project lead with information on the specific documentation that must be completed in the EHR for the facility to receive credit for properly documented stroke education. Questions 1-6 were developed base on the information provided by the stroke program coordinator. Questions 7-10 of the pre/post-test were developed using evidence-based information that has proven to be the most successful in providing stroke education. The pre/post-test contained the same questions.

  Evaluation. This objective was met as the post-test was successfully developed by December 31st, 2020.

Objective 2 Implementation

  A standardized protocol can help improve quality and frequency of stroke education and documentation (Turner et al., 2018). The unit did not have a standardized protocol to guide the provision of stroke education prior to the intervention. The standardized protocol was developed by prioritizing patient stroke education. As a priority, the mandated education was provided on the patient's day of admission. It was developed based on the average patient length of stay. Stroke patient education that was not mandated was placed towards the patients discharge day as it did not have as great of an effect on patient outcomes and did not affect the accreditation of the facility as a PSC. Printed copies of this protocol were placed with the other stroke education materials and available at all times for use by the neurological-trauma unit RNs.

  Evaluation. This objective was met as the standardized education protocol was successfully developed by December 31st, 2020.

Objective 3 Implementation

  This poster (Appendix C) was developed for use in the neurological-trauma unit breakroom. It was developed by the project lead in conjunction with the stroke program

coordinator. The poster included the mandated patient stroke education material required to maintain PSC accreditation, as well as the developed protocol (see objective 2) guiding the unit RNs on when to provide the patient stroke education.

Evaluation. This objective was met as the poster was successfully developed by December 31st, 2020.

Objective 4 Implementation

Modifying the written shift handoff document may increase accountability of nurses to initiate and continue stroke education (Walsh et al., 2018). The previous shift handoff report included the statement "Stroke Education Started?" The updated shift handoff report (Appendix D) for this project was to include the mandated components of patient stroke education, including: Stroke/TIA Teaching Handouts, Quitting Tobacco, Warning Signs/EMS Activation, and Medication Instruction, Age, Race, All Other Risk Factors. All of these mandated points were to include a spot for the RN to place their initials once the education has been provided.

Evaluation. This objective was met as the updated shift handoff report was developed.

Objective 5 Implementation

This survey (Appendix E) was be developed using information from the standardized education protocol (see Objective 2) and updated shift handoff (see Objective 4). The survey was developed using SurveyMonkey.

Evaluation. This objective was met as the survey was created by December 31st, 2020.

Implementation

The below objectives were used to guide the implementation of this initiative once the pre-implementation objectives were completed. This included administration of the pre/post-tests, implementation of a standardized protocol, display of break room poster, and

implementation of an updated shift handoff. Unfortunately, the implementation of the updated shift handoff was not possible due to Epic constraints.

Objective 6 Implementation

The pre-test was to be administered in person by the neurological-trauma unit manager during the pre-shift huddle. This time to complete these tests was to be one week. The nurses were instructed to complete only the pre-test before viewing the breakroom poster. The pre-test and post-test were numbered accordingly to allow for the comparison of each RNs pre- and post-test scores.

Evaluation. This objective was not met as at least 90% of the floor RNs did not complete the pre-test by January 31st, 2021. The pre-test was administered via electronic mail due to COVID-19 constraints.

Objective 7 Implementation

The shift handoff report was to be updated (see Objective 4, Appendix D) in the EHR by the neurological-trauma unit patient care supervisor. It was an expectation of the neurological-trauma unit RNs to update this handoff report each shift and utilize this report to communicate with the oncoming RN.

Evaluation. The objective was not met as the updated shift handoff report was not implemented in Epic. The previous shift handoff report (Appendix D) was found to be helpful in remembering to provide stroke education only 50% of the time.

Objective 8 Implementation

The poster was placed on the education bulletin board in the staff breakroom. The bulletin board was free of all other material to increase the attention of the RNs. This poster was left in the staff breakroom throughout the duration of the initiative for adequate viewing time.

Evaluation. This objective was met as the poster was placed in the staff breakroom by February 1st, 2021.

Objective 9 Implementation

The nurses were sent the post-test (Appendix B) and Survey for Use of Stroke Inpatient Protocol and Handoff Report (Appendix E) via email one week after the break room poster had been placed on the bulletin board. The nurses were instructed to complete the post-test only after having the opportunity to review the poster. They were instructed to complete the survey after 1 month of completing the post-test.

Evaluation. Pre-test and post-test scores were converted into percentages for each nurse and for the group in its entirety for comparison. This objective was met as the floor RNs scored ≥90% on the post-test. A paired t-test was used to evaluate the effectiveness of the poster for educating RNs.

Objective 10 Implementation

This initiative utilized a standardized, evidence-based protocol (see Objective 2) for the RN to educate the stroke patient. This protocol was available as a handout, as well as in the breakroom. Each shift, the nurse was responsible for providing a short amount of education to each stroke patient. The protocol outlined what education should be presented to the patient and/or their caregiver on the neurological-trauma RNs shift. This was reinforced during pre-shift huddles by the neurological-trauma unit manager.

Evaluation. This objective was not met as only 67% of neurological-trauma unit RNs reported using the Stroke Inpatient Education Protocol with 50% of them finding this tool helpful.

Objective 11 Implementation

RNs were educated on proper documentation of stroke education through self-review of the breakroom poster (see Objective 3), use of the standardized stroke education protocol (see Objective 2) and use of the updated shift handoff report (see Objective 4). Documentation of stroke education was reviewed after two weeks from the start of the initiative for one month, and then monthly for two months.

Evaluation. A chart review was completed by the project lead of all patients meeting the inclusion criteria after two weeks from the start of the initiative for one month, and then monthly for two months. This objective was not met as stroke education was not properly documented ≥80% of the time.

Post-Intervention

Participation in this intervention was voluntary, which led to inconsistent participation in the surveys. The post-intervention survey that was used to determine the nurse's opinions on the developed protocol had 9 responses, which was significantly less than the pre- and post-test. Most of the objectives for this initiative were met; however, the updated shift handoff report was not fully implemented into the EHR due to time constraints as discussed previously.

IRB/Ethical Considerations

The Institutional Review Board (IRB) served to assure that the appropriate steps were taken to protect the rights and welfare of human participants in research. This project was approved by the IRB. No identifying data was recorded for this project to ensure confidentiality of participants. The pre- and post-surveys were numbered to maintain confidentiality of all participants. There were no direct benefits to human participants as a result of participating as this was a quality improvement project. Indirect benefits may have occurred by standardizing the

stroke education process which improved the stroke patient outcomes and prevention of recurrent strokes. No risks nor discomforts occurred as the result of this quality improvement project.

The primary participants included regularly scheduled Registered Nurses (RNs) on the neurological-trauma unit who receive regular education on changes in practice as part of their employment at agency. The RNs participated on a voluntary basis. The secondary participants were adult patients, 18 years of age or older, on the neurological-trauma unit with a diagnosis of "ischemic stroke," "subarachnoid hemorrhage," "intracerebral hemorrhage," or "stroke not otherwise specified." These stroke patients received stroke education based on the new standardized protocol developed for this initiative. Patients that were admitted with any other diagnosis or under the age 18 were excluded from this quality improvement project. None of these participants were considered vulnerable participants. A consent was not applicable for this initiative. This project was in compliance with the American Nurses Association (ANA) and Health Insurance Portability and Accountability (HIPAA).

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Implementation

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Results from Data Collection

Pre-Test and Post-Test

The pre- and post-test data was collected through deidentified surveys that were voluntarily taken by the nurses. These surveys were used to determine improved knowledge of floor RNs after the intervention. A two-tailed paired samples *t*-test was conducted to examine whether the mean difference of pre-test and post-test was significantly different from zero.

Assumptions

Normality. A Shapiro-Wilk test was conducted to determine whether the differences in pre-test and post-test could have been produced by a normal distribution (Razali & Wah, 2011). The results of the Shapiro-Wilk test were not significant based on an alpha value of .05, $W =$

0.96, p = .777. This result suggests the possibility that the differences in pre-test and post-test were produced by a normal distribution cannot be ruled out, indicating the normality assumption is met.

Homogeneity of Variance. Levene's test was conducted to assess whether the variances of Pretest and Posttest were significantly different. The result of Levene's test was not significant based on an alpha value of .05, $F(1, 8) = 0.10$, p = .760. This result suggests it is possible that pre-test and post-test were produced by distributions with equal variances, indicating the assumption of homogeneity of variance was met.

Results

The result of the two-tailed paired samples t-test was significant based on an alpha value of .05, $t(4)$ = -3.32, p = .029, indicating the null hypothesis can be rejected. This finding suggests the difference in the mean of pre-test and the mean of post-test was significantly different from zero. The mean of pre-test was significantly lower than the mean of post-test. The results are presented in Table 1. A bar plot of the means is presented in Figure 1.
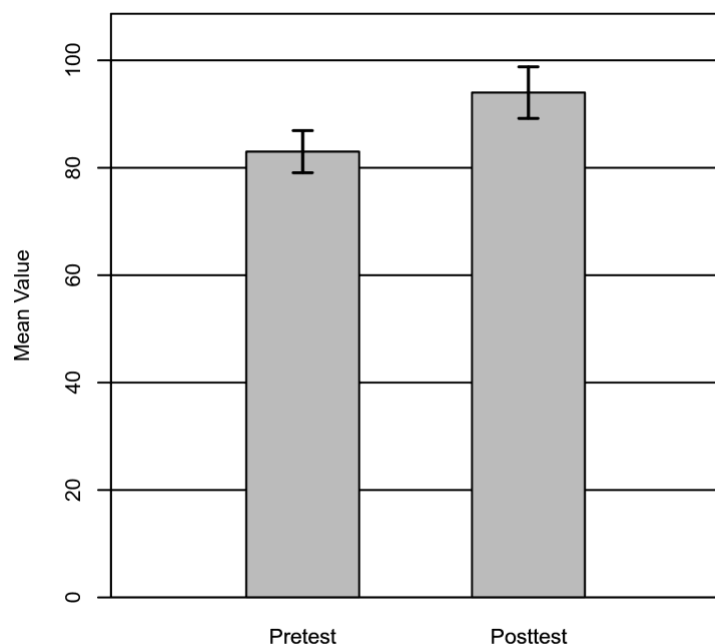
Table 1

Two-Tailed Paired Samples t-Test for the Difference Between Pre-test and Post-test

Pretest		Posttest				
M	SD	M	SD	t	p	d
83.00	4.47	94.00	5.48	-3.32	.029	1.48

Note. N = 5. Degrees of Freedom for the t-statistic = 4. d represents Cohen's d.

Figure 1

Accurate Provision of Stroke Education

Accurate provision of stroke education was measured by the Stroke Program Coordinator. At the beginning of this initiative, stroke education was documented to meet the guidelines 35% of the time. At the end of the initiative, accurate provision of stroke education had improved to 63%.

Post Intervention Survey

Sixty seven percent of the registered nurses reported using the Stroke Inpatient Education Protocol with 50% of them finding this tool helpful. Half of nurses reported the already existing Shift Handoff Report tool to be helpful in remembering to provide stroke education.

Discussion of Data/Outcomes Interpretation

RN Knowledge Pre- and Post- Intervention

There was a statistically significant ($p = 0.29$) improvement in RN knowledge through the implementation of this initiative. Based on this finding, the intervention proved to be an

effective intervention in the improvement on RN education on providing and documenting. This statistical significance indicates that the results are likely not due to chance, and are in fact a result of the intervention.

Provision of Stroke Education

In order to maintain accreditation as a PSC, a facility must have the mandated stroke education documented correctly at least 80% of the time. If this is not met, education must be in place to meet these guidelines. As a result of this project, stroke education improved from 35% pre-initiative to 63% post-initiative. Though the goal of 80% was not achieved, this project was a step towards achieving this goal.

RN Opinion of Intervention

A majority of nurses used and found the standardized protocol to be helpful in reminding them to provide stroke education, as well as guiding them in how to correctly documenting this stroke education. The use of a multifaceted education approach, including the use of a staff breakroom poster, can served as a useful way to educate RNs on stroke education.

Dissemination

The results of this project were presented to the stroke program coordinator. Based on the effectiveness of this project, the facility continued to educate RNs with staff breakroom posters, quarterly education with included exams to test knowledge, and implemented a stroke program champion. The stroke program champion was available to answer questions on stroke education, and conducted weekly check-ins with floor nurses who were not meeting the stroke education documentation guidelines.

Conclusion

Stroke has the potential to leave patients with lifelong deficits, and was preventable in up to 80% of cases (Wilson & Ashcraft, 2019). A multifaceted nurse education approach is supported by the literature as an effective way to educate nurses (Case, 2017). Breakroom posters, reinforcement via email, updated shift handoff reports, and standardized protocols are evidence-based ways to educate nurses and improve documentation of stroke education (Bjartmarz et al., 2017; Case, 2017; Turner et al., 2018; Walsh et al., 2018). Improved patient stroke education by nurses was necessary to improve patient outcomes, and this health program was a step towards achieving these improved outcomes.

Implementation of the initiative was mostly successful, including creation of the breakroom poster, administration of pre/post-tests and surveys, and provision of RN education. Unfortunately, even though the nurses pre/post-test scores improved, indicating successful education of the nurses, the overall documentation of stroke education did not achieve the goal of correct documentation in at least 80% of appropriate patients. However, even though a goal of at least 80% was not achieved, the percentages of correctly documented stroke education increased throughout the initiative from 35% at the start of the intervention to 63% at the conclusion of the intervention. Continued stroke education provided to floor nurses could be a helpful way to continue to improve stroke education in neurological-trauma unit RNs.

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Heiberger, C., Busch, C., Chandler, J., Rance, K., Montieth, B., Hanscom, J., Sandhu, G., & Sandhu, D. (2019). Caregiver's recall of stroke discharge education exceeds patients and is associated with greater satisfaction. *Journal of Patient Experience,* 1-5. DOI: 10.1177/2374373519893201

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Reference	Purpose/ Question	Design	Sample	Intervention	Results
Park J., & Ovbiagele, B. (2016). Relationship of functional disability after a recent stroke with recurrent stroke risk. *European Journal of Neurology*, *23*(2), 361–67. doi: 10.1111/ene.12837.	This study looked at the relationship between functional disability post-stroke and the risk of a recurrent vascular event.	Cohort study	3680 non-cardioembolic, non-to-moderate disabled participants who had experienced a stroke.	A modified Rankin Scale (mRS) was used to classify post-stroke disability with ischemic stroke as the primary outcome.	Moderate disability risk after a recent stroke was found to be linked to a higher risk of recurrent stroke when compared to no/slight disability
American Stroke Association (ASA). (2019). Preventing another stroke. https://www.stroke.org/en/life-after-stroke/preventing-another-stroke	The article discussed risk factor modification to prevent a recurrent stroke.	Expert opinion	n/a	n/a	For those who have experience a previous stroke, 25% will experience a recurrent stroke, 80% can be prevented.
Johnson, B., Handler, D., Urrutia, V., & Alexandrov, A. W. (2018). Retention of stroke education provided during hospitalization: Does provision of required education increase stroke knowledge? *Interventional Neurology*, *7*(6), 471–478. https://doi-org.akin.css.edu/10.1159/000488884	The purpose of this study was to evaluate the retention of stroke education.	Randomized Controlled Trial (RCT)	198 patients/caregivers in Pilot A, 187 patients/caregivers in Pilot B	The Targeted Education in Stroke Trial (TEST) was used as a means to improve retention of stroke education.	This was found to be an effective way to improve stroke education (p=0.04).

Det Norske Veritas-Germanischer Lloyd (DNV-GL). (2019). Primary stroke center certification requirements. https://brandcentral.dnvgl.com/original/gallery/dnvgl/files/original/33cf405709aa4b95822270c109261f1a.pdf	This article discussed the requirements set forth by the DNV-GL to maintain accreditation as a PSC.	Expert opinion	n/a	n/a	The four pieces of education that are mandated by the stroke center are: activation of EMS, warning signs of stroke, stroke risk factors, discharge medications, and follow up appointments
Morrison, L., McAteer, C., Donaghy, L., O'Connor, M., & Dolan, E. (2019). An evaluation of patient education post-stroke. *Age & Ageing*, *48*, 17-65. https://doi-org.akin.css.edu/10.1093/ageing/afz103.152	The purpose of this study was to evaluate patient's education of their stroke diagnosis and ways to improve this education.	Convenience sampling	30 post-stroke patients being seen at a stroke clinic	The researchers used a questionnaire to determine what information the patients remembered while in the hospital.	The results varied in regards to what question was asked. Only 33% of patients were able to state what type of stroke they had, and only 50% were able to identify their risk factors.
Hickey, A., O'Hanlon, A., McGee, H., Donnellan, C., Shelley, E., Horgan, F., & O'Neill, D. (2009). Stroke awareness in the general population: Knowledge of stroke risk factors and warning signs in older adults. *BMC*	The purpose of this study was to examine the knowledge of stroke warning signs and risk factors of older	Random selection, interviews	2,033 participants aged 65+ were	The participants completed home interviews on	Less than half of participants were able to correctly identify personal

geriatrics, *9*, 35. https://doi.org/10.1186/1471-2318-9-35	community-dwelling adults.		randomly selected	questions regarding stroke warning signs and risk factors, as well as personal risk factors for stroke.	risk factors for stroke (with hypertension as the exception), and less than half of participants were able to identify stroke warnings signs (with slurred speech as the exception).
Sposito, J., Zipf, A., Alhowaymel, F., Almutairi, M. T., & Breda, K. (2018). Community-based stroke recognition education and response: An evidence-based intervention project. *Creative Nursing*, *24*(4), 251–257. https://doi-org.akin.css.edu/10.1891/1078-4535.24.4.251	The purpose of this project was to examine the effectiveness of a public stroke education program using FAST.	Cross sectional	62 participants were included in this study from three different senior centers.	Nurses provided stroke education to the participants on the FAST acronym.	The recognition of stroke signs and symptoms improved to 87% after implementation of the intervention.
Pckham, D., Valdez, A., Demeestere, J., Diaz, L., Hopper, S., de la Cuesta, K., Rackover, F., Miller, K., & Lansberg, M. (2019). Prognostic value of BEFAST vs FAST to identify stroke in a prehospital setting. *Prehospital Emergency Care, 23*(2), 195-200.	This study examined wither adding BE to FAST increased accuracy in emergency response activations for a presumed stroke.	Prospective study	359 patients were included in the study	Emergency responders were trained in the BEFAST acronym and administered this scale to all	Stroke detection was not improved in the prehospital setting by adding BE on the preexisting acronym.

				patients who had experienced neurological symptoms within the past 6 hours. Each patient's final diagnosis (stroke vs no stroke) was compared using BEFAST and FAST scales for stroke detection and compared.	However, it may alert patients to additional stroke symptoms.
https://doi.org/10.1080/10903127.2018.1490837					
Centers for Disease Control (CDC). (2020). Stroke facts. https://www.cdc.gov/stroke/facts.htm	The article by the CDC presents stroke facts.	Expert opinion	n/a	n/a	Only 38% of adults had an awareness of all major stroke symptoms, and knew to call EMS for a suspected stroke.
Xirasagar, S., Tsai, M., Heidari, K., Hardin, J. W., Wu, Y., Wronski, R., Hurley, D., Jauch, E. C., & Sen, S. (2019). Why acute ischemic	The purpose of this study was to evaluate what percentage of people	Convenience sampling	108 patients who had a	Patients were surveyed on symptoms	A widespread lack of knowledge on

stroke patients in the United States use or do not use emergency medical services transport? Findings of an inpatient survey. *BMC Health Services Research*, *19*(1), N.PAG. https://doi-org.akin.css.edu/10.1186/s12913-019-4741-6	diagnosed with stroke activated EMS, and determine why EMS was not activated if that was the case.		diagnosis of acute ischemic stroke.	experienced, knowledge of symptoms, decision to call EMS, stroke education, and experiences with EMS.	stroke symptoms and the importance of activating EMS was found through the surveys. Stroke education is a necessary standard of care for these patients.
Jiang, C., Lan, D., Du, X., Geng, Y., Chang, S., Zheng, D., Chen, J., Yu, R., Sang, C., Long, D., Tang, R., Zhou, Y., Min, Y., Lu, Y., Dong, J., Lip, G. Y. H., & Ma, C. (2019). Prevalence of modifiable risk factors and relation to stroke and death in patients with atrial fibrillation: A report from the China atrial fibrillation registry study. *Journal of Cardiovascular Electrophysiology*, *30*(12), 2759–2766. https://doi-org.akin.css.edu/10.1111/jce.14231	The purpose of this study was to evaluate how modifiable risk factors impact patient clinical outcomes in patients with atrial fibrillation.	Cohort study	n=17,898 participants with atrial fibrillation	Data was analyzed to determine the relationship between risk factors and risk using Cox proportional hazards regression model	Controlling modifiable risk factors may substantially lower the risk of death in ischemic stroke patients with atrial fibrillation.
Hohmann, C., Neumann, H. T., Klotz, J. M., Freidank, A., & Radziwill, R. (2014). Providing systematic detailed information on medication upon hospital discharge as an important step towards improved transitional care. *Journal of Clinical Pharmacy &*	The purpose of this study was to develop a standardized medication report as a part of discharge education.	RCT	n=312 patients	Patients were randomized into either a control group or intervention group. Half of the	The use of a standardized medication report leads to improve adherence to hospital

Therapeutics, *39*(3), 286–291. https://doi-org.akin.css.edu/10.1111/jcpt.12140				participants were educated and given the newly developed, standardized discharge medication report, and the other half were not.	discharge medication (P=0.01).
Jackson, C., Shahsahebi, M., Wedlake, T., & DuBard, C. A. (2015). Timeliness of outpatient follow-up: an evidence-based approach for planning after hospital discharge. *Annals of Family Medicine*, *13*(2), 115–122. https://doi.org/10.1370/afm.1753	The purpose of this study was to identify the optimal timing of post-hospital follow up for patients with variable complexity.	Retrospective study	n=44,473 Medicaid claims data for patients discharged from 2012-2013	Patients were placed into clinical risk groups and readmission rate was determined based on reviewed data. Outpatient follow up was looked at post hospital day 3, 7, 14, 21, and 30.	Early follow up was of more benefit for patients who were more medically complex, with 7 days the ideal follow up to reduce hospital readmission.
Terman, S., Reeves, M., Skolarus, L, & Burke, J. (2018). Association between early outpatient	The purpose of this paper was to examine the effect	Retrospective cohort study	n=78,345 Medicare fee for service	Data on Medicare fee for service patients	30 day outpatient follow up was associated with

visits and readmission after ischemic stroke. *Circulation: Cardiovascular Quality and Outcomes, 11*(4). https://doi.org/10.1161/CIRCOUTCOMES.117.004024	of early outpatient follow up on readmission rate.		patients discharged back to home after an AIS in 2012	discharged back to home after an AIS in 2012 was analyzed. Several multivariable Cox models were used to analyze readmission within 30 days.	a reduction in hospital readmission, however, most readmission occurred a median of 14 days post-discharge
Heiberger, C., Busch, C., Chandler, J., Rance, K., Montieth, B., Hanscom, J., Sandhu, G., Sandhu, D. (2019). Caregiver's recall of stroke discharge education exceeds patients and is associated with greater satisfaction. *Journal of Patient Experience,* 1-5. doi: 10.1177/2374373519893201	The purpose of this study was to identify the strengths and weaknesses of stroke education at discharge.	Cross-sectional survey	24 participants who had a diagnosis of acute ischemic stroke and 19 caregivers. Excluded if not A&Ox3 or had deficits that prevented	Questionnaire's focused on recall and satisfaction of discharge education. Follow up questionnaires were administered at 1 and 3 months via phone call.	Stroke education has been insufficient at time of discharge, and recall suffers a significant decline. Targeting caregivers with stroke education may be more effective.

			the questionnaire from being answered completely.		
Turner, H., May-Cowgill, M., Mahanes, D., & Hundt, B. (2018). Improving initiation time and frequency of patient and family stroke education. *Stroke, 49*(1). https://www.ahajournals.org/doi/10.1161/str.49.suppl_1.WMP114	The purpose of this study was to improve the quality and frequency of stroke education.	Prospective cohort study	n=34 neuro ICU and acute care stroke unit RNs	Standardized work focused on a personalized stroke education packet with 24 hours of admission, daily education to the patient, and daily documentation of education. Education was given to the RNs through e-mail, flyers, and review at change of shift huddles and staff meetings.	Standardized work for the process of stroke education and follow up with documentation audits led to earlier provision of stroke education and significantly increased frequency of stroke education (p<0.05).

American Society for Quality (ASQ). (2020). What is the plan-do-check-act cycle? https://asq.org/quality-resources/pdca-cycle	This article discusses utilizing the PDCA cycle and its necessary steps.	Expert opinion	n/a	n/a	The PDCA cycle should be implemented if a change is to be incorporated to determine the effectiveness of the intervention and what changes need to be made. This four step model can be used to guide quality improvement interventions
Vann, J., & Diegel-Vacek, L. (2019). Improving patient stroke education by acute care nurses. *Stroke, 50*(1). https://doi.org/10.1161/str.50.suppl_1.TP483	The purpose of this study was to determine the effect of educational in-services for nurses regarding patient stroke education and documentation	Cohort study	N=37	Pre- and post-test surveys were used to determine the effectiveness of the educational session. The educational sessions were based on evidence-based information.	Nurse education was improved as shown by the pre and post-test scores from 73.1% to 87.8%.

Barofsky, I. (1978). Compliance, adherence and the therapeutic alliance: Steps in the development of self-care. *Social Science and Medicine*, 12, 369-376. https://doi.org/10.1016/0271-7123(78)90091-3	This article outlined the Therapeutic Alliance model.	Expert opinion	n/a	n/a	Barofsky provides an overview on the background and applicability of the Therapeutic Alliance Model. The model can be used to form a collaborative relationship between the patient and caregiver.
Byers, A. M., Lamanna, L., & Rosenberg, A. (2010). The effect of motivational interviewing after ischemic stroke on patient knowledge and patient satisfaction with care: a pilot study. *The Journal Of Neuroscience Nursing: Journal Of The American Association Of Neuroscience Nurses*, *42*(6), 312–322.	This study evaluated the effectiveness of two different educational methods in an acute care setting.	RCT	20 patients in an acute care setting.	Randomization to two groups then occurred. Group 1 received verbal and written education, the standard of care. Group 2 received individualized protocol-driven verbal and written education with	Group 2 had improved scores on the post-test that evaluated stroke knowledge and patient satisfaction.

				their caregiver present using the Therapeutic Alliance Model.	
Barrere, C., Delaney, C., Peterson, D., & Hickey, K. (2010). Primary stroke center education for nurses. *The Journal of Nursing Administration, 40*(12), 515-521. doi: 10.1097/NNA.0b013e3181fc1a05	The purpose of this study was to determine an effective way to improve nurse stroke education to meet core measures.	Quasi-experimental	56 nurses were randomly selected to be participants. There was no control group.	Evidence-based stroke guideline education was provided to RN's using the Donabedian model.	Documentation of stroke education improved from 42% to 86% in 1 year.
Case, C. A. (2017). Promoting evidence-based practice at a primary stroke center: A nurse education strategy. *Dimensions of Critical Care Nursing*, *36*(4), 244–252. https://doi-org.akin.css.edu/10.1097/DCC.0000000000000251	The purpose of this study was to determine the effectiveness of a nursing education intervention on evidence-based stroke guidelines were used in a stroke center to improve confidence in the RN's.	Quasi-experimental	20 RN's from the ED, critical care, progressive care, and intensive care unit were selected for this study.	Pre- and post-tests were given to determine the nurse's self-reported confidence. The RN's were educated with a 90 second pre-shift poster presentation, followed by an email with	A significant increase in the RN's perceived ability to perform an order set compared to if an order set was not evidence based.

				the same information a week later.	
Kim, J., Gu, M., & Chang, H. (2019). Effects of an evidence-based practice education program using multifaceted interventions: A quasi-experimental study with undergraduate nursing students. *BMC Medical Education, 19*(71), https://doi.org/10.1186/s12909-019-1501-6	The purpose of this study was to examine the effects on the EBP education on nursing students.	Quasi-experimental	n=44 nursing students	Pre-test, intervention, and post-test occurred. The EBP education was provided through 8 sessions across 4 weeks.	EBP education programs are effective in improving the knowledge and skills of future EBP use among nursing students.
Reynolds, S., Murray, L., McLennon, S., Bakas, T. (2016). Implementation of a stroke competency program to improve nurses' knowledge of and adherence to stroke guidelines. *Journal of Neuroscience Nursing, 48*(6), 328-334. DOI: http://dx.doi.org.akin.css.edu/10.1097/JNN.0000000000000237	The purpose of this study was to evaluate whether a multifaceted stroke competency program improve nurse's knowledge of and adherence to evidence-based stroke practices.	Pretest/posttest	88 neurocritical care Registered Nurse's	Nurses were surveyed pre and post intervention. The stroke competency program included printed educational materials, educational outreach, and discussion by local opinion leaders. Evaluation of	An overall improvement was determined after implementation of the program, as well as an improvement in nursing knowledge.

				program effectiveness done by chart audits.	
Furhman, S., & Plehn, P. (2018). Moving toward 100% stroke patient education compliance. *Stroke, 43*(1). https://www.ahajournals.org/doi/10.1161/str.43.suppl_1.A2477	The purpose of this was to identify barriers to providing stroke education, as well as implement strategies for improving stroke education.	Cross-sectional study	2 hospitals were included in this study. The number of participants was not specified.	A spiral bound educational booklet and audio version of this booklet were given to patients by the RN. The RN provided stroke education, and documented this in the EHR.	After 2 years of this initiative, most months resulted in stroke education compliance of 100%.

Stevens, K. (2013). The impact of evidence-based practice in nursing and the next big ideas. *The* *Online Journal of Issues in Nursing, 18*(2). http://ojin.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol-18-2013/No2-May-2013/Impact-of-Evidence-Based-Practice.html	This paper discussed the impact of EBP on nursing practice and education.	Expert opinion	n/a	n/a	The goal of EBP is to hardwire knowledge into daily practice to improve patient outcomes. It combines research with clinical expertise and individualizes patient care through patient preference.

Humphrey, J., (2015). Improving registered nurses' knowledge of evidence-based practice guidelines to decrease the incidence central-line associated bloodstream infections: An educational intervention. *Journal of the Association for Vascular Access, 20*(3), 143-149. https://doi.org/10.1016/j.java.2015.05.003	The purpose of this paper was to develop an educational intervention targeted at improved RN's knowledge of evidence-based guidelines to decrease the incidence of CLABSI.	Cohort study	n=64 RN's at a large regional hospital in the ICU	A pre-test and post-test were used to evaluate the effectiveness of the educational session. The educational session included an interactive, hands-on component utilizing an upper body mannequin.	The RN's knowledge of maintenance and care of central lines was improved significantly after the intervention (P=0.001).
American College of Emergency Physicians (ACEP). (2015). Standardized protocols for optimizing emergency department care. https://www.acep.org/globalassets/new-pdfs/policy-statements/standardized.protocols.for.optimizing.ed.care.pdf	The purpose of this paper was to evaluate the inclusion of standardized protocols.	Expert opinion	n/a	n/a	Standardized protocols should be developed based on the Standardized nurse protocols have benefits, including: enhanced patient comfort, improved overall patient safety, and improved

					patient experience
Bjartmarz, I., Jonsdottir, H., & Hafsteinsdottir, T. B. (2017). Implementation and feasibility of the stroke nursing guideline in the care of patients with stroke: A mixed methods study. *BMC Nursing*, *16*(72). https://doi-org.akin.css.edu/10.1186/s12912-017-0262-y	The objective of this study was to implement and determine the feasibility of a developed Stroke Nursing Guideline (SNG).	Mixed methods	33 nursing staff and 78 patients were included in this study.	Pre- and post-test were used with focused group interviews. Retrospective electronic data was recorded and collected, and focus groups were conducted with nursing staff.	Nursing documentation was improved for 23 items (including education) as a result of this study, with P=0.001.
Chung, K., Davis, I., Moughrabi, S., Gawlinski, A. (2011). Use of an evidence-based shift report tool to improve nurses' communication. *MedSurg Nursing, 20*(5), 255-260. https://link-gale-com.akin.css.edu/apps/doc/A270149311/HRCA?u=mnacstsch&sid=HRCA&xid=4a6ed1d9	This purpose of this study was to develop and determine the effects of a standardized shift report.	Pilot study	This was piloted on a med-surg unit in a large hospital. The number of participants was not identified.	The Iowa Model of Evidence-Based Practice was used to develop and pilot a standardized shift report.	Decreased frequency of missed information, less overtime, and few delays in shift starting time were a result of this pilot study.
Cairns, L., Dudjak, L., Hoffmann, R., Lorenz, H. (2013). Utilizing bedside shift report to	The purpose of this study was to evaluate the	Quasi-experimental	n=29 nurses on	A standardized	Call light and overtime were

improve the effectiveness of shift handover. *The Journal of Nursing Administration,* *43*(3), 160-165. doi: 10.1097/NNA.0b013e318283dc02.	effectiveness of a standardized, beside change of shift report.		an ICU floor	shift report was developed and implemented. Nurses were educated on this report with 1 hour didactic sessions.	reduced, and more time was available for the nurses to spend during their shift on completing the necessary tasks.
Walsh, A., Moore, A., Everson, J., & DeCaire, K. (2018). Gathering, strategizing, motivating and celebrating: the team huddle in a teaching general practice. *Education for Primary Care*, *29*(2), 94–99. https://doi-org.akin.css.edu/10.1080/14739879.2018.1423642	The purpose of this study was to determine the effects of a daily team huddle.	Qualitative study with semi-structured interviews	77 interdisciplinary team members in health care	Semi-structured interviews in focus groups were conducted to determine the effects after implementation of daily team huddles.	Daily team huddles seem to improve patient care, distribution of knowledge, and improved problem solving among the health care team.

Appendix B: Pre/Post-Test

1. Circle all that are considered "Stroke Key Points."
   a. Warning signs/EMS activation
   b. Risk actors
   c. Individualized risk factors
   d. Quitting tobacco
   e. Physical activity
   f. Stroke/TIA teaching handouts
2. What elements must be individualized in the "Stroke Risk Factors" section?
   a. Age
   b. Race
   c. Gender
   d. Socioeconomic status
   e. BMI
   f. Smoking status
3. Stroke education is part of the stroke order set.
   a. True
   b. False
4. When must stroke education begin?
   a. Day of admission
   b. Hospital day 2
   c. Hospital day 3
   d. Discharge day
5. Stroke education must be individualized.
   a. True
   b. False
6. An admission, a stroke patient should be provided with (circle all that apply):
   a. Care Map
   b. Stroke Booklet
   c. TBI Booklet
   d. Stroke Magnet
7. Who is responsible for ensuring stroke education is completed at time of discharge?
   a. Day shift nurse
   b. Night shift nurse
   c. Evening shift nurse
   d. Discharging nurse
8. The caregiver should not be included in stroke education.
   a. True
   b. False
9. The teach-back method should be used to improve information retention.
   a. True
   b. False
10. It is every nurse's responsibility to provide stroke education.
    a. True
    b. False

Appendix C: Breakroom Poster

STROKE EDUCATION DOCUMENTATION REQUIREMENTS

Stroke Key Points

➢ *All of the "Stroke Key Points" must be selected and documented on.*

Clarifying the "Tobacco" Key Point:
- If the patient is a tobacco user, this point **MUST** be selected and documented on.
- If the patient is not a tobacco user: documentation is considered "correct" whether it is selected and documented on, or not selected.

Warning Signs/ EMS Activation
- **MUST** be selected. This is the only point that is not found routinely on the AVS.

Risk Factors

➢ *Takeaway: Risk factors MUST be individualized for your patient. Selecting all factors will be a fail (unless that patient has e v e r y single one – not likely).*

Age: Always review and document appropriately
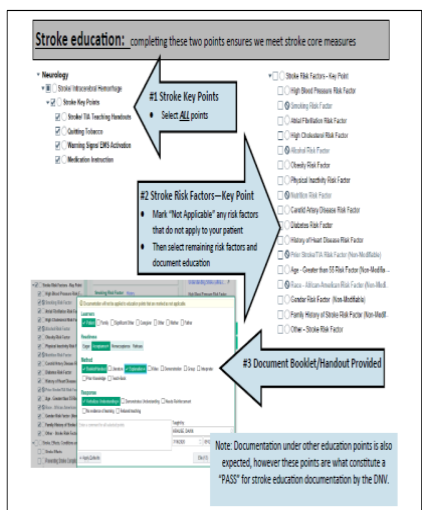Race: Always review and document appropriately
Does the patient have?
- A-fib
- HTN
- High cholesterol
- Diabetes
- Tobacco use
- **If yes, then document these risk factors.**

Tips:

✓ Look on the H & P if you are uncertain of risk factors. If a-fib, for instance, is clearly documented on the H & P, but has not been listed as a stroke risk factor, then that would be a fail.

✓ What meds are on the MAR? If there is a hypertension medication or diabetes medication, then document that risk factor appropriately.

PROVISION OF STROKE EDUCATION PROTOCOL

Day of Admission	Hospital Day 2	Hospital Day 3 OR Day of Discharge
❑ Review patient chart, including H&P prior to admission to floor.	❑ Review H&P and MAR.	❑ Complete DOCUMENTATION on any "Stroke Key Points" not yet documented on.
❑ Complete learning assessment for patient and/or caregiver.	❑ Complete DOCUMENTATION on Stroke Risk Factors, including those mentioned in the H&P. Mark n/a as appropriate.	❑ Complete DOCUMENTATION of and check for accuracy of previously documented on or remaining "Stroke Risk Factors."
❑ Provide patient and/or caregiver with stroke booklet, care map, and magnet.	❑ Ensure all risk factors are NOT selected unless the patient actually has ALL of those risk factors.	❑ At discharge, RESOLVE EDUCATION.
❑ DOCUMENT on AGE and RACE under "Stroke Risk Factors."	❑ Reinforce necessary education that has been documented as "Needs Reinforcement.	❑ The discharging nurse is responsible for ensuring stroke education is documented accurately and resolved.
❑ Provide education and DOCUMENT on "Stroke Key Points" (Stroke/TIA Teaching Handouts, Quitting Tobacco, Warning Signs/EMS Activation, and Medication Instruction)	❑ DOCUMENT on any education provided on the shift.	

Appendix D: Current and Updated Shift Handoff Report

Current Shift Report:	Updated Shift Report:
Stroke Education Started?	**Stroke Key Points (Initial When DOCUMENTED):** Stroke/TIA teaching handouts_____ Quitting Tobacco (even if not a tobacco user) _____ Warning Signs/EMS Activation _____ Medication Instruction _____ **Stroke Risk Factors (Initial when DOCUMENTED):** Age _____ Race _____ All others (if not applicable, documented not applicable) _____

Appendix E: Survey for Use of Stroke Inpatient Education Protocol and Handoff Report

1. In the past week, I have utilized the Stroke Inpatient Education Protocol.
   a. Yes
   b. No
2. In the past week, the Stroke Education Protocol has reminded me to provide stroke education.
   a. Yes
   b. No
3. In the past week, I have used the shift handoff report as a reminder to provide stroke education.
   a. Yes
   b. No
4. In the past week, I have taken responsibility for a piece of mandated stroke education on the updated shift handoff?
   a. Yes
   b. No

Appendix F: Logic Model

Assumptions	Inputs	Activities	Outputs	Outcomes
-Improving RN knowledge of stroke education will lead to improved stroke patient outcomes. -Using a standardized protocol is better than not using a standardized protocol and will lead to more accurate documentation.	- Stroke program coordinator -29 neurological-trauma floor RNs -Electronic health records	-Developed pre and post-test -Developed standardized protocol -Developed staff break room poster -Education provided during shift huddles	- RN pre/post-test administered -Standardized protocol implemented -RN opinion survey on standardized protocol emailed -Chart review completed to check accuracy of stroke education documentation	-Improved RN knowledge of the provision and documentation of stroke education -Improved accuracy and completeness of documentation of stroke patient education -Useful and effective tool to guide the provision and documentation of stroke education in the future