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BRAIN MATTERS: COGNITIVE-BEHAVIORAL THERAPY AND ANTIDEPRESSANTS FOR POST-STROKE DEPRESSION

Lindsey Anne Smith
University of Texas at Tyler, lsmith57@patriots.uttyler.edu

Brain Matters: Cognitive-Behavioral Therapy and Antidepressants for Post-Stroke Depression: A Benchmark Project

Lindsey A. Smith, BSN, RN, SCRN, CCRN

The University of Texas at Tyler, School of Nursing

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Dr. J. Michelle Nelson

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Contents

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Executive Summary

Stroke is the leading cause of death and disability in the United States, and approximately one-third of these patients will develop post-stroke depression, which is associated with higher rates of morbidity and mortality (American Stroke Association, 2022). Even though post-stroke depression is prevalent, it often goes undertreated. The combination of antidepressants and cognitive-behavioral therapy has shown to be an effective method of treating post-stroke depression. There are cognitive-behavioral exercises that nurses can implement, such as group therapy, acceptance therapy, and cognitive retraining, a method of coaching the patient to replace negative thoughts with positive ones (Byun et al., 2021). With the addition of antidepressants prescribed by advanced practice practitioners or physicians, the patients can receive combination therapy. The consequences of not treating post-stroke depression include significant increases in hospitalization costs, poor patient outcomes, and increased length of stay (Lavu et al., 2022; American Stroke Association, 2022). The combination of antidepressants with cognitive-behavioral therapies versus singular treatment with antidepressants alone has shown to be effective in decreasing post-stroke depression symptoms and therefore should be considered as first-line treatment (Starkstein & Hayhow, 2019).

To address the problem of post-stroke depression, the following research question was developed: In post-stroke patients who develop depression, how effective is cognitive-behavioral therapy combined with antidepressants, compared to antidepressants alone, in treating post-stroke depression symptoms, within the first three months post-stroke? Multiple stakeholders such as the bedside nurses will be instrumental in implementing the project in the neurological units and continuing it throughout the rehabilitation phase until the patients are discharged. These patients will receive a combination intervention of cognitive-behavioral therapy and

antidepressants for 12 weeks or until discharge. Results will be measured with the Patient Health Questionnaire (PHQ-9) survey and the Modified Rankin score, which measure depression symptoms and level of functionality. Discharge functionality data gathered from Modified Rankin scores will be analyzed using inferential statistics. The desired results are that these patients have an improvement in emotional status and functional outcomes, decreased length of stay, and a reduction in hospitalization costs.

Brain Matters: Cognitive-Behavioral Therapy and Antidepressants for Post-Stroke Depression: A Benchmark Project

People who suffer from a stroke face many difficult challenges. They may incur long-term hospitalization, significant hospital bills, and life-changing disabilities. This event can lead to the development of post-stroke depression, which further complicates recovery. The goal of this project is to explore ways that post-stroke depression can be mitigated so that stroke sufferers can live a long and meaningful life.

Rationale for the Project

Each year, nearly 800,000 people in the United States suffer from a stroke, costing Americans a staggering $56 billion per year, and contributing to the leading cause of death and disability in the United States (Centers for Disease Control and Prevention, 2023). The various types of strokes include those caused by a blood clot, intracerebral hemorrhage, or subarachnoid hemorrhage. Among those who suffer from a stroke, approximately 33% of these patients will develop post-stroke depression, which is associated with a greater incidence of poor functional outcomes, morbidity, and mortality (American Stroke Association, 2022). The facility where this project will be implemented is a Comprehensive Stroke Center and is in the top 1,000 out of 6,000 hospitals for treating stroke (U.S. News and World Report, 2023). Since this facility is a top-tier hospital for stroke treatment, they treat approximately 900-1,000 stroke patients per year in the neurological intensive care unit alone, not including the medical-surgical units. This means that a minimum of 300 patients treated each year in this facility will develop post-stroke depression. Morbidity and mortality rates can increase by as much as 90% for stroke patients who develop depression, further contributing to poor functional outcomes, long-term disability, and the incidence of suffering more strokes in the future (Lavu et al., 2019). All too often, only

the immediate physical deficits of a stroke are treated, while neglecting the patients' emotional health. These emotional needs must be addressed so that patients can have the best recovery possible.

Literature Synthesis

Evidence to support the research was collected by performing a systematic literature search across multiple databases. The APA PsycINFO, CINAHL, Cochrane, PubMed, and Google Scholar databases were searched using the keywords from the research question: *depression, stroke, cognitive-behavioral therapy, and antidepressants.* After a comprehensive review of the literature, twelve articles were chosen that best supported the proposed intervention of cognitive-behavioral therapy combined with antidepressants for post-stroke depression.

Ahrens et al. (2023), Byun et al. (2021), and Van Nimwegen et al. (2023) found that nurses are important in implementing cognitive-behavioral interventions such as group therapy, coping strategies, exercise, cognitive retraining, group acceptance therapy, reminiscence therapy, and goal-setting activities. These activities alone or in combination with antidepressants can be led by nurses to help reduce the rate of post-stroke depression. Byun et al. (2021) and Starkstein & Hayhow (2019) found that nurses and therapists in the rehabilitation setting are vital in implementing cognitive-behavioral interventions. For example, patients given cognitive-behavioral intervention sessions in combination with antidepressants prescribed by a provider had better outcomes several months post-stroke versus those who received a singular treatment. Starkstein & Hayhow (2019) suggested that combination interventions of cognitive-behavioral therapy and antidepressants should be the first-line treatment for post-stroke depression, and in a recent systematic literature review and evaluation of current practice guidelines, Cross et al.

(2023) state that combination therapy of antidepressants and cognitive interventions should be initiated together as quickly as possible after identifying the depression.

Lee et al. (2020) and Xie et al. (2022) found that cognitive-behavioral therapy when combined with antidepressants had a significant impact on the prevalence of post-stroke depression. They noted that cognitive-behavioral therapy should not replace antidepressants but should be used as an adjunct therapy. Withers et al. (2021) and Tao et al. (2022) concluded that combining cognitive-behavioral interventions with antidepressants may be an effective strategy for reducing post-stroke depression, but suggested that the evidence be supported with more research.

Medeiros et al. (2020) and Desai & Sonawane (2019) concluded that post-stroke depression can be managed with early recognition and prompt interventions. The combination of cognitive-behavioral therapy and antidepressants proved to be the most effective treatment strategy for post-stroke depression. Desai & Sonawane (2019) found that although only a small percentage of patients received combination therapy, the ones who did receive it saw a 47% reduction in depression on the Hamilton Depression Rating Scale after eight weeks of therapy. Early detection of post-stroke depression and implementation of combination therapy is crucial to a patient's recovery (Desai & Sonawane, 2019; Sarkar et al., 2021).

Project Stakeholders

The stakeholders involved in the project include patients, bedside nurses, the neurological intensive care unit and neurological step-down unit managers, the Chief Nursing Officer, the Neuroscience Center director/Stroke Coordinator, physicians and advanced practice nurses, physical therapists, nurse educators, and nurse case managers. Approval for the project will first come from the Chief Nursing Officer, and the approval for implementation on the units will be

from the unit managers. The Neuroscience Center director/Stroke Coordinator will be instrumental in keeping the project in sync with current practice guidelines. The bedside nurses are integral in implementing the project, and the physical therapists will assist with functional goals and the Modified Rankin scores. Physicians and advanced practice nurses will prescribe the antidepressants. Nurse educators will assist with HealthStream and in-person education. The case managers will help with post-discharge planning and patient follow-up. Patients are the most important stakeholders because they will be the ones receiving the combination interventions, and their participation is vital to the project's success.

Implementation Plan

The first step of implementation is to obtain approval from the Chief Nursing Officer and the Neuro Institute Director. After receiving their approval, the project will be presented to the neurological intensive care unit and neurological step-down unit managers. After receiving their approval, a meeting will be held with the neurological nurse educator to create depression symptoms recognition and cognitive-behavioral exercise training for the nurses. After creating the education about the planned initiative, it will be posted to each unit's HealthStream education platform. Not all the bedside nurses will be expected to participate. A set number of nurses will be allowed to volunteer to participate in the project. Once these nurses are chosen, they will complete the training and education, and will also be given in-person education sessions on the project and different ways to implement cognitive-behavioral training. The rehabilitation hospital is connected to the inpatient facility, so these nurses will also receive training so that the patients can receive the interventions throughout the entire hospital stay. After educating the nurses, the next step is to obtain buy-in from the attending physicians and neurologists since a physician or advanced practice practitioner will need to order the antidepressant medications. Also, approval

will have to be given by the facility's Internal Review Board since the project requires the addition of new medications and cognitive-behavioral therapies. After submitting for and receiving approval, the project can begin (Office for Human Research Protections, 2018).

After receiving approval, in the first step of implementation, every patient admitted with a diagnosis of a stroke such as ischemic, hemorrhagic, or subarachnoid, will be given a Patient Health Questionnaire (PHQ-9) on admission. A Modified Rankin Scale will also be filled out by a nurse or physical therapist. Patients who score even mildly depressed will begin to receive the combination therapy. The patient's progress will be monitored throughout their stay in the intensive care unit and step-down. This patient's progress will then be monitored throughout the rehabilitation stay, with surveys being filled out at one week, two weeks, four weeks, and six weeks. Once the patient is discharged home from the rehabilitation hospital, a follow-up phone call will be made between 10 and 12 weeks after the initial stroke to monitor the patient's functional and emotional status. The success of the implementation will then be compared to the results and functional status of previous patients who did not receive any type of combination intervention.

Timetable/Flowchart

The first and second weeks of implementation will include meeting with the unit managers and providing education to the bedside nurses who agreed to join the project. After educating the nurses, the first round of surveys will be given to the patients. The goal number of participants for this project is 100. The ratio of males to females admitted with a stroke is about 50%, so there will be approximately 50 males and 50 females participating. Since the neurological units do not house pediatric patients, the age will be adults 18 and over. After the initial PHQ-9 and Modified Rankin surveys are completed, the combination therapy can begin.

The combination interventions will begin in week three. At the end of week three, the patient will fill out another PHQ-9 survey to measure initial progress. Weeks four through six will be the maintenance weeks. This is the average length of stay for a stroke patient throughout the acute and rehabilitation phase. If patients are discharged home after four to six weeks, then these patients will receive a final discharge survey. Patients who require a longer rehabilitation stay will continue to receive the combination therapy and will fill out surveys again at six and eight weeks. Once all participants have been discharged home, follow-up phone calls will be made at 10 and 12 weeks to assess the patient's emotional and functional status, and the scales will be filled out using verbal information from these phone calls. See Appendix B for a detailed timeline flowchart.

Data Collection Methods

Data will be collected via Patient Health Questionnaire (PHQ-9) surveys and modified Rankin scores. These surveys and scores will be completed before implementation begins to collect baseline data. They will be completed periodically throughout the project and then again at the end of 12 weeks to collect final data (see Appendix C for the scoring instruments used). The PHQ-9 survey measures mood and emotional status. It scores the patient on nine domains from no depression symptoms at all to symptoms nearly every day. The modified Rankin scale measures the level of disability from zero to six, with zero being no disability and six being dead.

The patient population included in this project will be 100 total participants who have a diagnosis of a stroke (ischemic, hemorrhagic, subarachnoid). This will include approximately 50 males and 50 females over the age of 18, although it may not be feasible to have an exact 50/50 ratio of males to females. The goal is to have a mixed sample of different ethnicities which will be approximately 58% Non-Hispanic White and 42% Hispanic, Black, and other ethnicities

(University of Wisconsin Population Health Institute, 2023). This is the average patient population of the facility, but this exact diverse population may not be included since patients are admitted to the facility at random.

Data from the surveys and scales at the end of 12 weeks will be compared to the results of the pre-implementation surveys to see if there were improvements in scores. If the combination of interventions improved PHQ-9 and Modified Rankin scores, then these results will then be compared to the Modified Rankin score results of previous patients who did not receive any combination interventions, since every patient admitted with a stroke receives this score. This data will be collected using chart reviews and is readily available because these scores are part of the stroke documentation system. Since the project will be completed within a 12-week timeframe, data to compare from previous patients who did not receive interventions will be gathered from those admitted within 12 weeks before the project began.

A comprehensive sample of both males and females will be reviewed. The results of previous patients' modified Rankin scales will be placed in a spreadsheet. The final results of the patients who received the combination interventions will also be placed in a spreadsheet. The data of these two spreadsheets will be compared and analyzed using Excel analysis of variance (Digital Vidya, 2022). This method of data analysis will take the average of several columns of data, such as the Rankin Scores in this scenario. The two columns of Rankin Scores from the two samples will be run and analyzed by utilizing this variance, which will then equate the p-value. If the p-value of the project data is greater than 0.05, then that means there is a significant difference in the groups, and the project will be deemed successful. If the combination interventions were found to improve post-stroke patients' functionality and depression symptoms compared to the data gathered from chart reviews of patients who did not receive the

interventions, then a proposal will be made to the Neuro Institute director and Chief Nursing Officer about making the combination interventions a standard protocol for stroke treatment.

Evaluation

The results of the project will be evaluated by utilizing the Population Health Questionnaire (PHQ-9) Severity Measure for Depression as well as the Modified Rankin Scale to measure functionality before and after the project. The PHQ-9 survey will be given to patients who can fill out the questions or verbally give answers to the survey. This survey will be given at the beginning of the project, periodically throughout implementation, and again after 12 weeks. The Modified Rankin Scale will be completed by a nurse or physical therapist on admission and again after the patients' stay to measure the functional status of the patients. The PHQ-9 survey includes the following nine domains: *loss of interest or pleasure in doing things, feeling down depressed, or hopeless, trouble sleeping, feeling tired, having poor appetite or overeating, feeling like a failure, trouble concentrating, moving or speaking slowly, thoughts of self-harm or suicide*. The Modified Rankin Scale scores on a range of 0-6, with 0 being no physical dysfunction at all to 5 and 6 being severely disabled and bedridden to dead. The results of these surveys and scales will be compared at the beginning and end of implementation to see if the patients indicated improvement in emotional status and functionality throughout the project. The results of the patients who received the interventions will be evaluated against those who did not receive them by comparing the average discharge Modified Rankin scores. The current protocol is that every patient admitted with a diagnosis of a stroke receives a Modified Rankin score on admission and discharge to assess if they are making progress in their stroke recovery. A random sample of 100 previous patients' discharge scores will be gathered and compared to the average

discharge scores of those who did receive the combination interventions. See Appendix C for the survey and scale.

Cost/Benefit Analysis

The overall cost of the project will be low because staff and resources that are already available will be used. The surveys that will be used are online and free for public use. Data will be analyzed using a spreadsheet that the hospital already pays access to, and the facility already pays for the HealthStream education platform. Since the cognitive-behavioral interventions will be implemented by nursing staff, no additional staff will need to be hired.

Post-stroke depression greatly increases the cost of hospitalization. A study conducted in 2013 showed that post-stroke depression costs a facility 54% more on care than a patient who did not develop depression. Since that was 10 years ago, the cost is even more today. The increased cost is from a longer hospital stay, prolonged rehabilitation, and more outpatient visits after discharge (Husaini et al., 2013). According to Wijeratne & Sales (2021), it costs approximately $58,000 a year for every patient who develops a stroke. Considering that depression more than doubles this cost, this means that post-stroke depression increases costs to over $100,000 per patient. This is a significant amount of money not always reimbursed by insurance companies, and not every patient has health insurance. Because of this, the hospital may incur significant charges that do not receive reimbursement. The facility where this project will be implemented sees anywhere from 500-1000 stroke patients per year. According to the American Stroke Association (2022), one-third of all stroke patients will suffer from post-stroke depression. This means that if 33% of these patients suffer depression, this will increase hospitalization costs by $8.5 million to $15 million per year.

Not only does post-stroke depression significantly increase the cost of hospitalization, but it also increases morbidity and mortality, which leads to the facility having poor outcomes. Cai et al. (2019) and The American Stroke Association (2022) found that post-stroke depression is associated with a higher risk of another stroke reoccurring. Post-stroke depression also contributes to a greater prevalence of diabetes, hypertension, and coronary artery disease, which inadvertently increase the risk of having another stroke. Subsequently, the increase in comorbidities leads to increased rates of death and disability (American Stroke Association, 2022). Therefore, the benefit of implementing the project far outweighs the cost of a patient developing post-stroke depression.

Discussion of Results

When the proposed project is implemented, the expectation is that stroke patients' length of stay will begin to decrease, they will have better participation in physical therapy, their overall demeanor and outlook on life will improve, their length of stay will decrease, and the hospitalization costs will decrease. The goal is to see improvements in patients' post-discharge Modified Rankin and PHQ-9 scores. An improvement in these scores means that they will have a better prognosis and fewer functional disabilities. Implementation challenges will be maintaining the stakeholders' enthusiasm for change. They must share the vision for change and want to see the project take fruition. The leadership strategy that will be used for this project is transformational leadership. This inspires input from all parties involved and inspires stakeholders to share the same vision for change (Specchia et al., 2021). To sustain and manage the change, clear goals and expectations will be set, there will be a constant feedback loop between those involved in implementing the project, strong collaboration, and the team will feel

supported throughout. Ultimately, the end goal is to accomplish what is best for the patients and improve their overall quality of life.

Conclusions/Recommendations

The management of post-stroke depression using combination interventions to improve outcomes is recommended. An intervention such as the one discussed can help decrease post-stroke depression, improve quality of life, decrease length of stay, and increase hospital revenue. Since the bedside nurses will be the ones primarily involved with the project, the goal is to keep them enthusiastic and engaged without making them feel overwhelmed or overworked. Nurses are instrumental in implementing cognitive-behavioral exercises, and their involvement is critical to the project's success. For the future success of the project, it is recommended that the facility evaluate the current interventions for stroke patients and consider how this proposed project could make a difference in patients' lives. The leadership and nurses involved most with the patients must evaluate their feelings toward patient care and be cognizant of the fact that although change may be difficult initially, if successful, it has the potential to positively change many lives in the future.

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Appendix A

Evidence Table

Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
1.Ahrens, J., Shao, R., Blackport, D., Macaluso, D., Viana, R., Teasell, R. & Mehta, S. (2022).	NA	Systematic Review and Meta-analysis	Medline, EMBR, Cochrane & PsychINFO searched. 9 studies with 672 participants included in the study.	IV1: CBT IV2: antidepressants DV: PSD	HADS BDI BAI Wakefield Depression Inventory CES-D	SMD SE p-value	Overall effects of CBT: • SMD +/- SE: 0.95 +/- 0.22 • p<.000 After 3-months: • SMD +/- SE: 0.622 +/- 0.285 • p<.029	Strengths: high LOE, answers PICOT question Limitations: small sample, limited comparison, lack of adequate follow-up Feasibility: feasible Risk of harm: low Level of evidence: 1 Quality of Evidence: medium

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
Cognitive-behavioral therapy for managing depressive and anxiety symptoms after a stroke: a systematic review and			563 results; 563 after deuplicates removed; 507 removed after screen; 56 full-text assessed; 47 more excluded; 9 included in final yield.					USPSTF grade: B Recommendation: Good results of CBT on PSD in 3-month follow-up. Better outcomes in combination with antidepressants. Results are good despite limitations.

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
meta-analysis.			Articles excluded if they did not meet criteria: CBT intervention; stroke </= 3 months prior; 18 years old; focus of CBT was anxiety or depression					

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2. Byun, E., Becker, K.J., Kohen, R., Kirkness, C.J., & Mitchell, P.H. (2021). Brief psychosocial intervention to	NA	Randomized Control Trial	Sample: Screened (n=314) Met criteria (n=133) Consented (n=100) TPT (n=37) IPT (n=35) UC (n=28)	IV: CBT for PSD DV1: Fatigue DV2: SLD DV3: WD	P-value	ICC CI	Fatigue: • w/i p=.042; btwn p=.394 SLD: • w/i p = .024; btwn p = .102 WD: • w/i p = .004; btwn p = .508	Strengths: High LOE, good sample size, results measured 8wks, 21wks & 1yr, supports nursing interventions to answer PICOT Limitations: Sample from one region, small population Feasibility: Feasible: nurses can do intervention, especially in rehab setting Risk of harm: none

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Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
address poststroke depression may also benefit fatigue and sleep-wake disturbance.			Setting: Home/Rehabilitation hospital					Level of evidence: II Quality of Evidence: medium USPSTF grade: B Recommendation: CBT can be done by RN, especially in a rehab setting in conjunction with or without antidepressants.
3. Cross, J.C., May, B.R., Mai, P.Q.M.,	NA	Systematic Literature	Sample: 1236 screened; 27 considered; 7 met	IV1: Psychotherapy IV2: PCT	AGREE II Instrument on 6 domains	ICC CI	Domain 1 (scope & purpose) • ICC: 0.827 • 95% CI 0.444<0.967	Strengths: High LOE, recommendations answer PICOT Limitations: Small sample size

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Anderson, E., Welsh, C., Chandran, S., Chorath, K.T., Herr, S. & Gonzalez, D. (2023). A systematic review and evaluati		Review	inclusion criteria Setting: literature review across three databases (Pubmed, CINAHL, SCOPUS) & Google search	DV: PSD	Likert Scale		Domain 2 (stakeholder involvement) • ICC: 0.95 • 95% CI 0.838<0.99 Domain 3 (rigor of development) • ICC: 0.96 • 95% CI0.895<0.994 Domain 4 (clarity of presentation) • 0.746 • 95% CI 0.183<0.95 Domain 5 (applicability)	Feasibility: feasible – findings from guidelines could be applied to facility Risk of harm: low Level of Evidence: IV Quality of Evidence: medium USPSTF grade: B Recommendation: Identifying depression early & treating with CBT and antidepressants should be in the guidelines.

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

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on of post-stroke depression clinical practice guidelines							• 0.874 • 95% CI 0.593<0.976 Domain 6 (editorial independence) 95% CI 0.427<0.966	
4. Desai, R. & Sonawane, K. (2019). Depression treatment use among	NA	Cross-Sectional Survey	Sample: 759 people >18 years old who had a diagnosis of stroke/de	IV 1: AND only IV 2: AND & Psychotherapy DV: PSD	PDC ratio Student's t-test Multinomial logistic regression analysis	OR CI PDC	AND only • OR: 1.56 • 95% CI: 1.012-2.391 • PDC: 57.6 +/- 3.74 AND & CBT • OR: 2.32 • 95% CI: 1.288-4.175	Strengths: Answers PICOT question, large sample size Limitations: some unreliable self-reporting, missing data, low number of patients reported using combination therapy

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stroke individuals with depression: A cross-sectional analysis of the Medical Expenditure Panel Survey.			pression surveyed Setting: in-person interview				PDC: 65.8 +/- 6.89	Feasibility: feasible – findings support the need for CBT Risk of harm: none Level of Evidence: III Quality of Evidence: medium USPSTF grade: B Recommendation: Although low number used combination therapy, it is more effective in those who reported use of both.
5. Lee, Y., Chen,	NA	SR & MA	Databases screened:	IV 1: MBSR	Cochrane Collaborativ	SMD CI	• SMD: -1.27 • 95% CI (-1.71 to -0.84)	Strengths: Highest LOE, answers PICOT

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B., Fong, M.W.M., Lee, J.M., Nicol, G.E., Lenze, E.J., Connor, L.T., Baum, C. & Wong, A.W.K. (2020). Effectiveness of non-		of RCTs	MEDLINE, CINAHL, Cochrane. Scopus, Library, Information Science and Technology Abstracts found (n=1703	IV 2: MBCT DV: PSD	e Review Manager Cochrane's Q Test HAMD CES-D GDS SDS CPRS	P-value	• P = <0.001	Limitations: Small sample, variability across studies Feasibility: feasible – findings support positive result with CBT Risk of harm: none Level of evidence: I Quality of evidence: medium USPSTF grade: B Recommendation: CBT should not replace antidepressants and should be used in combination. More research needed to support the combination of both.

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pharmacological interventions for treat post-stroke depressive symptoms: systematic review and meta-analysis of randomi			Duplicates (n=933) Excluded (n=660) Excluded again (n=25) 3rd exclusion (n=6) included in MA (n=22)					

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zed control trials.								
6. Medeiros, G.C., Roy, D., Kontos, N. & Beach, S.R. (2020). Post-stroke depression: A 2020 updated review.	NA	Narrative review	PubMed, Medline, Embase, Google Scholar searched 140 articles reviewed	IV1: combination treatment IV2: antidepressants alone IV3: CBT alone DV: PSD	DSM-5 for depression	Mean CI p-value OR	Combination treatment • Mean: -0.95 • 95% CI -1.20 to -0.71 • P <0.00001 Antidepressants alone • OR = 0.34 • 95% CI = 0.22-0.53 • P <0.001 CBT alone • Mean = -0.76 • 95% CI = -1.22 to -0.29	Strengths: answers PICOT question, large sample Limitations: low LOE Feasibility: feasible Risk of harm: none Level of Evidence V Quality of evidence: medium USPSTF grade: B Recommendation: Studies show a positive effect of treating PSD

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							P = 0.001	with both antidepressants and CBT.

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

7. Sarkar, A., Sarmah, D., Datta, A., Kaur, H., Jagtap, P., Raut, S., Shah, B., Singh, U., Baidya, F., Bohra, M., Kalia, K., Borah, A., Wang, X., Dave, K.R.,	NA	Systematic review	Google Scholar, Cochrane, Springer Online, PubMed reviewed 300 articles reviewed	IV1: PCT IV2: CBT DV: PSD	ZDS HDRS BDI-II MES HADS MADRS MMSE CES-D D-VAMS PHQ-9 TICS-M	Narrative review only that measured improvement on depression rating scales	A combination of CBT & PCT showed promising improvement in PSD	Strengths: Helps answer PICOT, large sample Limitations: No quantifiable measurements used for results, international study, low LOE Feasibility: feasible with more research to support Risk of harm: none LOE: V Quality of evidence: medium USPSTF grade: B Recommendations: Antidepressants are effective for preventing & treating PSD but may cause rebound depression. CBT shows positive effects as an additional treatment strategy. Need more evidence to support combination therapy.

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Yavagal, D.R. & Bhattacharya, P. (2021). Post-stroke depression: Caos to exposition								
8. Starkstein, S.E. & Hayhow, B.D. (2019).	NA	SR and MA of RCTs To assess	PCT:12 RCTs, then 49 RCTs, then 20 studies	IV 1: AND IV2: Psychotherapy DV: PSD	HAM-D TESS HDRS valid scales measure	OR CI	AND remission of PSD: • OR = 0.47 • 95% CI; 0.22-0.98 50% reduction on scales	Strengths: highest LOE, compares CBT and antidepressants, large sample Limitations: differences in studies, efficacy of treatment

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Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
Treatment of post-stroke depression.		treatments for PSD: AND, CBT	Psychotherapy: 12 studies, then 23 RCTs, then 7 studies Over 700 studies reviewed.		efficacy of therapy before/after		• OR = 0.22 • 95% CI; 0.09-0.52 Psychotherapy: • OR=10 95% CI; 1.44-69.2	Feasibility: Feasible, large sample, multiple therapies Risk of harm: low Level of evidence: I Quality of Evidence: high USPSTF grade: B Recommendations: antidepressants and psychotherapy such as CBT should be first-line treatment.
9. Tao, S., Geng, Y., Li,	NA	SR and MA	PubMed, CINAL, Web of Science,	IV1: MBCT	Cochrane Collaboration Bias Tool	SMD CI	Effect on Depression • SMD = -0.93	Strengths: highest LOE, evaluates CBT & antidepressants, answers PICOT

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M., Ye, J. & Liu, Z. (2022). Effectiveness of mindfulness-based stress reduction and mindfulness-based cognitive therapy on		of RCTs	Embase, Cochrane, CNKI, Wangfang databases searched 7 trials and 500 participants studied 192 articles found; 65 removed for duplicate	IV2: MBSR DV: PSD	GRADE system Cochrane Collaborative Review manager Cochrane's Q test Higgin's convention HAMD CES-D CPRS	p-value	• 95% CI -1.34 to -0.53 • P <0.001 Effect on depressive emotions • SMD = -0.46 • 95% CI -1.71 to -0.84 P <0.001	Limitations: international study, some small studies in review, MBCT recommended as adjunct therapy, adverse events not evaluated Feasibility: Feasible Risk of harm: low Level of evidence: I Quality of Evidence: medium USPSTF grade: B Recommendations: studies show a positive effect of combination therapy with antidepressants &

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Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
depression in poststroke patients - A systematic review and meta-analysis of randomized control trials.			s; 32 excluded again; 6 removed for lack of text; 82 removed for being insufficient; final number included = 7		GDS SDS			CBT. MBCT can be added to treatment. Support with more research.

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10. Van Nimwegen, D., Hjelle, E.G., Bragstad, L.K., Kirkevold, M., Sveen, U., Hafsteinsdottir, T., Schoonhoven, L., Visser-Meily, J. & Man-van Ginkel, J.M. (2023). Interventions for improving	NA	SR and data synthesis of RCTs and quasi-experimental studies	Pubmed, Embase, PsychINFO, CINAHL, Cochrane library searched 18,608 found; after duplicates removed 9,088; after title/abstract screen 246; full text screen 93; quality assessment 33;	IV: cognitive therapy DV: PSD	BDI CES-D GDS HADS HAMD PROMIS SDS	p-value	Some studies report improvements in depression with cognitive behavioral training with nursing. Some results may include antidepressants p-values include different nursing specialties implementing CBT P=0.03 P=0.002 P=0.048 P=0.023	Strengths: large sample, study that measures nursing-specific interventions, answers PICOT Limitations: international study, some studies lack results Feasibility: Feasible, nursing driven Risk of harm: none Level of evidence: III Quality of Evidence: medium USPSTF grade: B Recommendations: There are CBT interventions nurses can implement & are effective in reducing PSD. Can be done with or without antidepressants.

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psychosocial wellbeing after stroke: A systematic review.			final yield 60 60 studies included; 52 RCTs; 3 non-RCTs; 4 quasi-experimental; 1 randomized cross-over.					
11. Withers, H., Plumble	NA	SR of RCTs	MEDLINE, Pubmed, Cochrane	IV1: CBT IV2: AND	HAM-D MES	P-value CI	CBT alone: • 95% CI -0.76 [-1.22 to -0.29]	Strengths: highest LOE, strong answer to PICOT

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y-Jones, J., Pyatt, E., Williams, L., Yule, L. & Kyte, D. (2021). The effectiveness of cognitive behavioral therapy versus antidepr			, PsychINFO (n=162); Duplicates removed (n=40); After duplicates (n=122); Title/abstract rejected (n=106); After screen	DV: PSD	QM Jadad CRBT		• P=0.001 CBT w/AND • 95% CI - 0.95[-1.20 to -0.71] • P=<0.0001 CBT w/some AND • 95% CI - 0.20[-0.53 to 0.13] • P=no p-value noted Overall • 95% CI - 0.83[-1.05 to -0.60] P=<0.001	Limitations: small sample size, support w/more evidence Feasibility: Feasible Risk of harm: low Level of evidence: I Quality of Evidence: high USPSTF grade: B Recommendations: Combination therapy is likely to be effective for PSD. Support findings with more evidence.

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

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essants for treatment of post-stroke depression in adults.			(n=16); After full-text screen (n=5); Final yield for SR (n=5)					
12. Xie, J., Geng, X., Fangcheng, F., Fu, X., He, S. & Li, T. (2022). The	NA	SR and MA of RCTs	Sample: -17 studies, including 267 trials Pubmed/ Web of Science	IV 1: CBT IV 2: AND	HAMD NIHSS ADL	SMD/ MD RR/OR CI	AND • Escitalopram: SMD: -2.72, 95% CI -3.61 to -1.82 • Paroxetine: MD: -9.79, 95% CI – 16.94 to -2.64	Strengths: Strengths: high LOE, compares therapies, answers PICOT Limitations: small treatment size, international study Feasibility: Feasible Risk of harm: low

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Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
efficacy of therapies for post-stroke depression in aging: an umbrella review.			Screened (n=291); Excluded (n=255); Excluded again (n=36); Included (n=17) Inclusion: peer-reviewed, English, MA/SR, general population				• Citalopram: MD: -0.43, 95% CI – 0.85 to -0.01 CBT SMD: -0.76, 95% CI -1.22 to -0.29	Level of evidence: I Quality of Evidence: medium USPSTF grade: B Recommendations: CBT may be an effective treatment strategy for PSD & results were better than patients who received just antidepressants.

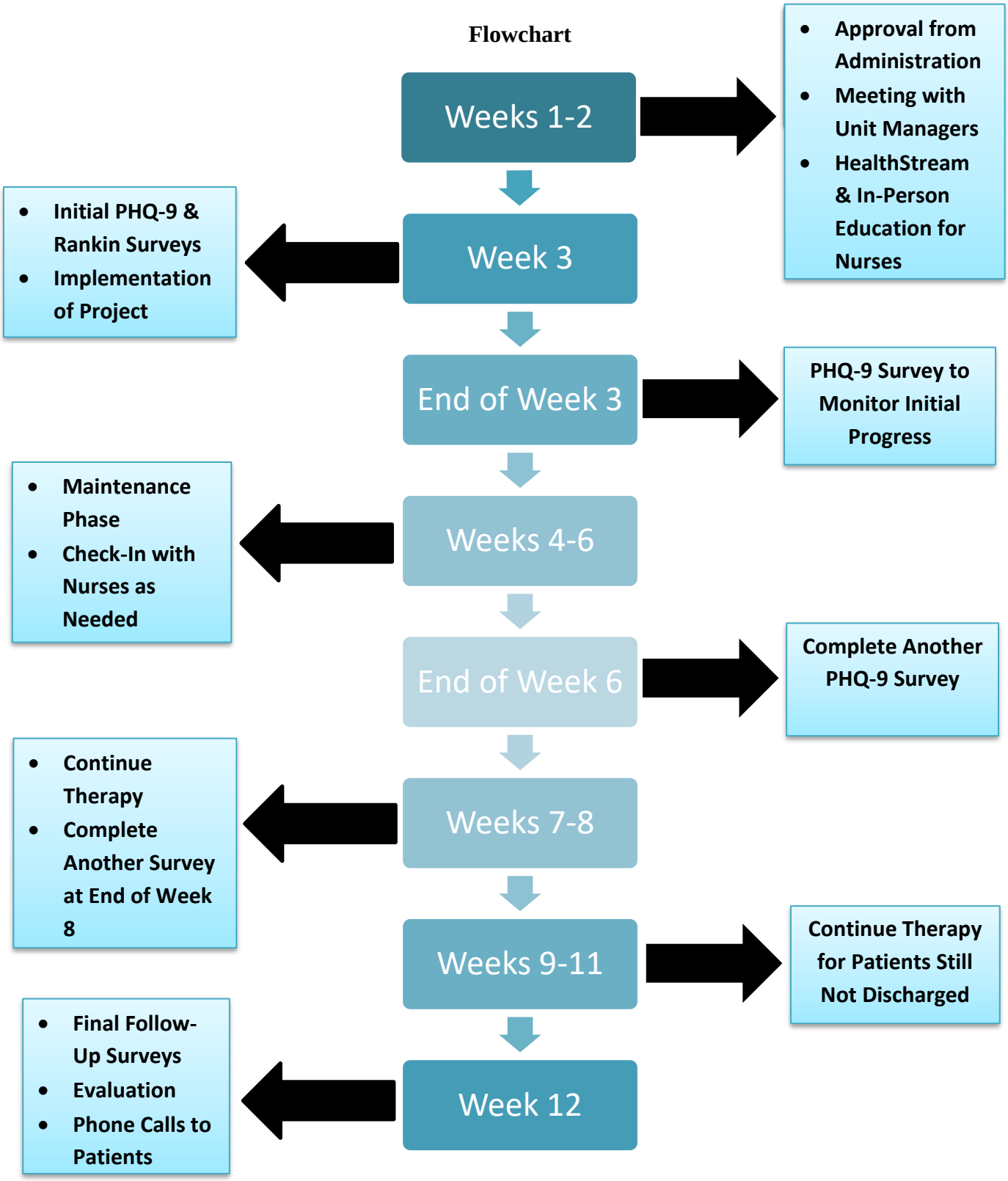
Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

Citation: (i.e., author(s), date of publication, & title)	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Study Findings	Strength of the Evidence (i.e., level of evidence + quality [study strengths and weaknesses])
			Exclusion: duplicates, unpublished, not English, insufficient details					

Legend: ADL – Activities of Daily Living; AGREE II – Appraisal of Guideleins Research and Evaluation; AND – antidepressants; BAI – Beck Anxiety Inventory; BDI – Beck Depression Inventrory; BTWN – between; CBT – cognitive-behavioral therapy; CCMD – Chinese Classification of Mental Disorders; CES-D – Center for Epidemiologic Studies Depression Scale; CI – confidence interval; CPRS – Comprehensive Psychopathological Rating Scale; CRBT – Cochrane Risk of Bias Tool; CVA – cerebrovascular accident; DV – dependent variable; D-Vams – Dynamic Visual Analog Mood Scale; FU – follow-up; GDS – Geriatric Depression Scale; GHQ-28 – General Health Questionairre; HADS-D – Hospital Anxiety and Depression Scale; GRADE – grading of recommendations, development, evaluation; HAMD – Hamilton Depression Rating Scale; HDRS – Hamilton Depression Rating Scale; ICC – Interclass Correlation Coefficient; IPT – inpatient therapy; IV – independent variable; LOE – level of evidence; MA – meta-amalysis; MADRS – Montgomery & Asberg Depression Rating Scale; MBCT – Mindfulness-based cognitive therapy; MBSR – Mindfulness-based stress reduction; MD – Mean deviation; MES – Bech-Rafaelsen Melencholia Scale; MMSE- Mini mental State Examination; NIHSS – National Institutes of Health Stroke Scale; NPI – non-pharmacological intervention; OR – odds ratio; P – statistical probability; PHQ-9 – Patitnet Health Questionairre 9; PROMIS – Patient Reported Outcomes Measurement Information System; PS – Post-Stroke; PCT – pharmacological threapy; PDC ratio – proportion of days covered; PSD – Post-stroke depression; QM – quality measure; RCT – randomized control trial; RR – relative ratio; SDS – Sheehan Disability Scale; SE – Standard Error; SLD – sleep disturbance; SMD – Standard Mean Differences; SR – systematic review; STAS – Spielberger Trait; SWC – sleep-wake cycle; TICS-M – Modified Telephone Interview for cognitive status; TPT – telephone therapy; TESS – Treatment Emergent Sysmptom Scale; UC – usual care; W – wakefulness; WD – wake disturbance; WDI – World Development Indicator; W/I – within; QM – quality measurements; ZDS – Zung Depression Scale

Appendix B

Flowchart



Appendix C

Instrument

PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

ID #: _____ **DATE:** _____

Over the last *2 weeks*, how often have you been bothered by any of the following problems? *(use "✓" to indicate your answer)*	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so figety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead, or of hurting yourself	0	1	2	3
add columns		+	+	
(Healthcare professional: For interpretation of TOTAL, please refer to accompanying scoring card).	TOTAL:			

10. If you checked off *any problems*, how *difficult* have these problems made it for you to do your work, take care of things at home, or get along with other people?	Not difficult at all _____ Somewhat difficult _____ Very difficult _____ Extremely difficult _____

The PHQ-9 is a public domain measure and can be reproduced without permission (Pfizer, 2010).

PHQ-9 Patient Depression Questionnaire

For initial diagnosis:

1. Patient completes PHQ-9 Quick Depression Assessment.
2. If there are at least 4 ✓s in the shaded section (including Questions #1 and #2), consider a depressive disorder. Add score to determine severity.

Consider Major Depressive Disorder

- if there are at least 5 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Consider Other Depressive Disorder

- if there are 2-4 ✓s in the shaded section (one of which corresponds to Question #1 or #2)

Note: Since the questionnaire relies on patient self-report, all responses should be verified by the clinician, and a definitive diagnosis is made on clinical grounds taking into account how well the patient understood the questionnaire, as well as other relevant information from the patient.
Diagnoses of Major Depressive Disorder or Other Depressive Disorder also require impairment of social, occupational, or other important areas of functioning (Question #10) and ruling out normal bereavement, a history of a Manic Episode (Bipolar Disorder), and a physical disorder, medication, or other drug as the biological cause of the depressive symptoms.

To monitor severity over time for newly diagnosed patients or patients in current treatment for depression:

1. Patients may complete questionnaires at baseline and at regular intervals (eg, every 2 weeks) at home and bring them in at their next appointment for scoring or they may complete the questionnaire during each scheduled appointment.
2. Add up ✓s by column. For every ✓: Several days = 1 More than half the days = 2 Nearly every day = 3
3. Add together column scores to get a TOTAL score.
4. Refer to the accompanying **PHQ-9 Scoring Box** to interpret the TOTAL score.
5. Results may be included in patient files to assist you in setting up a treatment goal, determining degree of response, as well as guiding treatment intervention.

Scoring: add up all checked boxes on PHQ-9

For every ✓ Not at all = 0; Several days = 1;
More than half the days = 2; Nearly every day = 3

Interpretation of Total Score

Total Score	Depression Severity
1-4	Minimal depression
5-9	Mild depression
10-14	Moderate depression
15-19	Moderately severe depression
20-27	Severe depression

The PHQ-9 is a public domain measure and can be used without permission (Pfizer, 2010).

mRS Score	Description
0	No symptoms at all
1	No significant disability despite symptoms; able to perform all usual duties and activities.
2	Slight disability; Unable to perform all previous activities but able to look after own affairs without assistance.
3	Moderate disability; requires some help, but able to walk without assistance.
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance.
5	Severe disability; bedridden, incontinent, and requires nursing care and attention.
6	Dead

Modified Rankin Scale (2022). Medscape.