

Screening for Post-Stroke Depression in an Inpatient Rehabilitation Facility

by

Joy R. Accrombessi

Under Supervision of

Barbara Van de Castle, DNP, RN-BC, APRN-CNS

Second Reader

Harsana Showunmi

A DNP Project Manuscript
Submitted in Partial Fulfilment of the Requirements for the
Doctor of Nursing Practice Degree

University of Maryland School of Nursing

May 2023

Abstract

Problem: The lack of a standardized process for screening and treatment of Post-Stroke Depression (PSD) in a 42-bed Inpatient Rehabilitation Facility (IRF) delayed the diagnosis and treatment of PSD. In fact, interviews carried out in the IRF revealed that 100% of nurses (n=20) did not use a standardized tool to address depressive mood verbalized by patients diagnosed with a stroke. There was a need for a validated PSD screening tool that could promote the early identification and management of the mood disorder. **Purpose:** The Patient Health Questionnaire-2 to 9 (PHQ-2 to 9) was administered to eligible patients within 24 hours of admission to improve the early identification of PSD over a 15-week period. Also, this project aimed at initiating a follow up step-by-step algorithm of interventions based on the screening scores. **Methods:** The PHQ-2 to 9 was a two-step validated tool administered and documented into the electronic health record (EHR) by the staff nurse to patients who met eligible criteria. Patients who were identified with PSD received interventions, including PSD education material, antidepressant treatment if clinically appropriate and not contraindicated. Further interventions included consults to recreational therapy, case management, and rehabilitation psychology. **Results:** Analysis of the project's outcomes included the implementation of the PHQ-2 to 9 tools in the EHR and the completion of the PSD training by nurses (N=44 total nurses, 100% trained). Moreover, the results suggested 93% of eligible patients (N=68) were screened. Among the patients screened, n=3 (4.5%) had a PHQ-2 to 9 ≥ 10 . Of the patients identified with PSD n=1, (33%) received antidepressant treatment, whereas n=3, (100%) received PSD educational material and outpatient resources to mental health services. **Conclusions:** The project's outcomes had the potential to promote the early identification and management of PSD, accelerated the recovery process, the continuation of care to promote quality of life and decrease stroke reoccurrence. The sustainability of the project will require frequent re-education provided to staff nurses and training of the initiative delivered upon onboarding orientation.

Screening for Post-Stroke Depression in an Inpatient Rehabilitation Facility

The sequela related to stroke are devastating and are not limited to physical and functional disabilities but include the compounding complication of Post-Stroke Depression (PSD). PSD has been reported to affect 23-40% of stroke patients, and can potentiate the inaccuracy of cognitive assessment, result in poor rehabilitation outcomes, social withdrawal, cognitive impairment, and increase mortality (Teasell & Hussein, 2016; Centers for Medicare & Medicaid Services, 2019). As such, the American Heart Association (AHA) recommends screening patient for depression two weeks after onset of a stroke (Powers et al., 2019).

Despite this recommendation, in a 42-bed Inpatient Rehabilitation Facility (IRF) located in an urban area, the lack of established standardized process for screening and treatment of PSD coupled with the lack of awareness among healthcare providers constitute major root-cause analysis of delayed diagnosis and treatment, see Figure 1 for a fishbone diagram. To further assess the pre implementation process in this IRF, interviews were carried out to identify how nurses assessed and addressed stroke patients with depressive moods. Based on the results, all staff nurses interviewed, N=20, stated not using a screening tool to assess for depression. In patients who verbalized feelings of depression, 4 out of 20 nurses stated initiating referral for spiritual care; 6 out of 20 nurses stated informing the charge nurse; and 10 out of 20 nurses stated directly informing the attending physician or rehabilitation psychologist as interventions measures to treat patients' depressive moods, see Table 10 for interviews results. Such practices had the potential to delay PSD screening and treatment. The purpose of this project was to implement a standardized protocol that required the administration of the PHQ-2 to 9 to every patient admitted to the IRF with a diagnosis of a stroke within 24 hours of admission to improve the early identification of PSD over 15 weeks. The second aim of the project was to implement a

follow up step-by step algorithm of interventions for the treatment of PSD based on the screening scores over 15 weeks. Effective implementation of this screening tool will aid in the timely recognition of PSD to ameliorate therapy participation and care planning and transitioning.

Available Knowledge

An evidence review of the literature was conducted to evaluate the reliability and validity of the Patient Health Questionnaire (PHQ) to detect and treat PSD in the acute and post-acute setting. Six studies were selected to justify the practice change, see Table 1 for evidence review. PSD screening is considered a standard of care, as a result, no randomized control trials were evaluated, as excluding patients from screening can cause more harm than benefit.

The evidence synthesis of all studies, Table 2, found that the PHQ is a reliable and valid tool for the screening of PSD. Prisdie et al. (2016) and de-Man van et al. (2012) found that the PHQ-9 identifies PSD with the highest sensitivity (88%) and specificity (97%) at different cut off points. Meader et al. (2014) and Prisdie et al. (2016) highlighted healthcare providers' positive perceptions of the PHQ. Karamchandani et al. (2015) modified the PHQ-9 and found that early detection of PSD mitigated early treatment and interventions based on an action plan and screening scoring. Wilkins et al. (2018) and McIntosh (2017) studies were conducted on stroke units revealed that the PHQ-9 detects PSD at an optimal cut off point of 10. Based on the integrative review, the studies listed above generated results that supported a practice change.

A coalition of several stakeholders was then created to implement the practice change, see Table 3. Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) goals have been established by the team to ensure the successful implementation of this project, see Table 4. The process and outcome goals aimed to screen all eligible patients within 24 hours of

admission, and to provide PSD education material, outpatient referral, and antidepressant to all eligible patients with a PHQ-2 to 9 score ≥ 10 .

Rational

The Knowledge-to-Action (KTA) framework accommodated different phases being accomplished by different stakeholders at different points in time and focused on translating knowledge into action to enhance health status, see Figure 2 (Field et al., 2014). As it relates to the implementation of the PHQ-2 to 9 in this 42-bed IRF, the problem identification and the evidence review addressed the knowledge inquiry of the knowledge creation. The PHQ-2 to 9 is the inventory tool chosen to address the delay in diagnosis and treatment of PSD. The information gathered from the evidence review and the screening tool formed the knowledge creation section of the KTA. During the implementation, the knowledge discovered was applied to post-stroke patients in the IRF, adjusting to the local context. Subsequently, any barriers encountered during the action cycle were reviewed and mitigated accordingly. The action cycle was monitored constantly to evaluate the outcomes that supported the knowledge obtained from the knowledge inquiry (Graham et al., 2006).

Methods

Context

The Organizational Readiness of Change Assessment was used to assess the IRF's readiness to implement the practice change (Helfrich et al., 2009). The ORCA revealed that the availability of assistance was imperative for a successful implementation, thus champion leaders were selected. The selected champion leaders were then tasked to communicate the initiative's common vision, increasing the readiness to change. The PHQ-2 to 9 score-based algorithm accessibility through the electronic health record further managed change as the staff obtained

timely access to the tool. Early adopters of the implementation were selected as superusers to provide further assistance to late adopters. Goals setting for the implementation of the practice change occurred with the involvement of the team, listening to their feedback during meetings, and changing goals accordingly. Frequently revisiting the impact of screening and treatment of PSD on therapy productivity reiterated the importance of the practice change. To ensure that no participants were excluded from the implementation, staff nurse received education of the initiative prior to implementation. Anticipated barriers to implementation included project overload, nurse and patient ratio, staff shortage, and resistance to change.

Intervention

The implementation of the PHQ-2 to 9 score-based algorithm was implemented over a 15-week period, see Table 5 for Gantt Chart. The project involved the screening of adult patients within 24 hours of admission to the IRF and hospitalized with a stroke diagnosis. Patients with critical illness, screening refusal, severe dementia, aphasia, or cognitive impairment were ineligible for the project, and staff nurses documented reasons for ineligibility in their admission or progress notes. From August 29th, 2022, to October 15th, 2022, staff nurses completed the PHQ-2 to 9 via scanning a QR code with the iPads on the unit. From October 15th, 2022, to the end of the project the PHQ-2 to 9 was completed directly on the EHR. Recommended interventions based on the PHQ-2 to 9 scores included alerting the attending physician of PHQ-2 to 9 scoring, providing PSD education materials to patients, consideration for consultations with recreational therapy, case manager or social worker, attending physicians, rehabilitation psychologist, antidepressant treatment if clinically appropriate and not medically contraindicated, outpatient resources to mental health services upon discharge, and completion of the Columbia Suicidality Scale Scoring (CSSS) per facility policy, see Figure 4 for the desired

process map. Completion of the CSSS is one of the most important follow up intervention after screening patients for PSD. Indeed, this tool is a risk assessment of suicide ideation endorsed by stroke patients in the PHQ-9. It allows providers to react quickly, rate the level of suicidality and implement safety measures that will avoid the burden related with suicide ideation. The staff nurses were to document PSD education material provided to patients by scanning a QR code provided with the education material. The ABCDE framework was utilized to identify strategies and tactics for project implementation (Powell et al., 2015), see Table 6 for detail of strategies and tactics. Prior to implementation of the project, the staff nurse received education of the initiative via a voice over PowerPoint presentation and post-test survey after completion of the training. The case managers also received one-on-one education about the initiative, and a one-page flyer constructed by the QI-lead with potential outpatient resources to mental health services was provided. Verbal performance reviews were provided to the staff nurses and emails were sent to communicate the implementation findings and request feedback from the stakeholders. “Thank you” notes were provided to the staff nurse who consistently screen patient for PSD, and a luncheon was provided by the Quality Improvement-Lead for achievement of 90% of PSD screening compliance. Two Assistant Nurse Managers (ANM) were selected as project champions and shared the initiative during shift huddle. Two early adopters were selected as superusers and provided resources and assistance to other staff nurses. To promote communication, two binders were created and placed in the nursing station units, the binders had information pertaining to the updated process map, the clinical policy manual for suicide prevention, PSD education materials, and the QR codes for the PHQ-2 to 9 screening tool and documentation of PSD education material provided to patient.

Measurement

The structure, process and outcome measures data were determined by ratios, with defined numerators and denominators, used to calculate a percentage for the measures, see Table 6. Screening scores range for depressive mood severity; however, a PHQ-2 to 9 cut off score ≥ 10 increases the likelihood of PSD. This is based off the evidence synthesis, Table 2, where findings suggested that the PHQ-2 to 9 detects PSD at an optimal cut off point of 10 (sensitivity 88%, specificity 88%). As a result, the structure outcome selected aimed to (1) implement to PHQ-2 to 9 in the EHR, and (2) provide education to all staff nurse about the initiative prior to implementation. Indeed, patient education is essential as it has the potential to speed up the recovery process and reduce the readmission rate (Agus & Haryati, 2019). The process outcomes selected aimed to (1) ensure that patients exhibiting symptoms of PSD, as evidence of a PHQ-2 to 9 score ≥ 5 , are given education materials, and (2) patients exhibiting symptoms of PSD, as evidence of a PHQ-2 to 9 score ≥ 10 , receive outpatient resources to mental health services upon discharge if clinically appropriate. The signs and symptoms of PSD can persist for up to 12 months from occurrence (Towghi et al., 2016). Therefore, the continuation of care is pivotal to promote quality of life, decrease stroke reoccurrence, and reduce mortality rate (Towghi et al., 2016). The outcome measures identified aimed at (1) ensuring that eligible patients admitted with a stroke are screened within 24 hours of admission, and (2) ensuring antidepressant treatment if clinically appropriate and not medically contraindicated is provided. These measures will aid in the timely recognition of the mood disorder, which will prompt treatment to ameliorate rehabilitation therapies participation, care planning and care transitioning (Centers for Medicare & Medicaid Services, 2019). Antidepressant treatment has been shown to have beneficial effects on depression remission and response, resulting on functional recovery (Teasell & Hussein, 2016).

Study of the Intervention

Regarding documentation of PSD training provided to staff nurse prior to implementation of the initiative, the staff nurse scanned the REDCap (Research Electronic Data Capture) generated QR code to complete the post-training survey after completion of PSD training, see Appendix A for the PSD post training survey. Regarding documentation of PSD screening, the staff nurses screened eligible patients with the PHQ-2 to 9 within 24 hours of admission, see Appendix B for screening tool. A task message alert popped in the EHR once the staff nurse opened the patient's chart, this prompt allowed the nurse to click on the task and to complete the PHQ-2 to 9. Once completed, the staff nurse provided PSD education material to the patient (Appendix C) and alerted the attending physician if the PHQ-2 to 9 score ≥ 5 . The staff nurse also scanned the REDCap generated QR code of the PSD education material questionnaire (Appendix D), attached to PSD education material to document education provided to patient. In addition, the QI project lead sent encrypted email to the attending physician when the patient PHQ-2 to 9 score was greater or equal to 5.

A chart audit was performed weekly at the facility by the QI project lead, see Appendix E for chart audit form. A list of the staff nurses who completed the PSD post training test was generated via REDCap through data reports. In addition, the daily admission logs were obtained from the unit coordinator and were matched with the daily census sheet. The QI project lead examined patient eligibility and only accessed patients' charts who met inclusion criteria. The QI project lead collected patient's information such as diagnosis of a stroke, Financial Identification Number (FIN), patient age, patient gender, PHQ-2 to 9 score, screening of PSD within 24 hours of admission, antidepressant treatment and outpatient resources to mental health services from the electronic health record. The FIN was used to access patients' charts to obtain basic

demographics, PHQ-2 to 9 scores, and follow up interventions, which were necessary to accurately conduct weekly chart audits.

Analytics

The data analysis was intended to monitor data trends over time to anticipate decision making. Run charts were used to monitor ongoing analysis of the data collected throughout the implementation. The analysis permitted easy temporal visualization during monthly meeting with the stakeholders (Ogrinc et al., 2018). The use of run charts for the analysis of the data will produce at least 15 points, which will generate power from point-to-point variation to detect a signal equivalent to a p value < 0.05 (Ogrinc et al., 2018).

Ethical Considerations

To prevent violation of patient privacy and confidentiality, the EHR was locked and logged out when not in use. Patient privacy and confidentiality were maintained as the data were collected, recorded, and tracked on REDCap software a HIPAA complaint server password protected using VPN. Data collection operations were conducted without patient identification. The chart audits were conducted at the facility in a private room with a quiet environment free of distraction to maintain patient privacy and confidentiality. The project was conducted under a Non-human Subject's Research determination from the Human Research Protections Office (HRPO) of the UMSOM and the facility's Institutional Review Boards (IRB).

Results

Between August 29th, 2022, and December 12th, 2022, N=73 patients were eligible to be screened with the PHQ-2 to 9 as they met inclusion criteria, whereas three patients did not meet eligible criteria due to cognitive impairment. Of the eligible patients screened, n= 68 (93%) were screened with the PHQ-2 to 9 within 24 hours of admission, whereas n=5 (7%) of eligible

patients received the PHQ-2 to 9 screening 24 hours after admission. Of the eligible patients screened within 24 hours of admission, n=35 (56%) patients were female, while n=28 (44%) patients were male, and age range varied between 33 to 93 years with an average age of 67. Of the eligible patients, n=65 (96%) patients had a PHQ-2 to 9 score between 0 to 4, indicating no depression, whereas n=1 patient had a PHQ-2 to 9 score of 13 indicating moderate depression, n=1 patient had a PHQ-2 to 9 score of 20 indicating severe depression, and n=1 patient had a PHQ-2 to 9 score of 15 indicating moderately severe depression (Figure 6). The data set on the run chart didn't reveal any shifts, trends, runs, or astronomical points. The delay in screening eligible patients was due to the ongoing education training in week 1 of implementation, short staffing, delay in admission, and poor communication among staff nurses. Tactics and strategies such as personalized "thank you" notes and luncheon provided to the staff nurses might have contributed to the 100% screening compliance rate sustained from week 6 to week 15.

Concerning the structure outcome, the PHQ-2 to 9 was included in the EHR on week 3 of implementation of the initiative, see Table 8. Regarding the process goal to successfully provide training to the staff nurse prior to the project implementation, by week 15, n=44 (100%) staff nurses received training on the initiative, see Figure 5 for run chart of staff nurse training. The run chart of staff nurse training revealed one shift, one trend in an upward direction and two runs (too few runs compared to the expected range for a data set of 10 points). Suggesting that the variability in the data set is due to a special cause variance, the implementation of the project. The process goal to train 100% of staff nurses prior to implementation encountered some delay, as until week 6 of the project, the QI Project lead was ordered by the facility's leadership team to train only selected nurses (ANM, preceptors, admission nurse, charge nurse). After verbal performance reviews and feedback from the stakeholders, the QI lead was able to expand

education of the initiative to the remaining staff nurses by sending email reminders containing the PowerPoint presentation and a QR code for the PSD post training survey. The project's champions communicated the expansion of education during shift huddles. These initiatives resulted in an increase from 75% to 100% of training completion.

Regarding the process outcome to provide PSD education to eligible patient with a PHQ-2 to 9 score ≥ 10 , between August 29th, 2022, and December 12th, 2022, n=3 (4.5%) of eligible patients who were screened with the PHQ-2 to 9 within 24 hours of admission had a PHQ-2 to 9 score ≥ 10 . On week 2, 7 and 13 of implementation, n=3 (4.5%) of eligible patient received PSD education provided by the staff nurses (Table 9).

Regarding the process outcome to provide outpatient resources in the discharge instructions of eligible patient with a PHQ-2 to 9 score ≥ 10 , on week 2, 7 and 13 of implementation, n=3 (100%) of eligible patient received outpatient resources provided by the staff nurses upon discharge (Table 9). The data set on the run chart only had 3 data points which is insufficient to draw an interference of shift, trend, or run.

Concerning the outcome to provide antidepressant treatment if clinically appropriate and not medically contraindicated, n=1 (1.5%) of eligible patients received antidepressant treatment since the implementation of the initiative. On week 2 of implementation, n=1 (1.5%) received antidepressant before discharge from the facility, whereas on week 7 and 13 of implementation, n=2 (3%) patients were eligible to receive antidepressant treatment but did not receive it due to refusal. The potential side effects related to antidepressant and language barrier were the main cause of refusal (Figure 9). The data set on the run chart only had 3 data points which is insufficient to draw an interference of shift, trend, or run. A table of the project's goals and their results are illustrated in Table 9.

The successful implementation of the follow up step by step screening algorithm had facilitators and barriers. One of the barriers to implementation was the inability to generate automated consults for follow ups based on the screening scores due to the cost related with consults that might not be covered by the insurance. Thus, the proposed consults on the algorithm were left for consideration of the attending physicians. Due to this change, staff nurses were tasked to provide outpatient resources to mental health services to patient identified with PSD upon discharge.

Discussion

The purpose of this project was to screen eligible stroke patients for the early identification of PSD and to consider treatment for the mood disorder. This goal aligns with the recommendation of the American Heart Association to screen patients for PSD and the U. S. Preventive Services Task Force recommendation to have support and follow up management after depression screening (USPSTF, 2016). The results of this quality improvement project demonstrate that the PHQ-2 to 9 administered by staff nurses as part of a standardized protocol can provide a systematic way to screen patients diagnosed with a stroke. After screening eligible patients, the prevalence of PSD was 4.5%, which is not consistent with the commonly reported prevalence of 30%. No definitive inference of this discrepancy could be made, however phenomena such as stigmatization related to depression and early screening before patients' realization of the sequela related to a stroke diagnosis could have been factors that affected the prevalence in this study. Nevertheless, one patient with history of depression was identified and restarted on antidepressant treatment potentially increasing participation in therapy and recovery. Patients who refused antidepressant treatment received PSD education material and outpatient resources to mental health services streamlining the management of PSD. One of the patients

who refused antidepressant treatment was Spanish speaking. Also, the American Stroke Association currently do not have PSD education material in Spanish which constituted a limitation in this study. Another limitation of the study was the small number of participants over a short period of time of implementation. Prior to implementation the facility did not have a standardized protocol to assess and manage PSD. The implemented initiative resulted in improved screening outcomes and distribution of PSD education material along with recommendation for treatment. The staff nurses provided educational resources to help patients cope with their illness and relieve the uncertainty related with disturbing thoughts. This project reduced the discrepancy in screening practices that are not evidence-based and provided practical suggestions for the treatment of patients identified with PSD.

Conclusion

The integration of the PSD staff education during onboarding orientation will be an ideal opportunity to sustain the screening of post-stroke depression in an inpatient rehabilitation. To further maintain sustainability, the ANMs will conduct chart audits of the outcomes measured. Future improvement of the project will necessitate frequent education refreshers of the project's initiative to revisit management interventions and adjust them to the context. This quality improvement project could benefit from an automated follow up screening through the patient portal to maintain the continuation of care and allow patients to access the PSD education material provided during their hospitalization. This will provide notifications to primary care providers and improve referrals to mental health services. The implementation of this project resulted in the initiation of an automated alert message in the EHR to complete the Columbia-Suicide Severity Rating Scale if the patient endorses suicide ideation on the PHQ-2 to 9. This integration of the evidence-based risk assessment of suicide ideation and behavior reduces

human errors, improves communication and the management of post stroke suicide. The PSD education material was integrated into the facility's stroke orientation booklet so that every patient would have access to potential treatment options, signs and symptoms, and resource contact information. Negotiations are underway to create tabs within the "stroke dashboard" section in the EHR where staff nurses can document PSD education and outpatient resources to mental health services provided to patient. As such, staff nurses will be empowered and accountable for providing education strategies to better inform their patients and improve coping strategies for their illness to lessen the burden associated with negative cognitions associated with PSD. The systematic implementation of this project also provided a framework of implementation for the sister facility and to initiate depression screening and management for the other patient population admitted in the facility. The findings of this quality improvement project demonstrated the importance of implementing a standardized depression screening and management for stroke patient during their hospitalization in an inpatient rehabilitation facility.

References

- Agency for Healthcare Research and Quality. (2020). *Section 4: Ways to approach the quality improvement process*. <https://www.ahrq.gov/cahps/quality-improvement/improvement-guide/4-approach-qi-process/index.html>
- Agus, D. & Haryati, T. (2019). Overview of nurse compliance level on documentation educational provision to patients and families at inpatient room of Immanuel Hospital Bandung. *In Selection and Peer-review under the responsibility of the ICHT Life Sciences*, 131-138. DOI 10.18502/kl.v4i13.5233
- Centers for Medicare & Medicaid Services. (2019). *Final specifications for IRF QRP quality measures and Standardized Patient Assessment Data Elements (SPADEs)*. Retrieved from <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/Downloads/Final-Specifications-for-IRF-QRP-Quality-Measures-and-SPADEs.pdf>
- Dang, D. & Dearholt, S., Bissett, K., Ascenzi, J., & Whalen, M. (2022). *John Hopkins evidence-based practice for healthcare professionals: Model and guidelines*. Fourth edition. Sigma Theta Tau International
- Daniels, S.K., Anderson, J.A., & Petersen N.J. (2013). Implementation of stroke dysphagia screening in the emergency department. *Nursing Research and Practice*, 2013. <https://dx.doi.org/10.1155/2013/304190>
- de Man-van Ginkel, J.M., Hafsteinsdottir, T., Lindeman, E., Burger, H., Grobbee, D., & Schuurmans M. (2012). An efficient way to detect Poststroke depression by subsequent administration of a 9-item and 2-item patient health questionnaire. *Stroke*, 43(3), 854-856. [doi:10.1161/STROKEAHA.111.640276](https://doi.org/10.1161/STROKEAHA.111.640276). Epub 2011 Dec 8. PMID:22156689

Field, B., Booth, A., Ilott, I., & Gerrish, K. (2014). Using the Knowledge to Action framework in practice: a citation analysis and systematic review. *Implementation Science*, 9, 172.

<https://doi.org/10.1186/s13012-014-0172-2>

Foy, R., Skrypak, M., Alderson, S., Ivers N.M., McInerney, B., Stoddart, J. Ingham, J., & Keenan, D. (2020). Revitalising audit and feedback to improve patient care. *BMJ*,

368(m213). <https://doi:10.1136/bmj.m213>

Graham, I., Logan, J., Harrison, M., Straus, S., Tetroe, J., Caswell, W. & Robinson, N.

(2006). Lost in knowledge translation: Time for a map? *J Contin Educ Health Prof*, 26.

doi: 10.1002/chp.47. <https://doi.org/10.1002/chp.47>

Helfrich, C.D., Li, Y., Sharp, N.D., & Sales, A.E. (2009). Organizational readiness to change assessment (ORCA): Development of an instrument based on the Promoting Action on

Research in Health Services (PARIHS) framework. *Implementation Science* 4,38.

<http://doi:10.1186/1748-5908-4-38>

Karamchandani, R.R., Vahidy, F., Bajgur, S., KimYen Thi Vu, H., Choi, A., Hamilton, R.K.,

Rahbar, M.H., & Savitz, S.I. (2015). Early depression screening is feasible in hospitalized

stroke patients. *PLoS ONE*, 10(6): e0128246. [doi: 10.1371/journal.pone.0128246](https://doi.org/10.1371/journal.pone.0128246). PMID:

[26039704](https://pubmed.ncbi.nlm.nih.gov/26039704/); [PMCID: PMC4454488](https://pubmed.ncbi.nlm.nih.gov/PMC4454488/)

McIntosh, C. (2017). A depression screening protocol for patients with acute stroke: A quality

improvement project. *American Association of Neuroscience Nurses*, 49(1), 39-48. [doi:](https://doi.org/10.1097/JNN.000000000000231)

[10.1097/JNN.000000000000231](https://doi.org/10.1097/JNN.000000000000231). PMID: 27602529

Meader, N., Moe-Byrne, T., Llewellyn, A., & Mitchell, A.J. (2014). Screening for poststroke

major depression: a meta-analysis of diagnostic validity studies. *Journal of Neurology, Neurosurgery, Psychiatry*, 85(2), 198-206. [doi: 10.1136/jnnp-2012-304194](https://doi.org/10.1136/jnnp-2012-304194). Epub 2013 Feb 5. PMID: 23385849

Melnyk, B., Fineout-Overholt, E. (2019). *Evidenced-based practice in nursing & healthcare: a guide to best practice*. Fourth edition. Philadelphia: Wolters Kluwer

O'Flaherty, S., Sanders, M.T., & Whillans, A. (2021). Research: A little recognition can provide a big morale boost. *Harvard Business Review*. Retrieved from <https://hbr.org/2021/03/research-a-little-recognition-can-provide-a-big-morale-boost>

Ogrinc, G.S., Headrick, L.A., Barton, A.J., Dolansky, M.A., Madigosky, W.S., Miltner, R.S. (2018). *Fundamentals of health care improvement: a guide to improving your patients' care* (3rd ed.). The Joint Commission and the Institute for Healthcare Improvement

Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., Procter, E.K., & Kirchner, J. E. (2015). A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science*, 10(1), 21. Retrieved from [https://implementationscience.biomedcentral.com/articles/10.1186/s13012-015-0209-](https://implementationscience.biomedcentral.com/articles/10.1186/s13012-015-0209-1)

[1](#)

Powers W. J., Rabinstein A. A., Ackerson T., Adeoye O.M., Bambakidis N.C., Becker, K., Biller J., Brown, M., Demaerschalk, M.B., Hoh, B., Jauch, C.E., Kidwell, C.S., Leslie-Mazwi, T.M., Obviagele, B., Scott, P.A., Sheth, N.K., Southerland, M.A., Summers. D.V., & Tirschwell, D.L. (2019). Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute

ischemic stroke. American Heart Association/American Stroke Association. *Stroke*, 2019(50), e344-e418. DOI: 10.1161/STR.0000000000000211

Prisnie, J. C., Fiest K. M., Coutts S. B., Patten S. B., Atta C. A., Blaikie L., Bulloch A.G.M., Demchuk A., Hill M.D., Smith E. E. & Jette N. (2016). Validating screening tools for depression in stroke and transient ischemic attack patients. *The International Journal of Psychiatry in Medicine*, 51(3), 262-277. [doi: 10.1177/0091217416652616](https://doi.org/10.1177/0091217416652616). PMID: [27284119](https://pubmed.ncbi.nlm.nih.gov/27284119/)

Teasell, R. & Hussein, N. (2016). *Post-Stroke Depression and Community Reintegration*. Retrieved from <file:///Users/joyaccrombessi/Downloads/7-1-depression-post-stroke-introduction-ebrsr.pdf>

Towfighi, A., Oubiagele, B., Hussein, N. E., Hackett, M. L., Jorge, R.E., Kissela, B. M., Mitchell, P. H., Skolaru, L.E., Whooley, M.A. & Williams, L. S. (2017). Poststroke Depression: A scientific statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*, 2017(48), e30-e43. DOI: 10.1161/STR.0000000000000113

U.S. Preventive Services Task Force. (2016). *Final Recommendation Statement: screening for depression in adults*. Retrieved from <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/depression-in-adults-screening>

Wilkins, S.S., Akhtar N., Salam A., Bourke P., Joseph S., Santo M., & Shuaib A. (2018). Acute post stroke depression at a primary stroke center in the Middle East. *PLoS ONE* 13(2): e0208708. [doi: 10.1371/journal.pone.0208708](https://doi.org/10.1371/journal.pone.0208708). Erratum in: *PLoS One*. 2019 Feb 21;14(2): [e0212919](https://doi.org/10.1371/journal.pone.0212919). PMID: 30571716; PMCID: PNC6301612

Table 1

Screening of Post-Stroke Depression using the Patient Health Questionnaire Evidence Review

Citation: de Man-van Ginkel, J.M., Hafsteinsdottir, T., Lindeman, E., Burger, H., Grobbee, D., & Schuurmans M. (2012). An efficient way to detect Poststroke depression by subsequent administration of a 9-item and 2-item patient health questionnaire. <i>Stroke</i> , 43, 854-856. DOI: 10.1161/STROKEAHA.111.640276					Level III – Quality B
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
The study aimed at evaluating the diagnostic value of the Patient Health Questionnaire-2 (PHQ-2) and Patient Health Questionnaire – 9 (PHQ-9) at identifying post-stroke depression (PSD) in patients with stroke at 6 weeks and 8 weeks after stroke onset	Prospective Cohort study	<p><u>Sampling Technique:</u> Convenience sampling</p> <p><u>Eligible:</u> All patient admitted with clinical diagnosis of stroke - 460 participants <u>Lost to follow-up:</u> 7 participants <u>Accepted:</u> 164 participants</p> <p><u>Exclusion criteria</u> – serious cognitive disorders defined as a Mini-Mental State Examination score >18, communicative disorders based on Frenchay Aphasia Screening Test</p> <p><u>Group Homogeneity:</u> Male 59.1 %, female 40.9%, mean age 70.6, intracerebral hemorrhage 13.4%, infarction 86.6% - The group is homogeneous based on p values on Table 1 for demographic and clinical characteristics</p> <p><u>Power analysis:</u> Not completed</p>	<p><u>Intervention fidelity:</u> The researcher was trained in administrating the Composite International Diagnostic Interview, the standard for diagnosis of depression. Before discharge (T=0), a research nurse obtained consent and gathered baseline data. After discharge, the researcher and research nurse visited the patient at 6 weeks and 8 weeks post- stroke (T=1). The nurse administered the PHQ-9 whereas the researcher administered the Composite International Diagnostic Interview. Both research and nurse were blinded to PHQ-9 scores</p> <p>Ethical approval was obtained from the Medical ethical committee of the University Medical Centre Utrecht and the three participating hospitals</p>	<p><u>Dependent Variable:</u> Optimal cut off points with highest sensitivity, specificity of the PHQ-2 and PHQ-9</p> <p><u>Instruments:</u> PHQ-2 and PHQ-9 were used to measure the dependent variables</p> <p><u>Statistical Analysis:</u> The dependent variables were analyzed with the receiver operating characteristic (ROC) Curve with measurement of discriminatory power and area under the curve, independent of cutoff value</p>	<p><u>Statistical Results</u> Post-stroke depression prevalence was 12.2% The discriminatory power of the PHQ-9 and PHQ-2 for major depression were good with an area under the curve of 0.87 and 0.82. -The accuracy of the PHQ-9 was best at a cutoff score ≥ 10 with a sensitivity of 80%, specificity of 78%, positive predicted value of 34%, negative predicted value 97%, positive likelihood ratio 3.71, negative likelihood ratio 0.24 -The accuracy of the PHQ-2 was best at a cutoff score ≥ 2 with a sensitivity of 75% and specificity of 76%, positive predicted value 0.30, negative predicted value 0.96, positive likelihood ratio 3.09, negative likelihood ratio 0.33</p> <p><u>Clinical Significance</u> Screening post-stroke patient for depression with the PHQ-9 is indicated for PHQ-2 score ≥ 2, this practice improved the detection of depressed patients</p> <p><u>Conclusions</u> The researchers concluded that the PHQ-2 and PHQ-9 are suitable tools to screen patient after a diagnosis of stroke as they allow an early detection of PSD. Recommendation suggests conducting the PHQ-2 on all patients and the PHQ-9 only in case of a positive PHQ-2</p>
Recommendations: The PHQ-2 and PHQ-9 are both acceptable tool for the screening of PSD at cut off points 12 and 2 respectively. PHQ-9 should be administered only for positive PHQ-2.					

Citation: Karamchandani, R.R., Vahidy, F., Bajgur, S., KimYen Thi Vu, H., Choi, A., Hamilton, R.K., Rahbar, M.H., & Savitz, S.I. (2015). Early depression screening is feasible in hospitalized stroke patients. <i>PLoS ONE</i> , 10(6): e0128246. doi: 10.1371/journal.pone.0128246					Level III – Quality B
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
<p>The study assessed the feasibility of early depression screening with the Modified Patient Health Questionnaire-9 (MPHQ-9), to accommodate hospitalization, among patient with a stroke diagnosis. An Appraisal of patient characteristics association with being screened for post-stroke depression (PSD) and screening positive for PSD was conducted.</p> <p><u>Hypothesis:</u> Early depression screening among patient with stroke is feasible. Feasibility defined as screening 75% of all eligible patients</p>	Prospective study Quasi – experimental	<p><u>Sampling Technique:</u> Convenience Sampling</p> <p>Eligible: 211 participants</p> <p>Accepted: 158 participants</p> <p><u>Group Homogeneity:</u> The group is homogeneous based on p values on Table 1 for demographic and clinical characteristics. Accepted participants were not significantly different with regards to age, gender, and race</p> <p><u>Inclusion criteria</u> – Patient admitted with a clinical diagnosis of ischemic stroke (IS) or intracerebral hemorrhage (ICH)</p> <p><u>Exclusion criteria</u> – Comfort/ hospice care, death, language dysfunction</p> <p><u>Setting:</u> Stroke Service at Memorial Hermann Hospital – Texas Medical Center</p> <p><u>Power analysis:</u> Not completed</p>	<p><u>Intervention fidelity:</u> Between 2/1/2013 and 4/15/2013, the MPHQ-9 was self-administered by patients and scores were collected and recorded in the electronic health record by the social workers. These last communicated with the medical team if patients’ MPHQ-9 score > 4. A step-by-step action plan was then carried out by the medical team and the social worker. For MPHQ-9 score greater or equal to 1, phone numbers or website addresses for mental health services were provided, and education materials / fact sheets on PSD were given</p> <p>All patient data was de-identified and analyzed anonymously</p> <p>Permission received by the Institutional Review Boards of Memorial Hermann Hospital and the University of Texas</p>	<p><u>DV:</u> MPHQ-9 scores, MPHQ-9 ≥ 4 as an indication of depression, National Institutes of Health Stroke Scale (NIHSS) > 15 as moderate to severe stroke, modified Rankin Scale (mRS) > 3 as poor discharge /day 7 outcome</p> <p><u>Instruments:</u> MPHQ-9, NIHSS, mRS scales were used to measure the dependent variables</p> <p><u>Statistical Analysis:</u> Univariable and multivariable logistic regression models to determine association between MPHQ-9 screening and MPHQ-9 positive screening, linear regression model to determine association between MPHQ-9 score, demographic and clinical variables</p>	<p><u>Statistical Results:</u> Predefined benchmark achieved - Hypothesis accepted – 74.88% (n=158) of eligible patients were screened Median time for screening was 2.5 days after admission Overall rate of depression was 35%, MPHQ-9 score ≥ 4. MPHQ-9 breakdown scores: -MPHQ-9 score=0, 20.88%, no depression -MPHQ-9 score = 1-4, 43.67%, minimal depression -MPHQ-9 score=5-14, 31.01%, mild to moderate depression -MPHQ-9 score ≥ or equal to 15, 4.4%, moderately severe to severe depression -Younger age (OR 0.97. 95%CI 0.96-0.99) and female sex (OR 2.06, 95% CI 1.06-4.01) was associated with screening positive for PSD - 50% of patient who screened positive for PSD had a poor outcome (mRS>3), but this finding was not statistically significant</p> <p><u>Clinical Significance</u> Antidepressant treatment, inpatient psychiatry consultation, and outpatient psychiatry and mental health counseling were interventions initiated for patient identified with PSD. Female sex and young age increase the likelihood to screen positive for PSD</p> <p><u>Conclusions</u> Researchers suggest early screening of PSD during initial inpatient stay is feasible, such practice increase the institution of therapies that positively influence patient outcomes</p>
Recommendations: The MPHQ-9 is a suitable tool for the early identification of PSD as it allows for early treatment. Patients’ sex and age should be considered during assessment					

Citation: Prisie, J. C., Fiest K. M., Coutts S. B., Patten S. B., Atta C. A., Blaikie L., Bulloch A.G.M., Demchuk A., Hill M.D., Smith E. E. & Jette N. (2016). Validating screening tools for depression in stroke and transient ischemic attack patients. <i>The International Journal of Psychiatry in Medicine</i> , 51(3), 262-277. DOI:10.1177/0091217416652616					Level III – Quality A
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
The study assessed the accuracy at which selected depression screening tools (Patient Health Questionnaire – 2 (PHQ-2), Patient Health Questionnaire – 9 (PHQ-9), Hospital Anxiety and Depression Scale (HADS-D), and Geriatric Depression Scale (GDS-15)) diagnosed post-stroke depression (PSD) among patient with stroke and transient ischemic attack (TIA)	Prospective study Cross-sectional Eligible stroke participants presented with a consent. Accepted participants received written depression screening tools (PHQ-2, PHQ-9, HADS-D, and GDS-15) to assess the tools’ diagnostic accuracy in screening for depression among patient with stroke and TIA	<u>Sampling Technique:</u> Convenience sampling <u>Sample Size:</u> Eligible – 303 participants Accepted - 122 participants <u>Group Homogeneity:</u> 59.5% of patients with a stroke, 40.5% of patients with a TIA, mean age 60.1 years, female 55.7%, male 44.3%. There is no difference in characteristics between the groups, except for female participants being higher than female non-participants (p=0.02) <u>Exclusion criteria</u> Involved age <18 years, live outside Alberta, not fluent in English, hearing impairment, other diagnosis than stroke or TIA, severe aphasia, developmental delay, prior diagnosis of dementia <u>Setting:</u> Outpatient stroke clinic Calgary, Alberta (Canada) <u>Power analysis:</u> Not completed	<u>Intervention Fidelity:</u> Between February and August 2013 participants were enrolled from an outpatient stroke prevention clinic in Calgary, Canada. Eligible participants received all depression screening tools along with a written questionnaire asking to rate overall disease severity. A follow-up telephone Structure Clinical Interview (SCID) for the Diagnostic and Statistical Manual for Mental Disorders (DSM-IV), the gold standard for the diagnosis of major depression was performed within 2 weeks by trained senior clinical psychology students blinded to the result of depression questionnaires Diagnosis of stroke or TIA was based on full evaluation and diagnostic workup The study was approved by the Conjoint Health Research ethic board at the university of Calgary	<u>Dependent Variable:</u> Each depression scales’ optimal cut off points with the highest sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) in detection PSD <u>Instruments:</u> Dependent variables were measured using PHQ-2, PHQ-9, HADS-D, GDS-15 <u>Statistical Analysis:</u> Clinical utility of the test was identified with likelihood ratios, and assessment of discriminative value of the tools was evaluated with the Receiver operating characteristics analysis (ROC)	<u>Statistical results:</u> The PHQ-9 was the best performing tool for screening for PSD with a sensitivity of 81.8%, specificity of 97.1% and a cut-off point of 13 The PHQ-2 performed better than previous studies report with a sensitivity of 75%, specificity of 96.3%, and cut of point of 3 consistent with the cut off value for the general population The HADS-D performed with lower accuracy but was deemed suitable for PSD. The GSD-15 performed the least among all screening tools with a low sensitivity rate (45.5%) The prevalence of PSD identified at 9.8%, (N=12), as confirmed with SCDI. <u>Clinical significance</u> All depression screening tools’ cut off points were higher among post-stroke population as compared to the general population. The study suggest that cut off points may vary depending on the context in which the testing is used <u>Conclusions</u> Researchers suggested that PHQ-9 and PHQ-2 are reliable and valid tools to screen for PSD at cut off points of 13 and 3 respectively. The PHQ is quick to administer and available at no cost
Recommendation: The PHQ-9 (sensitivity 81.8%, specificity 97.1%) and PHQ-2 (sensitivity 75%, specificity 96.3%) are good tools for screening for PSD with cut off points of 13 and 3 respectively.					

Citation: Meader, N., Moe-Byrne, T., Llewellyn, A., & Mitchell, A.J. (2014). Screening for poststroke major depression: a meta-analysis of diagnostic validity studies. <i>Journal of Neurology, Neurosurgery, Psychiatry</i> , 85, 198-206. doi:10.1136/jnnp-2012-304194					Level III – Quality A
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
The study aimed to establish the most accurate and efficient depression screening tool for the recognition of post-stroke depression (PSD). The Patient Health Questionnaire – 2 (PHQ-2), Patient Health Questionnaire – 9 (PHQ-9), Beck Depression Inventory (BDI), Center of Epidemiology Studies-Depression Scale (CES-D), Hamilton Depression Rating Scale (HDRS), Hospital Anxiety and Depression Scale (HADS), Geriatric Depression scale (GDS), and Montgomery Asberg Depression Rating scale (MADRS) were analyzed for accuracy and validity in screening for PSD	Meta-analysis of diagnostic validity studies	<p><u>Sampling Technique:</u> Search of seven electronic bibliographic databases generated 24 studies for analysis</p> <p><u>Sample Size:</u> 2907 participants</p> <p><u>Exclusion criteria</u> – studies without clearly stated comparator to be Diagnostic and Statistical Manual Fourth Edition (DSM-IV) or International Classification of Disease tenth Edition (ICD-10) which are reference standard for the diagnosis of depression</p> <p><u>Group Homogeneity:</u> The group is homogeneous based on p values on Table 1 for demographic and clinical characteristics. The mean age ranged (55-80 years) may have introduced some heterogeneity into the analyses</p> <p><u>Settings:</u> Acute and Post-acute Care</p>	<p><u>Intervention fidelity:</u> Seven electronic bibliographic databases (Cochrane Central Trial Register, Cumulative Index to Nursing and Allied Health literature (CINAHL), Embase, Health management Information Consortium (HMIC), Medline, PsycINFO, Web of Knowledge) were searched for studies assessing the validity of instruments to diagnose PSD. Two authors selected studies using ICD or DSM-IV and two authors extracted data and assessed their quality. The selected studies were synthesized with meta-analysis. Lastly, an evaluation of the precision of depression scales in efficiently diagnosing PSD was conducted on identified instruments (PHQ-2, PHQ-9, BDI, CES-D, HDRS, HADS-D, HADS-T, GDS-15, MADRS)</p>	<p><u>Dependent Variables:</u> Primary outcome -Pooled sensitivity and specificity Secondary outcomes - positive predictive values (PPV), negative predictive value (NPV), clinical utility index (CUI) of each depression scale were calculated using bivariate analysis and HSROC meta-analysis</p> <p><u>Instruments:</u> The dependent variables were measured with the PHQ-2, PHQ-9, BDI, CES-D, HDRS, HADS-D, HADS-T, GDS-15, MADRS</p> <p><u>Statistical analysis:</u> The instruments were analyzed with the visual examination of forest plot, predictions regions of Hierarchical Summary Receiver Operating Curve (HSROC), meta-regression, and subgroup analyses</p>	<p><u>Statistical Results:</u> The median prevalence of depression 18% (range 8-46%) in all studies PHQ-2: Sensitivity 79%, Specificity 76%, PPV 36%, NPV 96%, Rule in clinical utility – Poor, Rule out clinical utility – Good PHQ-9: Sensitivity 86%, Specificity 79%, PPV 41%, NPV 97%, Rule in clinical utility – Poor, Rule out clinical utility – Good</p> <p><u>Clinical Significance</u> The best performing scales with the highest sensitivity and specificity are HDRS, PHQ-9 and MADRS. Although, PHQ-2 sensitivity and specificity were lower in post stroke population it is preferred by clinicians</p> <p><u>Conclusions</u> Limited number of studies were evaluated for each screening tool. None of the depression scales had the performance to adequately rule in/rule out a diagnosis with few false positive, as such, diagnostic interview is still recommended</p>
<p>Recommendation: The PHQ-9 constitute one of the best performing scales (sensitivity 86%, specificity 79%) for the identification of PSD in the acute and post-acute setting. Although the PHQ-2 performed lower among the stroke population (sensitivity 79%, specificity 76%), its rule out clinical utility is good. It is also the most preferred tool by clinicians. The PHQ-2 and PHQ-9 are appropriate scales for the screening of PSD in the acute and post-acute setting.</p>					

Citation: Wilkins, S.S., Akhtar N., Salam A., Bourke P., Joseph S., Santo M., & Shuaib A. (2018). Acute post stroke depression at a primary stroke center in the Middle East. <i>PLoS ONE</i> 13(2): e0208708. https://doi.org/10.1371/journal.pone.0208708					Level V and Quality B
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
The study aimed at defining base rate of acute post-stroke depression (PSD) in Qatar. An investigation of the PHQ-2 as a tool to help improve rates of depression screening was conducted, and the association between depression, demographics, cognitive deficits, cardiovascular risk factors, stroke symptoms and severity was analyzed	Quality Improvement Retrospective chart review	<u>Sampling Technique:</u> Convenience sampling <u>Eligible:</u> All patient admitted with a diagnosis of a stroke <u>Accepted:</u> 233 participants <u>Exclusion criteria</u> – inability to communicate, delirium, confusion <u>Power analysis:</u> A sample size of 283 participants was deemed to be enough to produce a 95% confidence interval (24.7% to 35.7%) <u>Group Homogeneity:</u> The group is homogeneous based on p values on Table 1 for demographic and clinical characteristics <u>Setting:</u> Stroke unit at Hamad General Hospital (HGH) a Joint Commission International accredited 600 bed hospital	<u>Intervention fidelity:</u> Between March 2016 through March 2017 nurses on the stroke unit who were trained by a psychologist administered the PHQ-9 and Minicog. Patient with PHQ-9 score ≥ 10 received a DSM-V based interview administered by a psychologist when available. This last, reviewed all test results twice a week, provided follow-up consultation, and supervision throughout the project. Demographic data and treatment information was collected from the stroke database. Variables such as the National Institutes of Health Stroke Scale (NIHSS) and the Modified Rankin Scale (mRS) were also obtained Approval received by the Hamad Medical Corporation Research International Review Board	<u>Dependent Variable:</u> Rate of patient with a PHQ-9 score ≥ 10 defined as moderately depressed Association between diagnosis of PSD and demographic data, treatment information, NIHSS, mRS scores, discharge diagnosis/location <u>Instruments:</u> PHQ-9, PHQ-2, MiniCog, NIHSS, mRS were used to measure the dependent variables <u>Statistical Analyses:</u> Multiple binary logistic regression model, items analysis on the PHQ-9, goodness-of-fit test were used to analyze the dependent variables	<u>Statistical Results:</u> - Analysis revealed disability (mRS), stroke severity (NIHSS), prior stroke, MiniCog, discharge diagnosis/location, and smoking were not linked with depression - Mean time from stroke to screening was 1.5 days for non-depressed and 1.9 days for depressed (p=0.13) - PHQ-9 ≥ 10 (in 46/233) of sample - prevalence of stroke was 19.7% (n=46), which correlates with previous studies - Nationality (p=0.04) and dysarthria (p=0.047) were associated with depression - Item analysis revealed that the most frequent item endorsed by depressed patient were trouble sleeping, feeling tired, appetite changes, and anhedonia - Sensitivity and specificity of the PHQ-2 to predict the PHQ-9 was assessed as follow: - PHQ-2 cutoff ≥ 3 (sensitivity 78.3, specificity 85.6) - PHQ-2 cutoff ≥ 2 (sensitivity 91.3, specificity 71.6) <u>Clinical Significance</u> Recommendation of using the PHQ-2 score with cutoff ≥ 2 in the acute setting vs. PHQ-2 score with cutoff ≥ 3 used in the primary setting <u>Conclusion:</u> Early identification of PSD is feasible in the acute setting. The PHQ-2 should be administered to all patient followed by a full PHQ-9 if PHQ-2 score ≥ 2 . Patient's nationality should be considered in depression assessment as Middle eastern and African were more than twice as likely to be depressed
Recommendations: The PHQ-2 and PHQ-9 are appropriate tools to screen for PSD with cut off points of 2 and 10 respectively. The PHQ-9 should only be administered to patients with a positive PHQ-2. Patients' nationality and dysarthria status should be considered during assessment.					

Citation: McIntosh, C. (2017). A depression screening protocol for patients with acute stroke: A quality improvement project. <i>American Association of Neuroscience Nurses</i> , 49(1), 39-48. DOI:10.1097/JNN.0000000000000231					Level V- Quality A
Purpose/ Hypothesis	Type of Evidence Research Design	Sample – Population, Size, Setting	Intervention/Procedures	Primary Outcome/Measures	Results/Conclusions
Evidence-based clinical scholarship project seeking to improve the early identification and treatment of post-stroke depression (PSD) during hospitalization with the implementation of an Evidence Based depression Screening and treatment protocol (EBDST) involving the administration of the Patient Health Questionnaire-9 (PHQ-9) and a step-by-step protocol based on scoring. Relationship between the protocol interventions, depression scores, and diagnoses were also evaluated	Quality improvement Retrospective chart review	<p><u>Sampling Technique:</u> Convenience sampling</p> <p><u>Sample Size</u> Eligible: 95 participants Accepted: 79 participants</p> <p><u>Group Homogeneity:</u> Age range 26-97 years, female 44%, male 56%, Caucasians 65%, African American 28%, others 7%, Hispanics 10%, non-Hispanics 90%</p> <p><u>Inclusion criteria</u> - included age > 18 years, positive stroke confirmed with magnetic resonance imaging or computed tomography scan, ability to read or write English</p> <p><u>Exclusion criteria</u> - included patients too ill to participate, aphasic, dementia, comatose</p> <p><u>Setting:</u> Patients admitted to a stroke tertiary hospital in upstate New York</p> <p><u>Power analysis:</u> Not completed</p>	<p><u>Intervention Fidelity:</u> Between December 28, 2014, to February 15, 2015, accepted participants received the PHQ-9 administered by trained registered nurse on the unit. Trained registered nurses followed the step-by-step EBDST protocol and documented the depression screening scores and handoff communication in the electronic medical record. A retrospective chart audit was performed from mid-February to March 2015 and captured all variables required for analysis</p> <p>Institutional Review Board (IRB) approval was received by sponsoring college and the IRB committee</p>	<p><u>Dependent Variables:</u> <u>Primary outcome</u> - Depression screening protocol compliance by registered nurses and hospitalist providers <u>Secondary outcomes</u> – evaluated relationship between PHQ-9 scores, laboratories, interventions implemented, and day to depression screening</p> <p><u>Instrument:</u> PHQ-9 score ≥ 10 have 88% sensitivity and 88% specificity for a diagnosis of major depression in patients with stroke</p> <p><u>Statistical Analysis</u> Pearson’s chi – squared analysis was used to test association between variables and Pearson correlation was used to measure linear relationship between depression diagnosis and protocol variables</p>	<p><u>Statistical Results</u> Patient with history of alcohol consumption and acute stroke are more susceptible to acquire PSD (p=0.019) Findings suggest that patient diagnosed with PSD were more likely to receive an educational booklet on stroke and depression (p=0.000), be medically treated for PSD before discharge (p=0.018) Nurses’ documentation of the depression screening was also significant (p=0.002) History of depression increases the severity of depression after stroke (p=0.002) Delay in screening, increases depression severity (p<0.05)</p> <p><u>Clinical Significance</u> The EBDST was linked with improved PSD detection, prevalence at 48% (N=38), and treatment of PSD (p=0.025)</p> <p><u>Conclusions</u> The implementation of a standardized EBDST decreases discrepancy of screening practices and support the screening, detection, and treatment of PSD during hospitalization</p>
Recommendations: The PHQ-9 (sensitivity 88%, specificity 88%) is an adequate tool to implement as an EBDST to screen for PSD with a cutoff point of 10. This increases patients’ awareness and medical treatment of PSD. Special consideration needs to be taken for patient with history of alcohol consumption and depression during assessment.					

Table 2

Screening of Post-Stroke Depression using the Patient Health Questionnaire Evidence Synthesis

Category (Level Type)	Total Number of Sources/Level	Overall Quality Rating	Synthesis of Findings
Level I - Experimental study · Randomized Controlled Trial (RCT) · Systematic review of RCTs with or without meta-analysis	0		
Level II · Quasi-experimental studies · Systematic review of a combination of RCTs and quasi-experimental studies, or quasi-experimental studies only, with or without meta-analysis	0		
Level III · Non-experimental study · Systematic review of a combination of RCTs, quasi-experimental, and non-experimental studies, or non-experimental studies only, with or without meta-analysis · Qualitative study or systematic review of qualitative studies with or without meta-synthesis	4 single group observational	B	<p>All studies found that the Patient Health Questionnaire (PHQ) is a reliable and valid tool for the screening of post-stroke depression (PSD) among acute and post-acute stroke population. Prisnie et al. (2016) and de-Man van et al. (2012) found that the PHQ-2 and PHQ-9 identifies PSD with the highest sensitivity and specificity at different optimal cut off points. These variations were attributed to small sample sizes, differences in inclusion criteria, and other uncontrollable variables. Nonetheless, cut points may differ depending on the context in which the screening test is utilized (Prisnie et al., 2015).</p> <p>de-Man van et al. (2012), recommends screening patients with a PHQ-9 only if their PHQ-2 is positive.</p> <p>Meadar et al. (2014) and Prisnie et al. (2016) highlighted healthcare providers perception of the PHQ as the most preferred, the quicker to administer, and the most cost-effective tool to screen for PSD. Karamchandani et al. (2015) was the only study that modified the PHQ-9 to accommodate patients' hospitalization status and found that early detection of PSD mitigated early treatment and interventions based on an action plan and screening scoring. This step-by-step approach potentially resulted in positive patient outcomes. The study further revealed a significant association between young age, female, PSD, and recommended a special consideration during the assessment of such populations.</p>
Level IV · Opinion of respected authorities and/or reports of nationally recognized expert committees/consensus panels based on scientific evidence	0		

<p>Level V · Evidence obtained from literature reviews, quality improvement, program evaluation, financial evaluation, or case reports · Opinion of nationally recognized expert(s) based on experiential evidence</p>	<p>2 Quality Improvement</p>	<p>B</p>	<p>Both studies were conducted on stroke units, utilized retrospective chart review, and revealed that the PHQ-9 detects PSD at an optimal cut off point of 10. In addition, they both found an increase in prevalence of PSD in their patient population, which is consistent with prior studies.</p> <p>McIntosh, C. (2017) found that the implementation of an evidence-based depression screening and treatment protocol improve the treatment of PSD, and recommends a step-by-step protocol based on screening scores which will guide treatment and interventions. The study further revealed that delay in screening, prior history of depression and alcohol consumption increase PSD severity, as such, special consideration needs to be taken into prospective to mitigate treatment and intervention plan.</p> <p>Wilkins et al. (2018) recommends screening all post-stroke patients with a PHQ-2 followed with a PHQ-9 if their PHQ-2 is positive.</p>
<p>Recommendations Based on Evidence Synthesis: The studies listed above are good and consistent to support the implementation of the PHQ-2 to 9 accompanied by a step-by step protocol based on scoring to identify and treat PSD in the post-acute setting.</p>			

Table 3

Site team member of the implementation of the PHQ- 9 scored-based algorithm in an Inpatient Rehabilitation Facility

Team Member Credentials/Title	Responsibilities
1. DNP-FNP Student/QI Project Lead	Nurse practitioner student will lead the planning, implementation, analysis, and evaluation of the project.
2. Rehabilitation psychologist, Clinical Site Representative	Clinical site representative will assist nurse practitioner student in developing a proposal for the project, facilitate the IRB process, and provide guidance and support in putting together an implementation team
3. CNO, Project sponsor	Project sponsor will secure resources and remove barriers encountered by the nurse practitioner student during the implementation of the project
4. Project Faculty	Project faculty will provide guidance on the project’s planning, implementation, and evaluation period
5. Medical Director	Medical Director will aid in enforcing physicians’ assessment and treatment of depressive mood based on PHQ-2 to 9 score and algorithm
6. Case manager	Case manager will aid in coordinating outpatient mental health services and will provide linkage with already established mental health services
7. Clinical informatics specialist	Clinical informatics specialist will aid in the implementation of the PHQ-2 to 9 questionnaires with its clinical decision support system-based on scoring in the Electronic Health Record
8. Assistant Nurse Manager - Day shift	Assistant nurse manager identified as a champion and a superuser will remind staff on the importance of screening patient with the PHQ-2 to 9 questionnaires, will answer staff concern about the screen, assist with training registered nurse during day shift
9. Assistant Nurse Manger – Night shift	Assistant nurse manager identified as a champion and a superuser will remind staff on the importance of screening patient with the PHQ-2 to 9 questionnaires, will answer staff concern about the screen, and assist with training registered nurse during night shift

Table 4

Specific, Measurable, Achievable, Relevant, and Time-bound goals for the implementation of the PHQ-2 to 9 scored-based algorithm

Project Structure Goals	Project Process Goals	Outcome Goal(s)
<ol style="list-style-type: none"> 1. The PHQ-2 to 9 will be available to staff nurse to evaluate depression in patients admitted with a diagnosis of stroke to the inpatient rehabilitation facility in the Electronic Health Record prior to the implementation of the initiative 2. 100% of registered nurse, who will administer the PHQ-2 to 9 to patients admitted with a diagnosis of a stroke in the inpatient rehabilitation facility will receive proper training on administrating the PHQ-2 to 9 prior to the implementation of the initiative 	<ol style="list-style-type: none"> 1. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-9 ≥ 10 on admission will have documented outpatient referral to mental health services by the case manager/social worker in their discharge instructions 2. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-9 ≥ 10 will receive education material on post-stroke depression given by the staff nurses 	<ol style="list-style-type: none"> 1. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility will be screened by the staff nurses upon admission for depression with the PHQ-2 to 9 2. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-2 to 9 ≥ 10 will receive treatment of post-stroke depression with antidepressant treatment

Table 5

Gantt Chart of the implementation of the PHQ-2 to 9 scored-based algorithm in an Inpatient Rehabilitation Facility

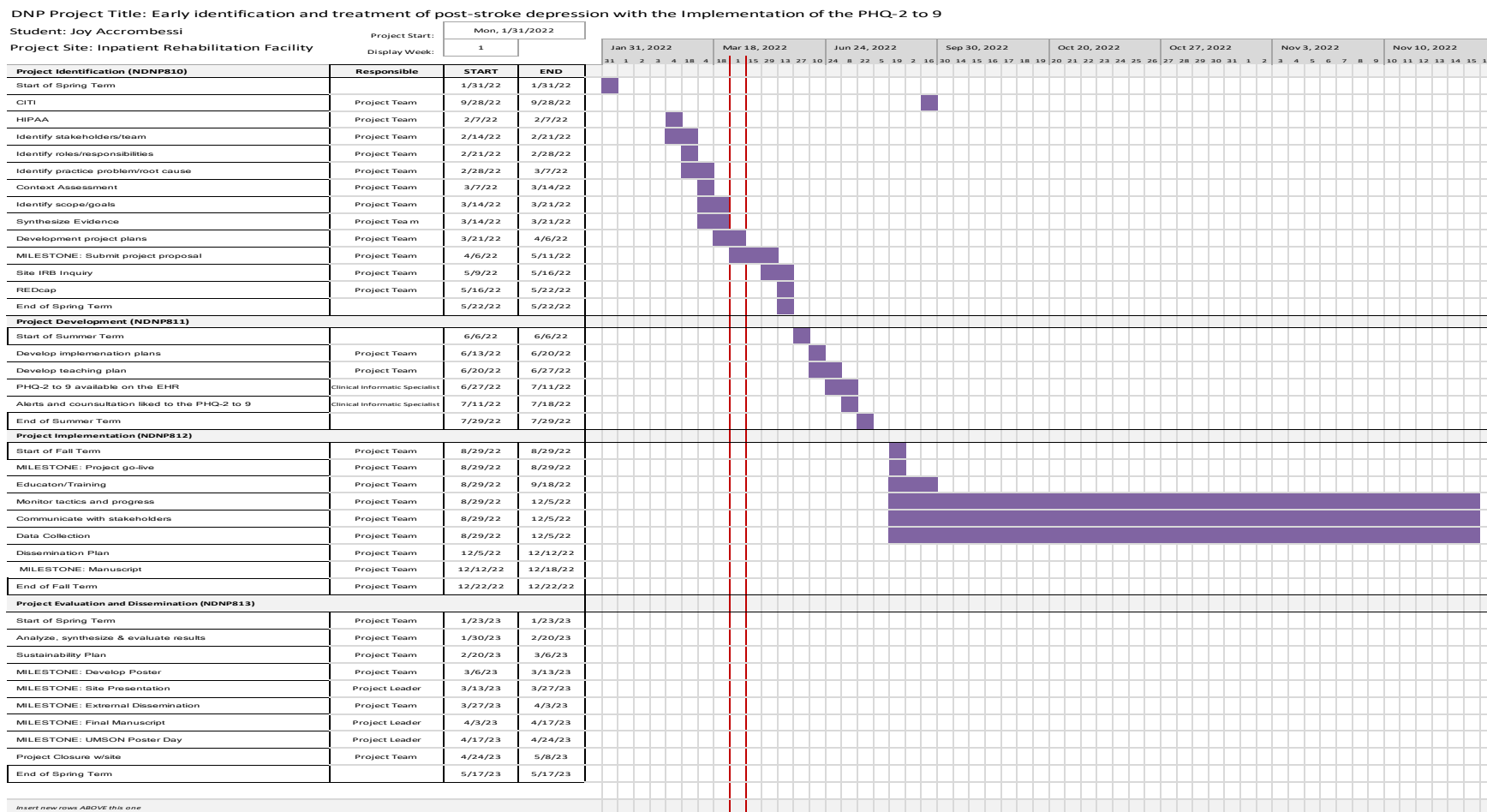


Table 6

Measure of Plan of the implementation of the PHQ-2 to 9 scored-based algorithm in an Inpatient Rehabilitation Facility

PLAN		
Measures		
Project Goals	Measure Pre-Implementation	Measure During Implementation
Structure Goal(s)		
1. The PHQ-2 to 9 will be available to staff RN to evaluate depression in patients admitted with a diagnosis of stroke to the inpatient rehabilitation facility on the Electronic Health Record prior to the implementation of the initiative	PHQ-2 to 9 screening tools available on the electronic health record: “Yes” or “No”	Data not needed during implementation
2. Staff nurses, who will administer the PHQ-2 to 9 to patients admitted with a diagnosis of stroke in the inpatient rehabilitation facility will receive proper training on administrating the PHQ-2 to 9 prior to the implementation of the initiative	<p><i>Numerator:</i> Data not available pre-implementation, due to new initiative</p> <p><i>Denominator:</i> Data not available pre-implementation, due to new initiative</p>	<p><i>Numerator:</i> The total number of staff nurse who will administer the PHQ-2 to 9 to patients admitted with a diagnosis of stroke in the inpatient rehabilitation facility who receive proper training on administrating the PHQ-2 to 9</p> <p><i>Denominator:</i> The total number of staff nurse in the IRF</p>
Process Goal(s)		
1. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-2 to 9 ≥ 10 prior to discharge will have documented outpatient referral to mental	<p><i>Numerator:</i> Data not available pre-implementation, due to new initiative</p> <p><i>Denominator:</i> Data not available pre-implementation, due to new initiative</p>	<p><i>Numerator:</i> the total number of patients admitted to the IRF with a diagnosis of a stroke with a PHQ-2 to 9 score ≥ 10 who received outpatient referral to mental health services prior to discharge</p>

<p>health services by the case manager/social worker in their discharge instructions</p>		<p><i>Denominator:</i> the total number of patients admitted to the IRF with a diagnosis of stroke</p>
<p>2. 100% of patient diagnosed with a stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-2 to 9 ≥ 10 will receive education material on post-stroke depression given by the staff nurses</p>	<p><i>Numerator:</i> Data not available pre-implementation, due to new initiative</p> <p><i>Denominator:</i> Data not available pre-implementation, due to new initiative</p>	<p><i>Numerator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke with a PHQ-2 to 9 score ≥ 10 who received post-stroke depression educational material from the staff nurse</p> <p><i>Denominator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke</p>
<p>Outcome Goal(s)</p>		
<p>1. 100% of patient diagnosed with an ischemic stroke, admitted to the inpatient rehabilitation facility will be screened by the staff nurses upon admission for depression with the PHQ-2 to 9</p>	<p><i>Numerator:</i> Data not available pre-implementation, due to new initiative</p> <p><i>Denominator:</i> Data not available pre-implementation, due to new initiative</p>	<p><i>Numerator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke who receive screening with the PHQ-2 to 9</p> <p><i>Denominator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke TIA</p>
<p>2. 100% of patient diagnosed with an ischemic stroke, admitted to the inpatient rehabilitation facility, and identified as having a PHQ-2 to 9 ≥ 10 will receive treatment of post-stroke depression with antidepressant treatment</p>	<p><i>Numerator:</i> Data not available pre-implementation, due to new initiative</p> <p><i>Denominator:</i> Data not available pre-implementation, due to new initiative</p>	<p><i>Numerator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke with a PHQ-2 to 9 score ≥ 10 who received antidepressant treatment</p> <p><i>Denominator:</i> the total number of patients admitted to the IRF with a diagnosis of ischemic stroke</p>

Table 7

Implementation Action Table

Strategy	Tactics	Rational	Monitoring
Accountability: Provide Performance Reviews (Powell, et al., 2015)	One-on-one conversation with the staff members who are not completing the new initiative will be conducted and emails will be sent to those who have been meeting expectation of the new initiative	This method will provide an assessment of the barriers encountered by the staff and will give an opportunity to provide guidance and reinforcement to improve compliance. It will also encourage the staff that are compliant to maintain excellency and will empower them in providing education to their peers	This strategy will be monitored with the evaluation of the number of one-on-one conversation and emails sent to the staff nurses. The success of this method will be confirmed with a decrease of one-on-one conversation
Buy-In: Alter Incentives (Powell, et al., 2015)	Personalized “Thank you” notes and luncheon will be provided weekly if 90% of the staff achieve compliance	Symbolic award such as “Thank you” notes can increase intrinsic motivation, performance, and retention rates (O’Flaherty, et al., 2019). Luncheon will cultivate a positive work culture, therefore boosting the staff morale and productivity	The strategy will be measured with the evaluation of the frequency the staff has achieved 90% compliance rate
Collaboration: Identify and prepare Champion (Powell et al., 2015)	1 dayshift Assistance Nurse Manager (ANM) and 1 nightshift ANM will be selected and trained on the new initiative. Early adopters will be selected as superusers	Champions and superusers will aid staff members and promote the initiative vision. Selecting the right team member or a respected person within the organization who informally impacts the actions and beliefs of others will increase the diffusion of the initiative (ARHQ, 2020)	The strategy will be measured with the evaluation of the frequency champions and superusers aid the staff. Their feedback will be considered to mitigate changes of the new initiative

<p>Communication: Remind Clinicians (Powell, et al. 2015)</p>	<p>The new initiate process map with score-based algorithm will be available at the nursing station. ANM will announce the new initiative at every huddle</p>	<p>The easy access of the process map and repetitive reminder during huddle will promote staff recall</p>	<p>The strategy will be measured with the evaluation of the use of the process map, and the announcement of the initiative during huddle</p>
<p>Data: Complete audits and provide feedback (Powell, et al., 2015)</p>	<p>Audits will be conducted weekly for 15-week implementation. The result will be shared with the staff via email on a weekly basis with suggested feedback</p>	<p>Audits and feedback will improve compliance of the new initiative. It also has a positive effect of up to 16% on patient care when provided by a colleague, delivered more than once, and include explicit targets and action plans (Foy, et al., 2020)</p>	<p>The strategy will be measured with the evaluation of the audits and feedback provided and received from staff</p>
<p>Education: Conduct Educational meeting & use test (Powel et al., 2015)</p>	<p>20 minutes education session with post training test will be provided to the staff involved in the implementation of the initiative</p>	<p>The education session will provide teaching and expectation of the new initiative. The post training test will allow staff member to ask questions and evaluate their understanding (Powell et al., 205)</p>	<p>The strategy will be measured with the evaluation of the educational session attendance and the post training test results</p>

Table 8

PHQ-2 to 9 in the Electronic Health Record

Is the PHQ -2 to 9 in the Electronic Health Record?	Yes/No
Prior to Implementation	No
Week 1	No
Week 2	No
Week 3	Yes

Table 9

Screening for PSD with the PHQ-2 to 9 Goals and Results

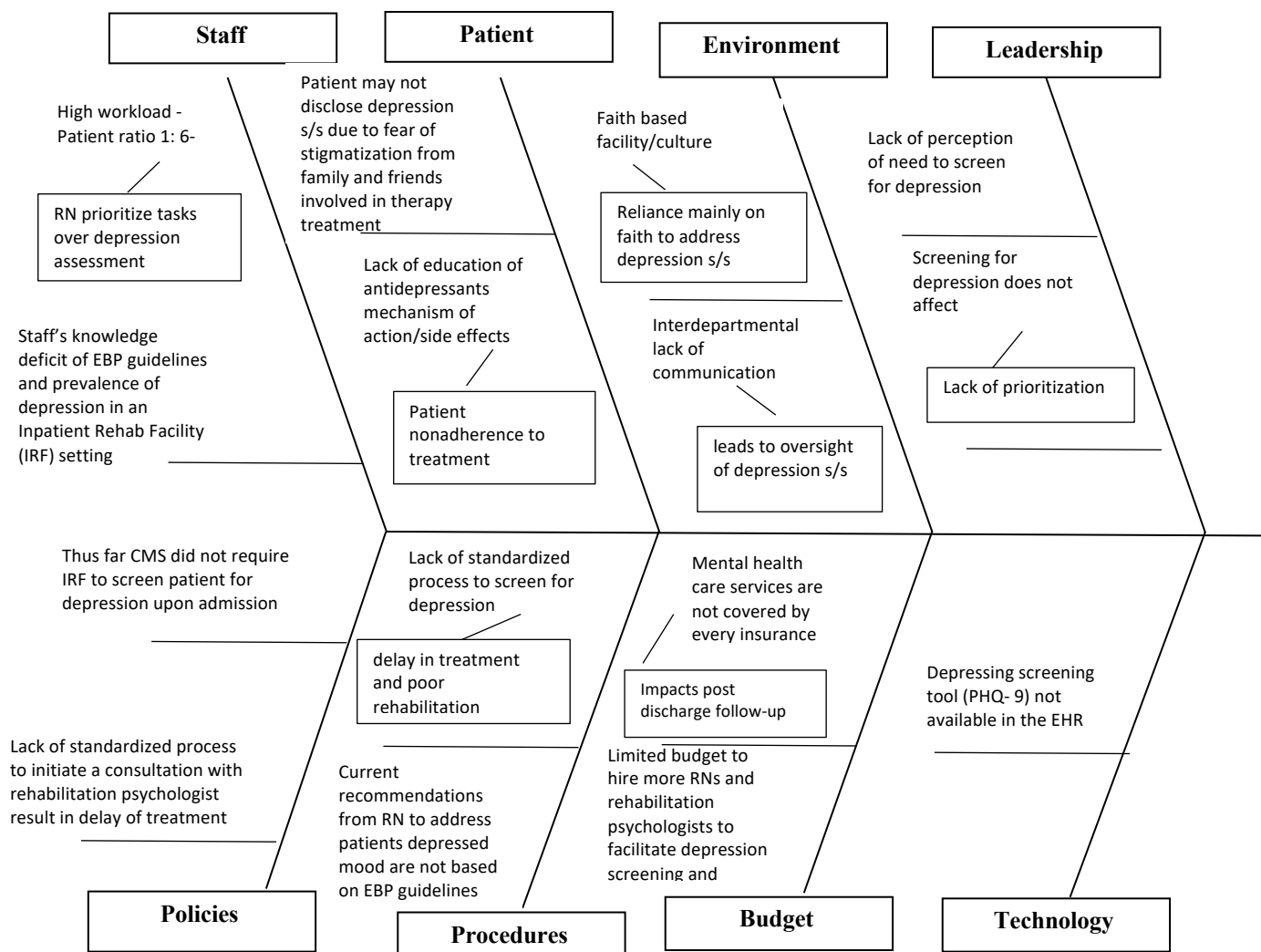
Goals	Results
100% of staff nurses trained	Goal achieved, n=44 (100%)
100% of post-stroke depression education material provided	Goal achieved, n=3 (100%)
100% of outpatient resource to mental health services provided	Goal achieved, n=3 (100%)
100% of antidepressant treatment provided	Goal not achieved, n=1 (33%)

Table 10*Interview of staff nurse pre-implementation of the initiative*

Total number of staff nurse interviewed	20
Number of staff nurse who use a depression tool when stroke patients express depressive mood	0
Number of staff nurse who initiate spiritual care referral when stroke patients express depressive mood	4
Number of staff nurse who inform the charge nurse when stroke patients express depressive mood	6
Number of staff nurse who inform the attending physician or rehabilitation psychologist when stroke patients express depressive mood	10

Figure 1

Root cause Analysis – Fishbone diagram



Problem/Issue: The clinical setting is an Inpatient Rehabilitation facility. The current setting does not have a standardized protocol to screen patient with post stroke depression upon admission, although depressed mood influences patient participation in rehabilitation therapies and affect the validity of cognitive assessments.

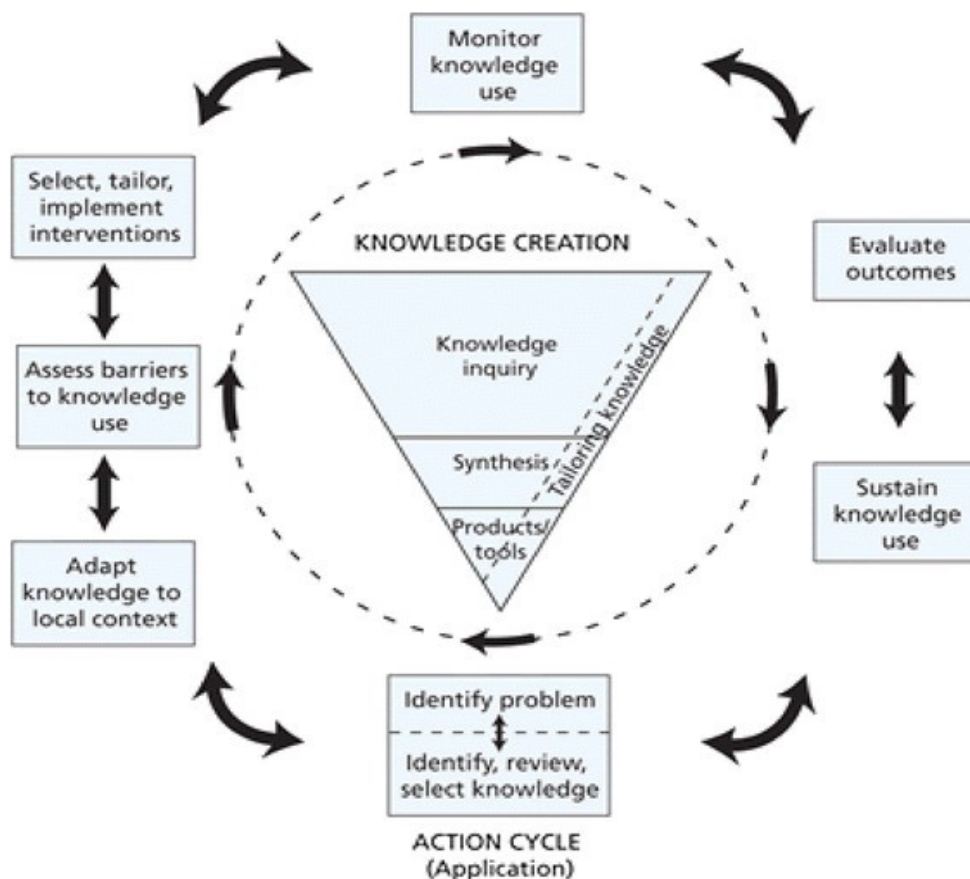
Problem question: Why is post-stroke depression underrecognized and undertreated among patient admitted to and discharge from an Inpatient Rehabilitation Facility?

PICOT: Among patient admitted to and discharged from an Inpatient Rehabilitation Facility, how does screening for post-stroke depression with the PHQ-2 to 9 affect the detection and treatment of depression over 15 weeks?

Include site data: From July 2021 to October 2021, several RN were interviewed, and asked how they assess and address depression signs and symptoms. All stated they do not use screening tool to assess for depression, N=20. 4 out of 20 stated relying on the patients' spiritual preferences, 6 out of 20 stated that upon patient/caregiver request they inform the charge nurse who then informs the rehabilitation psychologist during the daily behavioral huddle, and 10 out of 20 stated that they directly inform the attending physician or rehabilitation psychologist.

Figure 2

Knowledge to Action Framework



Note. Graham, I., Logan, J., Harrison, M., Straus, S., Tetroe, J., Caswell, W. & Robinson, N. (2006). Lost in knowledge translation: Time for a map? *J Contin Educ Health Prof*, 26. doi: 10.1002/chp.47. <https://doi.org/10.1002/chp.47>

Figure 3

Current Process at the Inpatient Rehabilitation Facility

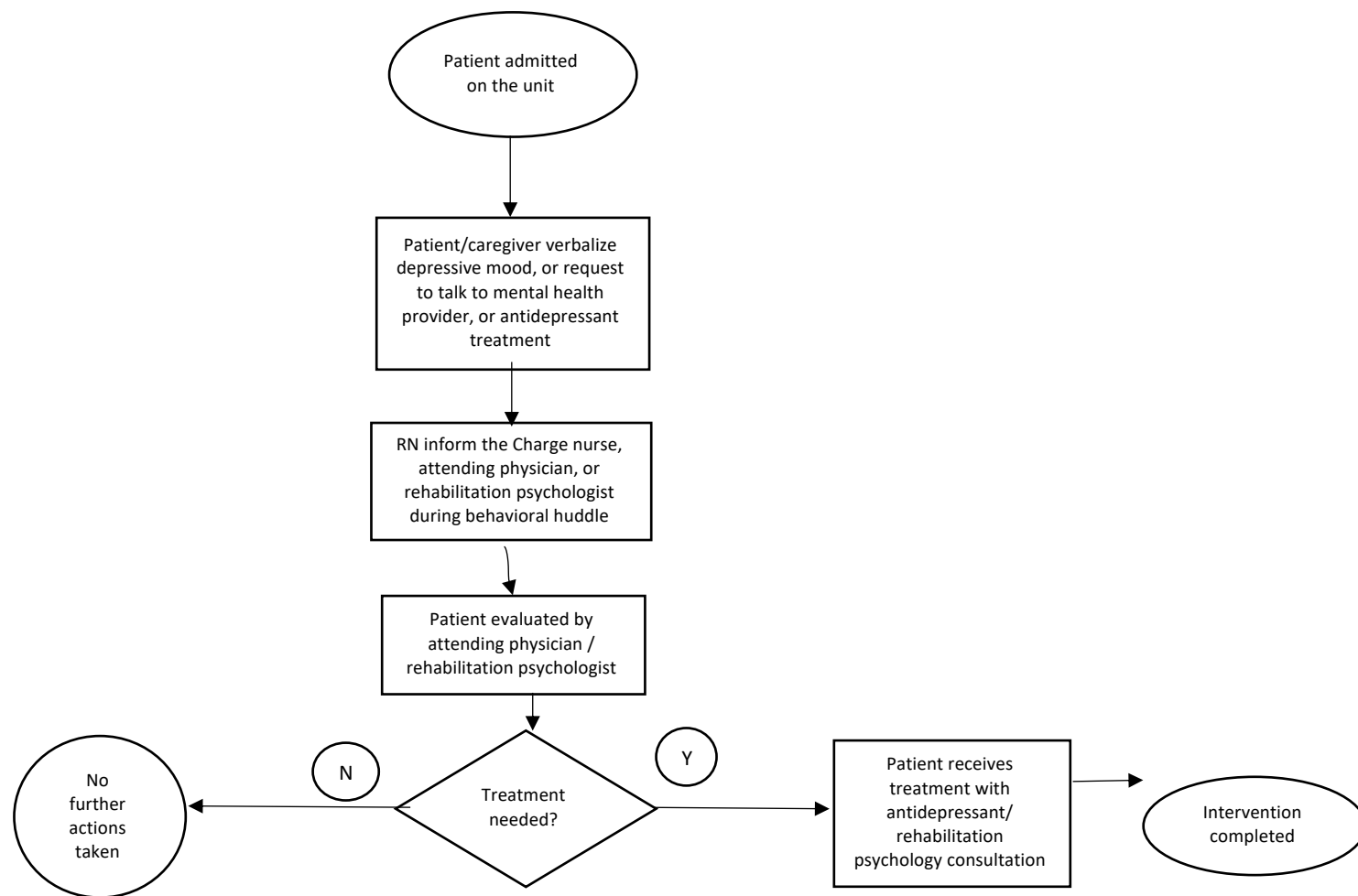


Figure 4

Updated process map of screening for Post-Stroke Depression with the PHQ-2 to 9

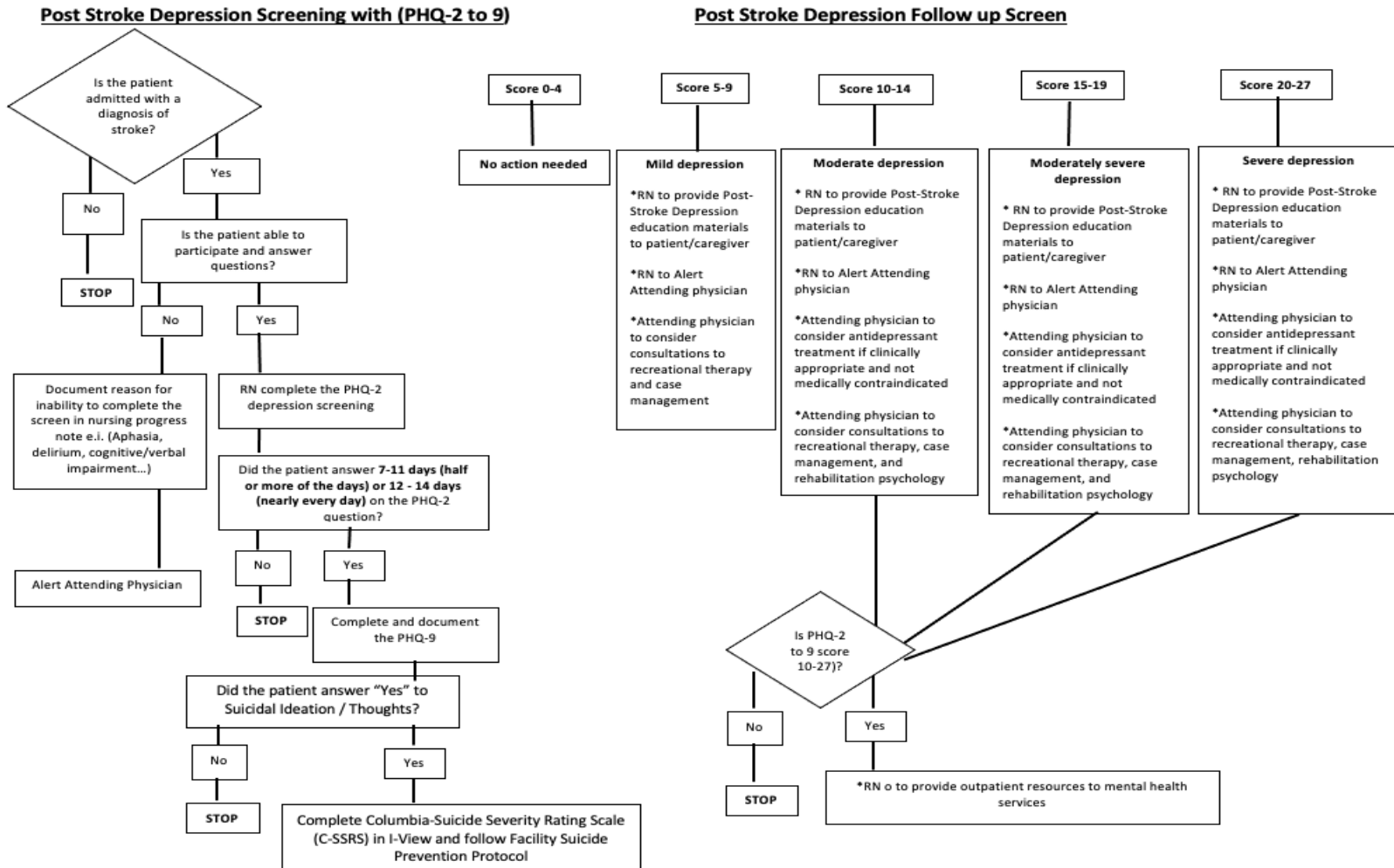


Figure 5

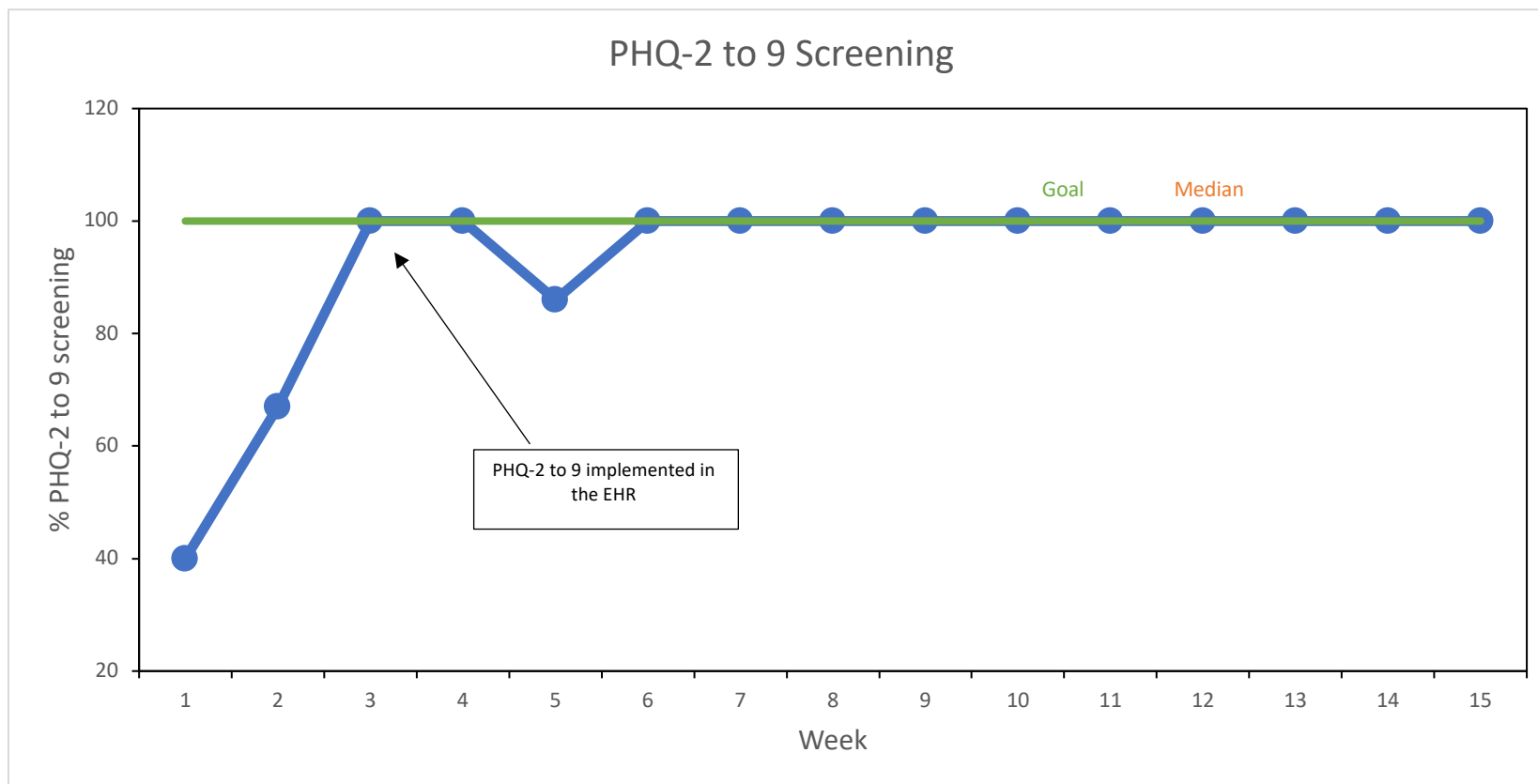
Run chart of Staff nurse training for the screening of Post-Stroke Depression with the PHQ-2 to 9



Note. Additional PSD training was provided on week 6 of implementation after stakeholders’ feedback. The PowerPoint presentation training and post training survey was sent via email reminders and project’s champions communicated the expansion of education during shift huddle.

Figure 6

Run chart of eligible patients screened for Post-Stroke Depression with the PHQ-2 to 9



Note. The PHQ-2 to 9 screening tool was implemented in the facility’s electronic health record on week 3 of the implementation of the project

Appendix A

Post-Stroke Depression Screening Training Survey

Page 1

Post Stroke Depression (PSD) Screening Training Survey

Please complete the survey below.
Thank you!

1) Name: _____

2) Role _____

3) Date of training: _____

4) 1. Which screening tool is used to screen for Post Stroke Depression (PSD)?
(Choose the best answer)

a- Braden scale
 b- Marion-Joy Fall Risk Assessment Tool
 c- Patient Health Questionnaire-2 to 9
 d- Glasgow Coma Scale

5) 2. How many total questions does the Patient Health Questionnaire have?
(Choose the best answer)

a- 3
 b- 12
 c- 9
 d- 25

6) 3. How long does it take to administer the Patient Health Questionnaire?
(Choose the best answer)

a- 20 minutes
 b- 2 to 5 minutes
 c- More than 15 minutes
 d- 60 minutes

7) 4. The staff nurse should continue the Patient Health Questionnaire if the patient answer "Never or 1 day" to "Little interest or pleasure in doing things" and/or "Feeling down, depressed, or hopeless"
(Choose the best answer)


a- True
 b- False

8) 5. How will the staff nurse document Post Stroke Depression (PSD) education material provided to patient?
(Choose the best answer)

a- Telling the Assistant Nurse Manager (ANM)
 b- Scanning QR code provided with the education material
 c- Documentation in EPIC
 d- Documentation on patient's White Board

9) 6. How confident are you to screen patient for Post Stroke Depression with the Patient Health Questionnaire-2 to 9?
(Choose the best answer)

a- Not confident at all
 b- Slightly confident
 c- Somewhat confident
 d- Fairly confident
 e- Completely confident

11/07/2022 6:46pm projectredcap.org 

Appendix B

Patient Health Questionnaire-2 to 9 Screening tool

Screening for Post-Stroke Depression (PSD) in an Inpatient Rehabilitation Facility
Page 1

Patient Health Questionnaire-2 to 9

Record ID _____

Is the patient diagnose with a stroke? Yes
(If "No", DO NOT complete screening) No

Date of event: _____

FIN _____

Date of admission _____

AGE _____

GENDER Female
 Male

Say to patient: "Over the last 2 weeks how often have you been bothered by any of the following problems?"

Read and show the patient a card with the symptom frequency choices

(Click the circle to indicate the patient's Symptom frequency answer)

A. Little interest or pleasure in doing things 0- Never or 1 day
 1- Several days (2-6 days)
 2- Half or more of the days (7-11 days)
 3- Nearly every day (12-14 days)

B. Feeling down, depressed, or hopeless 0- Never or 1 day
 1- Several days (2-6 days)
 2- Half or more of the days (7-11 days)
 3- Nearly every day (12-14 days)

If Question "A." or "B." is coded (half or more of the days) or (nearly every day) , CONTINUE asking the question below. If not, END the PHQ interview

C. Trouble falling or staying asleep, or sleeping too much 0- Never or 1 day
 1- Several days (2-6 days)
 2- Half or more of the days (7-11 days)
 3- Nearly every day (12-14 days)

D. Feeling tired or having little energy 0- Never or 1 day
 1- Several days (2-6 days)
 2- Half or more of the days (7-11 days)
 3- Nearly every day (12-14 days)

E. Poor appetite or overeating	<input type="radio"/> 0- Never or 1 day <input type="radio"/> 1- Several days (2-6 days) <input type="radio"/> 2- Half or more of the days (7-11 days) <input type="radio"/> 3- Nearly every day (12-14 days)
F. Feeling bad about yourself -- or that you are a failure or have let yourself or your family down	<input type="radio"/> 0- Never or 1 day <input type="radio"/> 1- Several days (2-6 days) <input type="radio"/> 2- Half or more of the days (7-11 days) <input type="radio"/> 3- Nearly every day (12-14 days)
G. Trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/> 0- Never or 1 day <input type="radio"/> 1- Several days (2-6 days) <input type="radio"/> 2- Half or more of the days (7-11 days) <input type="radio"/> 3- Nearly every day (12-14 days)
H. Moving or speaking so slowly that other people could have noticed? Or the opposite -- being so fidgety or restless that you have been moving around a lot more than usual	<input type="radio"/> 0- Never or 1 day <input type="radio"/> 1- Several days (2-6 days) <input type="radio"/> 2- Half or more of the days (7-11 days) <input type="radio"/> 3- Nearly every day (12-14 days)
I. Thoughts that you would be better off dead or of hurting yourself in some way	<input type="radio"/> 0- Never or 1 day <input type="radio"/> 1- Several days (2-6 days) <input type="radio"/> 2- Half or more of the days (7-11 days) <input type="radio"/> 3- Nearly every day (12-14 days)

Enter Total Score: _____

Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a Brief Depression Severity Measure. J Gen Intern Med. 2001 September; 16(9): 606-613.

Appendix C

Post Stroke Depression Education Material



American Stroke Association
A Division of the American Heart Association

Together to End Stroke®

let's talk about

STROKE



Recovery

let's talk about

Post-Stroke Depression

About 30% of people who have a stroke get depressed. It can occur right away, or months or even years later. Depression, which can be a serious complication, can result from a biochemical change in the brain due to stroke or from an emotional reaction to one. If left untreated, it can affect quality of life and make post-stroke recovery difficult. Post-stroke depression (PSD) — a feeling of hopelessness that interferes with functioning and quality of life — is largely unrecognized, under-diagnosed and under-treated.



Common symptoms include:

- Depressed mood, called anhedonia
- Persistent sad, anxious or empty feelings
- Significant fatigue/lack of energy
- Lack of motivation
- Social withdrawal
- Problems concentrating/remembering details
- Difficulty finding enjoyment in anything
- Sleep disturbances
- Irritability
- Increase or decrease in appetite and eating patterns
- Feelings of helplessness, hopelessness and/or worthlessness
- Aches, pains and digestive problems that don't ease with treatment
- Suicidal thoughts


Several factors can predict whether you're at risk for post-stroke depression, including:

- A history of depression
- Physical disability
- Stroke severity
- Cognitive impairment
- Previous stroke
- A family history of psychiatric conditions
- Being a woman
- Lack of family and social support after stroke
- Anxiety after stroke

Diagnosis

Diagnosing PSD can be challenging because stroke symptoms can mask signs of depression. Your health care professional should evaluate you for depression during a follow-up visit. Be open and honest and explain what you are experiencing. Include your caregiver or family member in these conversations, as it may be difficult for you to easily identify signs of depression.

(continued)




American Stroke Association
A division of the American Heart Association
Together to End Stroke®

Post-Stroke Depression

Treatment

Because of the complexity of post-stroke depression several treatments should be tried to determine patient-specific usefulness.

- **Antidepressants:** These medications should be closely monitored for their effectiveness. Antidepressants may help survivors enjoy life again. Consult with a psychiatrist to find one that works for you or your loved one.
- **Psychotherapies:** Cognitive behavioral therapy, motivational interviewing and supportive psychosocial intervention may be helpful. In addition, patient education, counseling and social support may all be added as components of a treatment plan.
- **Stroke support groups:** Finding a local group can be beneficial. You can connect with other stroke survivors and share your story. You can also learn



of resources and services in your community to help make your post-stroke journey easier.

- **Exercise program:** If you have been cleared to exercise, a structured exercise program for at least 4 weeks complementary to other treatment might also help treat your post-stroke depression.

HOW CAN I LEARN MORE?

- 1 Call 1-888-4-STROKE (1-888-478-7653) or visit stroke.org to learn more about stroke or find local support groups.
- 2 Sign up for our monthly Stroke Connection e-news for stroke survivors and caregivers at StrokeConnection.org.
- 3 Connect with others who have also had an experience with stroke by joining our Support Network at stroke.org/SupportNetwork.

Do you have questions for your doctor or nurse?

Take a few minutes to write down your questions for the next time you see your health care professional.

For example:
Will my depression ever get better?

MY QUESTIONS:

We have many other fact sheets to help you make healthier choices, manage your condition or care for a loved one. Visit stroke.org/LetsTalkAboutStroke to learn more.

Nationally sponsored by:



©Copyright 2022 American Heart Association, Inc., a 501(c)(3) not-for-profit. All rights reserved. American Stroke Association and Together to End Stroke are registered trademarks of the AHA. Unauthorized use prohibited. 05/01/22 4/22

Appendix D

Post Stroke Depression Education Material Questionnaire

Screening for Post-Stroke Depression (PSD) in an Inpatient Rehabilitation Facility
Page 1

Post Stroke Depression (PSD) Education Material Questionnaire

Record ID _____

Is the patient diagnosis with a stroke ? Yes
(If "No", DO NOT complete question below) No

Date of event: _____

Financial Identification Number (FIN) _____

Enter the Patient Health Questionnaire-2 to 9 (PHQ-2to 9) Total Score : _____

Was Post-Stroke Depression (PSD) education material given to patient? Yes
 No

Appendix E

Chart Audit Form

Screening for Post-Stroke Depression (PSD) in an Inpatient Rehabilitation Facility
Page 1

Chart Audit Form

Record ID	_____
Is the patient diagnosed with a stroke ?	<input type="radio"/> Yes <input type="radio"/> No
Event Date	_____
FIN Number	_____
Admission Date	_____
Patient Age	_____
Patient Gender	<input type="radio"/> Female <input type="radio"/> Male
PHQ-2 to 9 total score:	_____
Was the PHQ-2 to 9 Total score ≥ 10 ?	<input type="radio"/> Yes <input type="radio"/> No
Did the staff nurse administer the PHQ-2 to 9 within 24 hours of admission?	<input type="radio"/> Yes <input type="radio"/> No
Did the patient receive outpatient referral to mental health services in discharge instruction?	<input type="radio"/> Yes <input type="radio"/> No
Did the patient receive antidepressant treatment?	<input type="radio"/> Yes <input type="radio"/> No