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Depression: An Aftermath of Stroke

A dissertation submitted in partial satisfaction of the  
requirements for the degree  
Doctor of Nursing Practice

by

Karen Gaille Agustin Bacosa

2022

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# ABSTRACT OF THE DISSERTATION

Depression: An Aftermath of Stroke

by

Karen Gaille Agustin Bacosa

Doctor of Nursing Practice

University of California, Los Angeles, 2022

Professor Felicia Hodge, Chair

**Background:** As the leading cause of disability, stroke compromises physical and mental health. Stroke survivors are distressed by social challenges and emotional health problems. Many stroke survivors struggle with mental health, even with symptom resolution or returning to physical baseline. The feelings of anger, frustration, fear, and hopelessness are common emotions experienced. The sudden nature of this condition brings an overwhelming strain that significantly impacts patients' lives. **Objectives:** To screen for post-stroke depression (PSD) in the inpatient setting and examine the feasibility of a nurse-led structured depression screening and early referral based on severity compared to care-as-usual. Neuman's system model and the Iowa model of evidence-practice complemented the scholarly project by looking at patients

holistically with a goal of improving their outcomes. **Methods:** We included two groups: a care-as-usual cohort of discharged stroke patients compared to patients screened for depression within 48 hours of admission for stroke. The Patient Health Questionnaire-9 (PHQ-9) instrument was used to screen stroke patients admitted to the hospital. Patients in the screening group were referred to the organization's Center for Healthy Living, Depression Care Management, Social Services, and Behavioral Health Management prior to discharge. Descriptive statistics were utilized for data analysis. **Results:** There were 43 patients in the sample, 17 in the screening group and 26 in the care-as-usual group. Depression scores for the screening group had a mean of  $M = 5.7$  (range 1-27). The care-as-usual group had a mean of  $M = 49.3$  days to depression screening. Of the 43 participants, 12 (27.9%) were depressed; 7 (26.9%) in the usual care group versus 5 (29.4%) in the screening group. **Conclusion:** Establishing the nurse-led PSD screening protocol was feasible for identifying depression among stroke survivors within 48 hours of admission. Research is needed to establish whether the protocol can improve early referral, long-term health outcomes, and quality of care. Recognition of depression in the population of stroke patients may support patients with PSD and facilitate early management of mental health needs.

The dissertation of Karen Gaille Agustin Bacosa is approved.

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## DEDICATION

This project is a fruit of hard work and dedication to the nursing profession and patients who could be suffering in silence. My humble effort I dedicate to my parents, Rick and Cynthia, whose encouragement, unconditional love, and prayers make me able to get success and honor. To my brother, Kurt, whose support is unwavering.

I wholeheartedly dedicate this to you, my beloved husband, Mark, who gives me strength when thoughts of defeat and self-doubt cloud my mind. Your sacrifice, efforts, unfailing support, patience, time, and understanding mean the world. Thank you for putting up with an absentee wife and mother during this process. I could not have done it without you.

To my dearest, one and only daughter, Summer—may Mommy's perseverance and passion inspire you to achieve your dreams and chase your heart's desires and aspirations.

Kevin, my brother-in-law, we no longer have you here with us, but your courage and inspiration guided me to endure despite the challenges. I know you are very proud of your "Ate Kai" as you watch from the heavens. This project is for you and all patients who have been through an immeasurable amount of pain and suffering. We will forever miss you and your presence.

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"I can do all things through Christ that strengthens me."

--Philippians 4:13

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2	Depression: An Aftermath of Stroke Chair: Dr. Felicia Hodge	UCLA
3	Poster Presentation, Depression: An Aftermath of Stroke	UCLA
3	2 <sup>nd</sup> Place, Registered Nurses' Perceptions on Pathological Altruism Research Poster Presentation	Sigma Theta Tau International (STTI) Odyssey Conference, San Diego
4	Podium Presentation, Registered Nurses' Perceptions on Pathological Altruism	Providence St. Joseph Medical Center (Burbank, CA)

## CHAPTER ONE: INTRODUCTION

Physical impairment is a hallmark of stroke. As the leading cause of disability, stroke compromises physical health and is a condition that presents an array of complexities. Without any warning, a stroke can cause devastating changes to a person. Cognitive issues are of concern beyond the most common deficits, such as decreased motor function. Stroke survivors are distressed by social challenges and emotional health problems (Katzan et al., 2018). Many of these patients struggle with mental health post-stroke, even with a resolution of stroke symptoms or returning to physical health baseline. Feelings of anger, frustration, fear, and hopelessness are common emotions experienced among stroke survivors. The sudden nature of this condition can bring forth an overwhelming strain that significantly impacts patients' lives.

Taylor-Rowan et al. (2018) reported that post-stroke depression (PSD) is stroke's most common psychological consequence. PSD occurs in half of stroke patients, compared with 12% of the general population diagnosed with a mood disorder (Towfighi et al., 2017). Post-stroke depression, a sequela of stroke, is associated with poor functional recovery, suicidal ideation, decreased quality of life (QoL), recurrent vascular events, increase in mortality, and overall adverse outcomes (McIntosh, 2017; Towfighi et al., 2017; Wu et al., 2019). In addition, Wu et al. (2019) found that PSD is an independent predictor of recurrent strokes. However, despite acknowledging post-stroke depression, it is often under-detected and untreated (McIntosh, 2017). Furthermore, the association of PSD with types of strokes comprising ischemic, hemorrhagic, and transient ischemic attack is not well-established (Tu et al., 2018). Screening for post-stroke comorbidities remains rare or absent in hospitals (Lin et al., 2020; Lopez-Espuela et al., 2020; McIntosh, 2017). Post-stroke depression is a critical aspect of stroke care, and new interventions are needed to address gaps in this domain.

## **Problem Statement**

Post-Stroke Depression (PSD) is persistent sadness or loss of interest following a stroke. One-third of stroke patients suffer from PSD, which is an overall health risk (Towfighi et al., 2017). Melrose (2016) claims that PSD is a common, serious problem that complicates the recovery of stroke patients. Post-stroke depression negatively affects QoL. Jia et al. (2018) analyzed the differences in quality-adjusted life years QALY loss due to chronic conditions such as hypertension, depression, stroke, and heart disease. This study suggested that there is a high overall burden associated with the various diseases and predictive factors associated with PSD. After adjusting for age- and sex-related variables, depression had an estimated 8.2 years of QALY loss, and stroke had an estimated 6.4 years of loss in stroke survivors.

In comparison, persons without chronic conditions have 4.7 years of QALY loss (Jia et al., 2018). Amaricai and Poenaru (2016) further support that stroke patients with PSD are at greater risk for more unfavorable long-term outcomes than non-depressed patients. Although a prevalent sequela of stroke, few guidelines discuss the recognition, treatment, and prevention of PSD (Li et al., 2018; Tu et al., 2018).

## **PICO Question**

This quality improvement project addressed the PICO question: In stroke patients, 20 years of age and older (P), does implementation of a nurse-led structured depression screening process within 48 hours of admission (I), compared to no structured depression screening process or care-as-usual (C), lead to the early detection and referral of post-stroke depression (O)? The project's primary goal is to develop and evaluate a structured depression screening protocol and whether the protocol increases the number of referrals based on the PHQ-9 score to promote better recovery and improve patient outcomes. The secondary outcome is to determine whether

relationships exist between PSD and age, marital status, race, employment status, stroke type and severity, discharge disposition, history of depression, and if patients are taking anti-depressive medication.

### **Project Goals**

The scholarly project aims are: 1) Develop a structured depression screening protocol, 2) Determine if referrals were initiated based on depression severity, and 3) Identify variables associated with PSD age, marital status, race, employment status, stroke type, and severity, discharge disposition, history of depression and if patients are taking anti-depressive medication. After completing the pilot project, stroke unit nurses will be educated and trained on the structured depression screening and referral system for hospital-wide rollout.



## CHAPTER TWO: THEORETICAL FRAMEWORK

Neuman's Systems Model (NSM) is a general system theory based on the idea that each human being is an open system affected by the internal and external environment (Basogul and Buldukoglu, 2020). The human being is a total person, characterized by five variables: physiologic, psychologic, sociocultural, spiritual, and developmental (Ahmadi & Sadeghi, 2017). The model allows nurses to look at patients holistically and identify variables that could affect their well-being. Important factors for caring for depressed stroke patients can be explored further by applying NSM's structure to develop the primary, secondary, and tertiary nursing interventions. This project focuses on developing and evaluating a secondary nursing intervention for the early detection of depression.

An individual has a central core of basic survival mechanisms in the NSM model, such as temperature control, ego, and organ function (Ahmadi & Sadeghi, 2017; Fawcett & Foust, 2017). Two defense lines protect the core: the outer or flexible line of defense and the inner normal defense line (Ahmadi & Sadeghi, 2017). The impact of stressors can be beneficial wherein the core is enhanced or noxious, compromising the core stability. Stressors may be intrapersonal, interpersonal, and extra personal (Ahmadi & Sadeghi, 2017; Basogul & Buldukoglu, 2020; Fawcett & Foust, 2017; Johnson et al., 2015).

*Physiological and Developmental Intrapersonal Stressors:* Stroke can cause disabling deficits such as loss of vision, weakness, paralysis of one or two extremities, coordination and balance issues, inability to walk or talk, swallowing difficulties, urinary and bowel dysfunction (Fawcett & Foust, 2017). Limitations in functions are associated with falls, trauma, and other injuries.

*Psychological and Developmental Intrapersonal Stressors:* Common stressors involved in PSD are mood and cognitive changes. Stroke contributes to stress, anxiety, poor functional recovery, decreased QoL, increased morbidity, and mortality (McIntosh, 2017; Tu et al., 2018).

*Sociocultural and Development Extra-personal Stressors:* In experiencing a stroke, patients can feel isolated and have reduced social functioning. Evidence also showed that this stressor could negatively affect QoL. Stroke brings a heavy burden to the patients, families, and society (Tu et al., 2018). In addition to the nursing theory, the Iowa model of evidence-based practice (EBP) will help navigate the evidence-based project (see Appendix A). The model facilitates using current evidence to enhance patient care and improve outcomes through its step-by-step process (Buckwalter et al., 2017; Titler et al., 2001). The initial step in the framework is to identify the trigger or opportunity where EBP change is warranted. Titler et al. (2001) categorized two triggers for a change: problem-focused triggers and knowledge-focus triggers. This scholarly project examines PSD, which is a knowledge-focused trigger. Knowledge-focused triggers arise when a gap in practice and knowledge is identified (Titler et al., 2001). Depression in stroke survivors is a gap in stroke care. It is a condition also recognized as an organizational priority as depression leads to poorer outcomes among stroke survivors. Formation of the team and securing stakeholders were critical to gaining support for the project. Interdisciplinary collaboration is vital to carry to pilot's success. Critique and synthesis of the literature are essential to finding the best evidence. If credible and reliable evidence is available, one should pilot the practice change. Lastly, if the pilot is successful, dissemination of the findings is recommended within the organization and change into practice with goals of sustenance (Green, 2020).

## CHAPTER THREE: REVIEW OF LITERATURE

Stroke remains to be one of the crucial issues in healthcare. In the United States, there are more than seven million stroke survivors, and approximately one out of four cases are in people with recurrent stroke (CDC, 2020). Stroke can strike at any age; however, older individuals are at the highest risk. Despite stroke treatment advancements, stroke remains a significant health issue worldwide (Li et al., 2018). The condition presents global economic repercussions, as stroke accounts for nearly 46 billion dollars in 2014-2015 in the United States alone, £8 billion in the United Kingdom, and about \$354.3 million annually in Taiwan (Chiu et al., 2021; Clarke & Forster, 2015; Virani et al., 2020).

A literature review was conducted to identify evidence-based approaches to depression screening in stroke patients. The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed, and Embase were three databases used for the literature search. The primary search strings were composed of the following Boolean operators: "stroke OR "cerebrovascular" OR "CVA" AND "depression screening" AND "referral." The search selection criteria included peer-reviewed articles published in the full text between 2015 and 2021, adult participants (>20 years old), and written in English.

The 83 research articles identified were further filtered and selected based on the purpose of the study, methods, and relevant results to help define PSD's onset, prevalence, and etiology and identify the most appropriate assessment tools, treatments, and recommendations. Sixty articles were not utilized, as the search rendered 37 non-stroke-specific articles. Although mostly involving neurological conditions, the project aimed to focus on stroke specifically; 13 did not utilize a depression screen; and five articles were duplicated. Two more articles were removed as they involved patients less than 20 years old, and two studies targeted caregivers of stroke

survivors instead of patients. The 13 studies deemed relevant for the review are presented in the Table of Evidence (TOE). These studies had extensive reviews of screening processes, valid tools, and recommendations and compared usual care with non-standardized care. Most of the studies explored possible PSD etiologies and impacts on stroke survivors that are scholarly peer-reviewed documenting evidence to support results and conclusions. Themes and categories emerged from the literature review: PSD, depression screening, and PSD management.

### **Post-Stroke Depression**

Stroke is a challenging condition associated with disability and depression (Kapoor et al., 2019). As a common sequela of stroke, PSD is the onset of persistent sadness or loss of interest in the stroke's acute phase (Li et al., 2018; Lowe, 2019; Tu et al., 2018). Post-stroke depression is associated with poor functional recovery, decreased QoL, and increased morbidity and mortality (Fournier et al., 2020; McIntosh, 2017; Tu et al., 2018). One-third of stroke patients suffer from PSD, making the diagnosis an overall health risk (Fournier et al., 2020; Towfighi et al., 2017). Melrose (2016) claims that PSD is a common serious problem that complicates the recovery of stroke patients. A longitudinal study in 56 hospitals in China found that persistent depression at one-year post CVA predicted QoL at five years, regardless of stroke type (Li et al., 2018). Li et al. (2018) added that out of the 801 stroke patients, 80 had persistent depression. Data from Li et al. (2018) used various assessments: National Institutes of Health Stroke Scale (NIHSS) on admittance, disabling deficits, depression, and recurrence. The study measured QoL, comorbidities, and depression through the Diagnostic and Statistical Manual of Mental Disorders. Several limitations of the longitudinal study include excluding aphasic patients and mood assessment only for a year (Li et al., 2018).

Although PSD is common, it is often overlooked and undertreated (Melrose, 2016). The frequency of PSD is highest in the first-year post-stroke, and the underlying causes remain obscure (Towfighi et al., 2017). The literature suggests that biological and psychosocial factors are associated with PSD occurrence (Villa et al., 2018).

### ***Biological Factors***

Post-stroke Depression is a result of ischemia-induced neurological disorders, in addition to psychosocial distress, as suggested by Villa et al. (2018). The study further added that the pathophysiology of PSD involves the neuroinflammatory mechanisms of the stroke, stress-induced hypothalamic-pituitary-adrenal (HPA) axis, and the decline of neurogenesis in the context of dysfunctioning energy metabolism (Villa et al., 2018). Moreover, Melrose (2015) also linked PSD to increased inflammation due to brain ischemia in areas linked to mood disorders, decreasing serotonin levels. Lopez-Espuela et al. (2020) support that lesion location, genetics, excess of pro-inflammatory cytokines, and changes in amine levels are some biological factors causing PSD. Frontal lobe and basal-ganglia strokes are heavily associated with PSD, as the locations affect the emotional network (Lopez-Espuela et al., 2020).

### ***Psychosocial Factors***

Patients with PSD may also feel isolated and have reduced social functioning. The incidence of PSD brings a heavy burden to the patients, families, and society (Tu et al., 2018). Denham et al. (2019) considered stroke a "family disease" affecting the stroke survivor and the people caring for the patient. Limited social support is one of the PSD etiologies (Kapoor et al., 2019). Depression symptoms link to poor functional social support, decreased QoL, and impaired physical recovery (Norcott et al., 2018).

Furthermore, patients who suffered a stroke are at a higher risk for less engagement in social activities, decreased contact with friends, and conflicts with the family considered the primary source of functional support (Norcott et al., 2018). Kapoor et al., 2019 supported that depression risk is a factor of decreased social reintegration due to mood problems. A retrospective subgroup analysis of 124 participants who completed baseline assessment in-person at the first visit and follow-up phone call using the Depression, Obstructive Sleep Apnea, and Cognitive Impairment Screen (DOC screen) concluded that depression risks and cognitive impairment are independent predictors of higher-level functional impairment and community reintegration in 2-3 years after stroke (Kapoor et al., 2019).

After a stroke, most patients have various degrees of physical dysfunction, resulting in loss of work and other collective issues (Wang et al., 2019). Moreover, Fawcett and Faust (2017) associate social changes among elderly patients with retirement, death of a partner, and financial changes. Stroke can further burden these changes on this patient population, their families and contribute to society's problems (Tu et al., 2018).

Social isolation was associated with an increased risk of stroke. A meta-analysis found that those living alone negatively impact health and play a significant role in PSD (Shi et al., 2017). Moreover, the Covid-19 pandemic encouraged people to isolate themselves to slow the spread of this disease. According to Fitzgerald (2020), isolation is not seeing friends or family at least once a month. During the COVID-19 pandemic, there was a significant drop in code strokes and heart attacks at the project site as people were afraid to come to the hospital, causing treatment delays (Dula et al., 2020). Being in isolation also slows recovery and is linked to higher depression as stroke victims lack support and motivation for not seeing their loved ones. A study by Robinson and Jorge (2016) found that lack of social support at admission was related

to the onset of PSD at a 3-month follow-up. Moreover, Northcott et al. (2018) supported that stroke patients in social isolation during the stroke period are at higher risk of depression.

In contrast, adequate social support can protect against PSD among stroke survivors. In times of difficulty and stress, strong family and social support are enormously helpful and essential, as it may improve patient motivation, ability to adjust to the disability, and enthusiasm to engage in social activities (Shi et al., 2017). The stroke survivor benefits from robust emotional support to feel appreciated, understood, and encouraged (Northcott, 2018).

### **Post-Stroke Depression Management**

Timely recognition and treatment of PSD lead to better motor recovery and independence (Daipratham et al., 2020). Several professional guidelines recommended depression screening after a stroke and provided resources to manage patients who tested positive for PSD (Kerman et al., 2020). Kerman et al. further state that treatments for PSD are similar to depression for non-stroke patients. The literature review also identified depression interventions.

### ***Care After Stroke***

Graven et al. (2016) considered the recovery after a stroke a complex and individual phenomenon, as it entails adverse outcomes. Care after stroke is a continuous process that transcends beyond the acute phase (Graven et al., 2016). A randomized control trial (RCT) in Australia looked at the effectiveness of a patient-centered, collaborative goal approach to PSD in the first year after stroke (Graven et al., 2016). This study concluded that an integrated approach utilizing patient-centered care should be included in the usual care of post-stroke management, as reflected by a significant difference between the intervention group and usual care (Graven et al., 2016). In this RCT, the control group utilized usual care to provide patients with a recovery after stroke booklet, information on resources and support groups, and follow-up with the primary

physician. The intervention group integrated additional components to the usual care, comprising phone calls at two to six weeks and nine months post-stroke, home visits at three months, and depression screening using the Geriatric Depression Scale (GDS-15) at six months. The patient scoring greater than or equal to six in the GDS-15 triggers correspondence to primary care physicians and further reviews barriers and other challenges (Graven et al., 2016).

In a similar comparative research study in the Netherlands, Verberne et al. (2021) evaluated usual care practices and nurse-led stroke aftercare six months after stroke. The study compared the usual care, including routine follow-up care, a secondary stroke prevention program, and a neurologist consultation six weeks post-stroke. On the other hand, the nurse-led intervention included the usual care, screening and addressing psychosocial issues, psychosocial education, emotional support, and specialist referral if necessary. Eighty-four participants were part of the nurse-led aftercare, and 306 were in the usual care cohort. The patients in the nurse-led aftercare had higher stroke severity strokes ( $p < 0.054$ ) and severe ischemic and transient ischemic attack (TIA) percentages than the usual care group ( $p < 0.05$ ). The findings showed that the patients in the nurse-led intervention group have better QoL outcomes and are cost-effective than the usual care alone, found an incremental cost-effectiveness ratio of €24,679 per QALY gained (Verbene et al., 2021). The study concluded that addressing psychosocial problems that are not part of the usual care has a critical role in patient recovery (Verberne et al., 2021).

### **Depression Screening**

Paolucci et al. (2006) reported that depression occurred in up to 36% of stroke survivors, with 80.17% positive for minor depression. Depression is one of the gaps in post-stroke and persists to concern up to 25% of patients at two years (Kerman et al., 2021). Gaps arise from a lack of depression screening structures in health systems (Lopez-Espuela et al., 2020; McIntosh,



2017). Lin et al. (2020) stressed the significance of formal screening for depressive symptoms as it impacts motor recovery. Depression and other psychological disorders can develop at any time after a stroke. PSD is associated with more physical health complications, as studies have found that within a year after a stroke, patients who have PSD have 1.2 times more hospital stays, 1.3 times more outpatient visits, and 1.4 times longer hospital stay in comparison to patients without PSD (Jia et al., 2006). The optimal time or timeframe to screen is not well established (Fournier, 2020; Towfighi et al., 2017). The US Department of Health and Human Services (USHHS) recommends screening patients within 48 hours post-stroke using a validated tool (McIntosh, 2017). The American Heart Association/American Stroke Association (AHA/ASA) guidelines recommend routine screening for post-stroke depression because one in three survivors experience depression at some point, with the highest risk during the first year of recovery (Towfighi et al., 2017).

Post-stroke depression is known to exacerbate the severity of stroke (Li et al., 2018). Furthermore, a systematic review and meta-analysis in China hospitals found that PSD is a predictor of stroke recurrence (Wu et al., 2019). Melrose (2016) mentioned that 31% of stroke survivors could be diagnosed with depression. Screening for depression is critical to acquiring prompt treatment. Risk identification leads to early management and optimal recovery (Kapoor et al., 2019). Monitoring for depression has its challenges, but nurses can be crucial in helping with early recognition. Nurses play an essential role in advocating for patients when they cannot speak for themselves (Melrose, 2016). Nurses can also engage family members and caregivers to share mood observations and other depressive symptoms. Most importantly, nurses can utilize scales or questionnaires to recognize PSD. Melrose (2016) stated that scales could be self-

reported, where stroke patients answer questionnaires themselves, or observational, where nurses monitor observations.

Administration of a proper depression tool such as the PHQ-9 (see Appendix B) to screen for post-stroke routinely and periodically may be helpful in the care of stroke survivors (Winstein et al., 2016). The PHQ-9 is part of the hospital's electronic medical record (EMR). The American Heart Association/American Stroke Association (AHA/ASA) suggested that healthcare teams evaluate these issues during post-stroke follow-up visits (Towfighi, 2017).

Screening is beneficial for a prevalent condition that can be effectively treated but not immediately detected without screening. Towfighi et al. (2017) provided three critical factors for depression screening: 1) the validity and reliability of screening tools to identify PSD, 2) whether PSD treatment improves depressive symptoms, and 3) whether PSD screening improves outcomes. There are several screening tools used for depression in the general population. Per the AHA PSD scientific statement in 2017, the Center of Epidemiological Studies-Depression scale (CES-D) measures depressive symptomology and is reported to have a sensitivity of 0.75 and CI of 95%, Hamilton Depression Scale (HDRS) with a sensitivity of 0.84, CI 0.60-0.85, and PHQ-9, the sensitivity of 0.86, CI, 0.70-0.94 were high performers with optimal and high sensitivity (Towfighi et al., 2017). However, PHQ-9 is more practical, as the CES-D and HDRS are lengthier and may be challenging to administer in the clinical setting. The Patient Health Questionnaire is a quick and easy-to-use tool. The scale has a two-item (PHQ-2), eight-item (PHQ-8), and a nine-item (PHQ-9) version that was each validated for assessing depression symptoms and severity that patients may experience over the past two weeks (Kroenke et al., 2003; Kroenke et al., 2009; Kroenke et al., 2010). The PHQ-2 is a two-item screen using the scores zero ("not at all") to three ("nearly every day"), a score of equal to or greater than three

had a sensitivity of 83%, and a specificity of 92% for major depression (Kroenke et al., 2003). The shorter tool might be ideal for busy clinical settings to identify depression (Kroenke et al., 2003). The nine-item version is the most comprehensive and includes an item about self-harm, which is omitted in the eight-item version, stating that eliminating the last question has a minor impact on scoring (Kroenke et al., 2009). Kroenke et al. (2009) further added that thoughts of self-injury are unusual in the general population. Both PHQ-8 and PHQ-9 share the response set of zero to one day (“not at all”), two to six days (“Several days”), seven to eleven days (“more than half the days”) (Kroenke et al., 2003; Kroenke et al., 2009). The cut-off for PHQ-9 is a score of ten or greater that has an 88% sensitivity and specificity for major depression (Kroenke et al., 2009).

Staples et al. (2018) observed that PHQ-9 has high specificity, reliability, excellent consistency, and sensitivity to change. McIntosh (2017) quality improvement project, a Depression Screening Protocol for Patients with Acute Stroke, utilized this tool, wherein an Evidence-based protocol was executed in a New York City tertiary hospital. In addition, the study also concluded that 48% of the seventy-nine patients were depressed using the PHQ-9 tool (McIntosh, 2017).

### ***Non-Pharmacological Approaches***

Lee et al. (2020) completed a systematic review of the literature and added that different interventions may affect the PSD symptoms and that psychosocial therapy has short- and long-term effects, suggesting that interventions need to be patient-centered or individualized. The randomized control trial by Graven et al. (2016) addressed approaches to increase participation and screen for post-discharge stroke complications. The control group consisted of 56 patients who received the standard management determined by the treatment personnel, and the 54

patients from the intervention group received a multimodal approach, including depression screening and other sequelae of stroke, written information, home visits, telephone calls, and continuous referral to home health services, with primary outcome results was depressed scores, using the GDS (Graven et al., 2016). The study concluded that the person-centered, goal-driven intervention reduced depression symptoms as 34.8% of participants in the control group had depression, similar to baseline, while in the intervention group, only 14.6% of participants had depression (Graven et al., 2016). Engaging family members for emotional support and coordinating the stroke patient's care are essential and should start early (McIntosh, 2017; Melrose, 2016; Towfighi et al., 2017; Verberne et al., 2021).

Towfighi et al. (2017) emphasized the importance of depression screening combined with collaborative care interventions. Discharge phone calls to encourage medication and treatment compliance, behavioral-psychosocial support, psychosocial interventions as an intensive approach, and structured collaboration between primary care doctors and mental health specialists are some of the recommended interventions to address PSD (Graven et al., 2016; Towfighi et al., 2017; Verberne, 2021). Some alternative approaches explored in the studies include acupuncture, Chinese herbs, and music to enhance cognitive recovery and increase positive mood (Melrose, 2016). The combination of these interventions can result in a significant reduction of PSD.

### ***Pharmacological Approaches***

Per the scientific statement released by AHA/ASA in 2017 PSD can be driven by biological mechanisms that respond to pharmacological therapy, whereas psychosocial etiologies may respond to psychotherapy and social support interventions (Towfighi et al., 2017). Bai & Wang (2019) completed a review indicating that Sertraline effectively treats PSD. The

antidepressant medication also effectively prevents PSD occurrence (Melrose, 2016). In the ambulatory setting, a cross-sectional study found that one in two stroke survivors with depression received PSD treatment and that only 47% had an antidepressant treatment among the study sample of 50 years old and older, where Sertraline was the most common drug prescribed (Bhattacharjee et al., 2018).

### **DNP Leadership**

The DNP role can impact practice change at many levels. Leaders in the profession, DNP-prepared nurses, can implement policies and processes that safeguard patients' high-quality and thorough care and treatment, ensuring patient-centered care through comprehensive assessments and management of patients, caregivers, support systems, and adequate resources to enhance recovery. The DNP-prepared nurse translates evidence into practice with the primary goal of achieving high quality and safe care for all patients in all care settings. Identified as a critical player for change, the DNP's role in this project is to serve as a change agent and a transformational leader collaborating with the multidisciplinary team members to help identify and help treat PSD early, improving stroke patient outcomes.

### **Interprofessional Practice**

There is an increased demand for greater collaboration in healthcare to address patient needs (Burau et al., 2017). Interprofessional collaboration (IPC) plays a crucial role and is necessary to identify PSD by having a high index of suspicion (Towfighi et al., 2017). If a stroke patient refuses therapy, front-line staff may have a strong possibility of depression due to a lack of motivation and compliance. Staff feedback is valuable to recognize mood disorders timely. Recommendations for early referral to a multidisciplinary team to plan for discharge is highly encouraged (Chiu et al., 2021, Clarke & Forster, 2015; Johnson et al., 2015). Santos et al. (2020)

specifically identified domains for effective stroke management by patients with IPC when discharged from home; stroke guidelines, emotional support, diet, medications, and resources. Allowing interprofessional communication and integrated care for discharge can positively affect stroke survivors. Improvements in stroke care should continue the long-term support for the stroke survivors and heavily involve caregivers and families (Clarke & Forster, 2015).

### **Synthesis of Literature Review**

The studies considered in this literature indicate that depression is a common sequela of stroke but is underrecognized and undertreated, leading to adverse outcomes (Lopez-Espuela et al., 2020; Fournier et al., 2020; McIntosh, 2017; Towfighi et al., 2017). If left untreated, PSD complicates stroke recovery. The timing and onset of PSD are unclear, and etiology and risk factors remain elusive. The literature strongly recommends regular hospital admission and discharge screening as part of a more effective care transition (Fournier et al., 2020; Towfighi et al., 2017). Researchers also have added that nurses are in the best position to administer the PHQ-9 as it is a valid and reliable tool (Dajpratham et al., 2020; Fournier et al., 2020; Williams et al., 2020). Conducting discharge phone calls also appeared in the literature as part of the non-standardized screening process post-discharge (Graven et al., 2016; Li et al., 2019; Verberne et al., 2021; Williams et al., 2020). Limitations of the studies reviewed include small sample sizes and single-center cohorts, impacting generalizability. The RCT completed by Graven et al. (2016) mentioned having the trial as underpowered with only 83% of participants obtained, cautioning the interpretation of the results, thus recommending study replication with larger sample size. Convenience samples were used in many studies, resulting in potential selection bias and threats to internal validity. Reporting bias may also be a risk, as some studies used questionnaires completed by proxies (Lopez-Espuela et al., 2020). Timing also differed in

screening and re-screening of stroke patients with PSD across studies with no clear conclusions about what timing was optimal. Finally, most studies excluded aphasic patients and recommended exploring other validated tools, particularly for individuals with aphasia.

**Proposed Treatment Actions**

Studies reviewed showcased interventions for stroke patients identified with PSD. McIntosh (2017) proposed that nurses are in the best position to advocate for patients with PSD. However, screening alone is an inadequate solution. Communication with providers and experts is recommended in addition to referral to evidence-based treatment, including pharmacological and non-pharmacological treatment. Moreover, the article also emphasized the importance of nonpharmacological treatments such as exercise and therapy (McIntosh, 2017). These recommendations were supported by Verbene et al. (2021) that screening, with the addition of psychological education and emotional support, is critical to support psychosocial functioning. Recognition of the risks such as PSD results in poor outcomes and provides a chance for early intervention leading to optimized recovery (Kapoor et al., 2019). The study further emphasized that patient-centered or targeted interventions such as medications, physical, environmental, or social interventions may facilitate recovery (Kapoor et al., 2019). The proposed treatment actions are summarized and compared to the scholarly project’s interventions (Table 1).

**Table 1:** *Proposed Treatments found in the Literature and Nurse-led Protocol*

PHQ-9 Score	Depression Severity	Proposed Treatment Actions	Nurse-led Protocol
<b>0-4</b>	None	None	PSD Education
<b>5-9</b>	Mild	Watchful waiting; repeat PHQ-9 as a follow-up	PSD Education   Social Services Referral   Center for Healthy Living
<b>10-14</b>	Moderate	Treatment Plan, considering counseling, follow-up, and/or pharmacotherapy	PSD Education   Social Services Referral

<b>15-19</b>	Moderately Severe	Active treatment with pharmacotherapy and/or psychotherapy	Depression Care   Management
<b>20-27</b>	Severe	Immediate initiation of pharmacotherapy and, if severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management	PSD Education   Social Services Referral   IP Psychiatric Consultation   Behavioral Health Management

*Note.* PHQ-9 = Patient Health Questionnaire-9; PSD = Post stroke depression; IP = Inpatient



## CHAPTER FOUR: METHODS

The overall goal of this project was to establish a PSD screening protocol using the PHQ-9 and refer patients with symptoms to follow-up care, aiming to increase early recognition, timely referral, and management of depression among stroke survivors to promote better recovery. The medical center where this project was implemented has the vision to enhance and transform care delivery systems by shifting to a focus on patient-centered care. A secondary prevention screening for early detection of PSD may contribute to these goals and improve patient outcomes

### **Project Design**

The scholarly work was a pilot project. This QI project aimed to impact patient outcomes by improving safety, ensuring the quality of care, effectiveness, and care experience by applying a systematic approach to improve patient outcomes (Jones et al., 2019). The project utilized a pre-and post-project design to determine feasibility of a nurse-led structured depression screening protocol and referrals to appropriate services. Two cohorts were examined. First group consisted of discharged patients treated with care-as-usual, including routine follow-up care, secondary prevention program, and primary care follow-up within the two weeks of discharge. In addition, these are the patients who did not complete the PHQ-9 prior to discharge (see Appendix C). The second was the nurse-led group composed of participants screened for depression using the PHQ-9 tool within 48 hours (see Appendix D), provided PSD education (see Appendix E), referral to appropriate service based on depression severity, in addition to the standard care (see Appendix F).

## **Sample and Setting**

The project setting was a 274-bed, primary stroke certified hospital in Los Angeles that included participants  $\geq 20$  years old who met the following inclusion criteria: 1) patients with stroke as a principal diagnosis on admission (Transient Ischemic Attack or TIA, Ischemic and Hemorrhagic), or positive stroke confirmed by computed tomography scan or magnetic resonance imaging, and 2) ability to understand and speak English. 3) cognitively intact patients. Patients who have preexisting depression were included in the study to determine the relationship of depression history to PSD and if there was a change in depression severity. McIntosh (2017) and Towfighi et al. (2017) cited that depression history is a predictive factor of PSD patients who were too severely ill to participate transitioned to hospice or comfort care, have dementia as stated in the medical history, aphasia, and patients with bleeding caused by head trauma were excluded from the project. The screening protocol for admitted stroke patients was implemented from March to April 2022. The care-as-usual group of 30 stroke patients admitted from January to December 2021 was chosen randomly through a number generator website (see Appendix G). During review, four charts were excluded due to: (1) discharge to hospice care, (2) Spanish-speaking only, (3) positive for expressive aphasia, and (4) dementia history.

## **Ethical Considerations**

The scholarly project received approval from the hospital's Institutional Review Board (see Appendix H). Obtaining approval from the university's IRB was unnecessary as the project was considered a quality improvement project and thus exempt from IRB oversight. The recruitment of participants involved the following: The principal director gave an introduction, including the role of the Stroke Coordinator, an explanation and purpose of the PHQ-9, the

referral process, and its significance. Chart reviews for the retrospective portion of the study to derive a care-as-usual control group was conducted to identify if the patient met inclusion criteria. The PHQ-9 screening for the prospective portion took place in the patient's room in the intensive care unit (ICU), definitive observation unit (DOU), and telemetry units, where patients were admitted. Scoring was done simultaneously on the computer at the bedside. Patients were asked if they would like to be alone with the Project Director during the completion of the screen and were provided with additional time to think about participating. In addition, the patients were also given a chance to confer with family members. Informed consent was not required because this project was considered quality improvement. Patients in the screening group were given a project information sheet (see Appendix I). Privacy protection includes de-identifying data and assigning a unique identification number to maintain confidentiality and comply with the Health Insurance Portability and Accountability Act (HIPAA). Follow-up with referrals gone through secure messaging in the hospital EMR.

The records were in password-protected files that only the study project director could access. All identifiers were substituted with codes. Removal of identifiers was done as soon as possible. The data and all printed information were destroyed.

### **Instrument**

The PHQ-9 tool has excellent validity, high specificity, reliability, and clinical utility in measuring depression screening (Staples et al., 2018; Zhang et al., 2019). Constantini et al. (2021) suggest utilizing the tool in a two-stage screening process. The nurse-led pilot project considered the first stage to involve the stroke coordinator rounding and screening of stroke patients who meet inclusion criteria for a PHQ-9 score. Total scores on the PHQ-9 scale range from 0 to 27, with 0 indicating no depression symptoms and 27 indicating all symptoms

occurring nearly every day (Melrose, 2016). Furthermore, the screening tool identifies depression severity: 0-4 = no depression, 5-9= mild depression, 10-14= moderate depression, 15-19= moderate to severe depression, 20 and above= severe depression (McIntosh, 2017).

**Screening Tool.** The most common screening instrument for depression is the PHQ-9 questionnaire (Levis et al., 2019). The scale is more favorable than other depression tools due to its accessibility and availability in multiple languages (Williams et al., 2019). The PHQ-9 scale was analyzed in the project by Williams et al. (2019) as part of the Neurological Disease and Depression Study (NEEDS) to determine PHQ-9's specificity and validity for detecting depression as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Additionally, the research demonstrated that in the 830 study participants who completed both questionnaire and follow-up Structured Clinical Interview for Depression (SCID), the PHQ-9 achieved a specificity of 85% and sensitivity at 90% on all neurologic subpopulations such as epilepsy, migraine, Parkinson disease, and stroke (Williams et al., 2019). Williams et al. (2019) emphasized that PHQ-9 is not a diagnostic tool but a screening instrument. An observational study in Thailand reported satisfactory consistency at Cronbach's alpha: 0.78, and high specificity of the PHQ-9 scale (0.94), recognizing that the tool is acceptable for detecting major depression in individuals with stroke (Dajpratham et al., 2020). A study by Zhang et al. (2019) comparing PHQ-9 to the Geriatric Depression Screen (GDS) concluded that PHQ-9 was better than GDS; found to be shorter, more stable, and easier to implement and score. It is a suitable screening tool for depression in general older adults aged >60 (Zhang et al., 2019).

### **Project Processes**

The project included the following interventions:

**Screening.** The primary investigator assessed and documented PHQ-9 during patient rounds within 48 hours of admission. Based on scores, patients were referred to appropriate services available at the medical center. Patients who scored five or greater were referred to the specific services, and all the participants were provided PSD education. The patient time required during the PHQ-9 assessment was under ten minutes.

**Referral Services.** Treatment approaches must include pharmacological, physical, environmental, and social interventions to improve post-stroke recovery (Kapoor et al., 2019; Tu et al., 2019). Therefore, the nurse-led structured depression screening initiated a tapestry of referrals to appropriate services based on PHQ-9 scores during admission to the hospital. All stroke patients who participated in the project were provided with PSD education which included signs and symptoms of PSD and information on the referral services. Patients with 5-9 (mild depression) received the Center for Healthy Living referral. This department specializes in practical lifestyle and behavioral change programs through workshops and lectures and provides evidence-based services to support stress management, increase physical activity, wellness coaching, and stress reduction management. Patients scoring 10-19 (moderate depression) were referred to Depression Care Management, a centralized support center with a multidisciplinary team delivering interventions such as IPC assessment or PSD medication prescription and follow-up. For scores twenty and above on the scale (severe depression), the patient was referred for in-patient psychiatric evaluation and behavioral healthcare, which provides evidence-based treatments for mental health issues. Additionally, all stroke patients who screened positive for depression received a social service consult with encouragement to attend a monthly stroke support group facilitated by the stroke coordinator and social worker prior to their discharge.

## **Analysis**

The project utilized descriptive statistics to characterize all study variables: age, race, gender, depression history, stroke type, discharge disposition, employment, and marital status. The frequency and percentage were reported for categorical variables. Chi-square tests and Cramer's  $V$  were used to determine the association between variables and PSD. The same statistical analyses were used to determine whether there were differences between these two groups regarding the number of referrals to social services, the Center for Healthy Living, depression care management, behavioral health, and psychiatric consultation. The relationship between stroke type and severity was tested for statistical significance through Chi-square tests and Cramer's  $V$ .

## CHAPTER FIVE: RESULTS

### Sample

Forty-three participants with stroke were included for data analysis. Seventeen participants were in the nurse-led protocol group and 26 patients were in the care-as-usual group. Among the thirteen patients who were screened for inclusion in the nurse-led protocol but ultimately excluded, five had expressive aphasia, six were cognitively impaired, one patient refused to screen, and one was intubated. From the retrospective review of charts, only eight out of the 26 patients had a formal depression screening. Two patients had completed a PHQ-9 and two had a completed GDS. The remaining PSD diagnoses were only found on the physician's notes, but no formal screening scores were observed (see Appendix I).

As for the participant characteristics, the age of the participants in the care-as-usual ranged from 41 to 96 years. On the other hand, the age of participants in the nurse-led protocol ranged from 29-96 years. Both groups had more patients who are married, (n=16, 61.5% versus n=7, 41.1%) who were unmarried, White, (n= 17, 65.4% versus n=7, 35.3%) who were non-White. More than half of participants had ischemic strokes, (n=16, 61.5%) in the usual care group versus nine (n=9, 52.9%) with the nurse-led. The care-as-usual group had an equal number of males and females, (n=13, 50% versus n=12, 70.6%) in the nurse-led group. More patients in the care-as-usual group had no stroke symptoms (n=11, 42.3%), compared with the care-as usual group, while the protocol group did not show much difference in the severity. Patients in the usual care also had a higher number of patients on antidepressants than the nurse-led group (n=8, 30.8% versus n=2, 11.8%). Patients with a history of depression were higher in the care-as-usual group compared with the intervention group (n=7, 26.9% versus n=5, 5.9%). The other variables did not significantly differ between the two cohorts (see Table 2).

**Table 2: Characteristics of Participants**

	<b>Care-as-usual (n=26)</b>	<b>Nurse-led Protocol (n=17)</b>
Age at stroke onset (years)		
20-30	0 (0%)	1 (5.9%)
31-40	0 (0%)	0 (0%)
41-50	2 (7.7%)	1 (5.9%)
51-60	2 (7.7%)	2 (11.8%)
61-70	5 (19.2%)	4 (23.5%)
71-80	6 (23.1%)	5 (29.4%)
81-0	7 (26.9%)	3 (17.6%)
91-100	4 (15.4%)	1 (5.9%)
Sex		
Male	13 (50%)	5 (29.4%)
Female	13 (50%)	12 (70.6%)
Marital Status		
Married	16 (61.5%)	7 (41.1%)
Single	2 (7.7%)	3 (17.6%)
Divorced	2 (7.7%)	1 (5.9%)
Widowed	1 (3.8%)	5 (29.4%)
Domestic Partner	0 (0%)	1 (5.9%)
Race		
White	17 (65.4%)	6 (35.3%)
Asian	5 (19.2%)	2 (11.8%)
African American	3 (11.53%)	2 (11.8%)
Hispanic	1 (3.8%)	6 (35.3%)
American Indian	0 (0%)	1 (5.9%)
Employment Status		
Employed	6 (23.1%)	5 (29.4%)
Not Stated	17 (65.4%)	3 (17.6%)
Retired	2 (7.7%)	6 (35.3%)
Unemployed	0 (0%)	3 (17.6%)
Stroke Type		
TIA	7 (26.9%)	4 (23.5%)
Ischemic	16 (61.5%)	9 (52.9%)
Hemorrhagic	3 (11.53%)	4 (23.5%)
Stroke Severity (NIHSS 0-42)		
No stroke symptoms (0)	11 (42.3%)	6 (35.3%)
Minor stroke symptoms (1-4)	10 (38.5%)	5 (29.4%)
Moderate stroke symptoms (5-12)	5 (19.2%)	6 (35.3%)
Moderate to Severe (16-20)	0 (0%)	0 (0%)
Severe (21-42)	0 (0%)	0 (0%)



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Discharge Disposition		
Home	23 (88.5%)	12 (70.6%)
SNF	2 (7.7%)	1 (5.9%)
Assisted Living	1 (3.8%)	0 (0%)
Acute Rehab	0 (0%)	4 (23.5%)
Depression History		
Yes	7 (26.9%)	5 (5.9%)
No	19 (73.1%)	12 (70.6%)
Antidepressants		
Taking	8 (30.8%)	2 (11.8%)
Not Taking	15 (57.7%)	0 (0%)
Refused	1 (3.8%)	0 (0%)

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*Note.* TIA = Transient Ischemic Attack; NIHSS = National Institutes of Health Stroke Scale; SNF = Skilled Nursing Facility. This table demonstrates the characteristics of included participants in the project.  $N = 43$ .

### **PSD and Variables of Included Participants**

When compared for positive depression results, seven (26.9%) of the care-as-usual patients and five (29.4%) from the nurse led patient group had depression. These differences were not statistically significant in bivariate tests ( $\chi^2(1, N = 43) = 0.03, p = .86$ , Cramer's  $V = .03$ , see Table 3). Thirteen other chi-square comparisons were made between the two groups of patients. No significant differences were found. Specifically, no differences were found for being referred to social services ( $p = .60$ ), referred to Center for Healthy Living ( $p = .06$ ), age at stroke ( $p = .62$ ), gender ( $p = .31$ ), marital status ( $p = .32$ ), race/ethnicity ( $p = .10$ ), employment status, ( $p = .92$ ), discharge disposition ( $p = .28$ ), depression history ( $p = .86$ ), taking antidepressant medication ( $p = .22$ ) (Table 3). In addition, no statistical difference were also found on the stroke type ( $p = .58$ ), stroke severity ( $p = .49$ ), and depression severity ( $p = .44$ ).

Patients in the nurse-led protocol had a higher number of referrals to the Center for Healthy Living compared with the care as usual group (n=5,29.4% versus n=1,3.8%). However, the difference between groups in referrals was not statistically significant ( $\chi^2 = 3.67, p = .06$ , Cramer's  $V = .36$ ). Tests comparing group differences on other referrals, depression care management, behavioral health, and psychiatric consult was not performed due to the low sample size (n <5 for some subgroups).

**Table 3.** *Chi-Square Comparisons of Demographics*

Variable	Category	Care-as-Usual		Nurse-Led		$\chi^2$	<i>p</i>	<i>V</i>
		<i>n</i>	%	<i>n</i>	%			
PSD Result	Negative	19	73.1	12	70.6	0.03	.86	.03
	Positive	7	26.9	5	29.4			
Referred to Social Services	No	20	76.9	11	64.7	0.28	.60	.13
	Yes	6	23.1	6	35.3			
Referred to Center for Healthy Living	No	25	96.2	12	70.6	3.67	.06	.36
	Yes	1	3.8	5	29.4			
Age at Stroke	Under 70 years	9	34.6	8	47.1	0.25	.62	.12
	70 + years	17	65.4	9	52.9			
Gender	Male	13	50.0	5	29.4	1.04	.31	.20
	Female	13	50.0	12	70.6			
Marital Status	Not Married	10	38.5	10	58.8	0.99	.32	.20
	Married	16	61.5	7	41.2			
Race/Ethnicity	Others	9	34.6	11	64.7	2.63	.10	.29
	White	17	65.4	6	35.3			
Employed	Other	20	76.9	12	70.6	0.01	.92	.07
	Employed	6	23.1	5	29.4			
Discharge Disposition	Other location	3	11.5	5	29.4	1.15	.28	.22

Depression History	Home	23	88.5	12	70.6	0.03	.86	.03
	No	19	73.1	12	70.6			
Antidepressants	Yes	7	26.9	5	29.4	1.48	.22	.36
	No	18	69.2	15	88.2			
	Yes	8	30.8	2	11.8			

*Note.* PSD = Post stroke depression. This table demonstrates the characteristics of participants included in the project .  $N = 43$ .

**Table 3** Continued

Variable	Category	Care-as-Usual		Nurse-Led		$\chi^2$	$p$	$V$
		$n$	%	$n$	%			
Stroke Type						1.08	.58	.16
	TIA	7	26.9	4	23.5			
	Ischemic	16	61.5	9	52.9			
	Hemorrhagic	3	11.5	4	23.5			
Stroke Severity						1.41	.49	.18
	No stroke symptoms	11	42.3	6	35.3			
	Minor stroke	10	38.5	5	29.4			
	Moderate stroke	5	19.2	6	35.3			
Depression Severity						0.60	.44	.12
	No Depression	21	80.8	12	70.6			
	Some depression	5	19.2	5	29.4			

*Note.* TIA = Transient Ischemic Attack. This table demonstrates the characteristics of participants included in the project.  $N = 43$ .

### ***PSD Characteristics***

Frequencies and percentages were completed for patients that were positive for depression (see Table 4). Participant ages for both groups ranged from 51 to 70 years. The percentages of male participants and White participants were higher in the care-as-usual group ( $n=4$ , 57.1% and

n=5, 71.4%), in comparison to three females (60%) in the nurse-led group with no White patients. Married patients were significantly higher in the usual care (n=5, 71.4%). Three (60%) of patients in the protocol were employed. Both groups had more ischemic stroke patients than other stroke types. Among patients with depression in the care as usual group, one (14%) had a history of depression compared to three (60%) patients with a history of depression in the protocol group. Six (85.7%) patients in the care as usual group took antidepressants, versus two (40%) in the protocol group.

**Table 4.** PSD for the Screening Group Characteristics- Care-as-usual versus nurse-led

	Care-as-usual (n=7)	Nurse-led Protocol (n=5)
Age at stroke onset (years)		
20-30	0 (0%)	1 (20%)
31-40	0 (0%)	0 (0%)
41-50	1 (14%)	0 (0%)
51-60	2 (28.6%)	2 (40%)
61-70	1 (14%)	2 (40%)
71-80	1 (14%)	0 (0%)
81-0	1 (14%)	0 (0%)
91-100	1 (14%)	0 (0%)
Sex		
Male	4 (57.1%)	2 (40%)
Female	3 (42.9%)	3 (60%)
Marital Status		
Married	5 (71.4%)	2 (40%)
Single	0 (0%)	2 (40%)
Divorced	1 (14%)	0 (0%)
Widowed	1 (14%)	1 (20%)
Domestic Partner	0 (0%)	0 (0%)
Race		
White	5 (71.4%)	0 (0%)
Asian	2 (14%)	1 (20%)
African American	0 (0%)	2 (40%)
Hispanic	0 (0%)	2 (40%)
American Indian	0 (0%)	0 (0%)
Employment Status		
Employed	2 (14%)	3 (60%)
Not Stated	1 (14%)	2 (40%)
Retired	4 (57.1%)	0 (0%)

Unemployed	0 (0%)	0 (0%)
Stroke Type		
TIA	1 (14%)	1 (20%)
Ischemic	4 (57.1%)	3 (60%)
Hemorrhagic	2 (14%)	1 (20%)
Stroke Severity (NIHSS 0-42)		
No stroke symptoms (0)	3 (42.9%)	0 (0%)
Minor stroke symptoms (1-4)	2 (14%)	3 (60%)
Moderate stroke symptoms (5-12)	2 (14%)	2 (40%)
Moderate to Severe (16-20)	0 (0%)	0 (0%)
Severe (21-42)	0 (0%)	0 (0%)
Discharge Disposition		
Home	6 (85.7%)	3 (60%)
SNF	1 (14%)	0 (0%)
Assisted Living	0 (0%)	0 (0%)
Acute Rehab	0 (0%)	2 (40%)
Depression History		
Yes	1 (14%)	3 (60%)
No	0 (0%)	2 (40%)
Antidepressants		
Taking	6 (85.7%)	2 (40%)
Not Taking	0 (0%)	0 (0%)
Refused	1 (14%)	0 (0%)

Note. TIA = Transient Ischemic Attack; NIHSS = National Institutes of Health Stroke Scale; SNF = Skilled Nursing Facility. This table demonstrates the characteristics of participants who tested positive in PHQ-9.  $N = 12$ .

### PHQ-9 Scores

Less than half of the care-as-usual patients ( $n=12$ , 46.2%) were screened for depression. Seven (26.9%) of the care-as-usual patients were positive for PSD. Out of the seven depressed patients, one (14.3%) had a positive GDS score of five, two had PHQ-9 scores (28.6%), and the remaining four (57.1%) depressed patients were diagnosed without a formal screening tool noted in the charts. The lowest PHQ-9 score in the care-as usual group scored five (mild depression),

and the highest received 22 (severe depression). The nurse-led screening group had five (29.4%), patients positive for depression, with four as the lowest score (mild depression), and 17 was the highest (moderate depression) (see Table 5).

**Table 5.** *Depression Scale and Severity*

	<b>Care-as-Usual</b>	<b>Nurse-Led</b>
	<i>N</i> = 7	<i>N</i> = 5
<b>Depression Scale</b>		
GDS	1 (14.3%)	N/A
PHQ-9	2 (28.6%)	5 (100%)
None	4 (57.1%)	N/A
<b>PHQ-9 Depression Severity</b>		
Mild (5-9)	0 (0%)	3 (60%)
Moderate (10-19)	1 (14.3%)	2 (40%)
Severe (20+)	1 (14.3%)	0 (0%)

*Note.* GDS = Geriatric Depression Scale; PHQ-9 = Patient Health Questionnaire- 9

### **Screening Interval**

The care-as-usual group had a mean of  $M = 49.3$  ( $SD = 52.59$ ) days to depression screening from admission. Among the 12 patients in the care-as-usual group, the most extended PSD screening was 124 days from admission, and the shortest duration was within two days (see Table 6).

**Table 6.** *Care-as-Usual Screening Interval*

<b>Patients in the Care-as-Usual Group</b>	<b>Admission to Screening Interval</b>
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<b>with PSD Screening</b>	<b>(In Days)</b>
Patient A	44
Patient B	23
Patient C	124
Patient D	27
Patient E	23
Patient F	73
Patient G	179
Patient H	26
Patient I	25
Patient J	43
Patient K	3
Patient L	2

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*Note. N = 12*

## CHAPTER SIX: DISCUSSION

Stroke remains a challenging condition associated with physical disabilities and psychological consequences that may impact the recovery of stroke survivors (Kapoor et al., 2018; Towfighi et al., 2017). Despite its high association with poor outcomes, PSD is often overlooked (Kapoor et al., 2018). The current practice in many stroke centers does not usually include routine depression assessment, leading to undiagnosed depression. This project examined the feasibility of a nurse-led depression screening and referral protocol. Findings indicated that a nurse-led depression screening protocol was feasible for recognizing depression among stroke patients within 48 hours of admission.

Screening stroke patients for depression prior to discharge may be beneficial as it may identify depression early. This project did not identify any patient demographic characteristics associated with higher risk for depression, and there were also no differences in referrals to depression services. Despite some non-significant findings, the pilot project has important implications for future research on screening for post-stroke depression. Our findings of no significant demographic differences in risk for post-stroke depression contrasted with prior studies finding that women had higher risk for PSD than men (Espuela et al., 2020). Prior studies have found that stroke severity played a role in PSD risk, which we did not observe in this project (Espuela et al., 2020; Towfighi et al., 2017). Pre-stroke depression has also been deemed a factor that increases the odds of PSD (McIntosh, 2017; Taylor-Rowan et al., 2020; Towfighi et al., 2017). Consistent with the literature, we found that about a third of stroke patients suffered PSD (Towfighi et al., 2017). The lack of significant findings for demographic risk factors in this sample may be due to the small sample size and under-powering of the project for detecting subgroup differences.



The project also suggested that a nurse-led screening process was feasible to implement in an inpatient setting and may help identify depression early for referral to available services. The project also has the potential to detect untreated depression earlier in stroke survivors. By identifying those with severe depression early, particularly among patients with suicidal tendencies, patient can be better prepared with psychosocial resources for a safer discharge from the hospital. Overall, the protocol was a feasible approach to initiating early referrals and may contribute to more effective use of referrals and medical center resources. Post-stroke depression education was markedly increased as well after the intervention. Based on the retrospective review of the charts, PSD education has not historically been a major foci of stroke education. The implementation of the nurse-led intervention in this project included PSD education on what depression is, its mechanism, signs, and symptoms to watch out for, and referral information. Earlier identification of depression among stroke survivors may allow for depression education prior to discharge, which could further contribute to improved mental health outcomes.

This evidence-based project aimed to change the current practice of not having a standardized depression screening protocol before discharge. A standardized process also helps with consistency and decreases practice variations (McIntosh, 2017). Identifying depression is critical to optimizing stroke patients' recovery and managing this common psychological consequence early. A significant outcome included identifying depression among patients who had a stroke within 48 hours from admission. Within the scope of practice of advanced practice registered nurses (APRNs) is the identification of stroke patients suffering from depression, leading to timely treatment of the disorder. Early PSD recognition has strong associations with prompt treatment and better outcomes. Overall, the gathered knowledge of risk, prevalence, and comparative data will guide and support providers to better manage PSD early, thus improving

the referral system. Ultimately, this project may help improve patient recovery from stroke and optimize the transition of care from hospital to outpatient follow-up and back to the community.

### **Limitations**

There were some limitations to the project which could have impacted our findings: 1) by design, all patients in the screening group were screened at 48 hours so we cannot compare differences to the usual care group for which screening was determined by providers (no standardized protocol); 2) the convenience sample groups were not matched on potential confounding variables such as stroke severity, age, or sex; 3) the sample size was too small to achieve statistically significant differences in rates of depression; 4) Screening within 48 hours of admission may be too early to detect PSD for patients with moderate to severe strokes.

### **Implications for Practice**

*Patients.* The scholarly project involved the implementation of a nurse-led protocol for depression screening among stroke patients to improve patient-centered care and provide high-quality, individualized care. Depression screening within 48 hours of admission, education, and referral prior to discharge could prompt early and timely management to promote stroke recovery, and this project demonstrates the feasibility of screening which should be investigated further in future research. Stroke is complex and entails a wide range of needs (Denham et al., 2019; Kernan et al., 2021). Patient-centered care is necessary to provide high-quality and safe care. The needs, preferences, and support required for PSD included careful assessment and focus. The PHQ-9 screening tool is valuable to institutional order sets to provide consistency and sustainability of assessment and intervention (Melrose, 2016). As studies are inconclusive regarding the timing of depression post-stroke, a structured depression protocol would aid in

identifying depression in the stroke population (Kapoor et al., 2018; McIntosh, 2017; Towfighi et al., 2017).

*Nurses and organization.* Nurses are in an ideal position to screen for depression. Recognizing depression early on leads to the best patient outcomes. Establishing a standardized PSD protocol and early management in hospitals may improve long-term health outcomes by incorporating the screening as part of routine care of each patient with a stroke diagnosis, enhancing reintegration into the community by optimizing care transitions. Continuous education and training for the staff are crucial for sustainability. A stroke order set may also incorporate an order for the depression screen, which may help increase staff utilization when the protocol is implemented throughout an institution. A protocol for a treatment plan is also warranted to achieve consistency with PSD treatments across the board. Establishing better communication between the nurses and physicians, including notification of positive screening, may be helpful in the implementation of the protocol.

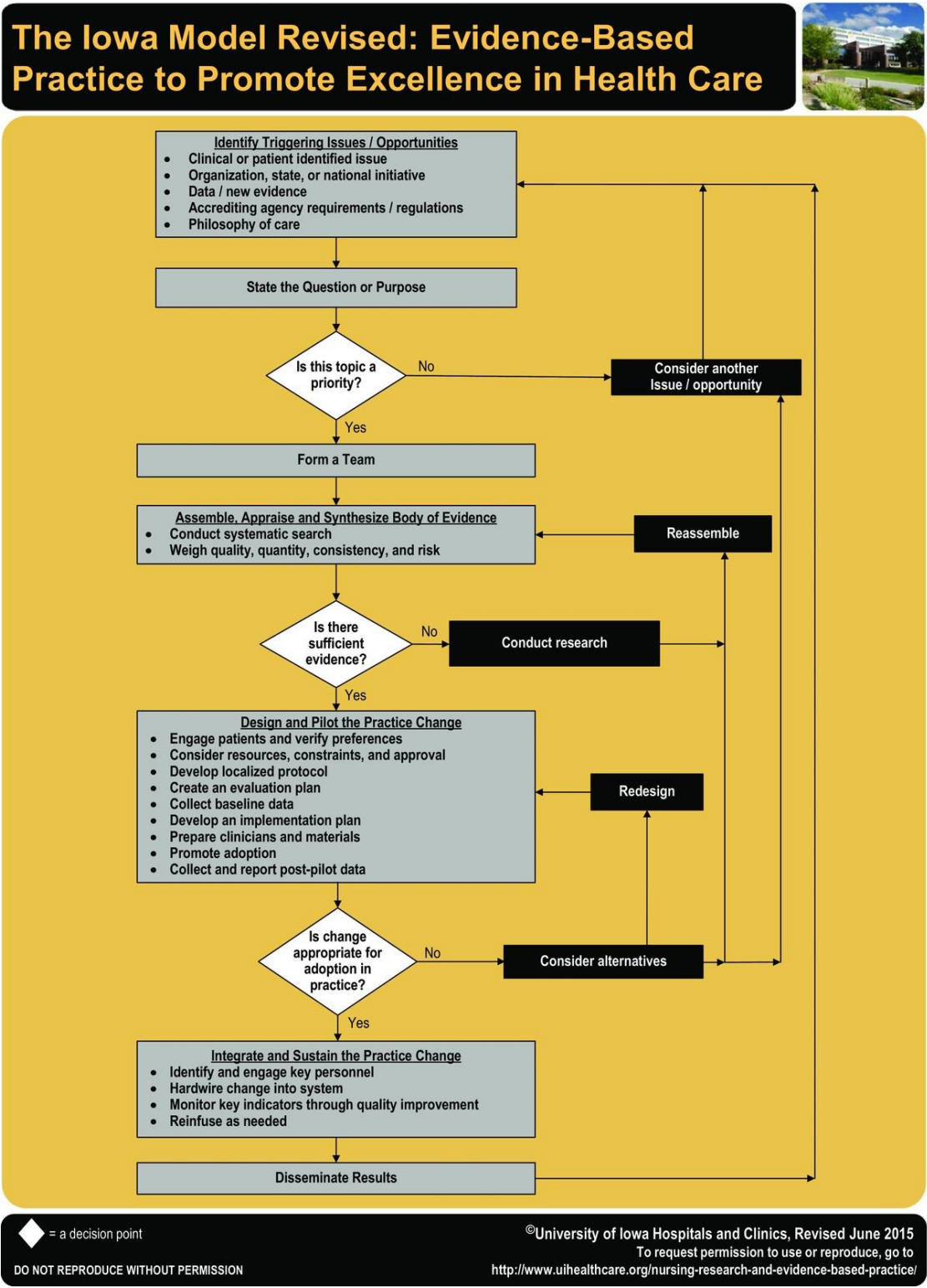
## CONCLUSION

Establishing the nurse-led PSD screening protocol was feasible for identifying depression among stroke survivors within 48 hours of admission. Research is needed to establish whether the protocol can improve early referral, long-term health outcomes, and quality of care. Recognition of depression in the population of stroke patients may support patients with PSD and facilitate early management of mental health needs.

## APPENDICES

# Appendix A

## The Iowa Model of Evidence-Based Practice



## Appendix B

### PHQ-9 Tool

Over the past two weeks, how often have you been bothered by any of the following problems?	Not at all	Several Days	More than half the days	Nearly Everyday
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 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 the television	0	1	2	3
8) 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	0	1	2	3
9) Thoughts that you would be better off dead or hurting yourself.	0	1	2	3

**Scores:**

1-4: None

5-9: Mild

10-14: Moderate

15-19: Moderately Severe

20+: Severe

## Appendix C

### The Care-as-Usual Group

<b>Time Point</b>	<b>Standardized Component</b>
At admission from the medical center	<ul style="list-style-type: none"><li>▪ Provision of stroke packet: "After A Stroke" booklet, stroke resources, stroke support group flyer, patient satisfaction survey</li></ul>
At discharge from the medical center	<ul style="list-style-type: none"><li>▪ There is a written copy of the discharge instructions, medications, secondary stroke prevention tips, and when to seek medical attention.</li></ul>
	<ul style="list-style-type: none"><li>▪ Referral to Rehabilitation Team, home visits, acute rehabilitation, or skilled nursing facility placement.</li></ul>
One to Two weeks post-discharge	<ul style="list-style-type: none"><li>▪ A follow-up appointment with a primary care physician or neurologist.</li></ul>

## Appendix D

### Nurse-Led Protocol (Intervention group)

Time Point	Standardized Component
At admission from the medical center	<ul style="list-style-type: none"> <li>▪ Provision of stroke packet: "After A Stroke" booklet, stroke resources, stroke support group flyer, patient satisfaction survey</li> </ul>
	<ul style="list-style-type: none"> <li>▪ PHQ-9 baseline assessment and referral for positive score               <ul style="list-style-type: none"> <li>○ 0-4: PSD Education</li> <li>○ 5-9: PSD Education   Center for Healthy Living   Social Services</li> <li>○ 10-19: Depression Care Program   Social Services</li> <li>○ 20+: Behavioral Health   IP Psychiatric Consult   Social Services</li> </ul> </li> </ul>
At discharge from the medical center	<ul style="list-style-type: none"> <li>▪ Provision of a written copy and education on discharge instructions, medications, secondary stroke prevention tips, and when to seek medical attention.</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Referral to Rehabilitation Team, home visits, acute rehabilitation, or skilled nursing facility placement.</li> </ul>
One to Two weeks post-discharge	<ul style="list-style-type: none"> <li>▪ A follow-up appointment with a primary care physician or neurologist.</li> </ul>



## Appendix E

### PSD Education (Handout)

**YOUR MENTAL HEALTH MATTERS**

**Post-Stroke Depression**

Depression, a condition often caused by biochemical changes in the brain after a stroke, is commonly experienced by stroke survivors. Depression may make the rehabilitation process more challenging for survivors to do the hard work required.

*If **five** or more of these symptoms persist for longer than two weeks, depression may be the cause. Contact your **Primary Care Physician**.*

<b>1</b>	<b>6</b>
Persistent sad, anxious, or "empty" mood	Difficulty concentrating, remembering, and making decisions
<b>2</b>	<b>7</b>
Restlessness and irritability	Loss of interest or pleasure in hobbies and activities, including sex
<b>3</b>	<b>8</b>
Decreased energy and fatigue, and feeling "slowed down"	Appetite and/or weight changes
<b>4</b>	<b>9</b>
Feelings of hopelessness, pessimism, guilt, worthlessness or helplessness	Thoughts of death or suicide, or suicide attempts --Call <b>Behavioral Health 1-855-701-7955, IMMEDIATELY!</b>
<b>5</b>	
Insomnia, early-morning awakening or oversleeping	

## Post-Stroke Depression Recommendations

- Treating depression not only improves the survivor's mood, but it also boosts physical, cognitive, and intellectual recovery.
- Social support is crucial.
- Several studies show that depression goes hand in hand with lower levels of support.
  - Look to your family, friends, a stroke support group, or a combination of resources for help. Everyone involved in recovery needs to be aware of the survivor's depression — and ready to respond to it.
  - The right kind of treatment and support can help ease the pain and move the survivor down the road to recovery.

### **STROKE SUPPORT GROUP**

Meets every 4th Thursday/Month  
For information and registration:  
Karen Bacosa, Stroke Coordinator  
(818)719-4734  
OR karen-gaille.a.bacosa@kp.org

### **CENTER FOR HEALTHY LIVING**

Stress Management and  
Wellness Coaching  
(818)719-4305

### **BEHAVIORAL HEALTH**

1-855-701-7955

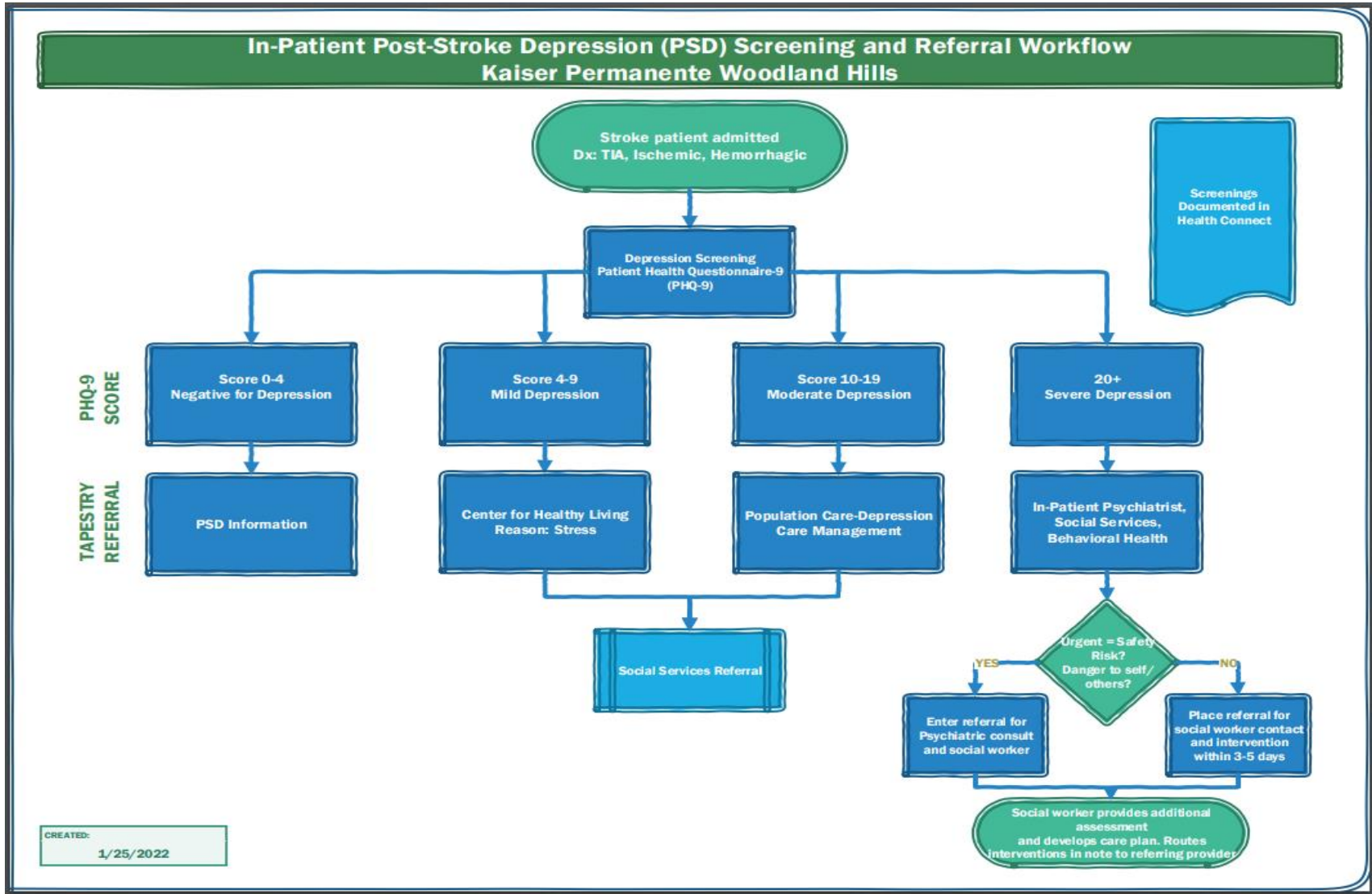


**FOR MORE INFORMATION, PLEASE VISIT:  
AMERICAN HEART ASSOCIATION**

**[HTTPS://WWW.STROKE.ORG/EN/ABOUT-STROKE/EFFECTS-OF-STROKE/EMOTIONAL-EFFECTS-OF-STROKE/DEPRESSION-AND-STROKE](https://www.stroke.org/en/about-stroke/effects-of-stroke/emotional-effects-of-stroke/depression-and-stroke)**

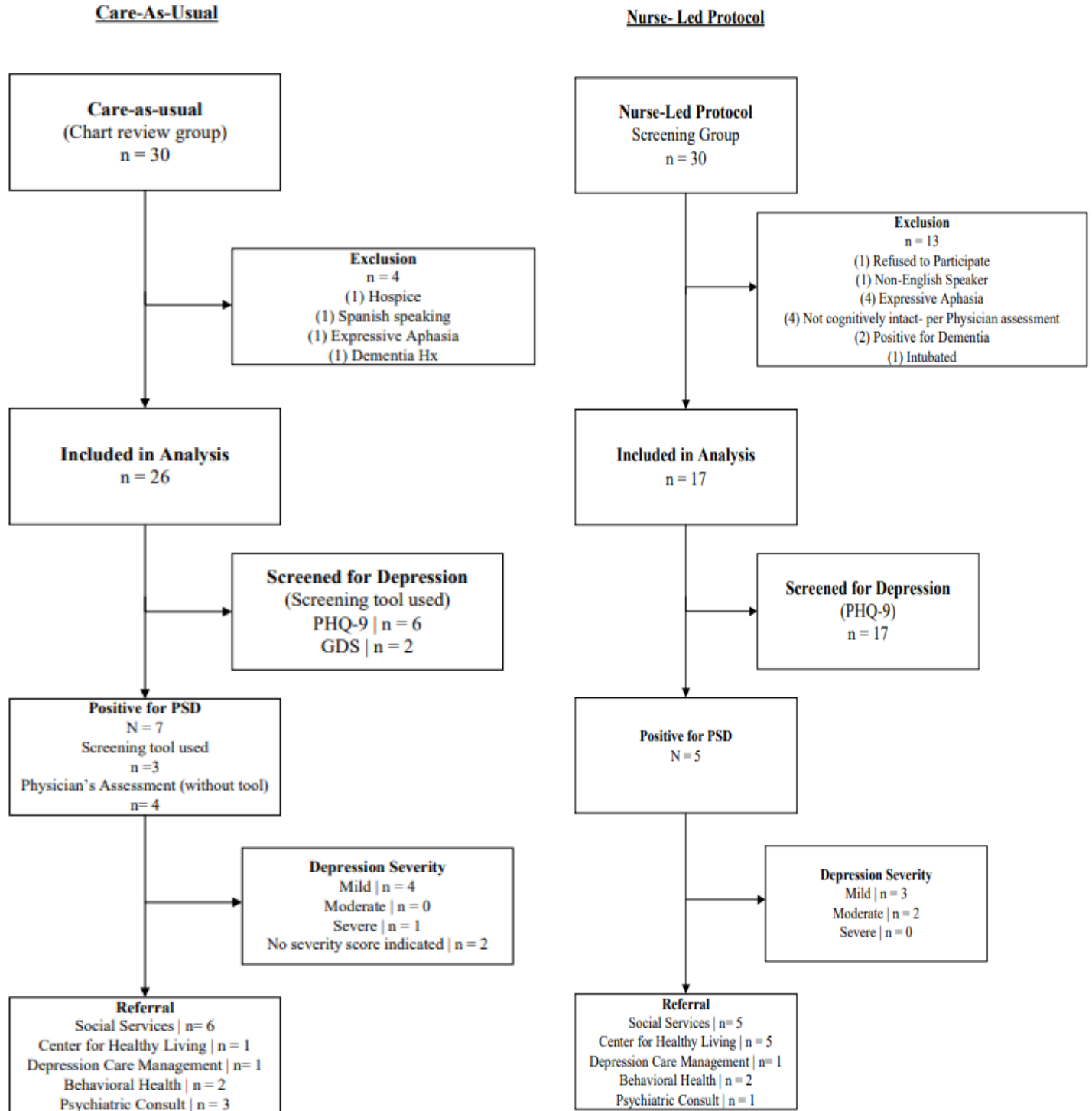
# Appendix F

## PSD Screening and Referral Workflow



## Appendix G

### Care-As-Usual and Nurse-Led Protocol Participants





## Appendix H

### IRB Approval Letter



### Approval Notice

March 02, 2022

**KP Principal Investigator(s)**

Karen Gaille Agustin Bacosa  
KPSC - Health Appraisal/Education  
5601 De Soto Ave.  
Woodland Hills , CA 91367

**Study Title: Depression: An Aftermath of Stroke (#13172)**

On **03/02/2022**, a subcommittee of the Kaiser Permanente (KP) Institutional Review Board (IRB) reviewed and approved your new study until 03/02/2032.

In accordance with the requirements for research activities that present no more than minimal risk to subjects set forth in [45 CFR 46.110](#) the study referenced above qualified for expedited review under the following research category(s):

- Category 5: Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis)
- Category 7: Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies

**Study Document(s):**

PHQ-9 KPHC 2.27.22  
Bacosa Informational Sheet            02/25/2022

In accordance with 45CFR 46.117 documentation of the requirement for the investigator to obtain a signed consent was waived under:

- (1) The only record linking the subject and the research would be the consent document and the principal risk would be the potential harm resulting from a breach of confidentiality  
**or**
- (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context **or**

- (3) That the subjects or legally authorized representatives are members of a distinct cultural group or community in which signing forms is not the norm, that the research presents no more than minimal risk of harm to subjects and provided there is an appropriate alternative mechanism for documenting that informed consent was obtained.

The requirement that written Privacy Rule authorization be obtained from study participants was waived for the data component of this study..

**The KP Principal Investigator (PI) is required to:**

- Review the document entitled HIPAA Privacy Rule Instructions for Researchers available at [http://irb.kp-scalresearch.org/5/HIPPA\\_Privacy\\_Rule\\_Instructions\\_for\\_Researchers.pdf](http://irb.kp-scalresearch.org/5/HIPPA_Privacy_Rule_Instructions_for_Researchers.pdf)
- Submit a complete progress or final report of research activities.

**And if applicable,**

- Submit for IRB review modifications to the research and/or IRB approved research documents.
- Submit Adverse Event report(s) according to IRB policies and procedures and consistent with federal regulations.
- Submit Protocol Violation report(s) and other Unanticipated Problem Reports according to IRB policies and procedures and consistent with federal regulations.

Sincerely,

Signature applied by Isabel M Sanchez on  
03/02/2022 04:00:58 PM PST

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Armida Ayala, MHA, PhD  
Director  
Human Research Subjects Protection Office  
Institutional Review Board

## Appendix I

### PSD Informational Sheet

Page 1 of 2

KAISER FOUNDATION HOSPITALS  
SOUTHERN CALIFORNIA PERMANENTE MEDICAL GROUP

#### **Depression: An Aftermath of Stroke Informational Sheet**

**SPONSOR:** None

**INVESTIGATOR:** Karen Bacosa, MSN, APRN-AGCNS, RN, PCCN-K, SCRNI  
5601 De Soto Ave  
Woodland Hills, Ca 91367

**TELEPHONE:** (818)518-5828

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You are being asked to be in a **voluntary** research study regarding having depression related to a stroke. You are being asked to take part in this research because you are an adult over age 20, and you have been diagnosed with either a transient ischemic attack, ischemic or hemorrhagic stroke.

Your decision to be in this study is completely voluntary. You do not have to participate in any research project offered by Kaiser Permanente.

#### **PURPOSE**

We are doing this research study to find out if you have depression from a stroke and to refer you to appropriate services based on the depression screen score noted using the Patient Health Questionnaire-9. The purpose of this research is to optimize stroke patient recovery by screening and managing depression early.

#### **DURATION**

The depression screening tool (Patient Health Questionnaire-9) should take less than 10 minutes to complete. You will be asked to complete the questionnaire once. You will also be referred to appropriate services or provided educational materials on the signs and symptoms of depression if needed. When appropriate, you will be provided a referral by the Principal Investigator during your office visit.

#### **VOLUNTARY PARTICIPATION**

You do not have to answer any questions that you do not want to answer and this will in no way affect the care provided by the Kaiser Permanente Woodland Hills Medical Center staff. You can skip any questions that you do not want to answer. The questions you answer as part of this research project are done for research purposes only.

#### **STUDY PROCEDURE**

If you choose to take part in the study visit, you will complete the Patient Health Questionnaire-9 which should take less than 10 minutes to complete.

If you join the study, you can decide to stop at any time for any reason. If you decide to stop, you should tell the Principal Investigator that you wish to stop the survey.

**IF I AGREE TO JOIN THIS STUDY, WHAT WOULD I NEED TO DO?**

- If you decide to take part in this study, you will be asked to complete a 9-item questionnaire called PHQ-9 through an interview which should take less than 10 minutes.
- Depending on the score: 0-4 (no depression; post-stroke depression information will be provided) 5-9 (mild depression; referral to Center for Healthy Living for wellness coaching or stress management) 10-19 (moderate depression; referral to Depression Care Management) 20 and over (severe depression; Behavioral health, in-patient psychiatric consult). All patients positive for depression, score 4 or greater will be referred to social services.

**WHAT ARE THE POSSIBLE RISKS IF I JOIN THIS STUDY?**

**Depression Questionnaire:** Some questions are about sensitive and personal topics and may make you uncomfortable. If any questions make you feel uncomfortable, you may skip those questions and not give an answer.

**BENEFITS**

There is no guarantee that you will benefit from participating in this study.

**ALTERNATIVES**

You do not have to participate in this study and the medical care you receive will not be affected.

**CONFIDENTIALITY**

To maintain your confidentiality, we will only use random code numbers to identify you on the survey.

**COMPENSATION**

You will not be paid for participating in this study.

**COSTS**

There are no costs to you for participating in this research study.

**CONTACT INFORMATION**

If you have any questions about this research study, please call Karen Bacosa at 818-518-5828.

**FOR QUESTIONS ABOUT MY RIGHTS AS A PARTICIPANT**

You may contact Armida Ayala, PhD, Director, Human Research Subjects Protection Office at (626) 405-3665 or [Armida.Ayala@kp.org](mailto:Armida.Ayala@kp.org)



TABLE OF EVIDENCE

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Chiu, C. C., Wang, J. J., Hung, C. M., Lin, H. F., Hsien, H. H., Hung, K. W., Chiu, H. C., Jennifer Yeh, S. C., &amp; Shi, H. Y. (2021). Impact of Multidisciplinary Stroke Post-Acute Care on Cost and Functional Status: A Prospective Study Based on Propensity Score Matching. <i>Brain sciences, 11</i>(2), 161. <a href="https://doi.org/10.3390/brainsci11020161">https://doi.org/10.3390/brainsci11020161</a></p>	<p>To assess the impact of multidisciplinary PAC programs on cost and functional status</p>	<p>-A total of 910 stroke patients (March 2014-October 2018) separated into a PAC group (2 medical centers), and non-PAC (3 regional hospitals and one district) -Cost-Illness approach to examine cost categories for analysis</p>	<p>-Multidisciplinary PAC stroke teams: Neurologists, psychiatrists, physiotherapists, occupational therapists, speech therapists, and nurses-Selection bias is minimized by propensity score matching (PSM) for patient selection -Caliper matching method (1:1) match between the two groups -Descriptive statistics (patient demographics) -Effect size, standard regression diagnostics</p>	<p>-455 stroke patients per group - Majority of patients suffered an ischemic stroke; over 50% had risk factors of hypertension., hyperlipidemia, and diabetes</p>	<p>-Patients receive more rehabilitation programs to their level of tolerance compared to once-a-day PT/OT/ST therapy - Multidisciplinary team approach recommended being started early after acute onset of stroke -Link to minimize functional disabilities, complication prevention, and decrease length of stay -Multidisciplinary team approach is cost-effective and leads to efficient outcomes -The collaborative effort by the multidisciplinary team was found to be a contributor to good outcomes</p>

Note: OT = Occupational Therapist, PAC = Post-Acute Care, PT = Physical Therapist, ST = Speech Therapist

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
					<p>-Medical cost in the PAC group was lower than the fee-for-service non-PAC (p&lt;0.001)</p> <p>-PAC group had improvement in functional status compared to the non-PAC cohort</p> <p>-Early stroke rehabilitation is associated with health restoration. Confidence and safe-care abilities of patients</p> <p>-Shortened the waiting time for rehabilitation transfer</p> <p>Limitations:</p> <p>-Limited experience of medical professionals does not significantly influence patient outcomes</p> <p>-Study did not examine the ischemic stroke subtype, risks</p>

Note: OT = Occupational Therapist, PAC = Post-Acute Care, PT = Physical Therapist, ST = Speech Therapist

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Clarke &amp; Forster, 2015, D. J., &amp; Forster, A. (2015). Improving post-stroke recovery: the role of the multidisciplinary health care team. <i>Journal of multidisciplinary healthcare</i>, 8, 433–442. <a href="https://doi.org/10.2147/JMDH.S68764">https://doi.org/10.2147/JMDH.S68764</a></p>	<p>To explore the contribution of the team working in providing evidence-based care to improve recovery</p>	<p>-Combination of qualitative and quantitative literature relevant to improving post-stroke recovery</p>	<p>-Systematic literature review (Cochrane) -The multidisciplinary team were divided into three sections, further examining roles of different team members across care pathway for stroke patients</p>	<p>1) Pre-hospital (hyperacute phase)- EMS dispatchers, paramedics, Stroke physician, stroke specialist working with the ED staff, imaging team -Needs a high level of collaboration (time-sensitive treatments) -Collaborative, interdisciplinary teamwork, patient-centered culture are features of hospitals outstanding performance of door-to-perfusion 2) In-patient stroke unit care -Designated stroke units: stroke physicians, nurses, PT/OT/ST, healthcare and therapy aides, stroke coordinators Relies on a coordinated team</p>	<p>-Health professionals' collaboration is necessary across the stroke pathway -Interdisciplinary care is critical to the stroke quality of care approach</p>

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
				for planning, delivering, and evaluating care -All stroke team members can support stroke survivors in practices related to improving independence in ADLs, increased function and mobility, communication 3) After hospital discharge - Early supported discharge should be multidisciplinary; it should have a consistent information strategy -Community-based teams	

Note: ADL = Activities of Daily Living , ED = Emergency Department, EMS = Emergency Medical System, OT = Occupational Therapist, PAC = Post-Acute Care, PT = Physical Therapist, ST = Speech Therapist

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Fournier, L. E., Beauchamp, J., Zhang, X., Bonojo, E., Love, M., Cooksey, G., Hinojosa, E., Okpala, M. N., Savitz, S. I., &amp; Sharrief, A. Z. (2020). Assessment of the progression of poststroke depression in ischemic stroke patients using the patient health questionnaire-9. <i>Journal of Stroke and Cerebrovascular Diseases: The official journal of National Stroke Association</i>, 29(4), 104561. <a href="https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.104561">https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.104561</a></p>	<p>To understand the progression of PSD symptoms early after ischemic stroke, identify PSD predictors and use antidepressants</p>	<p>-201 stroke patients hospitalized in a CSC who had a follow-up, with PHQ-9 &gt;4</p>	<p>-Data collection including demographics, clinical and PHQ-9 scores from hospitalization and in-clinic post 180 days of discharge. -Univariate analysis and logistic regression</p>	<p>-30% of patients and 46% of the 201 patients were positive for depression. -At follow-up, there was an increase of 36% or worse score in PHQ-9 than baseline PCA stroke and antidepressants linked to worsening scores (p&lt;0.01)</p>	<p>-Almost half of the ischemic stroke patients were positive for PSD, and more than 1/3 developed worsening PHQ-9 scores. Prompted change in treatments -Post-stroke disability= MRS ≥2 -PCA strokes are linked to PSD. -The study highly recommends screening patients at baseline and follow-up</p>

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Note: CSC= Comprehensive Stroke Center, MRS= Modified Rankin Scale, PCA= Posterior Cerebellar Artery

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Graven, C., Brock, K., Hill, K. D., Cotton, S., &amp; Joubert, L. (2016). First year after stroke: An integrated approach focusing on participation goals aiming to reduce depressive symptoms. <i>Stroke</i> (00392499), 47(11), 2820-2827. <a href="https://doi.org/10.1161/strokeaha.116.013081">https://doi.org/10.1161/strokeaha.116.013081</a></p>	<p>-To determine the effectiveness of a person-centered, integrated approach to goal achievement within the first year of stroke patients with depressive symptoms.</p>	<p>-Two in-patient rehabilitation sites, from the 201 patients with a stroke diagnosis, 110 were randomized into two groups, 54 allocated to the intervention group and 65 to the control group -Inclusion: patients with a primary diagnosis of acute CVA and patients with communicative and cognitive deficits were included -Exclusion: the primary cause of disability from non-stroke diagnosis, head trauma, epidural, subdural hemorrhage,</p>	<p>-Prospective randomized controlled trial, with outcomes assessment at six and 12 months after stroke. -Participants and outcome data abstractors were blinded as to group allocation (control or usual care and intervention or non-standardized) -Power calculations of 80% based on the GDS-15, significance at 0.05, target sample for 55 for each study group; t-test and Pearson chi-square</p>	<p>- No significant difference in the baseline characteristics for participants who completed the 12 months study follow-up (n=94, 85%) compared with the 12-month participants, and there was no difference in the dropout rates -110 participants recruited -significant difference between the two groups with regards to depression severity at 12 months post-stroke (R<sup>2</sup>=0.366; F (6, 89)=8.57; P&lt;0.005), with the intervention group</p>	<p><b>Discussion:</b> -One of the first studies to adopt a multimodal approach to address PSD -Study found that goal-focused intervention reduced depressive symptom levels <b>Limitations:</b> -Trial was underpowered. Although results found a significant difference between the two groups, caution is needed to interpret the clinical significance <b>Recommendation:</b> -Study should be replicated in a larger sample size <b>Conclusion:</b> -An integrated approach using the patient-identified interventions should be</p>

		cerebral malignancy, discharge to high-level residential care, and in-patient rehabilitation stay of <4 days or >6 months' duration		having lower depressive scores	part of routine post-stroke management.
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Note: CVA= Cerebrovascular Accident



CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Kapoor, A., Lancot, K. L., Bayley, M., Herrmann, N., Murray, B. J., &amp; Swartz, R. H. (2019). Screening for post-stroke depression and cognitive impairment at baseline predicts long-term patient-centered outcomes after stroke. <i>Journal of Geriatric Psychiatry and Neurology</i>, 32(1), 40–48. <a href="https://doi.org/10.1177/0891988718819859">https://doi.org/10.1177/0891988718819859</a></p>	<p>Evaluate validated screening tools for predicting long-term higher-level function and daily living 2-3 years after a stroke.</p>	<p>-Retrospective subgroup analysis One thousand five hundred four possible participants, 413 had a stroke, 270 had the baseline assessment, and 124 completed both assessment and follow-up. <b>Exclusion Criteria:</b> Severe aphasia Severe motor dysfunction non-fluent in English <b>Setting:</b> Outpatient Clinic Community</p>	<p>-Baseline assessment involved a chart review of the Modified Ranking Scale (MRS), assessed for depression using PHQ-2, STOP Questionnaire for Obstructive Sleep Apnea (OSA), and memory components of MoCA. -Follow-up telephone assessments completed in 2-3 years post-stroke IBM SPSS utilized</p>	<p>-Total of 124 patients completed both assessments and follow-up. -Older age, severe strokes, and more depressive and cognitive symptoms predicted insufficient instrumental activity. -Higher depression risk was the only significant predictor of Reintegration to Normal Living Index (RNLI) participation.</p>	<p><b>Discussion:</b> -Stroke is a challenging condition; it impacts functioning and disability and is associated with depression and cognitive impairment -Risk identification leads to early intervention and optimized recovery -Depression risk is the only significant factor in social reintegration (mood problems and apathy) -PSD is a potentially treatable condition. <b>Recommendations:</b> -Future studies should improve social support and targeted mood or apathy treatments. <b>Conclusion:</b></p>

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
					<p>-Baseline depressive and cognitive symptoms predict long-term outcomes after stroke.</p> <p>-Treatment approaches: Pharmacological, physical, environmental, and social interventions could improve post-stroke conditions.</p>

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Li, L. J., Yao, X. M., Guan, B. Y., Chen, Q., Zhang, N., &amp; Wang, C. X. (2019). Persistent depression is a predictor of quality of life in stroke survivors: results from a 5-year follow-up study of a Chinese cohort. <i>Chinese medical journal, 132</i>(18), 2206–2212. <a href="https://doi.org/10.1097/CM9.0000000000000000400">https://doi.org/10.1097/CM9.0000000000000000400</a></p>	<p>To ascertain if the time course of Post Stroke Depression (PSD) can be used to predict Quality of Life (QoL)</p>	<p>Out of the 801 patients:            -Mean age: 57.5 ±10.5 years)            -265 patients associated with lower levels of education: 39.2% vs 47.3%, <i>P</i>=0.021)            -Rates of Employment (46.2% vs 55.7%, <i>P</i>=0.007)            -Smoking (44.9% vs 52%, <i>P</i>=0.041)            -First-ever stroke (76.6% vs 82.9%, <i>P</i>=0.023)</p> <p><b>Setting:</b>            -56 Hospitals across China participated in the Prospective Cohort Study on the Incidence and Outcome of Patients with PSD in China Study.</p>	<p><b>Methods:</b>            -Analysis of demographic and clinical data of patients.            -Follow-up assessments performed in various time courses post stroke:            (In-Person)            Two weeks            Three months            Six months            One year            Five years (by telephone)            Approved by the medical ethics committee of Beijing Tian Tan Hospital  <b>Design:</b>            -Longitudinal Study  <b>Data Analysis:</b>            -SPSS v24.0</p>	<p>After one year of follow-up:            -330 (were positive for depression            -80 (24.3%) had persistent depression            -217 (65.7%) had transient depression            -33 (10%) had recurrent depression            -Patients with persistent depression were older, female, with higher NIHSS scores and stroke history in the family.</p>	<p>-Post-stroke depression is a typical sequel to a stroke.            -Female Stroke survivors are more likely to be deceased or dependent at one-year post-stroke.            -High baseline NIHSS is associated with an increased risk of complications.  <b>Limitations:</b>            -Aphasic patients were excluded            -The mood was only assessed for the first year.            -No comparison between baseline characteristics of the patients lost at one year follow up and included patients  <b>Conclusion:</b>            -Persistent depression at the one-year follow-up predicts low MCS</p>

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
			-Continuous data expressed as median or mean $\pm$ standard deviation -Chi-square test to compare statistics -T-test for continuous variables -Mann-Whitney U test for National Institutes of Health Stroke Scale (NIHSS) Kruskal-Wallis test for analysis of Variance (NIHSS, PCS), and MCS		scores at the five-year follow-up. -Research should focus on the development of strategies for patients with persistent depression

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>López-Espuela, F., Roncero-Martín, R., Canal-Macías, M. L., Moran, J. M., Vera, V., Gomez-Luque, A., Lendinez-Mesa, A., Pedrera-Zamorano, J. D., Casado-Naranjo, I., &amp; Lavado-García, J. (2020). Depressed mood after stroke: Predictive factors at six months follow-up. <i>International journal of environmental research and public health</i>, 17(24), 9542.  <a href="https://doi.org/10.3390/ijerph17249542">https://doi.org/10.3390/ijerph17249542</a></p>	<p>To identify prevalence, variables to predict PSD using the HDS and Barthel index</p>	<p>-173 stroke survivors in a vascular neurology clinic at the Complejo Hospitalario in Caceres</p>	<p>-The descriptive, cross-sectional, and observational design          -Participants are evaluated at the 6-month follow-up post-stroke  <b>Inclusion:</b>          -All stroke subtypes, including transient ischemic attack  <b>Variables:</b>          -Socio-economic          -Clinical          - Psychopathological assessment          -Functional assessment          -Neurological assessment          Mann-Whitney U test, SPSS</p>	<p>-Total of 173 patients, 35.5% women, with an average of 71.16 years, 67% live with partners, 15% alone, all White, 42.2% positive for depression on follow-up          -Previous depression associated with PSD</p>	<p>-PSD is the most frequent and burdensome neuropsychiatric complication after stroke          -Physical and psychological well-being are affected post-stroke.          -Administration of antidepressants improves NIHSS and functional status          -Large and multiple strokes are predictive of PSD  <b>Limitations</b>          -all white participants          -proxies completed some questionnaires          -convenience sampling; selection bias  <b>Conclusion:</b>          -PSD is standard and linked to stroke severity, left location of</p>

<b>CITATION</b>	<b>PURPOSE</b>	<b>SAMPLE/SETTING</b>	<b>METHODS (Design, Interventions Measures)</b>	<b>RESULTS</b>	<b>DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS</b>
					the stroke, degree of disability

Note: NIHSS= National Institutes of Health Stroke Scale

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>McIntosh, C. (2017). A depression screening protocol for patients with acute stroke. <i>Journal of Neuroscience Nursing, 49</i>(1), 39–48.  <a href="https://doi.org/10.1097/jnn.000000000000002311">https://doi.org/10.1097/jnn.000000000000002311</a></p>	<p>To determine the effectiveness of an Evidence-Based Depression Screening and Treatment (EBDST) protocol in early recognition and treatment of Post Stroke Depression (PSD).</p>	<p>The study sample included 95 patients with a Stroke diagnosis  16 patients excluded  56% Male; 44% (n=35) female  65% White  77% were admitted with Ischemic Stroke  <b>Inclusion Criteria:</b>  -18 y/o and older  -Positive stroke on MRI or CT scan  -Ability to read or understand English (or utilization of a translator)  <b>Exclusion Criteria:</b>  Patients with--  Aphasia  Confusion  Obtunded or unable to participate  Dementia  <b>Setting:</b></p>	<p><b>Methods:</b>  -Obtained Institutional review board approval (IRB).  -Protocol Development; is established by the researcher in collaboration with stakeholders from the hospital  -An extensive review of practice; gaps  -Protocol implementation and evaluation  <b>Design:</b>  -Retrospective chart review  -Utilization of PHQ-9 Questionnaire  -Collection of demographic data and medical</p>	<p>Of the 79 participants:  -48% (n=38) were identified as depressed (PHQ-9 score &gt;4)  52% (n=41) not depressed  -Patients with a history of depression (<math>\chi^2=17.09, p=.002</math>) were found to have higher levels of depression severity  -After the intervention, patients who were positive for depression (<math>\chi^2=30.0, p=.000</math>) received a Stroke and depression booklet; they were medically treated before discharge (<math>\chi^2=5.57, p=0.18</math>)</p>	<p><b>Discussion</b>  -Patients with a significant history of alcohol are more likely to have PSD  -PHQ-9 is a valuable tool for recognizing depression; nurses are educated and trained  -EBDST identified and treated patients with PSD before discharge.  <b>Limitations</b>  -Short implementation of 2 months  -Change of Hospitalists every week  -The sample was primarily Caucasian  <b>Recommendation</b>  -PSD screening be incorporated into the stroke order set  -Continuous training and education of staff  -Improve communication</p>

CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
		Stroke designated tertiary hospital in upstate New York	and protocol variables -Stroke and Depression education and provision of handouts. <b>Data Analysis:</b> SPSS 22.0 software -Combination of Descriptive, nonparametric, and parametric statistics. -Chi-square test -Pearson Correlation test	-Nurses' documentation of screening results also improved ( $\chi^2=9.19, p=.002$ )	between Hospitalists and Neurologists <b>Conclusion</b> -The EBST is an efficient protocol to recognize and treat PSD early. -The project decreased the detrimental effects of PSD

Note: EBDST= Evidence-Based Depression Screening and Treatment



CITATION	PURPOSE	SAMPLE/SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Ross, S. Y., Roberts, S., Taggart, H., &amp; Patronas, C. (2017). Stroke Transitions of Care. <i>Medsurg nursing: official journal of the Academy of Medical-Surgical Nurses</i>, 26(2), 119–123.</p>	<p>To improve patient education and patient satisfaction and reduce all-cause 30-day readmissions utilizing teach-back and discharge follow-up phone calls 72 hours post-discharge.</p>	<p>-A 689-bed nonprofit facility designated by The Joint Commission as an Advanced Primary Stroke Certified Center.-Included a prospective group of 5,507 participants.</p>	<p>-The quality improvement (QI) project used the literature review, PBED model. - Baseline data of the previous year's stroke readmissions were collected by the quality specialist and the project leader to establish project benchmarks -Data Abstraction: MIDAS (national comparative database for patient safety and quality management), Get with The Guidelines, HCAHPS scores</p>	<p>-Readmission- Two-sample variance test- Statistically significant. -12.4% increase in HCAHPS and 10% decrease in readmission -Satisfaction Scores: t-test: no statistical significance between pre-intervention satisfaction scores (M=67.593, SD 3.554, SE Mean=2.052, CI=95%) and post-intervention scores (M=79.980, SD-7.278, SE Mean=4.202, CI=95%) (p=0.1179).</p>	<p>-Improving transitions in stroke care by implementing evidence practice is a team effort and interprofessional collaboration (IPC) -Advance Practice Nurse (APN) key player in QI projects, expanding autonomy. -Project provided staff with a proven method (teach-back) to deliver patient education. <b>Limitations:</b> -Time constraints with discharge phone calls; challenging to coordinate with team leaders -Small sample at a single center</p>

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Santos, N. O., Predebon, M. L., Bierhals, C. C. B. K., Day, C. B., Machado, D. O., &amp; Paskulin, L. M. G., (2020). Development and validation a nursing care protocol with educational interventions for family caregivers of elderly people after stroke. <i>Revista Brasileira de Enfermagem</i>, 73, 1-9.  <a href="https://doi.org/10.1590/0034-7167-2018-0894">https://doi.org/10.1590/0034-7167-2018-0894</a></p>	<p>To develop and validate a nursing care protocol with educational interventions for family and caregivers' post-stroke</p>	<p>Methodological research completed in Brazil developed in 3 stages between 2016-2017.</p>	<p>Three stages of methodological study:          -Protocol based on literature review          -Pre-test with the multidisciplinary team          -Protocol validation by Delphi Technique          -Proper preparation of caregivers as part of the transition</p>	<p>-The caregiver protocol development for home care, consisting of 12 domains, 42 items, and 240 care guidelines, qualifies the care transition after hospital discharge          -Eight experts from the multidisciplinary team participated in the selection of domains          -42 experts accepted and composed the first round of protocol assessments</p>	<p>-12 domains of evidence-based, practical tool/ protocol validated by experts: stroke guidelines, emotional support, using healthcare network, diet, airways, medications, hygiene, skincare disposal, dressing/undressing, positioning, and transfer, fall prevention,          -Key to ensuring quality care for patients and informal caregivers          -validated and improved by experts  <b>Limitations:</b>          -Challenges with the Delphi technique validation phase          -Data collection tool that does not facilitate face-to-face contact with experts</p>

<b>CITATION</b>	<b>PURPOSE</b>	<b>SAMPLE/ SETTING</b>	<b>METHODS (Design, Interventions Measures)</b>	<b>RESULTS</b>	<b>DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS</b>
					-Delayed return and low adherence rate from experts -Further research through intervention studies using the protocol

Note: HCAHPS= Hospital Consumer Assessment of Healthcare Providers and Systems, PBED= Plan, Brief, Execute, and Debrief (PBED)

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Tu, J., Wang, L.-X., Wen, H.-F., Xu, Y.-C., &amp; Wang, P.-F. (2018). The association of different types of cerebral infarction with post-stroke depression and cognitive impairment <i>Medicine</i>, 97(23), e10919.  <a href="https://doi.org/10.1097/md.000000000000109199">https://doi.org/10.1097/md.000000000000109199</a></p>	<p>To study PSD and cognitive impairments with different types of strokes.</p>	<p>From a sample of 110 stroke patients, 47 had PSD, 63 non-PSD          -28 male, 19 female          -Age range: 46-63 years old          -32 patients: PACI, 48 LACI, 30 posterior POCI          -Conducted in Hospital in China</p>	<p>-HAMD and MMSE were utilized to assess for depression and cognition of patients within two weeks after stroke          -The relationship between PSD and cognitive impairment has been well-established: stroke patients with major depression had significantly lower MMSE scores as compared to patients with no PSD          -Stroke increases the risk of cognitive impairments</p>	<p>-Prevalence of PSD is significantly higher in PACI (68.75%) than in patients with LACI and POCI          -MMSE scores are significantly lower in PACI patients than in LACI and POCI          -MMSE scores of PSD patients were significantly lower than non-PSD patients</p>	<p>-PACI patients have a higher incidence of PSD and impaired cognitive functions in comparison with patients with LACI and POCI          -Depression may be correlated with cognitive impairment in patients with strokes.</p>

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
			-Stroke types were classified per the OCSF classification system		

Note: HAMD= Hamilton Depression Rating Scale, LACI= Lacunar circulation infarction, MMSE= Mini-Mental State Examination, OCSF= Oxfordshire

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Verberne, D., van Mastrigt, G., Ponds, R., van Heugten, C. M., &amp; Kroese, M. (2021). An economic evaluation of nurse-led stroke aftercare addressing long-term psychosocial outcome: a comparison to care-as-usual. <i>BMJ open</i>, <i>11</i>(2), e039201. <a href="https://doi.org/10.1136/bmjopen-2020-039201">https://doi.org/10.1136/bmjopen-2020-039201</a></p>	<p>To explore the cost-effectiveness of nurse-led stroke protocol focusing on psychosocial outcomes six months post-stroke, compared to usual care</p>	<p>-Single-center, Primary care and community settings in the Netherlands -Participants include patients who suffered from ischemic or hemorrhagic stroke, TIA and were discharged home after visiting the ED, hospitalization, or in-patient rehabilitation</p>	<p><b>Design:</b> -complete economic evaluation within comparative effectiveness, single-center, prospective, observational design - The main outcome was QoL measured by the five-dimensional, three-level EuroQol (EQ-5D-3L) -Dimensions included: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression assessed on three levels 'no problem', 'some problems', and 'extreme problems.' -Secondary outcomes concerned mod problems and experienced restrictions with</p>	<p>-84 stroke patients were included for analysis in the stroke aftercare group, 306 in the care-as-usual cohort. -Participants in the stroke aftercare group showed higher stroke severity scores (<math>p &lt; 0.05</math> and larger ischemic and TIA proportions than the usual care cohort (<math>p &lt; 0.05</math>). -Health outcomes are significantly better in the stroke aftercare cohort for QALYs and social participation than care-as-usual. -Total societal costs were €1208 higher in stroke aftercare than in care-as</p>	<p><b>Discussion:</b> -The study explored the nurse-led aftercare (in addition to routine follow-up care), aiming at the psychosocial outcome by screening, psychoeducation and emotional support, and referral when needed. <b>Limitations:</b> -the difference in the time horizon of the two cohorts impacted the uncertainty regarding cost-effectiveness -Inevitable differences in research design and time recruitment between the cohorts -QoL levels may have been overestimated <b>Conclusion:</b> -Nurse-led aftercare is an effective and low-cost intervention -The aftercare played a critical role in</p>

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			participation, HAD was utilized -IBM SPSS V.25; t- test and Pearson chi- square -Cost-effectiveness acceptability curve was calculated to describe the probability of the stroke-aftercare	usual (CI 95%- €3881 to €6057).	screening and addressing the psychosocial problem not covered by routine or usual care.

Note: ED= Emergency Department, HADS= Hospital Anxiety and Depression Scale, QoL=Quality of Life, TIA= Transient Ischemic Attack

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions Measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION OF FINDINGS
<p>Williams, K. G., Sanderson, M., Jette, N., &amp; Patten, S. B. (2020). Validity of the patient health questionnaire-9 in neurologic populations. <i>Neurology. Clinical practice, 10</i>(3), 190–198. <a href="https://doi.org/10.1212/CPJ.0000000000000748">https://doi.org/10.1212/CPJ.0000000000000748</a></p>	<p>To examine the validity of PHQ-9 in detecting SDM-defined significant depressive episodes in patients with neurologic conditions.</p>	<p>-Outpatient neurology clinics</p>	<p>Cross-sectional study          -Participants were recruited from outpatient clinics (epilepsy, migraines, Parkinson's disease, and stroke)          -Questionnaires administered PHQ-9, chart review, and follow-up telephone interview          -A structured clinical interview for Depression was used as a reference          -PHQ-9 was analyzed through diagnostic odds ratio, sensitivity, and specificity.</p>	<p>-All neurologic subpopulations had <math>\geq 78\%</math> specificity and sensitivity <math>&gt;79\%</math> at a cut-point of 10.          -The pooled DOR was 25.3; the meta-analytic analysis found that 90% sensitivity and 85% specificity</p>	<p>-PHQ-9 is a validated, brief tool that is publicly available and can be utilized for neurologic patients.          -PHS- performed well  <b>Limitations:</b>          -Selection bias          -Busy clinical setting          -SCID is administered over the phone and not in-person</p>

Note: PHQ-9 = Patient Health Questionnaire-9; DOR = Diagnostic Odds Ratios; SCID = Structured Clinical Interview for Depression



## REFERENCES

- Ahmadi, Z., & Sadeghi, T. (2017). Application of the Betty Neuman systems model in the nursing care of patients/clients with multiple sclerosis. *Multiple Sclerosis Journal - Experimental, Translational and Clinical*, 3(3), 2055217317726798. <https://doi.org/10.1177/2055217317726798>
- Alosious, R. (2016) Stroke education day: Early specialist referral is the key. *Kai Tiaki Nursing New Zealand*, 22(1), 38.
- Amaricai, E., & Poenaru, D. V. (2016). The post-stroke depression and its impact on functioning in young and adult stroke patients of a rehabilitation unit. *Journal of Mental Health (Abingdon, England)*, 25(2), 137–141. <https://doi.org/10.3109/09638237.2015.1022251>
- Başoğlu, C., & Buldukoğlu, K. (2020). Neuman systems model with depressed patients: A randomized controlled trial. *Nursing Science Quarterly*, 33(2), 148–158. <https://doi.org/10.1177/0894318419898172>
- Buckwalter, K. C., Cullen, L., Hanrahan, K., Kleiber, C., McCarthy, A. M., Rakel, B., Steelman, V., Tripp-Reimer, T., Tucker, S., & Authored on behalf of the Iowa Model Collaborative (2017). Iowa Model of Evidence-Based Practice: Revisions and validation. *Worldviews on Evidence-based Nursing*, 14(3), 175–182. <https://doi.org/10.1111/wvn.12223>
- Burau, V., Carstensen, K., Lou, S., & Kuhlmann, E. (2017). Professional groups driving change toward patient-centered care: interprofessional working in stroke rehabilitation in Denmark. *BMC Health Services Research*, 17(1), 662. <https://doi.org/10.1186/s12913-017-2603-7>
- Chiu, C. C., Wang, J. J., Hung, C. M., Lin, H. F., Hsien, H. H., Hung, WH K. W., Chiu, H. C., Jennifer Yeh, S. C., & Shi, H. Y. (2021). Impact of Multidisciplinary Stroke Post-Acute

- Care on Cost and Functional Status: A Prospective Study Based on Propensity Score Matching. *Brain Sciences*, 11(2), 161. <https://doi.org/10.3390/brainsci11020161>
- Clarke, D. J., & Forster, A. (2015). Improving post-stroke recovery: the role of the multidisciplinary health care team. *Journal of Multidisciplinary Healthcare*, 8, 433–442. <https://doi.org/10.2147/JMDH.S68764>
- Denham, A., Wynne, O., Baker, A. L., Spratt, N. J., Turner, A., Magin, P., Janssen, H., English, C., Loh, M., & Bonevski, B. (2019). This is our life now. Our new normal: A qualitative study of the unmet needs of carers of stroke survivors. *PloS one*, 14(5), e0216682. <https://doi.org/10.1371/journal.pone.0216682>
- Dula, A. N., Gealogo Brown, G., Aggarwal, A., & Clark, K. L. (2020). Decrease in Stroke Diagnoses During the COVID-19 Pandemic: Where Did All Our Stroke Patients Go?. *JMIR aging*, 3(2), e21608. <https://doi.org/10.2196/21608>
- Gilmer, A., Sweeney, L., & Nakajima, S. (2016). Pharmacists' role in a hospital's initiative to become a certified primary center. *American Journal of Health-System Pharmacy*, 73(5), S1-S7. <https://doi.org/10.2146/ajhp150443>
- Fawcett, J., & Foust, J. B. (2017). Optimal aging: A Neuman systems model perspective. *Nursing Science Quarterly*, 30(3), 269–276. <https://doi.org/10.1177/0894318417708413>
- Fitzgerald, S. (2020). These Social Determinants Are Associated with Increasing the Risk of Stroke. *Neurology Today*, 20(16), 40–41. [https://journals.lww.com/neurotodayonline/Fulltext/2020/08200/These\\_Social\\_Determinants\\_Are\\_Associated\\_with.13.aspx](https://journals.lww.com/neurotodayonline/Fulltext/2020/08200/These_Social_Determinants_Are_Associated_with.13.aspx)
- Fournier, L. E., Beauchamp, J., Zhang, X., Bonojo, E., Love, M., Cooksey, G., Hinojosa, E., Okpala, M. N., Savitz, S. I., & Sharrief, A. Z. (2020). Assessment of the progression of

- poststroke depression in ischemic stroke patients using the patient health questionnaire-9. *Journal of Stroke and Cerebrovascular Diseases: The Official Journal of National Stroke Association*, 29(4), 104561. <https://doi.org/10.1016/j.jstrokecerebrovasdis.2019.104561>
- Green, C. (2020). Application of the Iowa model, an evidence-based practice model, when initiating clinical project pilots to evaluate how self-care techniques affect simulated nursing performance. In *SAGE Research Methods Cases*.  
<https://www.doi.org/10.4135/9781529743616>
- Graven, C., Brock, K., Hill, K. D., Cotton, S., & Joubert, L. (2016). First year after stroke: An integrated approach focusing on participation goals aiming to reduce depressive symptoms. *Stroke (00392499)*, 47(11), 2820-2827.  
<https://doi.org/10.1161/strokeaha.116.013081>
- Jia, H., Damush, T. M., Qin, H., Ried, L. D., Wang, X., Young, L. J., & Williams, L. S. (2006). The impact of poststroke depression on healthcare use by veterans with acute stroke. *Stroke*, 37(11), 2796–2801. <https://doi.org/10.1161/01.STR.0000244783.53274.a4>
- Kapoor, A., Lanctot, K. L., Bayley, M., Herrmann, N., Murray, B. J., & Swartz, R. H. (2019). Screening for post-stroke depression and cognitive impairment at baseline predicts long-term patient-centered outcomes after stroke. *Journal of Geriatric Psychiatry and Neurology*, 32(1), 40–48. <https://doi.org/10.1177/0891988718819859>
- Katzan, I. L., Thompson, N. R., Uchino, K., & Lapin, B. (2018). The most affected health domains after ischemic stroke. *Neurology*, 90(16), e1364–e1371.  
<https://doi.org/10.1212/WNL.0000000000005327>
- Kernan, W. N., Viera, A. J., Billinger, S. A., Bravata, D. M., Stark, S. L., Kasner, S. E., Kuritzky, L., & Towfighi, A. (2021). Primary care of adult patients after stroke: A

- scientific statement from the American Heart Association/American Stroke Association. *Stroke* (00392499), 52(9), e558-e571. <https://doi.org/10.1161/STR.0000000000000382>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: Validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9), 606–613. <https://doi.org/10.1046/j.1525-1497.2001.016009606.x>
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2003). The Patient Health Questionnaire-2: validity of a two-item depression screener. *Medical care*, 41(11), 1284–1292. <https://doi.org/10.1097/01.MLR.0000093487.78664.3C>
- Kroenke, K., Strine, T. W., Spitzer, R. L., Williams, J. B. W., Berry, J. T., & Mokdad, A. H. (2009). The PHQ-8 as a measure of current depression in the general population. *Journal of Affective Disorders*, 114(1-3), 163–173. <https://doi.org/10.1016/j.jad.2008.06.026>
- Levis, B., Benedetti, A., & Thombs, B. D. (2019). Accuracy of Patient Health Questionnaire-9 (PHQ-9) for screening to detect major depression: individual participant data meta-analysis. *BMJ*, 365, 11476. <https://doi.org/10.1136/bmj.11476>
- Li, L. J., Yao, X. M., Guan, B. Y., Chen, Q., Zhang, N., & Wang, C. X. (2019). Persistent depression is a predictor of quality of life in stroke survivors: results from a 5-year follow-up study of a Chinese cohort. *Chinese Medical Journal*, 132(18), 2206–2212. <https://doi.org/10.1097/CM9.0000000000000400>
- López-Espuela, F., Roncero-Martín, R., Canal-Macías, M. L., Moran, J. M., Vera, V., Gomez-Luque, A., Lendinez-Mesa, A., Pedrera-Zamorano, J. D., Casado-Naranjo, I., & Lavado-García, J. (2020). Depressed mood after stroke: Predictive factors at six months follow-up. *International Journal of Environmental Research and Public Health*, 17(24), 9542. <https://doi.org/10.3390/ijerph17249542>

- McIntosh, C. (2017). A depression screening protocol for patients with acute stroke. *Journal of Neuroscience Nursing*, 49(1), 39–48. <https://doi.org/10.1097/jnn.0000000000000231>
- Melrose, S. (2016). Post-stroke depression: How can nurses help? *Canadian Nursing Home*, 27(1), 5-9. [https://pressbooks.com/app/uploads/sites/116908/2019/08/Post-Stroke-Depression\\_Melrose-2016.pdf](https://pressbooks.com/app/uploads/sites/116908/2019/08/Post-Stroke-Depression_Melrose-2016.pdf)
- Northcott, S., Moss, B., Harrison, K., & Hilari, K. (2016). A systematic review of the impact of stroke on social support and social networks: Associated factors and patterns of change. *Clinical Rehabilitation*, 30(8), 811–831. <https://doi.org/10.1177/0269215515602136>
- Paolucci, S., Gandolfo, C., Provinciali, L., Torta, R., Toso, V., & DESTRO Study Group (2006). The Italian multicenter observational study on post-stroke depression (DESTRO). *Journal of Neurology*, 253(5), 556–562. <https://doi.org/10.1007/s00415-006-0058-6>
- Reid, M. M., Valaitis, R., Bartholomew, A., Fisher, K., Fleck, R., Ploeg, J., Salerno, J., & Thabane, L. (2019). Feasibility and preliminary effects of an integrated hospital-to-home transitional care intervention for older adults with stroke and multimorbidity: A study protocol. *Journal of Comorbidity*, 9, 2235042X19828241. <https://doi.org/10.1177/2235042X19828241>
- Robinson, R. G., & Jorge, R. E. (2016). Post-Stroke depression: A review. *American Journal of Psychiatry*, 173(3), 221–231. <https://doi.org/10.1176/appi.ajp.2015.15030363>
- Ross, S. Y., Roberts, S., Taggart, H., & Patronas, C. (2017). Stroke transitions of care. *Medsurg Nursing: Official Journal of the Academy of Medical-Surgical Nurses*, 26(2), 119–123.
- Santos, N. O., Predebon, M. L., Bierhals, C. C. B. K., Day, C. B., Machado, D. O., & Paskulin, L. M. G., (2020). Development and validation a nursing care protocol with educational

- interventions for family caregivers of elderly people after stroke. *Revista Brasileira de Enfermagem*, 73, 1-9. <https://doi.org/10.1590/0034-7167-2018-0894>
- Shi, Y., Yang, D., Zeng, Y., & Wu, W. (2017). Risk factors for post-stroke depression: A meta-analysis. *Frontiers in Aging Neuroscience*, 9. <https://www.frontiersin.org/articles/10.3389/fnagi.2017.00218/full>
- Staples, L. G., Dear, B. F., Gandy, M., Fogliati, V., Fogliati, R., Karin, E., Nielsens, O., & Titov, N. (2019). Psychometric properties and clinical utility of brief measures of depression, anxiety, and general distress: The PHQ-2, GAD-2, and K-6. *General Hospital Psychiatry*, 56, 13–18. <https://doi.org/10.1016/j.genhosppsych.2018.11.003>
- Taylor-Rowan, M., Momoh, O., Ayerbe, L., Evans, J. J., Stott, D. J., & Quinn, T. J. (2018). Prevalence of pre-stroke depression and its association with post-stroke depression: a systematic review and meta-analysis. *Psychological Medicine*, 49(4), 685–696. <https://doi.org/10.1017/s0033291718002003>
- Titler, M. G., Kleiber, C., Steelman, V. J., Rakel, B. A., Budreau, G., Everett, L. Q., Buckwalter, K. C., Tripp-Reimer, T., & Goode, C. J. (2001). The Iowa model of evidence-based practice to promote quality care. *Critical Care Nursing Clinics of North America*, 13(4), 497–509. [https://doi.org/10.1016/S0899-5885\(18\)30017-0](https://doi.org/10.1016/S0899-5885(18)30017-0)
- Towfighi, A., Ovbiagele, B., El Hussein, N., Hackett, M. L., Jorge, R. E., Kissela, B. M., Mitchell, P. H., Skolarus, 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*, 48(2). <https://doi.org/10.1161/str.000000000000113>

- Trotter, T. L., Denny, D. L., & Evanson, T. A. (2019). Reliability and validity of the patient health questionnaire-9 as a screening tool for poststroke depression. *The Journal of Neuroscience Nursing: Journal of the American Association of Neuroscience Nurses*, 51(3), 147–152. <https://doi.org/10.1097/JNN.0000000000000442>
- Tu, J., Wang, L.-X., Wen, H.-F., Xu, Y.-C., & Wang, P.-F. (2018). The association of different types of cerebral infarction with post-stroke depression and cognitive impairment. *Medicine*, 97(23), e10919. <https://doi.org/10.1097/md.00000000000010919>
- Verberne, D., van Mastriegt, G., Ponds, R., van Heugten, C. M., & Kroese, M. (2021). An economic evaluation of nurse-led stroke aftercare addressing long-term psychosocial outcome: a comparison to care-as-usual. *BMJ open*, 11(2), e039201. <https://doi.org/10.1136/bmjopen-2020-039201>
- Villa, R. F., Ferrari, F., & Moretti, A. (2018). Post-stroke depression: Mechanisms and pharmacological treatment. *Pharmacology & Therapeutics*, 184, 131–144. <https://doi.org/10.1016/j.pharmthera.2017.11.005>
- Virani, S. S., Alonso, A., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Khan, S. S., Kissela, B. M., Knutson, K. L., Kwan, T. W., Lackland, D. T., & Lewis, T. T. (2020). Heart Disease and Stroke statistics—2020 Update. *Circulation*, 141(9). <https://doi.org/10.1161/cir.0000000000000757>
- Wang, Z., Shi, Y., Liu, F., Jia, N., Gao, J., Pang, X., & Deng, F. (2019). Diversiform Etiologies for Post-stroke Depression. *Frontiers in Psychiatry*, 9. <https://www.frontiersin.org/articles/10.3389/fpsy.2018.00761/full>

Williams, K. G., Sanderson, M., Jette, N., & Patten, S. B. (2020). Validity of the patient health questionnaire-9 in neurologic populations. *Neurology. Clinical Practice, 10*(3), 190–198.

<https://doi.org/10.1212/CPJ.0000000000000748>

Winstein, C. J., Stein, J., Arena, R., Bates, B., Cherney, L. R., Cramer, S. C., Deruyter, F., Eng, J. J., Fisher, B., Harvey, R. L., Lang, C. E., MacKay-Lyons, M., Ottenbacher, K. J., Pugh, S., Reeves, M. J., Richards, L. G., Stiers, W., Zorowitz, R. D., & American Heart Association Stroke Council, Council on Cardiovascular and Stroke Nursing, Council on Clinical Cardiology, and Council on Quality of Care and Outcomes Research. (2016). Guidelines for adult stroke rehabilitation and recovery: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke, 47*(6), e98–e169. <https://doi.org/10.1161/STR.0000000000000098>

Zhang, H., Wang, S., Wang, L., Yi, X., Jia, X., & Jia, C. (2019). Comparison of the geriatric depression scale-15 and the patient health questionnaire-9 for screening depression in older adults. *Geriatrics & Gerontology International, 20*(2), 138–143.

<https://doi.org/10.1111/ggi.13840>