USE OF A MULTIFACTORIAL FALL PROTOCOL IN PRIMARY CARE TO REDUCE FALLS IN OLDER COMMUNITY DWELLING ADULTS

A Doctor of Nursing Practice Project Report

by

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

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August 2021

DEDICATION

I would like to dedicate this work to my husband, David who provided unending support, to my children, Nathan, Becky, and Matthew, and my amazing grandchildren, Violet, Noah, Peyton, Lauryn, and Madyson, who have supported me throughout this program.

ACKNOWLEDGEMENTS

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ABSTRACT

Background: Falls among older community dwelling adults 65 years and older claim at least one life every twenty minutes in the United States. Falls occur in 28% of community dwelling older adults and result in seven million injuries per year and costs projected to rise above $100 billion within this decade. Primary care practice should implement fall risk screening with multifactorial fall assessments and interventions to avert unnecessary injuries and enhance quality of life. **Purpose:** The purpose of this quality improvement (QI) project was to improve management of falls through implementation of an evidence-based multifactorial fall risk protocol in a primary care clinic aimed at decreasing fall rates among community dwelling adults 65 years and older. **Method:** This QI project used a one-group pretest posttest and retrospective chart review comparison and correlation design to implement the STEADI fall protocol in a primary care clinic. Staff and providers were educated regarding fall risk assessment and preventative interventions guided by the STEADI algorithm. Aims included increasing provider and staff knowledge and decreasing community dwelling patient fall rates. **Results:** The STEADI fall prevention protocol was used in over 90% of patients 65 years and older. Fall assessments increased by 48% from prior review, and an increase in appropriate referrals as an intervention was associated with high fall risk patients ($r = .209$, $p < .01$). Fall rates decreased by 13.4% from pre-implementation (28.8%) to post-implementation (15.4%). **Implications:** Use of the STEADI fall risk protocol in this primary care clinic improved provider and staff assessment and management of fall risk and decreased fall rates for patients aged 65 and older.

Keywords: older community dwelling adults, multifactorial fall assessment, STEADI fall algorithm, fall risk, fall rate

Use of a Multifactorial Fall Protocol in Primary Care to Reduce Falls in Older Community Dwelling Adults

INTRODUCTION

Unintentional falls cause seven million injuries annually, rank as the fourth leading cause of death among persons 65 years and older and add a staggering financial burden of $754 million annually for costs related to unnecessary deaths (Centers for Disease Control and Prevention [CDC], 2019; Florence et al., 2018). Risk of mortality with falls is amplified since every 20 minutes an older adult will die because of a fall in the United States (CDC, 2020). Unintentional falls affect 28% of community dwelling adults aged 65 and older, and one in five falls result in serious injury (CDC, 2017b; Florence et al., 2017). The CDC (2015) and others define a *community dwelling older adult* as any person 65 years and older, independent, and residing in a private home environment (Hillcoat-Nalletamby, 2014 & Peek et al., 2017). Falls among persons 65 years and older result in seven million injuries per year and contribute to devastating loss of physical functional abilities and psychological loss of independence with increased fears of falling (CDC, 2019; Florence et al., 2018; Holloway et al., 2016). The American Geriatrics Society (2020) reported that falls are related to multiple determinants of health including biophysical, environmental, psychosocial, and medical care (medications). Falls play a key role in early nursing home admission because of significant physical disability from traumatic brain injury, and care needs related to hip fractures (Florence et al., 2018; Holloway et al., 2016). Consequences and complications of falls include increased emergency room visits for fractures and head injuries; radiological, surgical, and intensive care costs; and longer hospital stays followed by outpatient therapies, specialist referrals, skilled nursing care, and added multi-disciplinary care (Alekna et al., 2015). These negative consequences of falls contribute over $50

billion to Medicare, Medicaid, and other insurance expenditures (CDC, 2017b). The economic impact associated with falls is expected to worsen with projected costs of treating falls estimated to exceed $101 billion by 2030 (CDC, 2020; Houry et al., 2015). For interpretive purposes, the term *older community dwelling adult* was used for this project.

Background

Falls were found to be a significant impediment to "aging-in-place," (Ahn et al., 2020, p. 50; National Institute on Aging, 2017), especially in the state of Texas. Since 2019, Texas has exceeded the nation's average of non-fatal falls by nearly 6% (CDC, 2019b) and ranks fourth highest in total direct medical costs related to falls with over $2 billion spent annually (CDC, 2019b). The problem of falls is further heightened in Texas because 13% of the state's population is 65 years and older, and in Galveston County, where this quality improvement (QI) project was conducted, the population of older adults is even higher, at 15% (US Census, 2019b). To address negative outcomes of falls among older community dwelling adults, this QI project implemented a standardized fall risk protocol, Stopping Elderly Accidents, Deaths, and Injuries (STEADI; CDC, 2020b) in a primary care clinic in Texas.

Review of the Literature

Few QI projects have addressed the implementation of evidence-based fall intervention protocols into routine primary care practice (Mark et al., 2020; Smith et al., 2015). A lack of workflow mechanisms related to fall management programs and a lack of outcome measurements to track falls resulted in a gap in practice. Likewise, a lack of appropriate referrals for high-risk individuals; inconsistent interventions; and lack of standardized clinic follow-up for patients at high risk of falls, have also contributed (Phelan et al., 2016; Smith et al., 2015). A cross-sectional study among 38 health providers in a large New York health system identified

provider practice characteristics and found only 37% of primary care providers asked their patients if they had experienced a fall over the past year; while less than 16% assessed for functional deficits or fall factors through balance tests or timed up and go (TUG) assessments (Smith et al., 2015). A randomized survey study of fall management among 1,228 primary care providers revealed 52.9% of primary care providers screened for fall risks only when an older patient sustained a fall injury and 51.9% screened for falls when the patients voiced a fear of falling (Mark et al., 2020). The Howland et al. (2019) study of 90 primary care providers assessed beliefs, attitudes, knowledge, and practices on fall management among older adults. Findings suggested primary care providers agreed on the need for fall assessments, but admitted they only assessed fall history in 50% of patients 65 years and older and few physicians reported conducting multifactorial assessments such as vision testing (38%) and timed up and go assessments (TUG). The study also reported less than 9.2% primary care providers referred patients for fall interventions to reduce fall risks (Howland et al., 2019). The above study findings support the need to implement an evidence-based multifactorial fall program in primary care practice to improve provider risk assessment and management of falls among the population of older community adult dwellers (Vincenzo & Patton, 2019).

The United States Preventive Services Task Force (USPSTF, 2018) recommended fall screening and multifactorial assessments in all patients 65 years and older. Tricco et al. (2017) conducted a meta-analysis focused on fall prevention interventions, which included 54 randomized controlled trials and over 41,000 participants. Findings from this study revealed fall prevention interventions using multifactorial fall assessments, when compared with usual care, were associated with reduced falls among the older population (Tricco et al., 2017). The

meta-analysis found a combination of interventions played a role in mitigation of falls, including exercise with vision assessment (*OR*=0.17, CI [0.07-0.38]); exercise, vision assessment, and environmental assessment (*OR*, 0.30, CI [0.13-0.71]; and clinic-level quality improvement with multifactorial assessment, calcium and vitamin D supplementation (*OR*, 0.12, CI [0.03-0.55]) (Tricco et al., 2017). Multiple meta-analyses focused on fall prevention have found that multifactorial interventions as opposed to usual care were associated with greater reduction in falls (Guirguis-Blake et al., 2018; Hopewell et al., 2018; Lee & Yu, 2018). These studies provided ample evidence to support the effectiveness of multifactorial protocols such as the STEADI fall algorithm as a deterrent in mitigating falls among community dwelling older adults.

Problem Description in the Setting

An organizational assessment revealed a need to improve management of falls in a primary care clinic. The primary care internal medicine group served Galveston County patients in two clinic locations. Each location had its own staff; and the Medical Director visited both sites twice weekly. This QI project was conducted at one clinic site instead of both at the request of the Medical Director. Feasibility of the intervention at one location provided opportunity to expand the protocol to the second clinic. The two clinics were 20 minutes apart, and both clinics observed the global pandemic (COVID-19) infection control directives. The prior year, 2020, consisted of several months of virtual patient encounters. The QI project three-month implementation period consisted of all face-to-face patient encounters.

A retrospective review of patient records in 2020 revealed half the patients 65 years and older lacked fall assessments and a facility fall rate of 28%. The review also revealed varied provider technique on fall assessments and interventions. The problem was troubling since 60% of clinic patients were 65 years and older. If the clinic had assessed at least 80% of patients over

65 years of age for falls and fall risks, instead of 50%, would the fall rate have been higher than 28%? The clinic did not have a standardized plan or policy for capturing data on falls, fall screening, or prescribed interventions for falls. The clinic was supportive of a change in practice on how fall risks were screened, how fall assessments were performed, and how targeted fall interventions would improve safety and mitigate negative consequences of falls. The need for a change in practice in fall management was further augmented with an increase in staff and provider turnover during a national pandemic (COVID-19). Other organizational assessment findings included a need for education for staff on best practices for fall management, and a need for modification in the electronic medical record for documenting, tracking, and follow-up on patients with falls or at risk for falls.

Project Purpose and Aims

The purpose of this project was to improve fall management processes in the primary care clinic using an evidence-based multifactorial fall risk protocol to decrease patient falls among community dwelling adults 65 years and older. The QI project was guided by the following clinical practice question: In a Galveston County primary care clinic, will a multifactorial fall risk protocol, compared to current clinic practice, increase provider and staff knowledge regarding fall risk management, improve provider fall risk assessment and management, and reduce the number of falls in the clinic's community dwelling patients, aged 65 and older, within a period of 90 days?

The project aims were three-fold. The first aim was to increase knowledge regarding the STEADI Protocol among primary care staff as evidenced by a significantly higher posttest score on the Adult Fall Prevention Education Questionnaire (found in Appendix H) after educational sessions. The specific goal was to increase mean post-test scores by 10% or higher when

compared to mean pre-test scores. Multiple studies have used the STEADI education questionnaire following educational sessions, resulting in a significant increase in knowledge from 10-12% following education (CDC, 2020; Taylor et al., 2019; Urban et al., 2015).

The second aim sought to increase clinic use of the STEADI protocol for clinic patients aged 65 years and older (see the STEADI Algorithm Flow Process in Appendix D). The overarching goal was to use the STEADI fall algorithm in at least 80% of community dwelling adults (between the ages of 65 years and older) during clinic encounters over a three-month period, compared with baseline routine use of fall assessment from the previous year. Other studies supported consistent use of the protocol in 85% to 95% of patients 65 years and older (Eckstrom et al., 2017; Johnston et al., 2018; & Phelan et al., 2016). The second aim consisted of four other specific sub-goals that met the STEADI fall algorithm protocol process of risk identification, multifactorial fall assessment, and fall intervention. The sub-goals included:

(a) To use the STEADI fall screening questionnaire called the Staying Independent Brochure (SIB) in 80% of patients 65 and older during clinic encounters (found in Appendix I). Rationale for this goal was found in similar studies that had successful use rate of the SIB fall screen in up to 95% of patients 65 years and older (Casey et al., 2016; Eckstrom et al., 2017; & Loonlawon et al., 2019);

(b) To use multifactorial fall assessments in at least 80% of patients designated as moderate to high risk for falls (based on the SIB fall risk screen score). This goal was supported from previous studies which used multifactorial assessments in 78%-90% of patients 65 years and older (Casey et al., 2016; Eckstrom et al., 2017);

(c) To appropriately refer patients designated as moderate to high risk for falls (via the SIB fall risk screening score), to appropriate specialists as a fall intervention, in at least

80% of patients, and to ascertain if there were correlations between fall risk status and provider and staff adherence to the intervention of appropriate referrals. The rationale for this goal was consistent with other studies that recommended referrals such as physical therapy, ophthalmology, home health, or podiatry (Loonalawong et al., 2019; Phelan et al., 2016). These same studies also supported the importance of provider adherence to these interventions.

(d) To appropriately intervene in at least 80% of patients 65 years and older as evidenced by receipt of two or more fall management interventions (aside from referrals), such as medication reduction, home safety education, 30-60-day follow-up visits for moderate to high-risk patients, and community exercise programs. This project also sought to determine if there was a significant correlation between 30–60-day follow-up orders and patients at high risk for falls. Finally, this sub-goal sought to determine if there was a significant association between fall rates and any or all five fall interventions. Other studies utilized several interventions in over 90% of patients at moderate to high risk for falls and stressed the importance of provider adherence to individualized interventions (Johnston et al., 2018; Phelan et al. 2016).

The third aim was to decrease fall rates by 15% among patients 65 years and older when compared to the previous year; and determine if there was an association between reduced fall rates and use of the STEADI algorithm in assessments and interventions. The rationale for this goal was supported by studies that found reduced rates of falls following implementation of STEADI. A study by Pelvanen et al. (2014) found a 24% decrease in falls while Johnston reported a 21% decrease following use of the STEADI fall protocol.

This QI project exemplified the following Doctor of Nursing Practice (DNP) Essential: Essential II provided for Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006). The project exemplified a target population (ages 65 and older community dwelling adults) and an evidence-based care model for practice management that included organizational change and policy on delivery of care approaches for patient safety, and analysis of cost/benefits for risk and improvement of outcomes. A second DNP Essential demonstrated in this project was Essential V, Interprofessional Collaboration for Improving Patient and Population Health Outcomes (AACN, 2006). This project exemplified the Healthy People 2020 goal of interprofessional communication; recognized improvement in safety and quality of care by providing collaboration with providers of the practice and staff through sharing of fall protocol practice guidelines, standards of care, and consultive and educational leadership within the practice setting that included daily huddles or other daily electronic communication. The quality improvement project likewise embraced two American Organization for Nursing Leadership (AONL) competencies: communication and relationship building through collaborative relationships with communities, population served (older community dwelling adults), and practice settings, and knowledge of the health care environment through understanding of the primary care practice work design in implementing the falls protocol and technologies for data sharing, which will help support evidence, based practice outcomes.

Guiding Frameworks

The overarching guiding framework for this QI project was the National Health Services Improvement (NHSI, n.d) Plan-Do-Study-Act (PDSA). The PDSA guided the project through a cyclical action-oriented scientific approach which allowed for a fall assessment plan process; determination of resources and setting location; implementation of the fall protocol process;

review of outcomes and provided opportunity for changes after evaluation of outcome measures. The plan process entailed setting aims to reduce falls, created a collaborative fall protocol plan, and implemented education for providers and staff. Plans included communication through weekly provider and staff meetings, EHR planning with workflow process modifications and referral process mechanisms. The project implementation phase occurred in the primary care practice setting with planning in the fall and implementation in the spring. Retrospective chart served as a baseline and provided information on current clinic standards of practice on management of falls and fall risks. Provider and staff collaboration occurred through education on the client fall risk instrument called Staying Independent Brochure (SIB) which launched an algorithm process for further multifactorial assessments and fall interventions which included appropriate referrals, patient education, medication reduction, clinic follow-ups, and community resources. The study phase provided for patient outcome analysis of use of the STEADI protocol for fall risk assessments, multifactorial assessments, fall interventions, and fall rate data. Figure 1 depicts the PDSA (NHIS, n.d.) model for quality improvement. Figure 2 illustrated how each phase in the PDSA cycle applied to the QI project.

Figure 1: PDSA Model for Quality Improvement

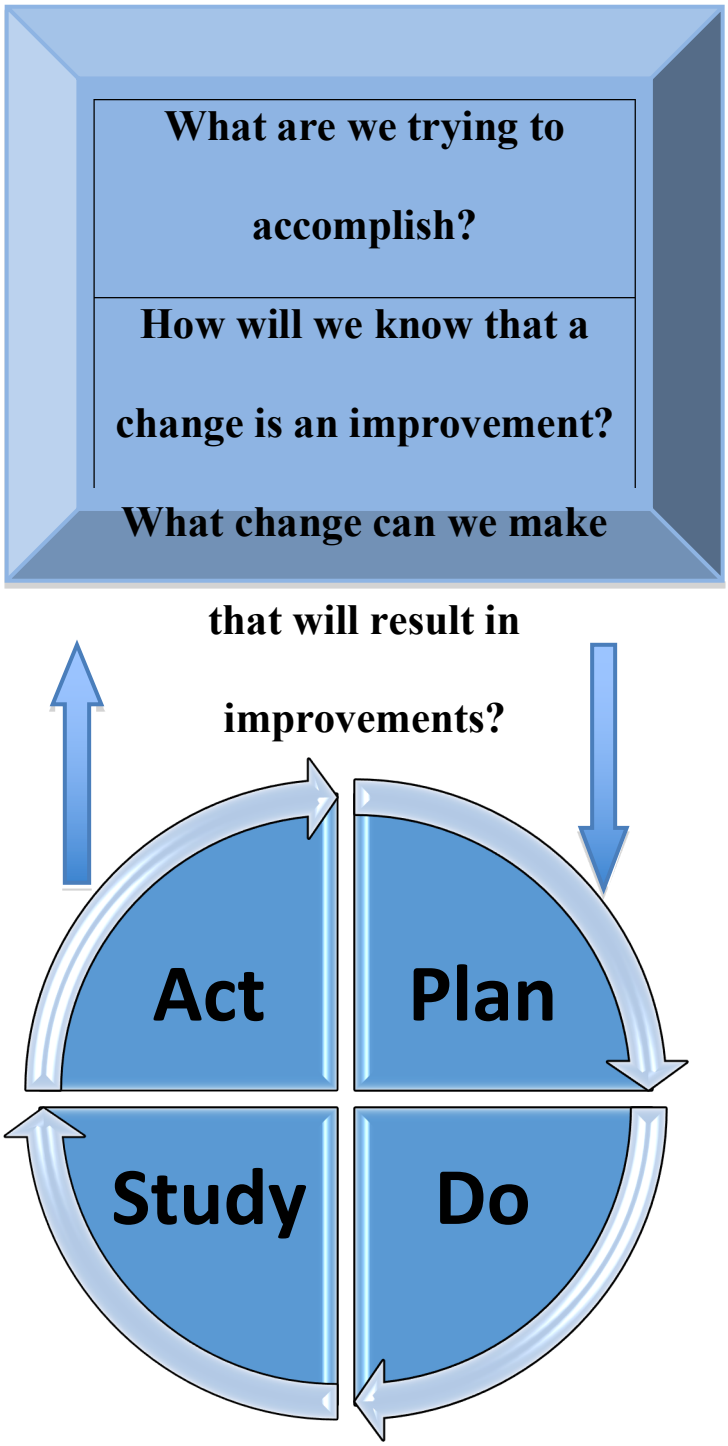
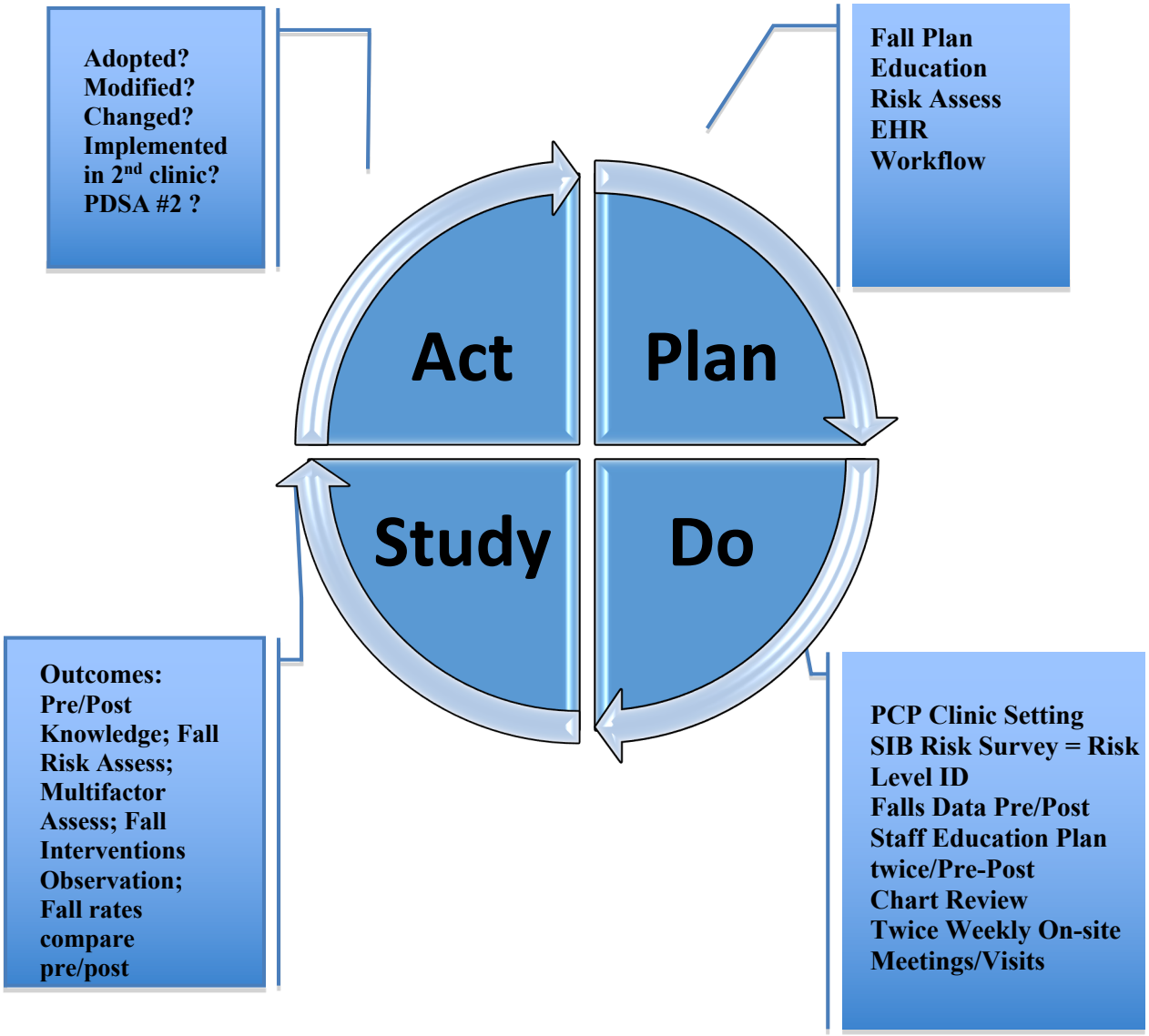


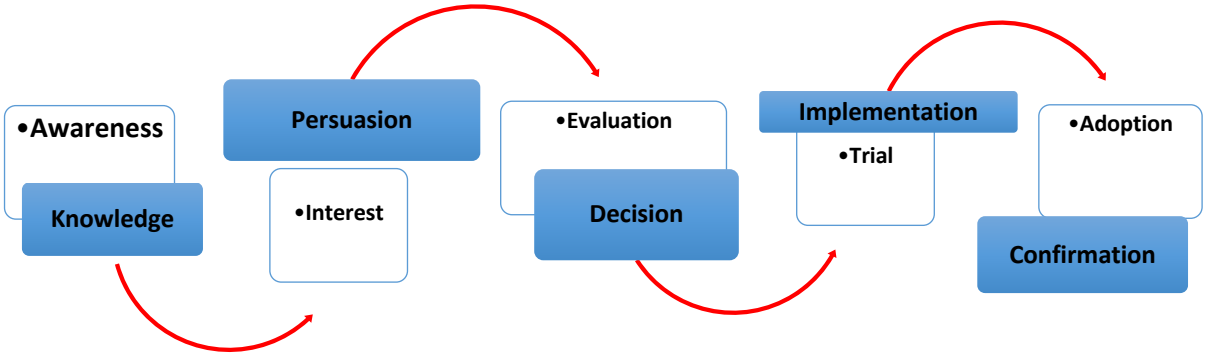
Figure 2: PDSA Model for the STEADI Fall Protocol



The Everett Rogers' (2003) Diffusion of Innovations (DOI) conceptual framework was employed to provide insight into the complexities in the process of adopting the new STEADI fall protocol in practice. The DOI framework for adoption of the STEADI protocol followed Rogers' (2003) five stages of adoption: awareness, persuasion, decision, implementation, and

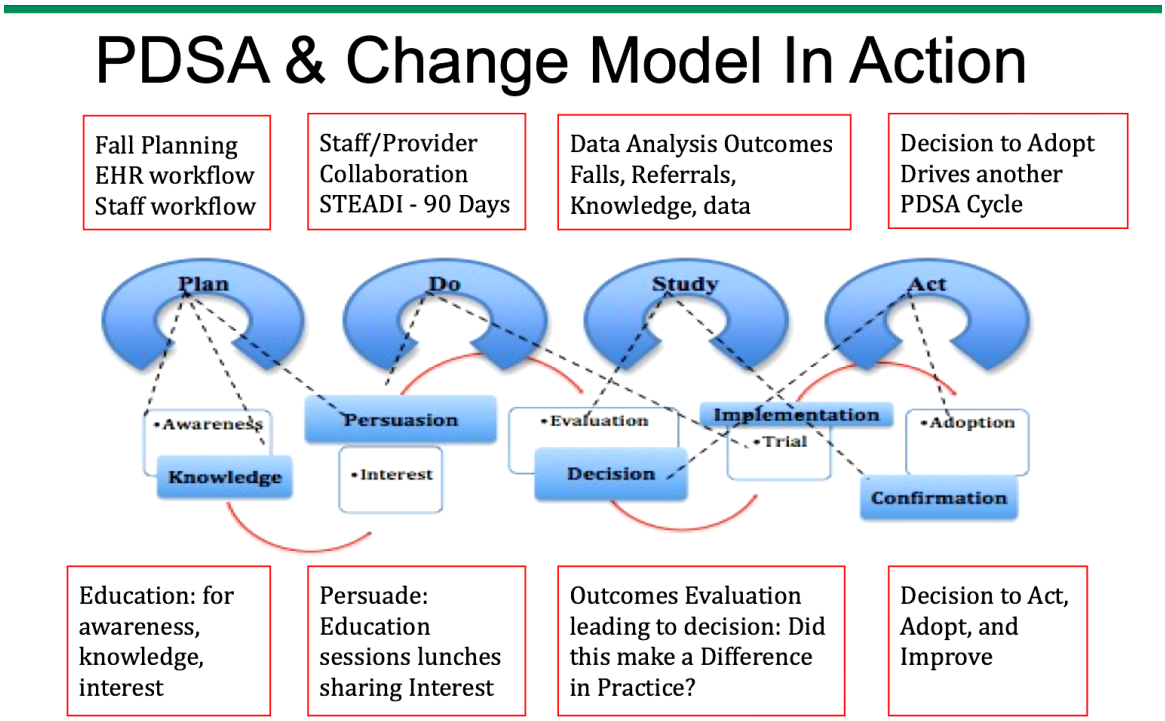
continuation. The DOI stages of adoption helped guide the quality improvement project with the falls protocol through understanding of the adoption process of a multifactorial process and changes that impacted individual perception and practice-wide change. Figure 3 depicts the Diffusion of Innovations decision process factors and Figure 4 illustrates how the PDSA and Diffusion of Innovations frameworks provided contextual influences. The conceptual model by Rogers (2003) was used to guide the process through the change and adoption of a quality improvement plan with the PDSA framework as the foundation.

Figure 3: Diffusion of Innovations Decision Process



Note. Adapted by Rogers (2003) diffusion of innovations decision process mechanisms. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed). Free Press.

Figure 4: Integration of PDSA and Diffusion of Innovation Decision Process Model



Note. The PDSA is adapted from the Shewhart (1931) and NHSI (n.d.) Plan Do Study Act quality improvement framework as a guide for the contextual framework of Rogers (2003) diffusion of innovation change and decision process. Both interact among individuals through the adoption and use of an innovation. As the process is further refined, the decision process is refined as well from awareness of the modification or change to its adoption. Processes among the two frameworks may interact individually or together through the change and refinement process.

METHODS

Ethical Considerations

This project plan was reviewed by the Texas A & M University-Corpus Christi (TAMU-CC) Research Compliance Office and received a determination of "Not Human Subjects Research" and permission to proceed as a Quality Improvement project as depicted in

Appendix A. Confidentiality and privacy of participants in the study was protected by de-identification. All paper forms of chart reviews were maintained for confidentiality and privacy (without identifying information) and stored in a locked area in the clinic office. Electronic chart reviews occurred on-site and within the locked clinic office areas and away from patients. Computers onsite required screens with privacy filters and lockdown mechanisms to prevent view of information by others. The Health Insurance Portability and Accountability Act (HIPPA) agreement (found in Appendix B), and Letter of Support (found in Appendix C) were approved by the Medical Director prior to collection of Personal Health Information (PHI) for QI purposes.

Project Design

This QI project used a one-group pre-test/posttest and retrospective chart review comparison design, to implement the STEADI evidence-based fall protocol in an internal medicine primary care clinic in Galveston County, Texas. Since the clinic practice served a large population of older persons, this QI project aimed to improve fall risk assessment and management and mitigate unintentional falls and subsequent admissions to assisted living or nursing facilities for this population.

As the project director (PD), I performed a risk assessment to determine dynamics of the practice culture, barriers, benefits, and resources. The group practice consisted of two clinics located twenty minutes apart and rotation of staff between practice sites was limited due to the COVID-19 pandemic. I selected one site to implement the project. One barrier related to staff turnover was recognized after one medical assistant (MA) left the practice. Remaining staff included the office manager, one physician, one nurse practitioner (NP), and two MAs. Staff and provider were open to the project and opportunities for change in practice since there was not a

standard method for assessing and managing fall risks in their patients 65 years and older. Another challenge was the limitations of the electronic record system dashboard. This issue was mitigated through modifications on how fall risks, assessments, and referrals were documented through provider note tabs by using a drop-down menu to select fall assessment on the *e*-ClinicalWorks dashboard. Next, a note card list of assessments and interventions from the STEADI algorithm were available in each room and entered into a freeform notes section during the clinical encounter. Access and availability of printed patient fall risk handouts and fall safety brochures was mitigated through adopting a process of replenishment on a weekly basis. Utilization of Rogers' (2003) DOI resulted in disruption of status quo routines among staff and providers with movement toward change mitigated through education, weekly on-site visits, and communication.

Intervention

This project used the CDC (2020) STEADI protocol in a primary clinic practice setting and provided a standardized method for use of a three-pronged algorithm process to identify fall risk levels; to provide multifactorial assessments; and to offer fall management interventions. The Algorithm flow process is depicted in Appendix D. As PD, I provided the clinic staff and health care providers educational content on the STEADI fall protocol, in two 30-minute sessions in January 2021. Content mirrored the STEADI online course (CDC, n.d.). The PDSA (NHSI, n.d.) framework guided the planning process, chart review, implementation, and analysis of outcomes. A retrospective chart review, EHR management system review, education review, and a workflow intervention plan, provided for a cohesive roadmap that allowed for the planned intervention of the three phases of the STEADI fall protocol. An initial patient fall risk SIB questionnaire was provided by the office staff in the patient waiting room; patient assessment

and intervention information were documented during patient encounters by the clinic staff (provider and/or MA); and data was collected by the PD every three weeks. The project timeline, Appendix E, from start to completion of the QI project, was three months.

Management System Review

The on-site office manager provided insight into the *e*-ClinicalWorks EHR system and internal system workflow orientation for office operations for the PD. The MA and physician provided orientation to clinic encounters, waiting areas, and exam room routines to the Project Director during the first two-week visits. The provider and MA were instructed to re-check fall history in *e*-ClinicalWorks for all patients 65 years and older, and encouraged to document risk findings, assessments, and interventions in the notes section of the chart using drop down menus and freeform notes section of the EHR. Staff were also instructed to make use of the referral tab located on each patient's electronic dashboard for appropriate referral orders. Although the EHR was not modifiable during the project timeframe, staff were able to enter the assessment findings into the record, summary notes, referrals, and follow-up instructions.

Education of Staff

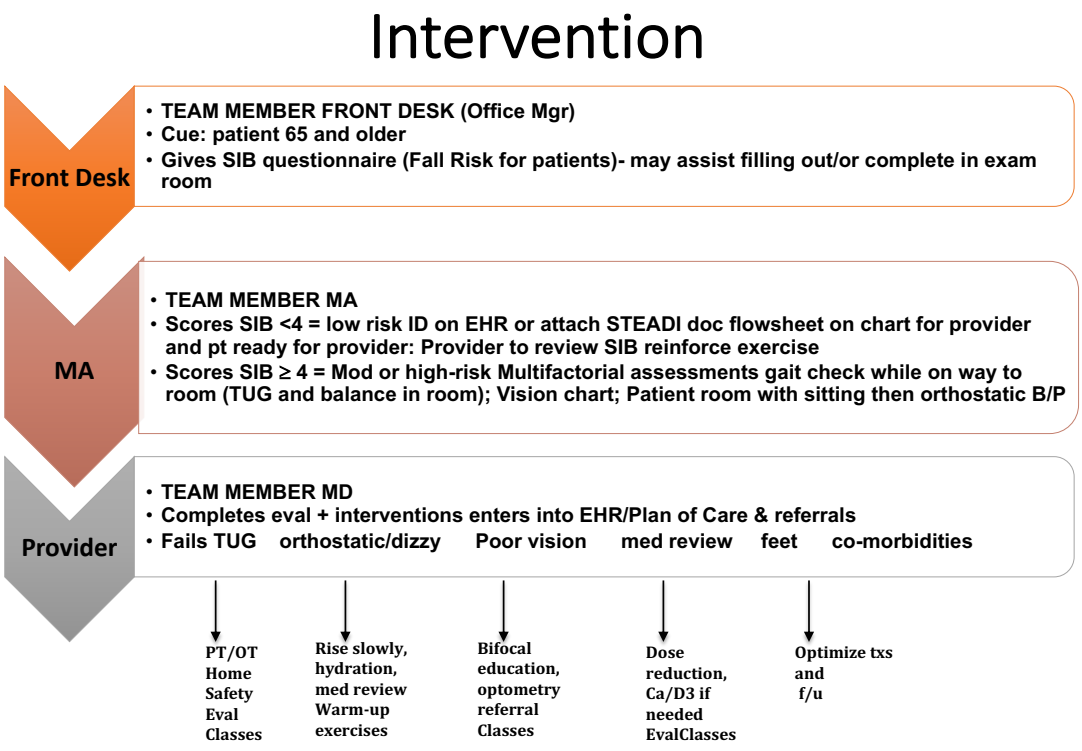
Clinic office staff and provider participants were recruited through in-person visits and received education on the use of the STEADI fall protocol. Session one included the primary care provider with education held on a morning prior to patient care and reviewed again at the close of the same clinical day. The office manager and two MAs received education and materials at the start of the next clinical day (see Appendix F for the educational activities and Appendix G for the education processes). The process for education (for provider and staff) included a 10-item Older Adult Fall Prevention Questionnaire pre-test, a 30-minute presentation, and handouts from the CDC (2020) STEADI provider toolkit. The posttest questionnaire was

administered after the education session. The staff were encouraged to view the online course modules with case scenarios and algorithm help topics (STEADI, 2020).

Workflow Intervention

As the PD, I facilitated a change in workflow the first week of the project. The workflow process is depicted in Figure 5. The first patient encounter began in the waiting room. The office manager or receptionist greeting the patient handed the SIB questionnaire to each patient 65 years and older (see the SIB questionnaire in Appendix H). Patients unable to complete the SIB in the waiting room, were provided an opportunity to complete it in the exam room by the MA. The MA scored the SIB (at risk if score ≥ 4) and documented the score and other assessment findings such as orthostatic blood pressure, foot and shoe check, vision assessment, and TUG and balance tests in the electronic record. I encouraged the MA to ask follow-up questions about fall history and complaints of dizziness with each subsequent visit. This added question element was made for all 30-60-day follow up encounters. All patient data was entered into *e*-ClinicalWorks prior to the provider's exam. The provider followed with the exam, recommendations, and interventions (such as appropriate referrals, medication adjustments, and orders to return in 30-60 days for moderate and high-risk fall patients) and documented in the provider notes section. Referrals were documented in the referral tab area of the EHR by the provider and followed by the MA and receptionist during patient checkout. Clinical encounter findings were entered into the record by the provider. I made weekly visits for further facilitation and guidance for the duration of the project.

Figure 5: Workflow Diagram for Clinic Staff and Providers



Note: Adapted from "Lessons learned from implementing CDC's STEADI falls prevention algorithm in primary care", by C. M. Casey et al. 2016, The Gerontologist, 57(4), p. 792. This figure summarizes the STEADI workflow from front desk to exam room through phases of fall risk screening, multifactorial assessment, and intervention.

Data Collection

I conducted retrospective chart reviews of patients meeting criteria from January through March of the previous year (2020) to use as comparison and pre-intervention data. Data was documented within applicable sections of the Chart Review and Clinical Encounter Data Checklist (Appendix I). The review occurred on-site, and data was retrieved from the clinic's *e*-ClinicalWorks (2020) data management system.

Data during the implementation period was collected every three weeks from January through March (as indicated in the Project Timeline found in Appendix E). The Chart Review and Clinical Encounter Data Checklist form was used through the implementation period. Staff education pre-test and posttest was collected on-site immediately after completion. The SIB fall risk paper questionnaire scores were entered into the electronic record by the MA, and SIB data was also entered into the Chart Review and Clinical Encounter Data Checklist form during chart review.

Measurement Tools

Measurement tools used in the project consisted of the Older Adult Fall Prevention Questionnaire (in Appendix H) administered to staff during the education session; the SIB for fall risk level administered to patients meeting inclusion criteria (SIB found in Appendix I); and the Chart Review and Clinical Encounter Data Checklist (found in Appendix J).

Education Pre/Posttest

The pretest and posttest consisted of the 10-item Older Adult Fall Prevention Education Questionnaire and was administered via paper to the office staff and provider prior to and following the educational session. Demographic information was added to the Older Adult Fall Prevention Questionnaire, which included professional title and years' experience. The 10 multiple-choice items provided four choices for one answer selection. The pretests and posttests were part of the STEADI online provider-learning course (CDC, 2020). Higher scores indicated greater knowledge of assessment of older adult fall risk and management. Taylor et al. (2019) reported the STEADI Older Adult Fall Prevention Education Questionnaire was reliable for professional education (Cronbach α =.72) and Casey et al. (2015) reported 85% of health care providers accepted the CDC STEADI training questionnaire as important in addressing falls.

Staying Independent Brochure (SIB)

The SIB questionnaire consisted of a 12-item survey for patients to complete. Participants were asked to answer by circling *yes* or *no*. Item one and two asked: (1) "I have fallen in the past 6 months *yes* or *no"* (CDC, 2020, p. 2) and (2) "I used or have been advised to use a cane or walker to get around safely: *Yes* or *No*" (CDC, 2020, p. 2). Both items received a score of 2 for *Yes* responses and score of 0 for *No* responses. The remaining 10 items received a score of 1 for *Yes* and 0 for *No* responses. The answers were summed and scores of 4 or greater indicated the patient was at risk of falling. Acuity of risk levels (whether moderate or high risk) were then determined following the algorithm protocol. For instance, if the patient had a non-injury single fall and no gait, strength, or balance issues, the patient was at moderate risk. A patient with one non-injury fall with normal gait, strength, and balance was at a moderate risk. Any patient assessed as unsteady or unbalanced, with a history of two or more falls was designated as high risk. Moderate and high-risk designations triggered the multifactorial assessment. Loonawaong et al. (2019) and Rubenstein (2011) reported good reliability of the SIB (Cronbach α =.80 and .78, respectively. The MA completed the scoring for electronic input and saved the paper form in a folder maintained in a locked area.

The Chart Review and Clinical Encounter Data Checklist

The STEADI algorithm represented a three-pronged process that screened for fall risk, assessed for other risk factors, and intervened for fall management. The CDC (2017) Fall Risk Factors Checklist was modified for this project to include demographic and other project related data and was called the Chart Review and Clinical Encounter Data Checklist (found in Appendix J). The CDC (2017) version was a one-page yes/no checklist with fall history, medical conditions (with six listed), medications, functional, vision, and postural hypotension. The one-page

modified form for the project was comprised of three sections. This form was used for data collection from both review periods (the retrospective review and implementation period). Section I and parts of Section III (referrals and follow-ups) covered all necessary items for data collection for the retrospective review period. All sections (Sections I, II, and III) provided data during the implementation period. Section I queried for demographic information. Fall assessment questions (with yes/no answer) asked if the medical record had a fall assessment, and if history of falls occurred in the past year. The STEADI SIB fall screening section asked if the risk screening occurred as yes/no, and yes/no if score was < 4 or ≥ 4, followed by identification of low, moderate, or high fall risk. Section II consisted of the multifactorial assessment and queried if any of the five types of assessments were performed (medication review, functional ability, vision, postural hypotension, and feet/footwear assessment). These assessments were answered in yes/no format. Section III included an intervention checklist which required a yes/no to determine if the following interventions were performed: referral; 30–60-day clinic follow-up; home safety education; medication modification; and community services recommendations. The Chart Review and Clinical Encounter Data Checklist chart reviews were kept in a folder and under lock and key, and data was collected every three weeks. The CDC (2020) and other studies supported successful use of similar checklists (Eckstrom et al., 2017; Palvanen et al., 2017; Phelan et al., 2016).

Falls Reporting

Fall rates were reported on the Chart Review and Clinical Encounter Data Checklist for both review periods (retrospective chart review across three months in 2020 (January to March) and the implementation period across three months in 2021 (January to March). The electronic record contained a summary of assessments including the fall assessment. Each patient's chart

(retrospective and project period) was reviewed to determine if a fall occurred. Fall data (as part of the Chart Review and Clinical Encounter Data Checklist) was collected every three weeks during clinic visits.

Data Analysis

Data was analyzed using the Statistical Program for Social Sciences (SPSS), version 27.0. Staff and provider participant demographic data included years in the practice and level of education. Patient demographic data included age, gender, ethnicity, and living status - whether living alone or with other (s). Demographic data was analyzed through descriptive statistics. Other data collected, included fall history, whether a fall occurred over the past twelve months. This data was included in the prior year chart review and the 90-day implementation period. Demographic data for both years was represented in table format.

The first aim was to increase provider and staff knowledge of the STEADI fall protocol following educational sessions and analysis of pre and posttest scores on the Older Adult Fall Prevention Questionnaire. Descriptive statistics were used to determine if there was at least a 10% increase in mean score from pre-test to post-test. A *t*-test to was used to determine if there was a statistically significant improvement from pre-test to post-test.

The second aim was to use the STEADI fall algorithm protocol to assess and manage fall risk in 80% of primary care clinic patients 65 years and older during the ninety-day project period. There were 4 subgoals under this aim. The first sub-goal was to use the STEADI fall screening questionnaire in 80% of patients 65 years. Classification of fall risks (low, moderate, or high) was examined through data collected from the SIB fall screening assessment tool. This data was analyzed through descriptive statistics to describe the sample in each fall risk group as a category. Percentages of participants in each fall risk category were depicted in a line chart. A *t*-

test was used to determine significant differences between baseline routine use of documented fall risk assessments from prior year and use of the STEADI fall risk screening for risk levels using the SIB.

To determine if the second sub-goal was met, chart review was used to determine if multifactorial assessments were conducted on at least 80% of patients designated as moderate or high risk for falls. Frequencies and percentages were used to analyze each type of multifactorial assessment (functional ability, medication review, functional ability, vision, foot screening, and postural hypotension). Data were collected and analyzed monthly and depicted through bar charts to determine if use of the assessments increased over time. Sub-goal three sought to determine if 80% of patients designated as high fall risk received appropriate referrals (physical therapy, occupational therapy, ophthalmology, home health, or podiatry and if correlations between risk level and compliance with referrals occurred. Frequencies of referrals related to fall risks were analyzed retrospectively (January – March 2020) and compared with the implementation period. Next, I analyzed correlations between risk level and referrals. Monthly run charts depicted frequency of appropriate referrals across the 90-day period to determine trends in use over time. Likewise, appropriate referrals by risk category were depicted through a bar chart to determine if high risk patients received appropriate referrals.

To determine if sub-goal four was met, other fall management interventions were analyzed using frequencies for each intervention type (30-day clinic follow-up orders, home safety, medication reduction, and community information on exercise and fall programs). Follow-up visits were analyzed by frequency of clinic follow-up orders and depicted on a population pyramid figure according to fall risk category. Home safety, medication reduction and community exercise information were analyzed by frequency. Percentages of interventions were

captured on the algorithm model found in Figure 14. Correlation analysis using Pearson's *r* was performed between fall management interventions and fall rates to determine if significant correlations were present between falls and adherence to fall management interventions. An overarching data flow diagram was created to reveal the full algorithm protocol as illustrated in Figure 14. This holistic model illustrated the algorithm process and associated aims. Data was depicted within the three prongs of the algorithm: fall screening, multifactorial assessment, and interventions.

The last aim was to determine whether a reduction in falls occurred from baseline to 3 months post-intervention, the implementation period. The outcome objective was to reduce the fall rate by 15% during the three-month STEADI fall implementation project period compared to the fall rate from the previous year. Data on number of falls for the two periods were analyzed through descriptive statistics and displayed in bar charts for comparison. Frequency of falls were compared with previous year and depicted in bar charts. A correlation matrix between fall rates and use of the algorithm for assessments and interventions was performed to determine associations between use of the STEADI fall protocol and falls.

RESULTS

Implementation

Implementation of the project occurred over 90 days. Despite planning, unintended issues occurred which led to changes in the original plan. Issues included COVID-19 pandemic considerations, inability to perform the project at both clinic sites, staff turnover, and *e*ClinicalWorks EHR documentation constraints. Issues were mitigated after early recognition and application of mitigation strategies, such as modifying assessment drop-down menus providing individual education on STEADI to new employees.

The retrospective review sample (*n* = 117) was smaller than the implementation sample (n = 149). The chart review found fewer numbers of patients visited the clinic compared to 2021. This finding was likely from the COVID-19 pandemic, since the office was closed for a couple of weeks, and clinic encounters were migrated to telehealth during one month of the review period. Patient encounters during the implementation period were in person at the primary care clinic with COVID-19 restrictions in place (such as wearing face masks and gloves for staff and patients and required distance proxemics). No virtual visits were performed during the implementation period.

Outcomes

Demographic Data

Demographics for the retrospective period (prior year) and implementation period revealed similarities in population among age categories. The largest group consisted of patients 70-74 years of age. Gender percentages were similar in both time periods with larger number of females than males (64% and 80%). Living status results indicated most patients lived with others. Caucasians represented the largest ethnic group followed by African Americans and Hispanics for both review periods. Demographic data for both years were represented in Table 1.

Table 1: Patient Demographics for Pre- and Post-Implementation Periods 2020 and 2021

Demographic Data for Pre- and Post-Implementation Three-Month Period				
Characteristics	**Pre-Implementation 2020**		**Implementation 2021**	
	n = 118		*n* = 149	
Age	**Frequency**	**Percent**	**Frequency**	**Percent**
65-69	27	22.9	35	23.5
70-74	28	23.7	50	33.6
74-79	25	21.2	39	26.2

80-84	10	8.5	10	6.7
85 and older	28	23.7	15	10.1
Gender				
Male	54	45.8	69	46.3
Female	64	54.2	80	53.7
Living Status				
Lives Alone	35	29.7	58	38.9
Lives w/Others	83	70.3	91	61.1
Race/Ethnicity				
African Am	34	28.8	51	34.2
Asian	0	0	3	2
Caucasian	58	49.2	71	47.7
Hispanic	24	20.3	22	14.8
MidEastern Am	1	0.8	0	0
Other	1	0.8	0	0

Aim 1: Knowledge Among Primary Care Staff Outcomes

All providers and staff of the primary care clinic completed the pretest and posttest Adult Fall Prevention Education Questionnaire following education sessions in the second week of January 2021. Knowledge increased by 18% on posttest scores. Paired *t*-test with $t\ (df = 4) = -4.81$, $p < .009$, suggested that knowledge of the STEADI protocol increased significantly following educational sessions. The participants included two providers (one physician and one NP), two MAs, and one office manager. One MA and the physician had ten or more years of practice experience, the second MA and the NP were in practice one to three years, and the office manager was in practice four to six years.

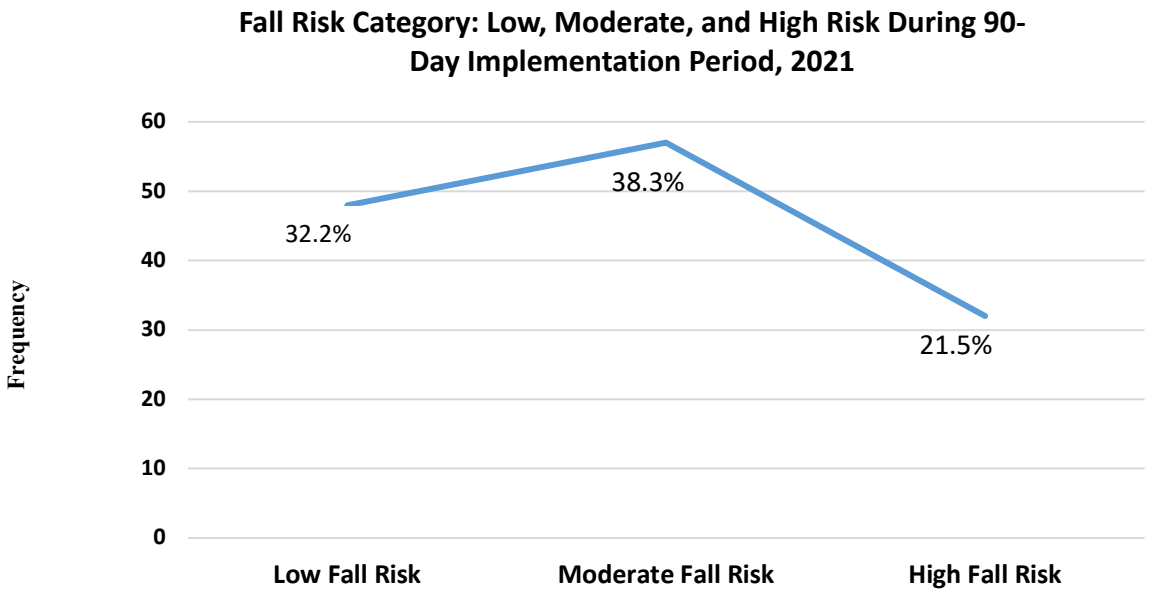
Aim 2: Use of the STEADI Algorithm Outcomes

An overarching aim meeting of 80% usage of the STEADI protocol among patients 65 years and older was met through the flow of the STEADI algorithm which included fall screening for risk identification, multifactorial assessments, and falls intervention processes. This

outcome was met since each algorithm section (fall screening, assessment, and intervention) was used for greater than 90% of patients 65 years and older in the primary care setting.

Goal 1 Outcome: Fall Screening. The goal of providing fall risk screening through the SIB for 80% of patients 65 years and older was met since 92.6% received fall risk screening compared to prior year of 44%. A *t*-test found adherence to performing fall screening was significantly greater through the use of the STEADI fall risk screening assessment during the implementation period compared to baseline routine use of fall assessments from the prior year ($t(df = 117) = 9.65$, $p < .001$). Fall risk level results from the SIB found most patients at moderate fall risk (38.3%) while high fall risks represented 12.5% of patients during implementation. Fall risk categories were described in Figure 6.

Figure 6: Participant Fall Risk Category of Low, Moderate, and High Risk



Note: Fall risk categories represented classification across 90-days among patients 65 years and older based on the STEADI Staying Independent Brochure (SIB) fall screening. The screening was patient-driven and performed during primary clinic encounters.

Goal 2 Outcome: Multifactorial Fall Assessment Outcomes. Five multifactorial assessments were performed which included functional ability, vision, postural blood pressure, medication review, and footwear/feet assessment. The goal was to perform these multifactorial assessments on at least 80% of patients 65 years and older. The top three highest percentages of multifactorial assessment areas were in footwear/feet assessments (100%), medication review (99%), and functional ability assessments (95%). Fewer assessments in vision were performed (81.8%). Frequencies and percentages of multifactorial assessments were represented in a bar chart found in Figure 7. Figure 8 depicted month-to-month frequencies with increase adherence in use of the assessments over time.

Figure 7: STEADI Multifactorial Assessments Performed During Implementation Period

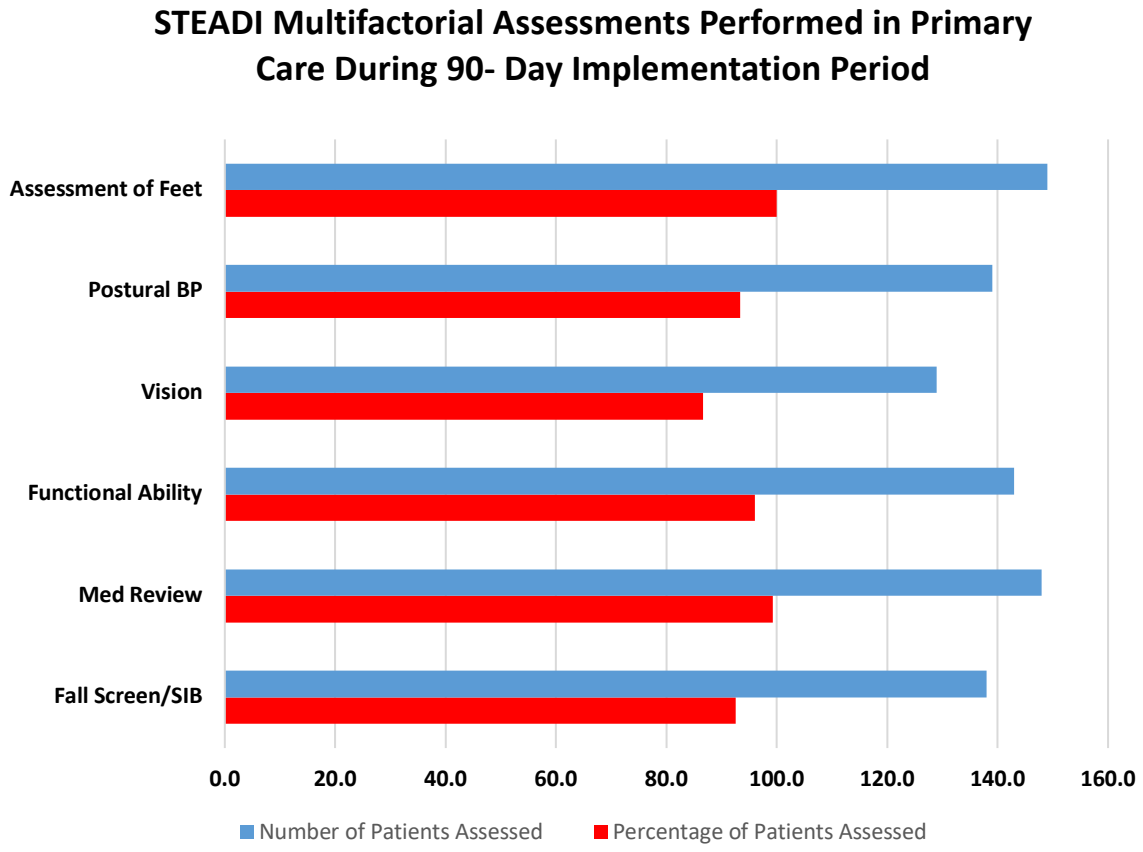
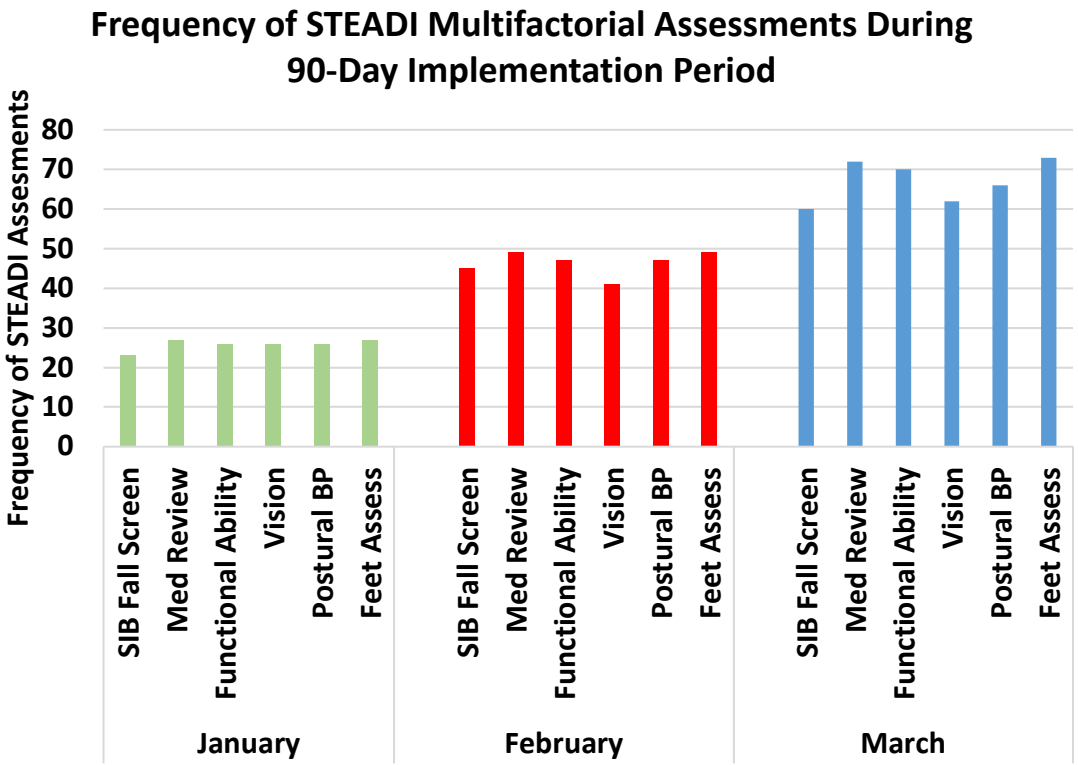


Figure 8: Frequency of Monthly STEADI Multifactorial Assessments

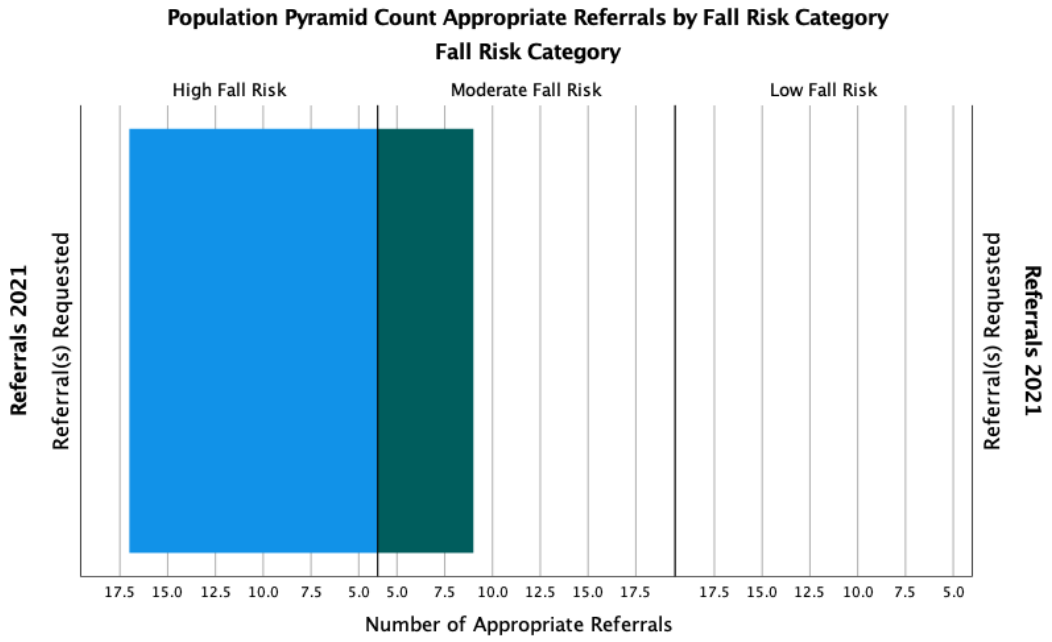


Note: The STEADI Multifactorial Assessments by frequency across 90-days was displayed Rates of assessments increased over time during the implementation period.

Goal 3: Fall Intervention through Appropriate Referrals. Percentage of patients with appropriate referrals represented 17.4% of fall risk patients during the implementation period. Retrospective results indicated fewer referrals (.93%). Referrals were most prevalent with higher risk scores. Pearson's *r* indicated an overall positive and moderately strong correlation between risk level and use of an appropriate referral ($r = .209$, $p < .01$). Frequency of referrals within fall risk categories were displayed in Figure 9. A run chart in Figure 10 revealed an increase in referrals during implementation compared to the prior year. A correlation was also found

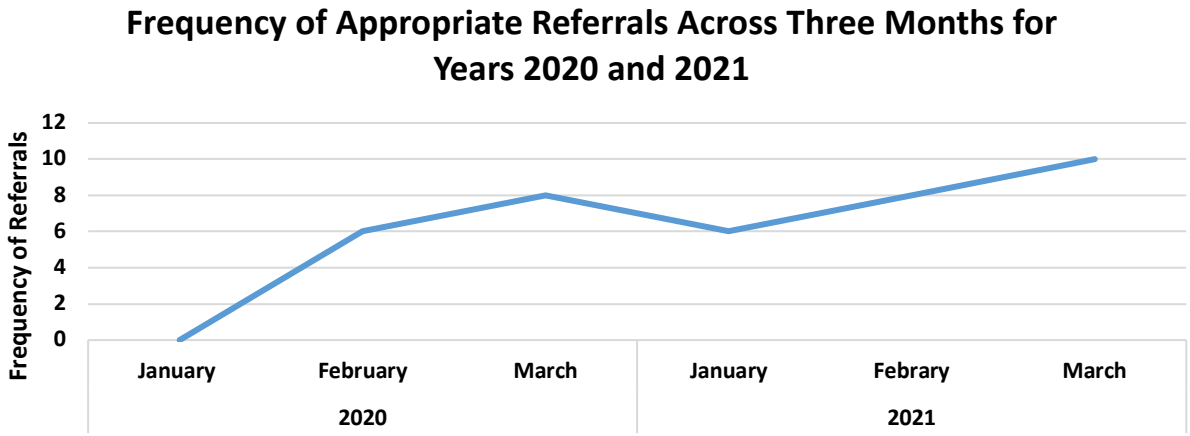
between adherence by providers for appropriate referrals and fall rates ($r = .43$, $p < .01$) post implementation.

Figure 9: Population Pyramid for Appropriate Referrals by Fall Risk Category



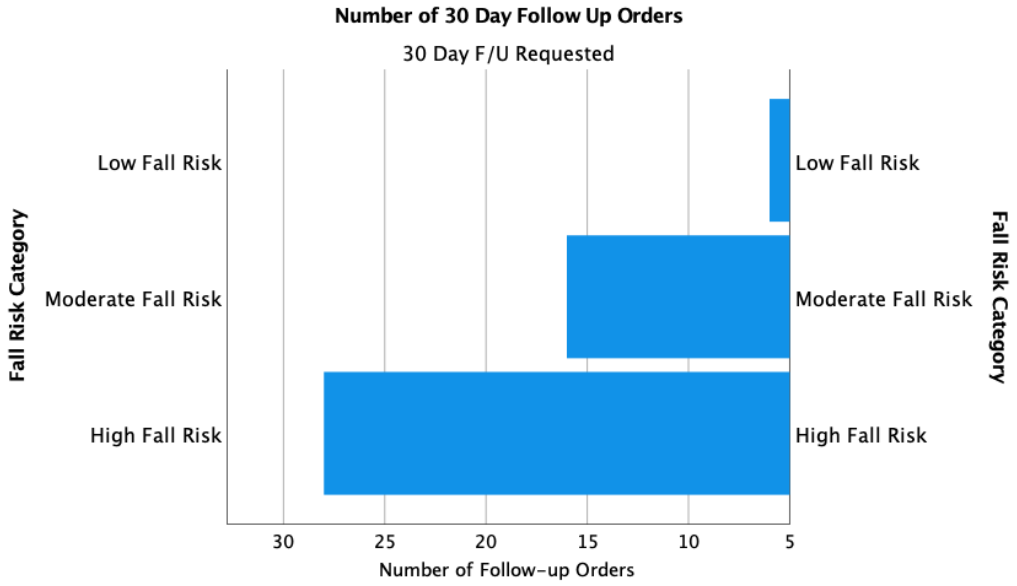
Note: Appropriate referrals are defined as referrals that were associated with fall risk or because of injury or physical therapy need following a fall. An example of fall risk need was a referral for ophthalmologist for follow up related to poor vision screen results while also having a moderate to high risk level for falls.

Figure 10: Month-to-Month Frequency of Appropriate Referrals for Years 2020 and 2021



Goal 4: Other Fall Management Intervention Outcomes. The fall algorithm included other fall management interventions such as 30-60 day follow up visits for moderate and high-risk patients, patient education for home safety and community resources, and medication reduction or discontinuation. Clinic follow-up visits were ordered for 34.2% of patients. A significant positive correlation was found between clinic follow-up orders and patients classified as high risk for falls ($r = .324$, $p < .001$). Figure 11 revealed the frequency of 30-day clinic follow-up visits with fall risk. A total of 143 handouts were provided and explained to patients (96%) and 16% received information on community resources such as area Tai Chi programs. Medication reduction or discontinuation occurred in 4.7% of patients and represented the least used intervention. Table 2 displays a correlation between fall rates and type of intervention revealed a significant and positive relationship between falls and 30–60-day clinic follow-up ($r = .48$, $p < .001$), and a small positive relationship between falls and medication reduction or discontinuation interventions ($r = .18$, $p < .03$). Percentages of these interventions along with correlations between falls were depicted in the STEADI algorithm and fall rates. A correlation matrix found in Table 3 depicted associations between fall rate; the five multifactorial assessments; interventions (referrals, follow-ups, home safety, and medication reduction or discontinuation); and demographics. Significant and moderate correlations were found between age and follow-up ($r = .24$, $p < .001$); age and living status (whether living alone or with others) ($r = .26$, $p < .01$); and race and living status ($r = .22$, $p < .001$).

Figure 11: Frequency of 30-Day Follow-up Visits Ordered by Fall Risk Category



Note: Fall risk categories correspond with 30-day clinic follow-up orders. The STEADI algorithm recommended 30-day follow-ups for patients at high risk for falls.

Table 2: Correlation Matrix of Fall Rate, STEADI Assessments, Interventions, and Demographics

Correlation Matrix of Fall Rate, STEADI Assessments, Interventions, and Demographics													
Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**
1. Fall Rate Jan-Mar 2021	1.00												
2. Med Review Performed	0.03												
3. Vision Assessed	0.15	-0.32											
4. Eye Exam Past Year	0.08	.175*	.377**										
5. Postural BP	0.05	.306**	0.13	0.13									
6. Functional Ability	0.08	-0.02	-0.01	0.08	0.10								
7. Referrals 2021	.429**	-.164*	.198*	-0.02	-0.13	.129*							
8. 30-60 Day F/U Ordered	.481**	-0.11	.201*	0.01	-0.09	0.15	.555**						
9. Home Safety Education Provided	0.08	-0.02	0.12	-0.01	-0.06	0.13	0.10	0.15					
10. Med Reduced or Discontinued	.176*	0.02	0.09	0.10	0.06	0.05	.205*	.241**	0.06				
11. Age	.196*	-0.04	0.05	-.166*	-0.03	-0.04	0.14	.239**	.207*	.145*			
12. Gender	-0.06	-0.09	-0.07	0.02	0.03	-0.08	-.164*	-0.10	-0.02	-.206*	.-134*		
13. Living Status	0.05	-0.07	0.01	-0.02	-0.16	-.164*	-0.01	0.03	0.05	-0.08	.261**	0.10	
14. Race	0.08	0.11	-0.06	-0.10	-0.10	-0.10	-0.12	-0.12	-0.01	-0.04	0.09	0.08	.220**
**** p< 0.01 level (2-tailed); *p<0.05; N=149**													

Aim 3: Fall Rate Outcomes

Fall rates were analyzed by frequency of falls for three months retrospectively and during the implementation period. Fewer falls were reported during the implementation period with 15.4% compared to the prior year of 28.8% and were represented by bar charts in Figure 12. Both review periods (prior year and implementation) experienced highest fall rates among patients in age groups of 70-74 and 75-79 years. A population pyramid in Figure 13 depicted clusters of falls by number of falls (no falls, one fall, two falls, or three or more falls) across age categories. Finally, a complete three-pronged algorithm data flow process depicted the protocol from fall risk identification, assessments, and interventions as illustrated in Figure 14.

Figure 12: Fall Rates Comparing Pre-implementation (2020) to Post-implementation (2021)

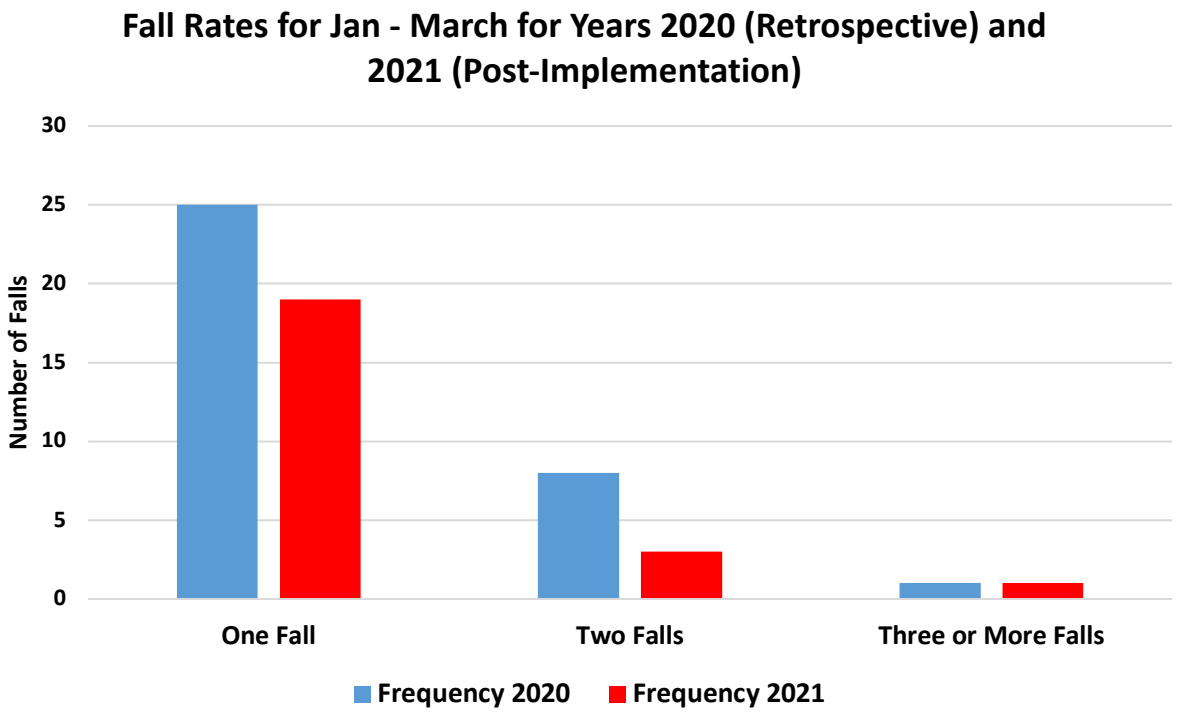


Figure 13: Population Pyramid Fall Rate Jan – March 2021 by Age Category

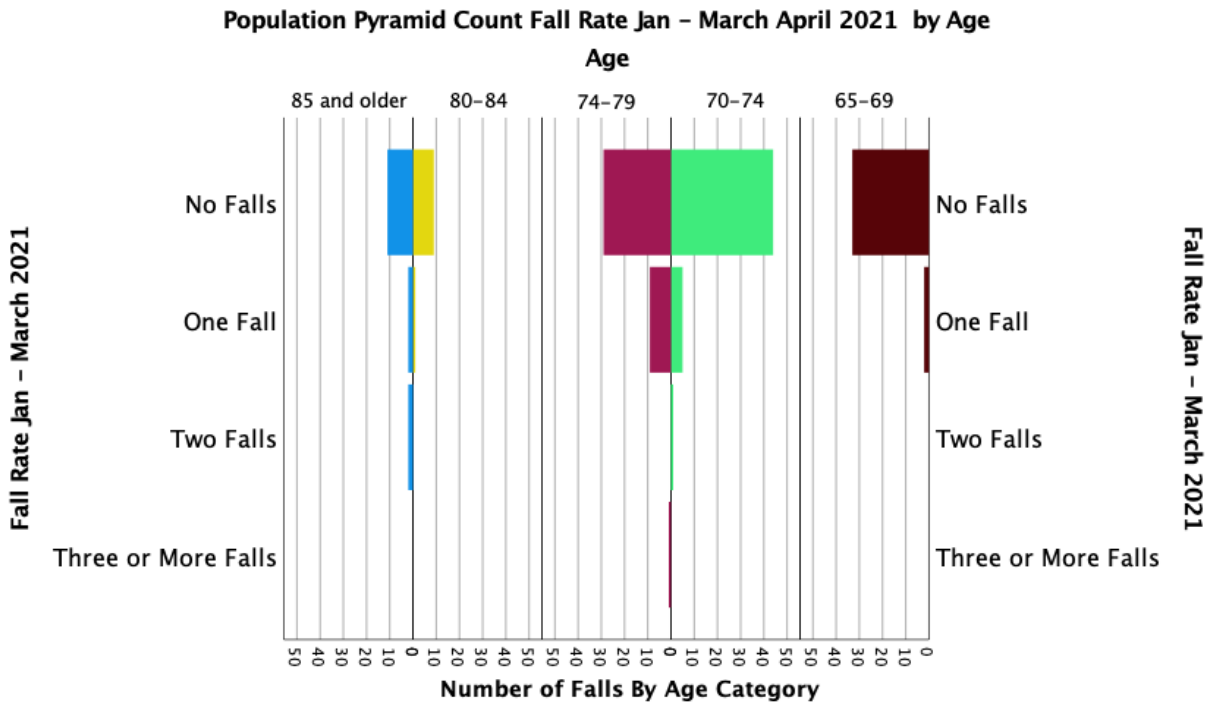
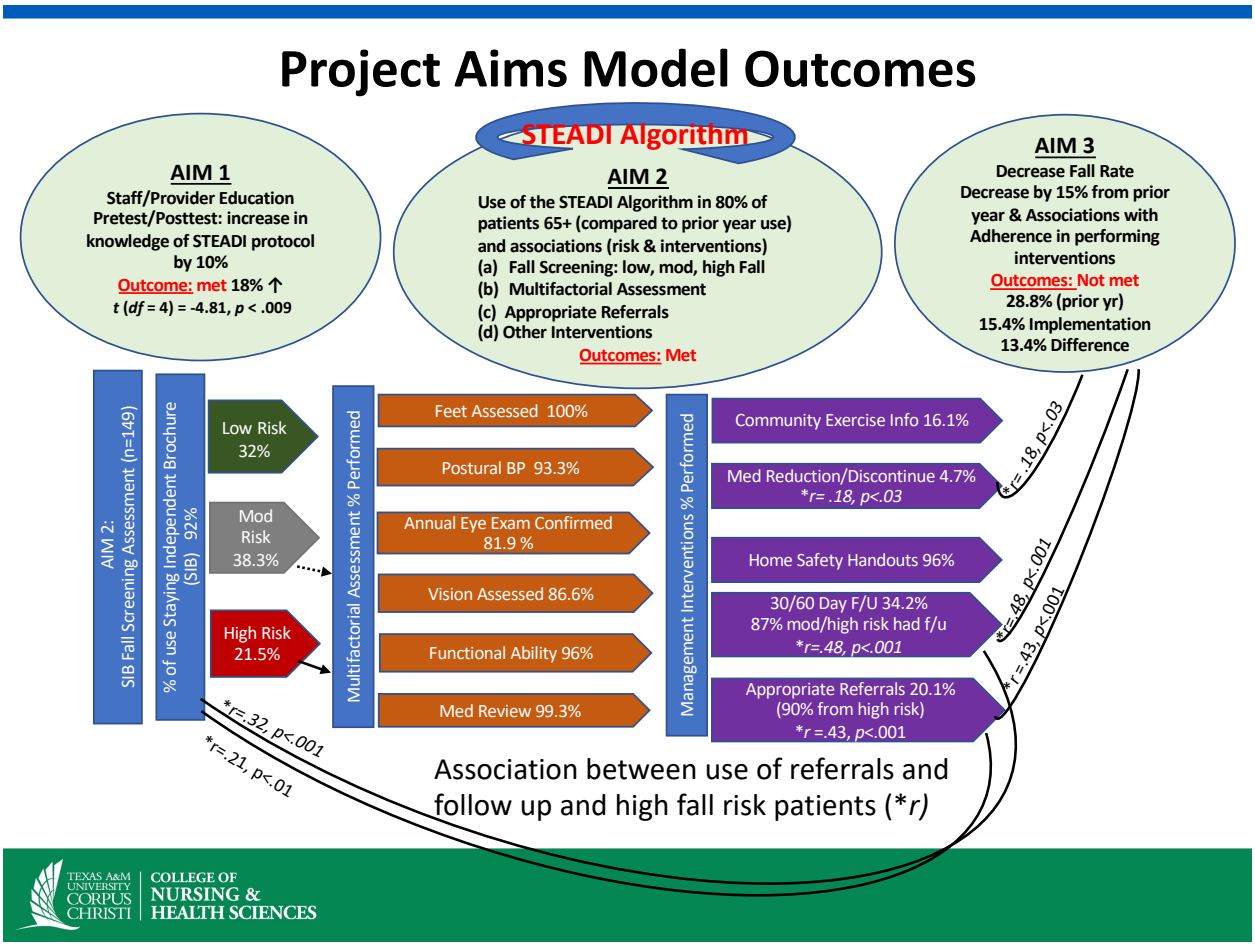


Figure 14: STEADI Algorithm Model and Data Flow Process



Note: Project data is visualized through the STEADI algorithm flow process beginning with fall screening, multifactorial assessments, and fall management interventions. Percentages of use of across the three prongs of the algorithm are included. The STEADI process is used to mitigate falls. Fall rates are included and comparative data between prior year and implementation period. Small to moderate correlations (signified by *) between use of appropriate interventions and falls are included. Appropriate use of referrals and follow-up visits for moderate and high-risk fall patients is recommended.

DISCUSSION

A key concept of the STEADI multifactorial fall protocol in primary care was to connect the importance of fall risk to assessments that provided early warnings with preventative practice via individualized interventions. This QI project sought to determine if such practices provided

improved fall management along with a decrease in falls among community dwelling adults 65 years and older. Staff participants put forth effort to improve efficiency of standardized fall assessments and individualized interventions for moderate and high-risk patients. This project followed Rogers (2003) DOI as provider acceptance and use of the fall protocol algorithm increased over time (per month-to-month analysis of use). The staff team nearly doubled the number of documented fall risk assessments from current practice and increased adherence in referrals and clinic follow-up visits for high-risk patients. Importance of identification of fall risk levels was evident. Despite the low numbers of referrals for fall management, analysis found referrals and clinic follow-up orders increased with severity of fall risk. A cohesive workflow modification was critical for success. Each staff member and provider were assigned to the process from waiting room to the end of the clinical experience. Likewise, workflow handouts for staff and weekly PD visits ensured a smooth process. The team also made meaningful advancement in using components of the *e*ClinicalWorks electronic encounter documentation to hone in on elements of screening, assessing, and interventions.

The results of this QI project were consistent with those of others in which use of systematic fall protocols like STEADI were used to mitigate falls and improve quality through use of standardized fall risk screening (Hamm et al., 2016); multifactorial assessments (Menezes, et al., 2020); and prioritizing fall interventions (Jansen et al., 2015); Lusardi, et al., 2017. This project focused on three project aims: 1.) an increase in staff and provider knowledge on the STEADI fall protocol 2.) use of the STEADI fall algorithm (which included outcomes related to the use of the SIB for risk identification, multifactorial assessments, appropriate referrals, and other fall interventions); and 3.) decrease in fall rates. The first aim was met with an 18% increase in knowledge of the fall protocol. The second aim goal and sub-goals were met and

included algorithm-based outcomes which represented the major prongs of the fall protocol (use of the SIB fall risk screening assessment, multifactorial assessments, appropriate referrals, and fall interventions). Each multifactorial assessment was performed in 81%-100% of patients with fall screenings. Results found an 16% increase in appropriate referrals, plus staff were found to be adherent to making appropriate referrals for high fall risk patients. A plus for the project was recognition of patient safety education since 96% of all patients 65 years and older received home safety handouts. The third aim was partially met. An overarching aim was a decrease in falls during use of the STEADI fall management protocol. Patient clinical outcomes improved with fewer falls during the implementation period. The findings were like the Palvanen et al. (2013) study which found a significantly lower fall rate among older community dwelling adults when the multifactorial fall protocol was implemented (95 falls per 100 person years versus control group with 131 falls per 100 person years, [$p = 0.001$]). Despite a decrease in falls during the implementation period, the difference between prior year fall rate and post implementation rate was 13.4% and did not meet the goal of a 15% reduction in falls from prior year. An optimistic outcome was provider and staff adherence to the protocol for fall risk patients since results found associations between falls and use of important interventions such as appropriate referrals and clinic follow-up. Finally, a cohesive workflow modification was critical for success. Each staff member and provider were assigned to the process from waiting room to the end of the clinical experience. Likewise, workflow handouts for staff and weekly PD visits ensured a smooth process. Another quality improvement gain was patient participation in care since the SIB fall risk screening tool was patient driven.

Limitations

The threat to small sample size for pretest and posttest as a paired *t*-test for significance was a possible threat to generalizing to a larger population. Likewise, the clinic setting was small with five total staff members, and findings may not transfer to a larger clinic practice. Clinic setting was limited since the clinic group included two primary care sites, and COVID-19 restrictions allowed the project to be occur at one site. Another limitation was the restrictions of the electronic medical record. While the technology was impressive, there were gaps in how the algorithm and protocol flowed, and long-term adherence of the protocol via use of notes and drop-down boxes was at risk. This QI project centered around one population type (persons 65 years and older) and did not consider other groups with risk factors that could be applicable to the study. Finally, the sample size and population of retrospective review and implementation period was a threat for adequate sample size due to limitations caused by the COVID-19 pandemic. Recommendations to mitigate limitations was to use a site with larger practice group, implement the project after COVID-19 restrictions were lifted, and perform the project at a primary care site that uses EHR charts that conform to the STEADI protocol.

Interpretation

This project was guided by the PDSA that provided a theoretical framework and was instrumental in providing cohesive and organized modifications when barriers and issues occurred. The primary care practice setting became the pilot study for the first PDSA cycle. Plans to continue the practice and bring about change in the sister location was considered. Lessons learned from the first PDSA included a need to development electronic notes template to trigger staff and providers through the STEADI assessments and interventions. Office management would benefit through contact with the *e*-ClinicalWorks Company for ideas and

costs for modifying the EHR documentation dashboard. Fewer COVID-19 limitations created opportunity for the project to expand to the sister location. The primary care practice setting was encouraged to use the fall protocol in their sister location (which would be the first cycle for the site) and use staff from this project site location for implementation.

Financial considerations for expansion to the next site and continuation in the project site was considered. Costs related to education material for patients was expected to increase since the sister clinic site was larger than the original project site. There were no financial burdens for increased staff since the protocol became a change in practice without additional personnel, and sharing of resources for education materials, and shared referral networking. Likewise, 30-60-day follow-up appointments for high fall risk patients would provide another financial incentive relative to billing fall codes for reimbursement. Finally, considerations for acceptance of the practice change by the second clinic was considered. Everette Rogers' (2003) DOI provided the conceptual framework in the adoption and decision to use the STEADI protocol in the project clinic setting. Staff and providers followed the decision process mechanisms from education sessions to adoption of the protocol. In selecting staff for buy-in, I found it critical to determine opinion leaders that could influence the next clinical site in the adoption process. The smaller setting for this QI study provided opportunity for acceptance and adoption of the protocol; however, expansion to the next clinical site within Rogers' (2003) decision process provided opportunity for continued use of the fall management protocol.

Conclusion and Implications

The results of this project provide support favoring the use of a multifactorial fall management protocol in primary care. An important take home message for providers is to be cognizant of the need to promote an organized fall management system in practice. This QI

project found importance in adherence to interventions in high fall risk patients. Implications may equate with the Johnston et al. (2018) study that found patients (n = 12,346) in primary care were less likely to have a fall-related hospitalization or emergency department admission when fall management protocols like STEADI were used compared with those without a fall management program. Use of the STEADI tools with thorough follow-up must also have intentional staff engagement and a culture of willingness to adopt a change in practice as supported by Everette Rogers' (2003) DOI. Using the PDSA strategies and components with DOI decision to initiate and adopt the change in how falls are managed, the clinic team was able to decrease falls, improve fall documentation, and engage patients in safety initiatives. Sustaining these practice changes will provide opportunity for a new second PDSA cycle and will strengthen plans for initiating the fall protocol in the second clinic site.

Recommendations include use of the STEADI fall protocol in rural clinics. Studies are recommended on the implications of referrals for falls, and mechanisms for networking across discipline. Studies in provider perception on change in practice from historical fall assessments towards patient-directed fall management protocols is also recommended. Analysis of results from this project disclosed opportunity to determine how medications are changed or discontinued. This QI study finds a small percentage of modifications or discontinuation of medications, and opportunities for exploring the reasons or linkages to falls is recommended. Finally, studies on how safe patients remain safe is suggested. QI projects related to outcomes associated with not falling with injury-free practice periods was suggested to celebrate safety and enhance aging-in-place.

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LIST OF APPENDICES

APPENDIX A: TAMU-CC Determination of Not-Human Subject Research

From: irb@tamucc.edu <donotreply@redcap.tamucc.edu>
Sent: Monday, November 23, 2020 2:46 PM
To: Garcia, Theresa <Theresa.Garcia@tamucc.edu>
Cc: IRB <irb@tamucc.edu>
Subject: Not Human Subjects Determination: Not Research

Dear Theresa Garcia,
Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves human subjects are subject to IRB review and approval.
On 11-23-2020, the Office of Research Compliance reviewed the project below and determined that the proposed activity does not meet the FDA definition of a clinical investigation or DHHS definition of research:

Type of Review:	Not Human Subjects Determination
IRB ID:	TAMU-CC-IRB-2020-11-113
Project Lead:	Theresa Garcia
Title:	Use of a Multifactorial Fall Protocol in Primary Care to Reduce Falls Among Older Community Dwellers
Rationale:	The project will not develop or contribute generalizable knowledge

Therefore, this project does not require IRB review. You may proceed with this project.
Limits to this determination:

1. This determination applies only to the activities described in the documents reviewed. Any planned changes require submission to the IRB to ensure that the research continues to meet criteria for a non-human subject research determination.
2. This project may NOT be referenced as "IRB approved".

The following statement can be included in the manuscript: "This Project was reviewed and determined to not meet the criteria for human subjects research by the Texas A&M University-Corpus Christi Institutional Review Board."
Please do not hesitate to contact the Office of Research Compliance with any questions.
Respectfully,
Germaine Hughes-Waters
Office of Research Compliance

APPENDIX B: HIPAA Facility Confidentiality and Non-Disclosure Statement

All Care Medical Group Healthcare
HIPAA Confidentiality and Non-Disclosure Statement

I, Deborah Smith, will be participating as an unpaid quality improvement project facilitator as a student in the Texas A & M Corpus Christi Doctor of Nursing Practice (DNP) program. I am aware that clinic policies follow the Health Insurance Portability and Accountability Act of 1996 (also known as the HIPAA Privacy Rule) and updated through the HIPAA Omnibus Rule of 2013, the HITECH Act of 2009 that pertains to the use of electronic health records by healthcare providers, and Office for Civil Rights (OCR) and US Department of Health and Human Services (HHS) guidance with HIPAA during the COVID-19 public health emergency.

I understand that all patient information, including medical records, other medical information, billing and financial data, is confidential.

I agree to keep all patient information confidential.

I agree to comply with all clinic privacy policies and procedures including those implementing the HIPAA Privacy Rule.

I understand that if I violate patient confidentiality by using or disclosing patient information improperly, I may be subject to disciplinary action including having my quality improvement DNP project immediately terminated.

I understand that if I have any questions or concerns about the Privacy Rule and/or the proper use or disclosure of patient information, I shall ask the supervising attending, the clinic office manager, or managing provider of the clinic.

I understand and agree that clinic policies and procedures will apply to all patient information even after my quality improvement project has been completed.

I certify that I have read the HIPPA Act and the HITECH Act and I understand that no information about any patients I may observe or heard discussed while at the clinic or at any time thereafter may be transmitted to any third party or person.

I will refrain from engaging in any type of social network, e-mailing, texting, applications, or any other technology-based information sharing platforms that include any information related to patients, providers, or staff of the clinic.

Signature: Deborah Smith 09-07-2020
Name and Title: Deborah A. Smith, EdD, MSN, MBA RN
DNP Student
Texas A & M University Corpus Christi
Committee Chair: Theresa Garcia, PhD, Texas A & M University Corpus Christi

APPENDIX C: Letter of Support

All Care Medical Group Clinic

October 22, 2020

Dr. Sara Baldwin
Associate Dean for Academic Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Baldwin,

The purpose of this letter is to provide Deborah Smith a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at *All Care Medical Group Clinic.* The project, Use of a Multifactorial Fall Protocol to Reduce Incidence of Falls Among Older Community Dwellers entails introduction of the use of the CDCs Stopping Elderly Accidents, Deaths, and Injuires (STEADI) quality improvement project in clinic practices for community dwelling elderly populations in effort to reduce falls. Use of the STEADI quick assessment algorithm will allow for identifying risk levels and modifiable risk factors.

The purpose of this project is to determine if implementation of an evidence-based multifactorial fall risk assessment in primary care can improve the rate of falls among community dwellers 65 years of age and older. All Care Medical Group was selected for this project because the practice is dedicated to the health and wellness of many community dwellers 65 years and older, and the practice drives quality care from community to assisted, rehabilitation, and skilled care centers. All Care Medical Group is one of only a few medical provider groups that also serves as medical management of persons in assisted living, skilled, and rehabilitation centers, as well as primary care for all ages and across local hospital systems. Deborah Smith is not employed at this institution, *but* has an interest in improving care at this facility.

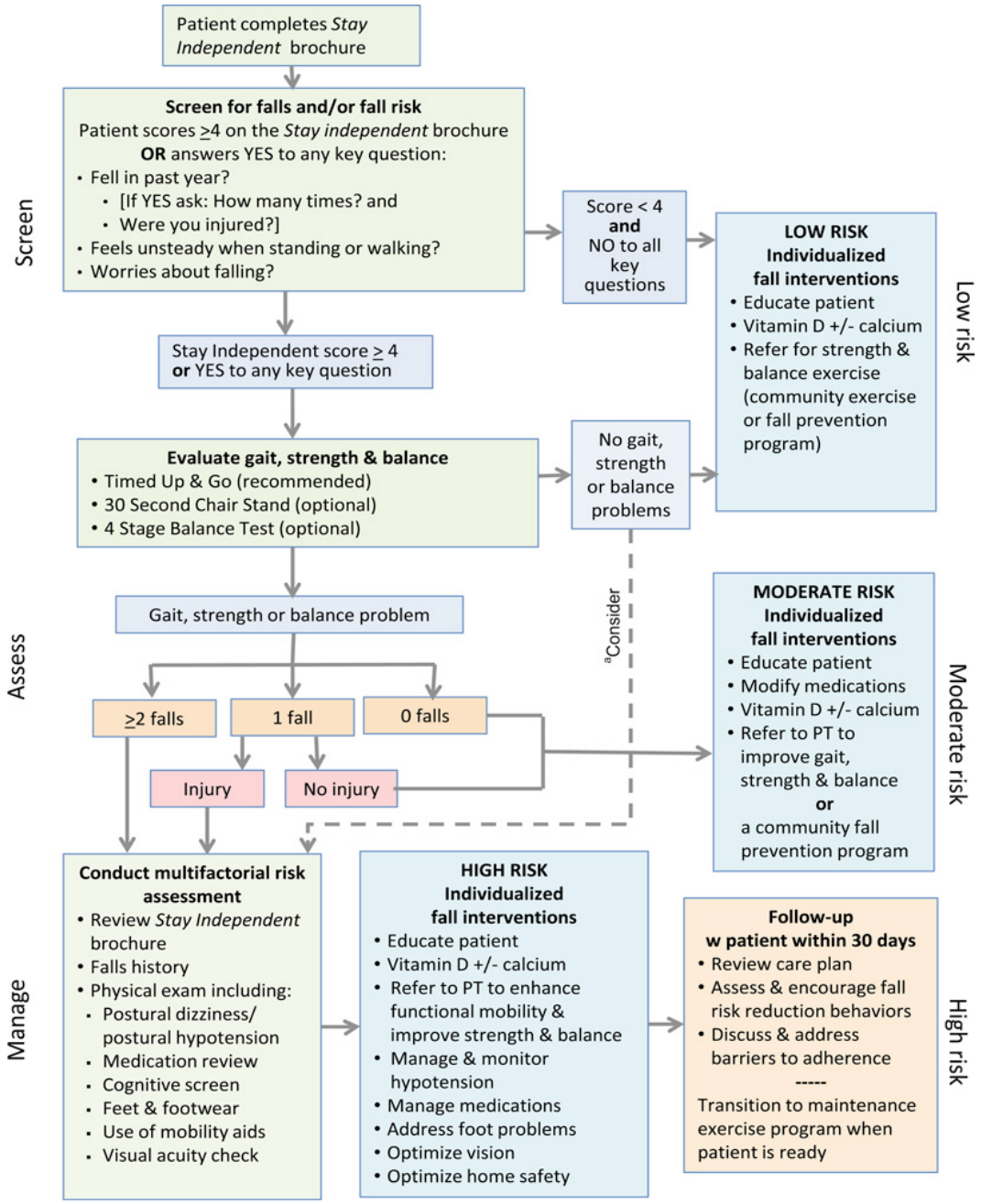
I, Nehme Alkarra, MD, Clinic Director/owner at All Care Medical Group, do hereby fully support Deborah Smith in the conduct of this quality improvement project, ***Use of a Multifactorial Fall Protocol To Reduce Incidence of Falls Among Older Community Dwellers*** at *All Care Medical Group Clinic.*

I also approve Deborah Smith to access protected health information (PHI) for purposes of conducting this quality improvement project. She has signed a HIPAA release form.

Sincerely,

Nehme Alkarra, MD

APPENDIX D: Steady Algorithm Flow Process



Note: Adapted from STEADI algorithm. STEADI Stopping Elderly Accidents, Deaths, & Injuries. CDC, 2020 https://www.cdc.gov/steadi/pdf/STEADI-Algorithm-print.pdf and approved by CDC for public use.

APPENDIX E: Project Timeline

DNP PROJECT TIMELINE

DEBORAH A SMITH
PROJECT DIRECTOR

Project Start: Mon, 1/4/2021

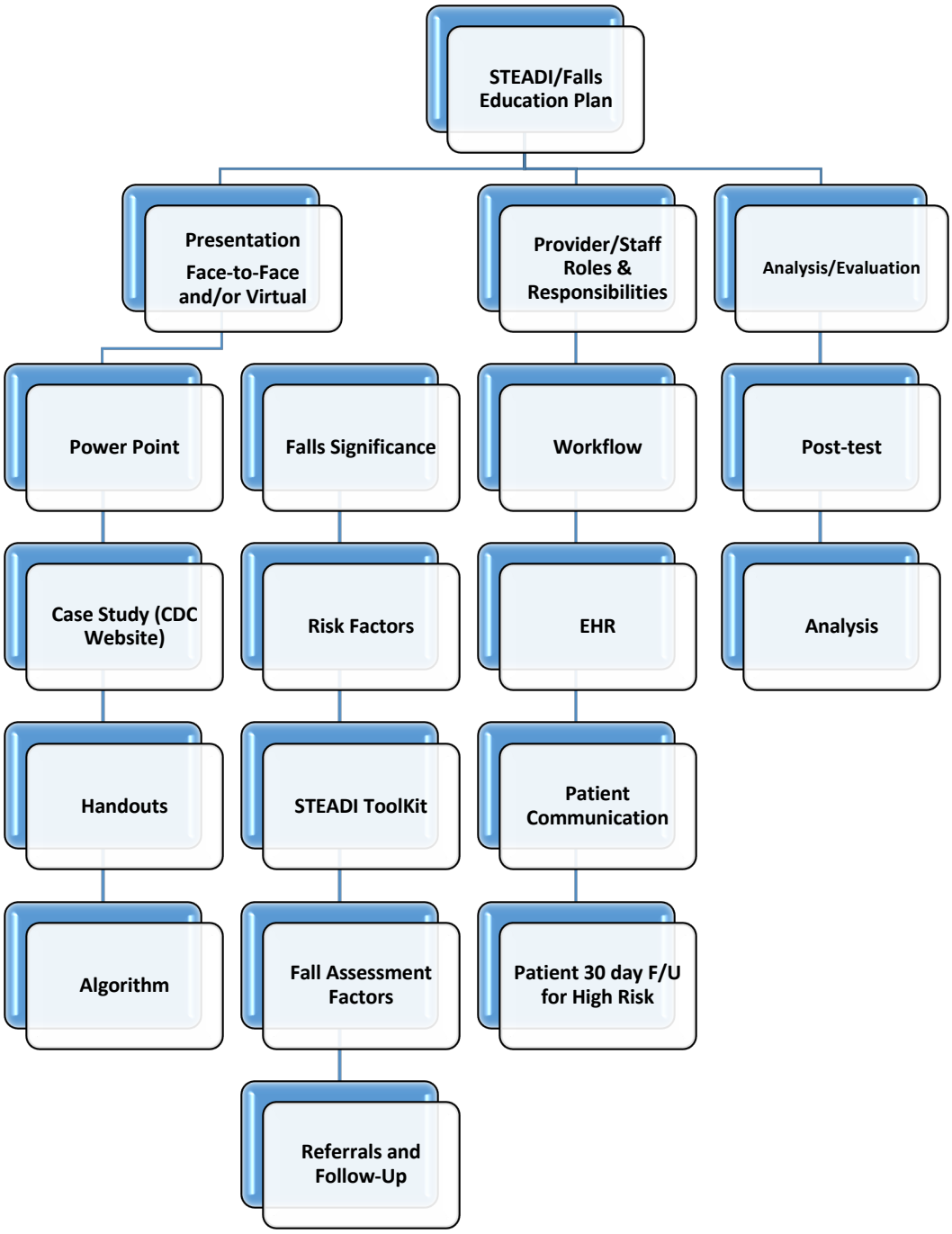
TASK		START	END
Project Developemt			
Proposal Defense		11/24/20	11/24/20
Retrospective Chart Review for Jan-Mar 2020		1/6/21	1/11/21
Educaton to staff in 2 sessions		1/6/21	1/11/20
Preparing to Begin Project			
Office mgr meeting		1/4/21	1/18/21
MA/nurse meeting		1/6/21	1/18/21
Algorithm to providers		1/4/21	1/4/21
Begin data collection/p	week 1-3	1/6/21	1/15/21
Data Collection	week 4-6	1/18/21	2/5/21
Data collection	week 7-9	2/8/21	2/26/21
Data Collection	week 10-12	3/1/21	3/19/21
End of Data Collection and Start of Analysis			
Data results analysis and synthesis		4/12/21	4/21/21
Conclusion Development		4/30/21	5/10/21
Completion of project		5/11/21	6/28/21
Presentation of Project/defense		7/7/21	7/7/21

APPENDIX F: Education Activities

Education Lesson Plan: STEADI Training		
Education Session	**Active Learning**	**View and Discuss**
Session1	Intro to STEADI	View video by CDC
	PreTest	
	Handouts/powerpoint	Discussion
	Case Study	
	Hands-on	
	Kahoot Q & A	Review
	Post Test	Discussion of Timeline/Project
Session 2	Mock Run	Roles and responsibilities review
	Virtual mock run	Discussion
	Close Session	

Note. A provider/staff education algorithm education plan and education module booklet is prepared and available for education sessions and for new hires and refresher on STEADI as needed. (See Appendix G for the STEADI Fall Protocol Algorithm Education Training Guide)

APPENDIX G: STEADI Fall Protocol Algorithm Education Training Guide



APPENDIX H: STEADI Pre/Post Test Older Adult Fall Prevention Questionnaire

Older Adult Fall Prevention Education Questionnaire

Please answer the following: (All responses are confidential and without identifiable information)

Title/Licensure/Certification (Circle)

A. MD or DO
B. NP
C. PA
D. MA
E. Nurse
F. Office Mgr
G. Office Staff

Years in Practice

A. 1-3 years
B. 4 - 6years
C. 7 - 9 years
D. 10+ years

<u>Each question is answered with ONE selection from the choices given. Circle the Answer</u>

1. What proportion of independently living older adults will fall in a given year?
A. 75%
B. 50%
C. 30%
D. 15%

2. Which is NOT a modifiable risk factor for falls in older adults?
A. Lower body weakness
B. Age
C. Limited mobility
D. Postural hypotension

3. Which is NOT a key question when screening older adults for fall risk?
A. Have you fallen in the past year?
B. Do you feel unsteady when standing or walking?
C. Do you worry about falling?
D. Do you ever use a cane to help you get around? *

4. A person who feels unsteady when walking but hasn't fallen is at what level of risk?
A. very low risk
B. low risk
C. moderate risk
D. high risk

5. Which is the quickest test to assess for gait and balance?

A. Timed up and Go test
B. 4-stage balance test
C. Berg balance test
D. Functional reach test

6. Which is an appropriate intervention for a patient at moderate risk of falling?
A. Recommend home safety check-up
B. Refer the patient to an aerobics exercise program
C. Refer the patient to a community fall prevention program
D. Refer the patient for physical therapy

7. Which components of a fall intervention for a high-risk patient?
A. Educate about fall prevention and recommend an aerobics exercise class
B. Review medications and refer for physical therapy
C. Suggest using a cane or walker for balance and taking a daily multivitamin
D. Educate about fall prevention and recommend a walking program

8. Which patient education brochure is included in STEADI?
A. How Food Can Interfere with your Medications
B. Facts about Osteoporosis
C. Managing Your Diabetes
D. Stay Independent

9. Which fall risk assessment or prevention task is likely to be performed by a medical assistant?
A. Review medications
B. Recommend Vitamin D supplements
C. Assess orthostatic blood pressure
D. Assess Feet and recommend footwear

10. Follow-up is needed within 30 days for which group of older adult patients?
A. All those at high risk for falls
B. All those who answer "YES" to a key question
C. All those who fail a physical performance test for gait, strength, or balance but have not fallen
D. All older adults

Note. This survey is available for public use for pre/posttest and part of the STEADI learning module found at: CDC, 2020. STEADI for professional's education https://www.train.org/cdctrain/view/course/1086876/content/pre

APPENDIX I: The Staying Independent Brochure (SIB)

Check Your Risk for Falling

Please circle "Yes" or "No" for each statement below.			Why it matters
Yes (2)	No (0)	I have fallen in the last 6 months.	People who have fallen once are likely to fall again.
Yes (2)	No (0)	I use or have been advised to use a cane or walker to get around safely.	People who have been advised to use a cane or walker may already be more likely to fall.
Yes (1)	No (0)	Sometimes I feel unsteady when I am walking.	Unsteadiness or needing support while walking are signs of poor balance.
Yes (1)	No (0)	I steady myself by holding onto furniture when walking at home.	This is also a sign of poor balance.
Yes (1)	No (0)	I am worried about falling.	People who are worried about falling are more likely to fall.
Yes (1)	No (0)	I need to push with my hands to stand up from a chair.	This is a sign of weak leg muscles, a major reason for falling.
Yes (1)	No (0)	I have some trouble stepping up onto a curb.	This is also a sign of weak leg muscles.
Yes (1)	No (0)	I often have to rush to the toilet.	Rushing to the bathroom, especially at night, increases your chance of falling.
Yes (1)	No (0)	I have lost some feeling in my feet.	Numbness in your feet can cause stumbles and lead to falls.
Yes (1)	No (0)	I take medicine that sometimes makes me feel light-headed or more tired than usual.	Side effects from medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I take medicine to help me sleep or improve my mood.	These medicines can sometimes increase your chance of falling.
Yes (1)	No (0)	I often feel sad or depressed.	Symptoms of depression, such as not feeling well or feeling slowed down, are linked to falls.
Total_____		Add up the number of points for each "yes" answer. If you scored 4 points or more, you may be at risk for falling. Discuss this brochure with your doctor.	

Note: The SIB questionnaire is part of the CDC (2020) downloadable resources found at https://www.cdc.gov/steadi/pdf/STEADI-Brochure-StayIndependent-508.pdf. Permission to download and use are available on CDC website. This questionnaire is designed for patients for self-reporting. It is the first step in the STEADI algorithm process and represents a fall screening tool. Totals 4 or > indicate the patient is at risk for falls. Fall history and functional ability may result in moderate or high risk for falls. (See Algorithm flow process in Appendix D).

APPENDIX J: Chart Review and Clinical Encounter Data Checklist Form

Chart Review and Clinical Encounter Data Checklist			
PT ID:	**Date of Review**		
Section I. Demographic Data			
1. Age (circle) 65-69 70-74 75-79 80-84 85+	**2. Gender (circle)** **Male** **Female**	**3. Living Status (circle)** **Lives alone** **Lives with other(s)**	**4. Race/ethnicity: (Circle)** African Am Asian Caucasian Hispanic/Latino Other

Comorbidities	**Yes/No**
5. Comorbidities:	***Circle Y or N***
0 comorbidities	Y N
1-2 comorbidities	Y N
≥ 3 comorbidities	Y N
6. Fall Assessment	**Yes/No**
Is Fall Assessment Present in Medical Record?	Y N
Hx of falls in the past year?	Y N
If Yes, No. of falls in the past year	***Circle no. of falls*** 1 fall 2 falls 3+ falls
7. STEADI SIB Fall Screening (during implementation period)	**Yes/No**
Was the SIB Fall Screening Completed?	Y N
SIB ≥ 4	Y N
SIB < 4	Y N
Circle Appropriate Risk Level:	**Low** (< 4SIB & no falls) **Moderate** ≥ 4 hx 1 fall w/o injury **High** ≥ 4, fall injury, >2 falls, poor balance/TUG/unsteady
Section II. Multifactorial Fall Assessment ***Answer Y or N if assessment performed***	
This Section For Implementation Period/Use of STEADI Multifactorial Assessment (Not for retrospective review)	
1. Medication Review Performed? (Psychoactives, opioids, benzodiazepines, sedatives, hypnotics, pain meds, HTN, Diuretics, Ca, Vit D, other)	Y N Y N
2. Functional ability assessed & results	Y N
TUG ≥ 12 sec	Y N
Balance < 10 sec	Y N
3. Vision assessed?	Y N
4. Has patient had eye exam in past year?	Y N
5. Postural hypotension assessment completed?	Y N
B/P drop ≥ 20 mmHg/10mmHg standing from sitting or lying	Y N
6. Assessment of feet & footwear?	Y N
Section III. Interventions	
1. Referral(s) (PT, OT, ophthalmology, podiatry, GU, neuro, etc)	Y N
2. 30-60 day clinic follow up order	Y N
3. Education on home safety provided (materials by CDC)	Y N
4. Med reduced or discontinued (causing low BP or dizziness)	Y N
5. Provided information on community exercise or fall program (Tai Chi Etc)	Y N