Improving Stroke Care with Depression Screening

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Abstract

Stroke and depression are two of the leading causes of death and disability, with post-stroke depression being the result. Post-stroke depression can lead to increased stay length, decreased rehabilitation engagement, increased morbidity, and decreased quality of life. Depression screening is a critical component of post-stroke care, as it enables the identification and intervention of depressive symptoms among stroke patients. This evidence-based project's purpose is to enhance stroke care through depression screening and raising awareness of depression among patients who have suffered a stroke.

The project was implemented in a neurological unit at a midwestern trauma 2 Hospital, on a 34-bed unit. All patients admitted with a primary diagnosis of stroke, transient ischemic attack, or cerebrovascular accident with a National Institute of Health Stroke Scale (NIHSS) of four or greater were included in post-stroke depression screening. A comparison before and after nursing education will be measured, which will include (Patient Health Questionnaire) PHQ-9 screening of patients who survived a stroke with an NIHSS score of four or greater, patients with a PHQ-9 score, and referrals to the Neurology clinic, percentage of nursing staff on unit who completed education, and documentation of patient education about depression.

Improving Stroke Care with Depression Screening

Stroke is one of the leading causes of death and disability in the United States, with depression being the second leading cause of disability (Mitchell, 2016). Depending on the severity of stroke symptoms, stroke can be debilitating for patients, resulting in the loss of a career, an increase in family burden, and the inability to perform activities of daily living independently. Post-stroke depression is common among stroke survivors; approximately forty percent of stroke patients will develop depression after a stroke (Mitchell, 2016). Post-stroke depression results in decreased recovery, decreased quality of health, subsequent strokes, and mortality (Mitchell, 2016). There are many types of depression screening tools, including the Patient Health Questionnaire (PHQ-9), Aphasic Depression Rating Scale (ADRS), Hamilton Depression Rating Scale, EQ-5D, and Geriatric Depression Scale (APA, 2023). There are many types of depression screening tools available; one tool may not be the right tool for a specific patient population, but another may be the better option. The depression screening tool cannot diagnose a patient with depression but rather open areas of conversation with their health care team. This evidence-based project improves stroke care by increasing depression screening by implementing a depression screening tool and providing depression awareness among stroke survivors.

Background and Significance:

Strokes occur every forty seconds in the United States, accumulating to more than 795,000 strokes yearly (CDC, 2023). With 795,000 strokes occurring yearly, an estimated 295,000 people will experience depression (Mitchell, 2016). Patients who suffered from a stroke are at risk for post-stroke depression, which is a complication that can reduce the quality of life, reduce rehabilitation efforts, and put the patient at risk of experiencing more life-threatening vascular events, such as myocardial infarctions, deep venous thrombosis, and further progression of cerebrovascular accidents (Towfighi et al., 2017).

The neurological team at a midwestern 270-bed level one trauma center recognized that they do not evaluate for mental illness. Specifically, depression after a patient has suffered a stroke. In 2022, the stroke coordinator identified 473 stroke patients treated at this comprehensive stroke center who did not receive a depression screening on admission to the stroke unit (S. Mulder, personal communication, March 2023). Current practice involves asking the patient on admission if the patient has feelings of self-harm and if there is a history of self-harm. Clinicians, nurses, and physicians in this stroke unit do not assess patients for depression by determining how the patient is feeling in their current state regarding their mood, sleep, or anxiety symptoms. Clinicians not assessing patient's mental health can significantly impact the hospital, including self-harm, polysubstance abuse, and loss of follow-up care (Pfoh et al., 2020). The patient's primary care physician does depression screenings, which are not completed at outpatient specialty clinics or the inpatient clinical setting, specifically done per each clinic.

Specific tools are available for assessing children, adolescents, adults, and geriatric patient populations. The Patient Health Questionnaire (PHQ-9) is the most used depression screening tool in the health care setting (O'Byrne & Jacob, 2018). PHQ-9 is the current depression screening tool available to nurses in inpatient units associated with EPIC, the electronic health record. PHQ-9 addresses areas of concern related to the patient's mood, anxiety, and sleep (Towfighi et al., 2017). The Aphasic Depression Rating Scale (ADRS) tool was designed to identify patients with difficulty understanding or speaking after a stroke (Benaim et al., 2004). Many depression screening tools have different concepts and can be individualized for the patient. Healthcare is designed to be individualized to each patient and their complex needs, which can result in improved patient outcomes.

Organizational Assessment

The 270-bed institution has a mission to serve together in the spirit of the Gospel as a compassionate and transforming healing presence within their communities. The institution also has the vision to be a mission-driven, innovative health organization that will become the national leader in improving the health of our communities and each person they serve (Trinity Health, 2023). They will be your most trusted health partner for life. This institution's values include reverence, commitment to poor people, safety, justice, stewardship, and integrity.

Strengths

A strengths, weakness, opportunities, and threats analysis found that the institution has a powerful neurology department using physicians, residents, nurses, and advanced practice nurses who support evidence-based practice to improve stroke care in the community. In the outpatient neurology office, a Neuropsychiatrist sees patients and discusses how they are coping with their new disabilities. This strength can help continue depression screening in outpatient clinics.

Weaknesses

Weaknesses include staff feeling overwhelmed with an abundance of new education. Staff perceive the time spent on new education as pulling them from the bedside and causing potential harm to patients from missed critical tasks. The nursing staff has informed management that they often feel overwhelmed with new education related to process improvement and feel that it is “just another task added to their day.” Another weakness is the lack of mental health treatment facilities and mental health care staff. Currently, thirty inpatient beds are available in the psychiatric medicine unit, and two other inpatient facilities are available in the area to serve a large population of patients. This unit can continue to treat patients with medical and mental health concerns to improve patient care and decrease delays in care.

Opportunities

Opportunities to improve depression screening may include the use of technology often patients do not want to disclose their needs, and technology could facilitate an open dialogue for patients experiencing signs or symptoms of depression. Technology can be used to administer depression screening assessments when patients are not open to discussing with healthcare providers (Sewell, 2021). Other opportunities include providing awareness to increase the need for mental health treatment by utilizing social media and the Michigan Stroke Network to provide education about post-stroke depression. A new mental health treatment center will potentially open in 2025 to expand treatment options.

Threats

Mental health is a threat that may not be seen as a priority among the staff, as well as the inability to seek treatment for these patients in the inpatient and outpatient centers. There are insufficient resources such as therapists and counseling for these patients if they do not meet the criteria for inpatient treatment. Staff focus on the physical health of the patient's needs, but they also need to focus on mental health. Stroke patients struggle with mental health after a stroke because they will leave the hospital in a different sense of normal. There is a need for increased mental health treatment because it can affect the patient's recovery (Mitchell, 2016). The readiness and preparedness of an evidence-based project are well supported throughout the institution, with strong leadership and the Unit-Based Council to help implement interventions. See Appendix F for a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis.

Gap Analysis

A strong evidence-based project identifies the gaps utilizing the five whys. Five whys identify a question and then ask another based on the response to identify where a problem lies

(Card, 2017). The first question asked why depression screenings are not being done inpatient. The bedside nursing staff responded that the institution is concerned with an immediate emergency mental health crisis, and there is a lack of staff knowledge regarding depression screening (A. Smith, personal communication, March 2023). The hospital has the resources with an inpatient mental health unit but cannot treat those patients without emergent mental health concerns. The patient is often referred to a mental health counselor, in which the wait time to receive care could be weeks.

This then asks why there is a knowledge deficit regarding depression screenings. Bedside nurses reported that screening is difficult to find in the electronic health record EPIC. This then leads to the question of why depression screenings are challenging to find in EPIC. It was established through staff that depression screenings were not taught in the EPIC classes. This now leads to asking why depression screenings have not been taught in the EPIC classes. As we advance, it was identified that depression screening was taught in primary care center classes and has traditionally not been used in the inpatient care areas. After assessing these four questions, it then leads to asking the question, why are depression screenings important in stroke patients? Strokes can lead to debilitating symptoms and varying degrees, which are individualized to each patient. A lesser symptom to one patient can be extremely debilitating to another, leading to mental health concerns. Gaps on the unit level include the type of staff education, the platform in which education is delivered, and the willingness to open doors related to more mental health concerns among the stroke population, which includes ischemic, embolic, and hemorrhagic strokes.

Framework

The treatment of strokes and depression can be utilized using the ACE Star Model of Knowledge Transformation. Evidence-based practice aims to improve patient care processes,

including identifying the relationship that depression plays within stroke patients and how to improve the care provided (Stevens, 2013). The ACE Star Model of Knowledge Transformation has a five-step process which includes research, evidence summary, translation into guidelines, practice integration, and process outcomes evaluation (Stevens, 2013). Core competencies for health care professionals that can be met through the utilization of this model include providing patient care, employing evidence-based practice, working in interdisciplinary teams, applying quality improvement, and utilizing informatics, all of which can be conducted with both the identification of depression screening within stroke patients (Stevens, 2013). This model outlines close teamwork in all areas, including the Stroke Action Team, which consists of physicians, advanced practice nurses, bedside nurses, pharmacists, social workers, case managers, and therapists. This model fits well as it addresses the need for evidence-based practice and the utilization of quality improvement with a closely observed process evaluation.

Problem Statement and Clinical Question

A population or problem, intervention, comparison, outcome, and time (PICOT) is an effective way to understand a good clinical question and reflect the problem statement. Post-stroke depression has an increased risk of mortality and morbidity than stroke alone (Mitchell, 2016). The problem is that post-stroke depression can lead to poor patient outcomes, decreased rehabilitation efforts, and longer patient stays (Sewell et al., 2021). In this scenario, we have the population in question, those patients with a primary stroke diagnosis. The intervention uses post-stroke depression screening with a comparison to not use a depression screening tool following post-stroke. The outcome would be measured by the score on the depression screening tool, and the timing would be by the time of discharge. The PICO(T) statement would be that in patients with a primary diagnosis of stroke with a National Institute Stroke Scale of four or greater, how does

using a post-stroke depression (PSD) screening protocol at discharge compared to no depression screening affect PSD treatment?

Review of the Evidence

A search was conducted in Cumulative Index to Nursing and Allied Health Literature (CINAHL) and PubMed on April 19, 2023. The search criteria limited available articles published in English within the previous four years, 2019 through 2023. Keyword terms used for both databases were [(“stroke OR strok* OR cerebrovascular accident) AND (“depression” OR depression screening OR depression screen*) NOT (covid OR coronavirus) NOT (“cancer”)]. 43 articles were identified in CINAHL and 64 in PubMed for 107 using the same search criteria. After removing duplicates, 103 articles were reviewed based on title and abstract. After a thorough review, 11 articles were chosen for inclusion in this study. The inclusion criteria included adult and geriatric patients diagnosed with a stroke. Exclusion criteria included pediatric and adolescent patients.

Results

Prior research and data collected by other institutions can be crucial to this study. After thoroughly reviewing the selected literature, an analysis was conducted to identify trends within the research. Multiple journals had an exclusion criterion that excluded aphasia patients who have difficulty communicating or understanding communication. Also excluded were those patients who had a preexisting depression diagnosis before the patient suffered a stroke to adequately determine if the patient experienced depression after their stroke occurred. Inclusion criteria included patients with an International Classification of Diseases (ICD) diagnosis of stroke, cerebral hemorrhage, subarachnoid hemorrhage, or transient ischemic attack upon chart reviews. Including the several types of strokes allowed more patients to be included in those studies; it also provided a larger sample size to increase the study's quality. Trends that were identified through 11 articles that

consisted of retrospective and prospective cohort studies, case-control studies, expert opinions, and systematic reviews included depression screening tools that were used, the timing of when depression screening should be completed, and the outcomes of depression screening among the stroke population. See Appendix D Quality Improvement/EBP Project Evidence Critique Table

Synthesis of the Evidence

Depression Screening Tools

The Patient Health Questionairre-9 (PHQ-9) was the most widely used tool for depression screening found within the research (Mackenzie et al., 2019; Kristo et al., 2022; Kapoor et al., 2019; Mclean et al., 2019; Qawasmeh et al., 2022). Of the studies conducted, there was also the use of the Hamilton Rating Scale for Depression-24, Stroke Aphasic Depression Questionnaire (SADQ-10), Hospital Anxiety and Depression Scale (HADS-A), and Behavioral Outcomes of Anxiety Scale (BOA), PHQ-9 is the known as the gold standard for depression screening (Li et al., 2019; Mclean et al., 2019). In one of the pieces of literature, it was noted that a comprehensive stroke center used the Signs of Depression Scale (SODS), a scale of observation that can leave room for interpretation if conducted by multiple providers. Twenty-one of the thirty-nine participants in this study did have positive symptoms of depression (Smith, 2020). These research journals suggest that all these scales can be administered by a healthcare professional or independently by the patient to promote dialogue between the healthcare provider and the patient.

Timing

Timing is a crucial component of this project, as the question arises: when is the right time to present a depression screening tool to a post-stroke patient? Sewell, Dong, and their contributors suggested that screening should occur at multiple points with the patient and family present (2021, 2022). One article suggested that family can help with the screening because they observe the patient's behaviors and can identify when the patient is disengaged (Sewell et al., 2021).

Admission and discharge from the acute care unit, acute rehabilitation units, skilled nursing facilities, and outpatient clinics were recommended by multiple studies for frequent screening opportunities (Sewell et al., 2021; Dong et al., 2022). Screening can occur at any moment. With the advancements in technology; screening can be done with as much of a healthcare provider, a handout, or a smartphone. There are endless opportunities available.

Outcomes

Outcomes are another crucial part of this literature review: how do healthcare providers improve the patient experience to improve outcomes post-stroke? There were many mentions that post-stroke depression increases mortality and morbidity while contributing to decreased rehabilitation, poor patient outcomes, and increased length of stay. Stroke survivors are more likely to be unemployed due to physical, cognitive, and mental health deficits that occurred due to the stroke put these patients at significant risk for suicide (Vyas et al.,2021). One study used risk ratio to identify the association between stroke and suicide risk. This study found that the risk ratio was 1.73, with 5,563 patients attempting or dying by suicide following a stroke (Vyas et al., 2021). Impaired communication was mentioned to be a stronger indicator of post-stroke depression and will have a negative impact on activities of daily living, personal image, and frustrations regarding communicating with family (Smith, 2020). Post-stroke depression can further complicate physical and cognitive functions, reducing the patient's ability to "rejoin" life (Li et al., 2020, p. 1). An upwards of 40% of patients with a stroke will experience post-stroke depression and will require more care in the acute care setting and the outpatient setting for more support (Kapoor et al., 2019). Another study found that when patients return home following their stroke, they often have less risk of developing post-stroke depression compared to those who have more severe symptoms and need to attend rehabilitation before returning to their homes (Mayman et al., 2021). How do healthcare providers improve these outcomes to provide a better patient experience post-stroke?

The literature synthesis guides the most suitable depression screening tool, the optimal timing for screening, and the desired outcomes for preventing post-stroke depression. The literature also emphasized the importance of increasing awareness and improving communication about mental health issues among stroke survivors and healthcare providers.

Integration of the Evidence

Setting and Context

This Evidence-Based Practice (EBP) will take place in a large midwestern hospital, 34-bed Neuroscience unit. This unit accepts various neurological disease processes, with stroke being one of the subsets accepted. Patients included in this evidence-based project will be adults, and geriatric patients who have an admitted diagnosis of stroke; this patient population will have frequent assessments, which include a National Institute of Health Stroke Scale.

Stakeholders

Stakeholders are an important part of the implementation of this evidence-based project. The first step in engaging the stakeholders is to organize an informational meeting to discuss the project and potential barriers. Key stakeholders include patients and their families, nurses, social workers, case management, neurological nurse navigators, and clinical nurse specialists.

Implementation Team

The design as the lead facilitator, the clinical nurse specialist student, will monitor the unit census and filter out the patients over the age of 18 who have an admitting diagnosis of stroke, transient ischemic attack, or cerebrovascular accident that have an NIHSS of four or greater. The NIHSS will help differentiate the severity and location of the stroke that has affected the patient. Once those patients are filtered, the Unit-Based Council stroke-certified nurses will provide a depression screening assessment using the Patient Health Questionnaire-9 (PHQ-9) at discharge. When a patient has a positive depression screening, the healthcare professional providing the

screening will alert the attending provider, social worker, and the neuro-nurse navigator to help facilitate more resources for the patient. The population number cannot be determined at this point as this proposal is subject to variability based on the unit census of the population for which the intervention is targeted.

Measurement Plan

The team that will help provide assessment would be the Unit Based Council, which consists of seven bedside nurses in the acute inpatient stroke unit, all stroke certified nurses. The goal would be to obtain 80% education with the use of a workforce learning platform, e-learning, as well as hands-on practice administering a depression screening. Education will be continued with other stroke-certified bedside staff after completing the evaluation with the smaller group. A positive depression screening on the PHQ-9 can be described as 5-9 for minimal depression symptoms, 10-14 is minor depression, 15-19 is moderate major depression, and a score of greater than 20 would be severe major depression (O'Byrne, 2018). This project will not be utilized as a platform to diagnose or treat patients for depression but as a tool to provide dialogue for patients and providers to diagnose and treat them. See Appendix I: Infographic for process.

Approvals

The College of Nursing Internal Review and the Michigan State University's Institutional Review Board (IRB) reviewed and approved the project. The hospital's Nursing Scholarly Practice Council also reviewed and approved the project; because this project was deemed not human subject research, the hospital's IRB did not need to review the project.

Implementation Strategies

Roger's Diffusion of Innovation Theory guided this EBP project. The first stage of the innovation process is knowledge, which involves creating awareness and understanding among potential adopters. In this stage, a literature review and evidence synthesis has been conducted. The

second stage of the innovation process is persuasion, which involves influencing the attitudes and opinions of the potential adopters towards the innovation. In this stage, the clinical nurse specialist student will provide education and training to the staff nurses on administering and documenting depression screening using the PHQ-9 tool. Develop education and resources for stroke patients and their families on depression awareness using various modalities such as brochures, videos, websites, or apps. Address any concerns or questions that may arise from the potential adopters regarding the innovation. Highlight the advantages and incentives of adopting the innovation, such as improving patient outcomes, enhancing quality of care, increasing patient satisfaction, and reducing costs.

The third stage of the innovation process is decision, which was accomplished through the Michigan State University (MSU) College of Nursing Internal Review Process, MSU's Institutional Review Board (IRB), and the hospital's Nursing Scholarly Practice Council. The fourth stage of the innovation process is implementation, which involves implementing the innovation and adjusting as needed. In this stage, depression screening for stroke patients began in September after completing all the education and training. Use the PHQ-9 tool to screen all eligible stroke patients before discharge and document the results in EPIC. Alert the attending provider and social worker for further evaluation and intervention if a patient has a PHQ-9 score of 15 or higher. Contact case management or the neurology nurse navigator for additional outpatient resources if a patient has a PHQ-9 score of 14 or lower. Ensure a follow-up appointment is scheduled in the discharge summary for all patients who screen positive for depression. Provide depression awareness education to all stroke patients and their families using various modalities such as brochures, videos, websites, or apps. Monitor and evaluate the process and outcome indicators of the project using chart reviews, PHQ-9 scores, patient surveys, focus groups, and clinical assessments. Identify and resolve any barriers or challenges during the implementation phase, such

as staff resistance, patient refusal, technical issues, or resource constraints. See Appendix G Gannt Chart for the timeline.

Facilitators

Facilitators included the Clinical Nurse Specialist on the unit, the Clinical Nurse Specialist student, neurology physicians' neurology residents, the H3 Neuroscience leadership team, and the bedside stroke certified nurses. Facilitators are an important driving force in implementing this evidence-based project to facilitate change regarding the stroke patient population.

Barriers

A lack of social workers throughout the hospital limits the education and referral of patients to available resources. The Neurology Nurse Navigator can assist with the follow-up of patients based on their depression screening scores. Nurses may be too busy to notice that a depression screening was not done on discharge and may miss the opportunity to screen the patient before they leave the unit.

Resources

There are minimal costs associated with this evidence-based project, as the assessment of the patient takes less than five minutes to perform, and the assessment is available and ready to use in the electronic health record. Education was conducted with the bedside staff during their productive hours. It took about one hour to complete education, which was completed at the Unit-Based Council meeting on the first Monday of every month. Nurses, on average, make approximately $35.00 an hour currently; on average, the associated costs included within this project would be $245.00 (Indeed, 2023). As the lead facilitator, it was estimated that it would take eight hours to complete education materials, which would cost $280.00, but as a student, reimbursement will not occur. See Appendix H Cost Analysis.

Evaluation Plan

Measuring and evaluating the outcomes associated with post-stroke depression is important to determine the effectiveness of this evidence-based project. The evaluation plan started in October 2023 and concluded in January 2024. The detailed plan is outlined below and is included in a flow chart to evaluate the outcomes effectively.

Staff education was evaluated after their education, which occurred in October. It is important to determine if the education provided is sufficient and whether the staff have confidence in their skills. Learning objectives include knowledge and understanding of the importance of depression screening among post-stroke survivors and the ability to perform a PHQ-9 depression screening.

Post-stroke depression screening data was collected weekly and included in a spreadsheet to then disseminate the outcomes associated with screening for post-stroke depression. Data collected in this evidence-based project include the National Institute of Health Stroke Scale (NIHSS), stroke symptoms, PHQ-9 score, PHQ-9 scoring details if the attending physician was notified, social work or case management notified, and resources given.

Sustainability Plan

The fifth and final stage of the innovation process is confirmation, which involves reinforcing and sustaining the adoption of the innovation over time. In this stage, the project team will communicate and report the project results and achievements to various stakeholders, such as the hospital leadership, the unit manager, the staff nurses, the providers, the social workers, the case managers, the neurological nurse navigator, the grant funder, and the public. Use various communication channels to disseminate information about the project, such as meetings, emails, newsletters, posters, presentations, or articles. Celebrate and reward the successes and contributions of the project team and the adopters of the innovation. Seek feedback and suggestions from the stakeholders on improving or expanding the project. Incorporate depression screening into the

standard practice of stroke care on the unit and other units in the hospital. Discuss with the EPIC team and other hospital systems to place depression screening on shift-required documentation for all patients admitted to the hospital.

Integration with Clinical Expertise and Patient/Family Preference

The project aimed to integrate the best available evidence from the literature with the clinical expertise of the health care professionals and the patient/family preferences and values. The project team used the PHQ-9 tool, which is widely used and validated for depression screening, to assess stroke patients' mental health status before discharge. The project team provided education and resources to stroke patients and their families on depression awareness, using various modalities that suit their needs and preferences. The project team collaborated with the attending provider, social worker, case management, and neurology nurse navigator to set up referrals for appropriate mental health services or providers for the patients who screened positive for depression. The project team will follow up with the patients and their families within one month after discharge to evaluate their satisfaction and feedback. The project team will continue to respect the patients' and their families' autonomy and dignity and involve them in the decision-making process regarding their depression care.

Evaluation of Outcomes

Outcomes Measures

This project used both process and outcome measures. The process measure included the number and percentage of patients who survived a stroke who were screened, educated, and referred for depression using the PHQ-9 before discharge. This included providing the patients with outpatient resources and social work consultation. Additionally, the percentage of nurses who completed their education. The outcome measures will include the prevalence and severity of post-stroke depression among patients who survived a stroke.

Education was completed, and there was 100% completion by all the stroke unit nurses. Education was presented and recorded in the mandatory staff meeting. Additionally, education was completed with nurses at the bedside by assisting the nurses with how to find the PHQ-9 screening tool in the electronic health record, as well as letting them watch and then allow them to do the screening on their own with patients that meet the criteria.

Data Collection

Data collection occurred weekly from November 15, 2023, through January 31, 2023. The collected data includes deidentified patient data, NIHSS score, PHQ-9 score, and notification to the provider, social work, case management, or the neurology nurse navigator. Over 10 weeks, over 100 stroke patients admitted were analyzed to decide if the patient met the criteria for depression screening. To meet the criteria the patient needed an NIHSS score of four or greater and only 11 met this standard. Three patients had a score of one on the NIHSS and were included due to their age and considered working class and may experience disruptions due to mild stroke symptoms. There were five patients with a NIHSS score of four or greater that did not receive a depression screening due to aphasia, confusion, or inability to follow commands. The mean PHQ-9 score was five, which is considered mild depression. Patients with mild depression resulted in support services given at discharge and encouraged to attend the stroke survivor support group offered through the hospital. The max PHQ-9 score was 12, this patient had moderate depression and was referred to Social Work for an evaluation, as the patient was flagged in the electronic health record as high suicide risk. All patients received support services and the stroke survivor support group information at discharge. There was no correlation between having a higher NIHSS score and having a higher PHQ-9 score. See Appendix J: Stroke and Depression Data. See Appendix K: Stroke and Depression Scores Chart.

Analysis of Data

The implementation phase of this project took place from November 2023 to January 2024. For implementation, the sample size was 14 patients with a NIHSS score of four or greater. More than 100 patients were screened to see if they met the criteria of a NIHSS of four or greater. The stroke patient census was variable due to being a Comprehensive Stroke Center, and patients can receive Tenecteplase and thrombectomies, which can reduce the patient's NIHSS score greatly. This could be the reason for a small sample size of fourteen. Nineteen patients met the criteria of an NIHSS of four or greater, but five of them were not appropriate to answer the depression screening due to aphasia, confusion, or the inability to follow commands. A sample size of 50 or more would have been desirable. Data that was evaluated includes the NIHSS score, and the PHQ-9 score to evaluate for any correlation between debilitating symptoms and depression symptoms. The mean PHQ-9 score was five, which is considered mild depression. Patients with mild depression received support services at discharge and were encouraged to attend the stroke survivor support group offered through the hospital. The max PHQ-9 score was 12; this patient had moderate depression and was referred to Social Work for an evaluation, as the patient was flagged in the electronic health record as high suicide risk. The mean NIHSS score was eight, which indicates multiple stroke symptoms. The max NIHSS score was 21, which indicates severe debilitating stroke symptoms that greatly affect the patient returning to their previous lifestyle, which can lead to post-stroke depression.

Return of Investment/Value of Investment

Implementing depression screening for patients post-stroke will decrease the length of stay if depression symptoms are impeding rehabilitation efforts (Smith, 2020). The higher the NIHSS score, the more physical limitations that patient is likely to experience; helping patients become

educated on depression signs and symptoms can help patients and families be aware of potential barriers associated with post-stroke depression.

The value of the investment in implementing depression screening in stroke patients is that they receive quicker depression treatment while also helping ease the minds of families that take on the caregiver role. As discussed, post-stroke depression can significantly make it more difficult for patients to reintegrate into their previous lifestyle, which could lead to mortality and morbidity. Fourteen patients received depression screening in the acute care setting at a Comprehensive Stroke Center. Patients and families were present for the screening and now understand what the patient may experience trying to reintegrate themselves into their daily lives. Multiple family members commended staff for providing depression screening and allowing them to be present for the screening. All fourteen patients received information about the support group the center offers, as well as other resources that they can use. One patient also received a referral to the Neuropsychiatrist in the Neurology office.

Implications for Practice

Nursing implications for practice include time restraints to complete a post-stroke depression screening adequately. Stroke patients are often not admitted to the stroke unit for more than 48 hours; once their testing is complete and there are no rehabilitation needs, the patient may return to their original disposition. Post-stroke depression screening cannot occur when the patient is being discharged. To combat this nursing implication, there needs to be at least 24 hours before discharge to ensure that social workers can evaluate the patient if it is warranted according to the patient's PHQ-9 score.

Another key nursing implication is the ability of nursing staff to provide thorough education to the patient and their families. Patient experience is critical to ensuring that the patient receives quality care. Proper education about a diagnosis or outpatient resources can improve the patient's

experience. To provide detailed education to the patient, a resources guide will be given to the patient, and education will be included in the discharge packet by the nurse or the social worker.

This could be useful in other hospitals because the facilities can utilize the same process to implement depression screening with the stroke population. Utilizing the flowsheet of when a patient needs a referral or needs resources and follow-up can be helpful for other facilities. The results will not be the same as those of this Comprehensive Stroke Center as it is not reproducible.

Dissemination

The dissemination plan is to present to the hospital unit in the Unit-Based Council, the all-staff meeting, the stroke team, the National Association of Clinical Nurse Specialists in March 2024, and the MSU College of Nursing for the DNP presentation in April 2024. This evidence-based project's audience is designed to attract includes the bedside nurses on the stroke unit, the neurology physicians, neurology residents, stroke coordinators, social workers, and the neurological nurse navigators, all of whom are included within the unit or the stroke team. Abstracts and publication plans will need to be approved by the Chief Nurse Officer and the Clinical Nurse Specialist Program Director before publication.

Conclusion

Stroke and depression are two complex medical diagnoses that can be found simultaneously. The use of depression screening to evaluate primary stroke patients who are developing depression following debilitating stroke symptoms was evaluated in January 2024. The evidence-based practice project used evidence to support depression screening at multiple care areas, such as acute care, rehabilitation, and outpatient clinics. The EBP project utilizes generalizable knowledge and may not yield that same response in another stroke unit.

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Appendix A: Quality Improvement/EBP Project Evidence Critique Table

Problem Statement: In patients with physical deficits following an acute ischemic stroke how does the use of a post stroke depression (PSD) screening protocol at admission compared to no depression screening affect PSD treatment and rehabilitation willingness before discharge.						
Article Citation	**Design/Purpose**	**Sample/Setting**	**Measurement and Instruments**	**Results**	**LOE and Quality; Strengths and Weaknesses**	**Relevance to Problem**
Smith, C. (2020). Poststroke depression in patients with impaired communication. *Nursing* 50(8): p 64-66 DOI: 10.1097/01.NURSE.0000684180.70332.a3	Post-Stroke depression has an increased mortality rate, decreased quality of life and poor patient outcomes. This study's purpose was to determine if early recognition of signs and symptoms of depression in patients with communication impairment would benefit from an effective screening tool.	Thirty-Nine patients were included in the study on an acute care Neurology floor at a Comprehensive Stroke Center	Signs of Depression Scale (SODS) A score of three or higher indicates depression	21/39 (54%) exhibited signs of depression. It was expected that approximately 30% would exhibit signs and symptoms of depression. 19% of those that screened positive were prescribed antidepressants and one patient received a psychiatric evaluation.	LOE and Quality: Level 1 (Cohort Study) There were no retrospective patients included. Data was collected daily Strengths: Education was provided to the nurses that would administer the tool before they could administer the tool to a patient. Nurses reported that it took a minute or less to administer depression screening tool. Weaknesses: A small number of patients were assessed using SODS. No process was determined to decide how many patients with impaired communication following a stroke would be assessed. Discrepancies were created if the nursing staff did not administer the screening tool daily.	Impaired communication is many times an effect of a stroke and can have a negative impact on the patient's activities of daily living and how they see their personal image post-stroke. Patients are unable to communicate effectively with their families and nursing staff and have concerns that they may develop post-stroke depression. Post-Stroke depression can have a negative effect on rehabilitation efforts. This evidence-based quality improvement project helps determine if the impaired communication stroke population has a depression screening tool that can effectively determine if the patient is experiencing post-stroke depression.

Sewell, K., Tse, T., Donnan, G.A. and Carey, L.M. (2021), Screening for post-stroke depression: who, when and how? *Medical Journal of Australia*, 215: 305-307.e1. https://doi-org.proxy2.cl.msu.edu/10.5694/mja2.51256	Determine the optimal timing of who should screen patients for post-stroke depression, when the patient should be screened and how the patient will be screened.	Clinical Guidelines from Australia, United Kingdom, and United States No sample size included	There were no measurements used in this article	The American Stroke Association recommends that stroke screening tools be administered routinely but the timely is unclear and should occur most often at transition points (Acute care, rehabilitation hospitals, subacute care, home care, home). The United Kingdom National Clinical Guidelines suggest that depression screening occur every six weeks.	LOE and Quality: Level 5 Expert opinion; Low quality Strengths: Included multiple guidelines from area countries. Australia, United Kingdom, United States Weaknesses: Article did not state when it is appropriate to screen, there are multiple times that could be considered but not definitive.	Depression is common after a patient has suffered from a stroke and can lead to poor patient outcomes, reduced rehabilitation, and increased mortality. Depression occurs in approximately 30% of stroke survivors and typically only 5% are diagnosed and treated in routine clinical practices. There are many distinct types of depression screening tools (Beck, PHQ-9, Geriatric Depression Scale, Hamilton-Asberg) Some of these should be completed by a health care provider but some can also be completed independently or by family. There are now options available on the smart phone. PHQ-9 is available via smart phone and is suitable for patients that have impaired communication or significant dysphasia. Screening is available in many settings.
Li J, Oakley LD, Brown RL, Li Y, Luo Y. (2020). Properties of the Early Symptom Measurement of Post-Stroke Depression: Concurrent Criterion Validity and Cutoff Scores. *The Journal of Nursing Research*. 28(4): e107. doi: 10.1097/jnr.0000000000000380.	The purpose of this study was to evaluate the concurrent criterion validity and cutoff scoring of early symptom management if post-stroke depression in patients diagnosed with an acute stroke.	The sample size included one hundred thirty-nine patients that were nonaphasic that were 7-30 days post-stroke.	Patients were given the ESM-PSD and the Hamilton Rating Scale for Depression-24	The average length of stay was 11.99 days post stroke. Internal consistency was ESM-PSD =.90 and HAMD-24 =.76. Based on the cutoff scores no PSD<14.5 Low= 14.5-25.5 moderate= 25.5-45.5 and severe=45.5 or greater	LOE and Quality; Case Control Study; Level 3; Moderate Quality Strengths: Larger sample size was included in this study. HAMD-24 is the gold standard for determining cutoff scores for ESM-PSD, therefore other screening tools may have different cutoff scores. Weaknesses: Nonaphasic patients were not included.	Post-stroke depression has greater morbidity and mortality than the actual stroke itself and can complicate speech and motor functions while also decreasing the patient's ability to participate in rehabilitation or "rejoin" life.

Kristo I, Mowll J. (2022). Voicing the perspectives of stroke survivors with aphasia: A rapid evidence review of post-stroke mental health, screening practices and lived experiences. *Health Soc Care Community.* 30(4): e898-e908. doi: 10.1111/hsc.13694.	This systematic review synthesized current research on aphasic stroke population and post-stroke depression. The study also wanted to investigate the most reliable mood screening tools for aphasic patients.	Twenty-nine articles were selected for review out of an original search of 1,454. The search took three weeks to conduct.	Instruments used included mental health outcomes, lived experiences, mood screening tools (stoke aphasic depression questionnaire and behavioral outcomes of anxiety scale)	Introducing depression and mood screening in the post-stroke population in a timely manner is essential due to early onset of mental health concerns. Those that were screened were lost to follow-up due to the lack of psychological care pathways.	LOE/Quality: Systematic Review Level 1 Strengths: The use of qualitative and quantitative review forms was used to appraise the articles. No conflicts of interest identified. Weaknesses: Time and resource constraints restricted articles that may have been included. A single researcher was used to conduct the search. There may have been implicit personal bias and publication bias.	Patients with aphasia following a stroke have been identified as the most at risk for developing post-stroke depression. Studies within the systematic review determined that 43-70% of patients screen positive for depression following a stroke.
MacKenzie, H., Rice, D., Teasell, R., & Macaluso, S. (2019) Screening Adherence for Depression Post Stroke: Evaluation of Outpatients, a London Experience (SAD PEOPLE), *Topics in Stroke Rehabilitation,* 26:1, 67, DOI: 10.1080/10749357.2018.1536096	The aim is determined how specific the Canadian Best Practice Recommendations for Post-Stroke depression screening was adopted by a stroke rehabilitation outpatient center before and after a standardized clinical form.	There were 135 patient charts reviewed that were included in this study. All patients were greater than 18 years old. This study took place between December 2011 and May 2012, December 2013, and May 2014. The facility this took place at was an outpatient stroke psychiatry clinic in Ontario, Canada	PHQ-9 screening tool was used to assess patients for depression.	In the preintervention phase there were 35.7% of patients that were already on an antidepressant however only 5 patients were on an antidepressant's pre-stroke. Four patients were prescribed in acute care and fourteen in rehab. In the post-intervention phase three patients were prescribed antidepressants in acute care and three in rehab. Nine patients were on antidepressants prior to their stroke.	LOE/Quality: Retrospective Cohort Study Level 3 Strengths: Utilized chart reviews. PHQ-9 Gold standard for validity of a depression scale. Weaknesses: Single center stroke rehabilitation center. Retrospective study is determined based on what is in the patient's chart.	Strokes can have many adverse effects such as decreased engagement in rehabilitation, increased readmission to the hospital, increased caregiver distress, and decreased ability to perform activities of daily living. Depression screening should take place at all levels, acute care (admission and discharge), Skilled nursing, rehabilitation, outpatient clinics, and primary care physicians. Increasing awareness of depression post-stroke opens the dialogue between the patient and health care professionals.

Kapoor A, Lanctot KL, Bayley M, Herrmann N, Murray BJ, Swartz RH. (2019). Screening for Post-Stroke Depression and Cognitive Impairment at Baseline Predicts Long-Term Patient-Centered Outcomes After Stroke. *Journal of Geriatric Psychiatry and Neurology*. 32(1):40-48. doi:10.1177/0891988718819859	Evaluate the ability of a validated depression, obstructive sleep apnea, and cognitive impairments screen to predict long-term community participation and independence in activities of daily living post stroke.	The sample size included 124 patients with a mean age of 66 years old. These patients completed baseline depression and cognitive impairment screening at first stroke visit and telephone interviews two to three years post stroke.	Instruments used included baseline demographics, medical history, stroke severity, and risk factors were gathered to include or exclude patient. Functional instruments used included the modified Rankin scale and the Canadian Neurological Scale. DOC which includes PHQ-9 and STOP BANG.	Based on the study results the older the patient, the more severe the stroke the more depression symptoms the patient experienced. Higher depression risk was the only predictor of participation in activities of daily living.	LOE/Quality: Prospective longitudinal cohort study Level 2 Strengths: Included the PHQ-9 and neurological scores to correlate stroke to depression risk. Weaknesses: Attrition and survivor bias were compared to those patients that were lost to follow-up and not included in the study. Significant aphasia and physical disabilities were excluded from study. The study suggests that those patients do not add valuable information to their studies.	Up to 40% of post-stroke patients will have depression as a result and need more support from the acute care center and outpatient centers. Increased stroke severity can lead to increased risk of post-stroke depression. Post-stroke depression leads to an increased risk in poor rehabilitation and increased dependence on health care providers and family for continued support.
Dong, L., Mezuk, B., Williams, L., Lisabeth, L. (2022). Trends in Outpatient Treatment for Depression in Survivors of Stroke in the United States, 2004–2017 *Neurology*. 98 (22) e 2258-e2267; DOI: 10.1212/WNL.0000000000200286	The purpose of this study was to examine trends in outpatient treatment for post-stroke depression in the United States between 2004 and 2017.	This study had 10,243 survivors of stroke and 264,645 non-stroke patients. The study was completed with non-Hispanic white, non-Hispanic blacks, and Hispanics that self-reported to the Medical Expenditure Panel Survey	Participants used the PHQ-2 and self-reported their symptoms and diagnosis of stroke or TIA. ICD diagnosis of depression from medical records. Participants self-reported that they were prescribed medication or psychotherapy.	Approximately 66% of stroke patients did not receive outpatient treatment for depression. There were more likely to be patients prescribed with antidepressants than those that participated in psychotherapy. Younger patients were more likely to receive treatment than those older than 75.	LOE/Quality: Case-Control Level 3 Strengths: Comparison to those without stroke diagnosis. Used a reliable scale PHQ. The NIH funded study Weaknesses: Participants self-reported diagnosis, symptoms. and medications. PHQ-2 is very brief and may not completely include all the depression symptoms.	Stroke affects all distinct types of ethnicities and races; depression affects every race and ethnicity. Stroke care needs to be improved to reduce disparities and increase outpatient treatment follow-up and care. The use of self-reporting of symptoms can reduce the stigma of disclosing to health care providers or family members.

McLean P., Torkington R., & Ratsch A. (2019) Development, Implementation, and Outcomes of Post-stroke Mood Assessment Pathways: Implications for Social Workers*, Australian Social Work,* 72:3, 336-356, DOI: 10.1080/0312407X.2019.1579350	This study's purpose was to develop and implement a post-stroke mood assessment pathway with staff training to improve the rates of mood screening, interviews, and interventions for patients.	This study was conducted at the WBHHS South at two different hospitals from October 1, 2013-september 30, 2015. Hospital A has 177 beds and hospital B has 44 sub-acute beds and 16 rehabilitation beds. In the pre-intervention phase, there were 213 charts audited. In the post-intervention phase, there were 238 charts reviewed.	Patient charts were the main method used for this study to conduct chart reviews. Depression and anxiety scales that were used included PHQ-9, HADS-A, BOA, SADQ-10.	There was a 11.7% increase from the pre- to post-intervention phase on conducting screening and interviewing the patient. However, there were only 19 and 30 patients identified for low mood. There was data collected on using a screening tool, 8 and 42, so there was a significant increase in the post-intervention following staff training.	LOE/Quality: Retro prospective cohort study Level 3 Strengths: Utilized multiple different depression screening tools. Study was examining all the post discharge options. Weaknesses: Relied on chart reviews to access data. More interviews could have happened that were not within the chart. TIAs were excluded from this study.	Depression affects approximately 33% of patients in the post-stroke phase. There are separate times at which depression screening is recommended, but there is consistency in that there needs to be screening done multiple times within their stay in the acute care setting, rehabilitation, and sub-acute, and community health. Depression affects rehabilitation, longer hospital stays, increased physical impairments, and increased mortality. It is imperative that multiple disciplines evaluate patients regularly.
Vyas, M., Wang, J., Gao, M., Hackam, D., (2021). Association Between Stroke and Subsequent Risk of Suicide*. Stroke.* 52:4 10.1161/STROKEAHA.120.032692	Poor mental health and depression are a recognized association with stroke, there is also an unknown association with stroke and suicide, this study will identify if there is a known risk.	September 15, 2020, there was a literature search conducted that resulted in 4,093 articles and after review 23 journals were included. This totals more than two million stroke patients.	Risk ratio was the designated tool used in this study. A risk ratio greater than one is a result of a positive association between the two subjects.	The risk ratio was resulted at 1.73 which indicates a positive association between stroke and suicide risk. There were 5,563 patients that attempted or died by suicide following a stroke.	LOE/Quality: Systematic Review/Meta-Analysis Level 1 Strengths: There were two reviewers deciding on which articles to include. Comparison to non-stroke patients to identify that there is a higher risk for stroke patients. Weaknesses: Each study had a different variety to self-reported measures of suicide and there may be bias due to the mental health stigma.	Stroke survivors are more likely to be unemployed and have higher disability related to physical, cognitive, and mental health disabilities. Better access to post-stroke care fatality can decrease. Stroke should be considered as a risk factor for suicide and depression.

Mayman, N., Stein, L., Erdman, J., Kornspun, A., Tuhrim, S., Jette, N. & Dhamoon, M. (2021). Risk and Predictors of Depression Following Acute Ischemic Stroke in the Elderly. *Neurology, 96* (17), e2184-e2191. doi: 10.1212/WNL.0000000000011828.	The objective of this study was to examine predictors of post stroke depression in the United States compared to post-myocardial infarction depression	Patients identified in this study included those from Medicare data from 2016-2017 greater than 65. Post-stroke included 174,901 patients and post-MI included 193,418 patients.	Methods and instruments used include ICD codes of Medicare patients to determine MI versus stroke. Exclusions included those diagnosed with depression before stroke or MI. Kaplan Meier curve to show the comparison. Hazard Ratio	Females, that were white and greater than 75 were more likely to be diagnosed with post-stroke depression. History of anxiety was the strongest predictor of post-stroke depression	LOE/Quality: Retrospective Cohort Study Level 3 Strengths: Followed both groups for a year and half following diagnosis. Weaknesses: Exclusion of patients less than 65 years old. Reliance on ICD codes (missed patients). Also, they could not control lesion location, stroke severity, socioeconomic factors.	Patients following a stroke have increased mortality associated with post-stroke depression and therefore need to be screened timely and participate in treatment. Those patients that return home are less likely to screen positive for post-stroke depression. Stroke patients though often have physical and communication disabilities that do not allow them to return home and are more at risk for post-stroke depression based on their stroke symptoms.
Qawasmeh, M., Aldabbour, B., Amal Abuabada, et al. (2022). Prevalence, severity, and predictors of poststroke depression in a prospective cohort of Jordanian patients." *Stroke Research and Treatment*, vol. 2022, https://doi.org/10.1155/2022/6506326	Objective is to assess the prevalence, severity, and predictors of post-stroke depression among Jordanian survivors.	The original population consisted of 177 patients that was then reduced to include 151 patients due to patient death or loss to follow-up. This study was conducted at King Abdullah University Hospital and has over 680 beds in the tertiary center	Instruments used include PHQ-9, modified Rankin, NIHSS, Barthel Index. These were all completed to assess prevalence, severity, and predictors of post-stroke depression.	Fifteen percent of stroke patients reported depression following their stroke on admission, there was a nine percent increase at the one month following a stroke. Subsequently there was a decrease in depression at the three-month mark. Predictors of post-stroke depression included kidney disease, smoking status, severe disability, and severe dependence.	LOE/Quality: Prospective Cohort Study Level 3 Strengths: PHQ-9 is the gold standard for reliability and validity. Inclusion of Modified Rankin, NIHSS, Barthel Index. Weaknesses: Single center and excluded patients with dementia and severe aphasia. Lasting effects of stroke may impact patient's awareness. Follow-up stopped at three months.	Post-stroke depression reduces rehabilitation efforts and can increase the risk of future vascular incidents thus reducing quality of life and increase mortality and morbidity. There are multiple factors that can impact increasing scores among the PHQ-9 such as smoking status, dependence on health care staff, severity of stroke, and family support.

Appendix B: Strengths, Weaknesses, Opportunities, Threats Analysis

Strengths • Strong Neurology Department • UBC council-Nurse led • Neuropsychiatrist in outpatient clinic	Weakness • Staff Education • Staff get overwhelmed with new priorities.
Opportunities • New Mental Health treatment center opening in 2025 • Technology to facilitate dialogue • Michigan Stroke Network • Use of social media	Threats • Mental Health facilities • Mental health is not seen as a priority among staff. • Lack of mental health providers • Increased need for mental health treatment

Appendix G Gannt Chart

7/25/2023	4/1/2024
START DATE	END DATE

Task ID	Task Name	Start Date	End Date	8/2023	9/2023	10/2023	11/2023	12/2023	1/2024	2/2024	3/2024	4/2024
1	TH Scholarly practice council	8/1/2023	9/12/2023									
2	IRB completion	8/1/2023	9/31/2023									
3	Education development	9/31/2023	10/8/2023									
4	Staff education	10/8/2023	10/15/2023									
5	Implementation	10/15/2023	12/2023									
6	Data Collection	10/1/2023	1/1/2024									
7	Evaluation	1/1/2024	2/1/2024									
8	Complete final report	2/1/2024	4/1/2024									

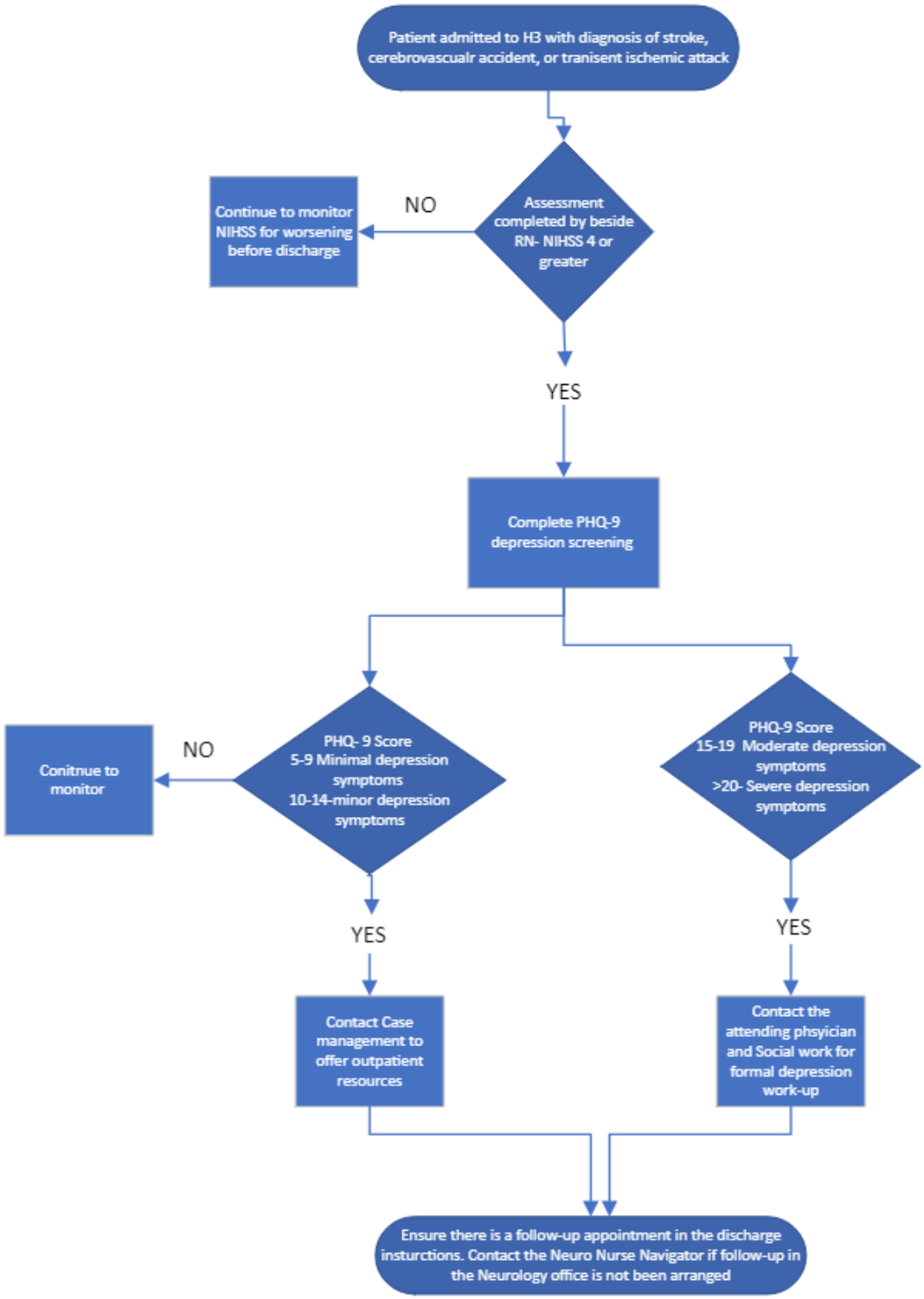
Katie Averill

PROJECT MANAGER

Appendix H: Cost Analysis

Resources	**Cost**
Seven nurses to complete one hour of education- $35.00 an hour	$245.00
CNS will create education and provide bedside nurses with $35.00 an hour. Eight hours to complete education	$280.00
PHQ-9 screening tool- Available in EPIC	$0.00
Multidisciplinary Team meeting once monthly- $35.00 per person, and there will be 11 team members	$2,310 based on one meeting monthly for six months
Total Cost	$2,835

Appendix I: Process Map



Appendix J: Stroke and Depression Screening Data

Post-Stroke Depression Screening

Gender	Age	Date	NIHSS	Stroke Symptoms	PHQ-9 Score	PHQ-9 score details	Score reported to whom	Resoucres Given
Male	84	12/6/2023	4	dysarthria, facial droop, sensory loss	4	feels down, tired throughout the day, feels like a failure,restless	social work	yes
Male	64	12/6/2023	4	sensory loss, facial droop, dysarthria, limb weakness	4	diff. concentrating, feeling down, feels like a failure, poor appetite	social work	yes
Female	62	12/6/2023	6	dysarthria, limb ataxia, snesory loss, facial droop	6	Feels like a failure, feels down, difficulty sleeping, tired, diff concentrating, restless	Social work	yes
Female	64	12/13/2023	1	sensory loss	7	poor appetite, trouble falling asleep, little pleasure in doing activities, little energy, trouble concentrating	Social work	Yes
Female	85	12/13/2023	1	facial droop	0		RN	Yes
Female	50	12/22/2023	1	aphasia	0		RN	yes
Male	46	12/22/2023	16	confusion, facialpalsy, R arm flaccid, sens loss, aphasia, dysarthri	5	feels down, tired, little pleasure, poor appetitie (diff swallowing)	RN social work	yes
Male	64	12/22/2023	21	gaze, facial palsy, visual deficits, flaccid-L, pain on Right side(gou	6	hopeless, down , depressed, trouble falling asleep, difficulty concentrating	Social work, RN	yes
Female	55	1/16/2024	8	facial palsy, R arm/leg weakness, sensory loss, aphasia	5	feels tired, hopeless, trouble falling asleep,	RN	yes
Female	72	1/16/2024	4	facial palsy, R arm/leg weakness, limb ataxia, dysarthria	12	Little energy, feels depressed, feels like afailure, little pleasure in doing things, low appetite, feels better off dead	RN social work, physician	Yes
Male	78	1/16/2024	20	short term memory, facial palsy, visual, L arm/leg flaccid, sens lo	8	little pleasure, feeling down, trouble staying asleep, bothered by moving slowly	RN social work	yes
Male	84	1/16/2024	13	conf, visual loss, facial palsy, L arm/leg flaccid, sensory loss, inatt	11	Little interest, feels down, feels tired, feels like a failure, difficulty concentr. Bothered by moving slowly	RN social work	Yes
Female	68	1/19/2024	15	facial palsy, R arm flaccid, R leg weak, sens loss, dystarthria, visua	0			yes
Female	51	1/24/2024	4	R arm/leg weakness	9	poor appetite, trouble falling asleep, little pleasure in doing activities, little energy, trouble concentrating	RN Social work	yes

Appendix K: NIHSS and PHQ-9 scores Chart