



## Research Article

# Preventing Falls in Community-Dwelling Hispanic Elderly Using an Evidenced-Based Fall Prevention Toolkit

Claudia Saenz Hourigan\*, Tammy Walker-Smith

Texas A & M University- Corpus Christi College of Nursing and Health Sciences, Corpus Christi, Texas, USA

\*Corresponding Author: Claudia Saenz Hourigan, Texas A & M University- Corpus Christi College of Nursing and Health Sciences, Corpus Christi, Texas, USA

Citation: Hourigan CS, Walker-Smith T (2024) Preventing Falls in Community-Dwelling Hispanic Elderly Using an Evidenced-Based Fall Prevention Toolkit. Int J Nurs Health Care Res 7: 1510. DOI: 10.29011/2688-9501.101510.

Received Date: 05 February, 2024; Accepted Date: 17 February, 2024; Published Date: 19 February, 2024

### Abstract

**Background:** One fourth of elderly falls, resulting in accidental injuries and death, causing a health concern and a financial burden. This project identified a South Texas home health agency (HHA) with a vulnerable population, nurses' knowledge deficits, and evidence-based practice (EBP) resource needs. **Objective:** Project aims included: implementing an EBP Stop Elderly Accidents, Death, and Injury (STEADI) fall prevention protocol to improve nurses' knowledge and minimize elderly risk in an HHA. **Methods:** The project employed a Quasi-Experimental with a Quality Improvement Initiative. On phase one, subjects were recruited. On phase two, the HHA's Registered (n=4) and Licensed Vocational Nurses (n=4) STEADI trained. Over three months, they applied the STEADI toolkit on community-dwelling Hispanic elderly (CDHE) (n=48). On phase three, data was analyzed and evaluated. **Evaluation and Measurement:** Pre- STEADI fall data was the baseline. Quantitative pre-and post-STEADI educational tests, fall data chart review, and feedback surveys were collected and analyzed over three months. Paired sample t-Test compared pre- and post-STEADI scores for nurse STEADI toolkit knowledge and patient screening effectiveness in decreasing CDHE fall rates. **Results:** All HHA nurses (n=8) were STEADI-trained subsequently screening the CDHE (100%). Post-STEADI revealed a statistically significant increase in the nurses' knowledge (36.25, 95% CI) and skills (147.5%, p =.007) and a decrease in the CDHE fall rates (71%, p =.019). **Conclusion:** Nursing Implications: Every nurse must fall screen, and HHAs should include STEADI in policy adoption to sustain fall monitoring and screening as STEADI enhanced organizational outcomes, nurse prudence, and decreased CDHE falls.

**Keywords:** Elderly Falls; Risks; Prevention; Home Health Care.

### Introduction

Elderly fall-related incidences contribute to the US medical and financial burden. Thirty- six million community-dwelling elderly, aged 65 or older, fall annually, often resulting in severe or fatal harm costing Americans 50 billion dollars annually from the costs associated with fall- related emergency treatments and

supportive care. Emergent treatments include soft tissue injury, head trauma (51%), and hip fractures (95%) [1]. Supportive care treatments include social withdrawal, dependence, impaired physical mobility, and the rising coroner examination rates which currently account for 51.1% of unintentional fall-associated deaths (National Center for Health Statistics) [2]. Fall incidence among the community-dwelling Hispanic elderly (CDHE) population is concerning as they are disproportionately impacted by falls compared to other ethnicities. The Hispanics above age 65 fall

incidence is 32% slightly behind American Indians and Alaska Natives (Centers for Disease Control and Prevention [CDC]) [3]. The CDC [4] reports that between 2012 and 2018, 1,039,618 elderly Hispanics fell. A fall is an unplanned or out-of-control descent to the floor with or without injury. In 2019 Hispanic elderly fall-related accidental deaths totaled 1,646, accounting for more than half of all fall-related accidental deaths in the elderly [2]. Statistics indicate that elderly falls and incidence rate increased by 30% from 2009 to 2018 [3]. Last year, in Texas, 34% of Hispanic adults ages 65 and older reported having fallen at least once in a 12-month period [5]. Noninstitutionalized or community-dwelling elderly Hispanics living at home are at a higher risk for falls due to the lack of recognition of potential fall hazards in their home environment [6].

## Background

Known fall-related factors in noninstitutionalized self-identifying Hispanic elderly include modifiable and nonmodifiable risks such as age, gender, level of education, socioeconomic status, and chronic disease. Studies indicate that nationally and in Texas CDHEs are at increased risk for falls, and a knowledge deficit in nurses caring for elderly patients limits the potential fall prevention intervention opportunities that may help to decrease fall rates among this patient population. Despite the impact of elderly falls on society, there is no single interventional instrument for nurses to use to identify older adults at increased risk for falls in home health care [7] US Preventive Services Task Force [USPSTF], [8]. Nurses are healthcare professionals that have a valid and active nursing license to practice in Texas.

Evidence-based resources have been identified as lacking use/access in the field for nurses, which include: 1) prediction systems, 2) feedback techniques, and 3) available interfaces for nurses to identify key fall risk factors [9]. Stop Elderly Accidents, Death, and Injury (STEADI) is an evidence-based practice (EBP) toolkit identified to prevent falls in those above the age of 65 and is recommended for nurse use to prevent falls in the CDHE population [7,8,10]. The Centers for Medicare and Medicaid (CMS) (2020a) annually tracks and publishes national statistics on home health agency (HHA) fall rates in a Home Health Compare report. Home health is a professional healthcare service received in the home setting [11].

The CMS Home Health Compare is a HHA quality of patient care rating. It calculates and compares HHA's yearly performance to itself and other HHAs. According to the project's HHA's CMS Home Health Compare results, the HHA presented an increased fall rate, needing to reach its fall prevention goals. Elderly falls are concerning, and measures for nurses to address falls in the home setting are required [12]. Addressing falls in this population is essential because its incidence is rising, debilitating, costly, and potentially fatal. If this trend continues, CDHEs will

likely experience a higher fall rate that could affect their health and independence and result in a substantial financial burden, negatively impacting patients and families and stressing their community resources. This project was a quality initiative in a South Texas HHA that aimed to reduce CDHE fall incidence by improving nursing staff's knowledge through education on fall prevention assessment skills and interventions using the STEADI toolkit over three months. This project implemented an evidence-based fall prevention program (STEADI) and its interventions within an HHA to improve patient outcomes and decrease the fall rate for patients aged 65 and older. The persons impacted by this study were the home care agency, its nurses, and its CDHE population.

## Review of the Literature

The purpose of the literature review was to examine nursing EBP regarding falls. Studies indicate that those above age 65 are at increased risk for falls, and improving nurses' knowledge about screening for fall risk may decrease patient fall rates [13,14]. A gap exists between nurses' fall knowledge and the interventions required to screen, identify, and prevent falls. Hakvoort et al. [13], conducted a mixed method study that used the Behavioral Change Wheel framework on hospital nurses (n=26) to target their behaviors related to fall prevention. The study discovered an exceptionally high need for nurses to continue education about elderly falls. The study identified that educating nurses about falls often receives scant regard and discovered an exceptionally high need for continual nurse fall education because there is a strong correlation between nurses' education and their fall reduction practice.

The CDHE have an increase in fall risk, and a deficit in nurses' fall knowledge limits the opportunity to decrease their fall rates. Cho & Jang [14] conducted a cross-sectional study, surveying hospital nurses (n=162). The participants were nurses who worked at small- and medium-sized hospitals with fewer than 300 beds. The nurses were classified by educational level preparation as community college (n=81), university (n=77), and master prepared or higher (n=4) rather than by license. The study found a positive relationship between nurse fall attitudes and prevention activities ( $r=.25, p=.001$ ). The study determined that the nurses' knowledge about falls in smaller hospitals, with less than 300 beds, was lower than that of nurses in larger hospitals resulting in fewer fall prevention practices by nurses in smaller hospitals. Cho & Jang [14] explain that smaller hospitals have limited nurse educational programs and speculate that the cause of the nurse fall-related knowledge deficit in smaller hospitals results from fewer educational opportunities. Studies indicated that a decrease in nurses' fall knowledge and education correlates with increased fall incidence.

Falls threaten Hispanic older adults' quality of life and often

cause a decline in self-care ability [15]. Hanlin et al. [16] conducted a quantitative study's cross-sectional survey of 103 participants and determined fall prevention barriers and strengths in Latinos. A finding of the study was that the fall risk factors for the Hispanic elderly are five times or higher than the other groups [16]. Fall risk factors, especially in the community dwelling elderly, include co-morbidities, balance and gait, repeated falls, rehospitalizations, and dependence on caregiver assistance. A quantitative cohort study with 22,722 participants, found that 86% of hospitalized subjects had falls associated with a lack of caregiver availability and limited functional status [10]. Chase et al. (2020) examined hospital records and determined Hispanics in the home setting have more critical mean assistance with activities of daily living (3.53, SD 1.43) ( $p < .001$ ). Elements of the home environment such as fear of falling and unmet healthcare needs in the home cause fall risk factors which are associated with greater healthcare utilization and elderly fall-related emergency room visits. Emergency rooms are frequented by the elderly as they receive two million fall-related emergency rooms treatments annually [7].

A quantitative correlational study utilized patient evaluations and interviews to examine functional independence in community-dwelling older adults who receive home health services [17]. The study determined that functional limitations cause fear of falling and contribute to falling in the elderly ( $p = .001$ ) [17]. Currie (2008) indicated that functional limitations cause repeated falls and repeated falls cause increased hospitalizations and chances of rehospitalizations by 15% [18]. Studies concluded that one-third of elderly who fall require home safety measures and assistance with activities of daily living (ADL) to minimize incidence [12,10,19]. Minimizing incidence is essential as ten percent of the elderly who fall suffer from severe injury or fatal outcomes [15]. However, minimizing incidence requires the use of elderly fall prevention methods as home safety measures and ADL assistance thereby increasing direct and indirect medical costs. Florence et al. [20], conducted a quantitative quasi experimental regression analysis using a tracking methodology to evaluate fall-associated medical expenditures and found that older adult falls costs billions (95% CI). A substantial amount of federal funds, fifty billion, are spent annually on fall-related direct medical costs with 75% of cost covered by Medicare and Medicaid creating a financial burden on society [1].

Cost may be substantial, but the elderly require home assessments, and the community-based programs that serve the elderly must offer fall prevention solutions for them in their setting. A literature review conducted to understand fall determinants and public health solutions concluded that efforts are needed to engage professionals and organizations such as HHA's to address falls because older adults are not targeted for fall prevention interventions [21]. In outpatient settings, professionals and organizations such as HHA's lack completing assessments in identifying fall hazards,

putting the elderly at risk [12,10,16,17,22]. Professionals and organizations should reduce fall risk in the home as home safety is just as crucial as hospitalization, and interventions that do not include HHA's nurses to prevent falls in the elderly are dangerous [23]. Adoption of a fall policy by community-based programs as HHAs meets their regulations and clinical practice guidelines. The current home care regulations and clinical practice guidelines require that HHA's policies and procedures monitor, track, and analyze falls [24]. Guidelines also recommend that organizations implement EBP fall programs to engage nurses to utilize when identifying elderly risk factors, strategies, and assessment tools to minimize fall risk [25,26] (CDC, 2021). The USPSTF, recommends and evaluates evidence-based practices of preventing disease and prolonging life using an A to D grade category, with A being highly recommended. The USPSTF [26] categorizes falls as a grade B, meaning that fall interventions and clinician assessment in community-dwelling elderly is highly beneficial. In a cohort study, Lohman et al. [27] surveyed adults over the age of 65 ( $n=7392$ ). The study found that implementing a toolkit such as STEADI that identifies fall risk and coordinates clinical and community-based fall prevention practice is essential. Categorizing elderly, utilizing STEADI, as having moderate and high fall risk are 4 to 13 times more likely to report multiple falls than low risk individuals [27]. Studies indicated that categorizing individuals with fall risk factor levels using the STEADI toolkit allows for proactive actions in preventing incidence and hospitalizations. Literature supported the need to conduct this quality improvement (QI) project. Practice and clinical guidelines support using the STEADI toolkit for nurse use in CDHE fall prevention [10,12,25,26,28,19].

### **Problem Description in the Setting**

The practice location is a for-profit privately owned South Texas home health agency which employs Licensed Vocational (LVN) ( $n = 4$ ) and Registered Nurses (RN) ( $n = 4$ ) who service the HHA's 98% CDHE population. The HHA's location is in a city that has a 95.4% Hispanic population, and nearly 27% of this population lives below the Federal poverty level [29]. A query of the institution's CMS Home Health Compare report indicated an increase in falls from 3.23% in 2020 to 7.14% in 2021. The national average is 8.13%. The HHA's electronic healthcare record (EHR) software system indicated that of all the CDHE served by the agency, seven fell in 2020, averaging 1.75 falls per quarter, and 15 fell in 2021, averaging 3.75 falls per quarter. Even though the agency's fall rate was below the national average, it did not meet its fall goals in 2021 to decrease quarterly fall occurrence by 25%. A retrospective query of the HHA's QI measures and EHR discovered that no consistent fall educational or systematic identification and assessment process existed. Failure to address QI measures may result in poor patient outcomes, agency penalties, and sanctions [30].

## **Project Purpose**

The HHA lacked a consistent fall program and a single instrument for nurses to identify older adults accurately and feasibly at increased risk for falls, did not exist. Despite the existence of EBP such as STEADI, nurses in home health care are not using risk assessments, protocols, and education to manage falls [8]. This project aimed to implement STEADI, improve nurses' knowledge and practice and reduce falls in the CDHE population. The project answered the following question: In nurses aiming to prevent fall incidences in home health care, does implementation of use Stop Elderly Accidents, Death, and Injury (STEADI) protocol, as compared to the existing home health fall prevention program, improve nurse's knowledge and practice and reduce falls in the Community-Dwelling Hispanic Elderly (CDHE) during a three- month project period? It utilized evidenced-based findings in determining improvement in nurses' fall knowledge for care delivery approaches related to the fall prevention of the CDHE population. This project used EBP (STEADI) for organizational change in nurse education to foster competencies and develop goals for fall-related outcome-based performance and management. STEADI was used as an organization-wide quality health measure to ensure policy compliance and facilitate staff/patient education, health promotion, and risk identification.

## **Project Aims**

The primary goal of this DNP project was to improve nurses' fall knowledge and practice and reduce CDHE falls by the end of the project period. This QI project had three specific improvement outcomes. The first was to improve the HHA nurses' fall prevention knowledge post-STEADI education by 10% of the baseline score. The second was to improve nurses' use of EBP (STEADI) fall assessments by 30% by the end of the three-month project period. The third was to decrease the CDHE quarterly fall rate by a 25% by the end of the three-month project period.

## **Guiding Frameworks**

The project's guiding frameworks were Quadruple Aim Model and the Pender's Health Promotional Model (HPM). The conceptual framework, the Quadruple Aim Model, is a theory that supports the improvement of patient and provider experience and

outcomes, advancement of population health, and cost reduction [31]. The authors Bodenheimer and Sinsky (2014) [31] explain the Quadruple Aim Model optimizes healthcare systems' performance and aims to improve the work of clinicians and staff. The theoretical framework in defining the project's phenomena was Pender's HPM. Nola J. Pender first developed the HPM, a middle-range theory, in 1982 and revised its perspectives and empirical findings in 1996 [32,33] (Nursing- Theory.org, 2016). Pender used the expectancy-value theory and the social cognitive theory in developing the HPM (Pender, 2011) [33]. This conceptual model is a framework for nursing protocols and interventions and was applied to this project as it assesses biological, psychological, and sociocultural factors and prior related behavior. The model guided the fall project in the behavioral outcomes of the nurses because nurses make up a part of the interpersonal environment and influence people throughout their lifespan in reducing falls.

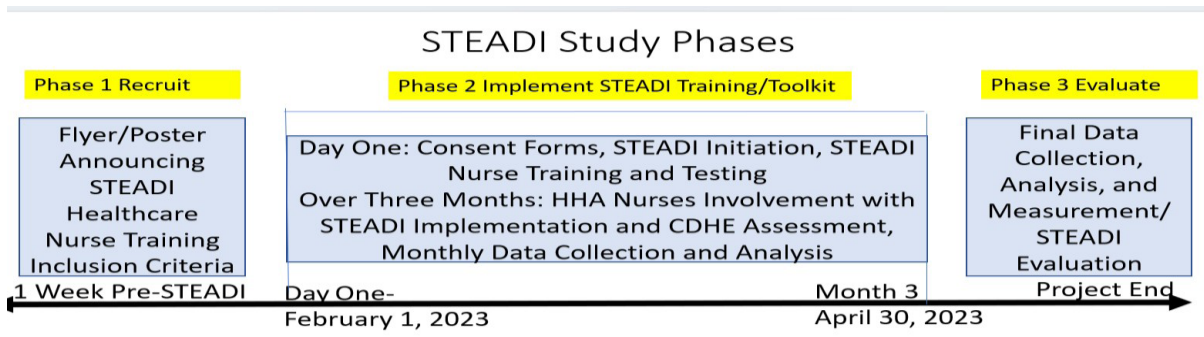
## **Methods**

### **Project Design**

The project design is Quasi-Experimental with a Quality Improvement Initiative. This DNP project used quantitative pre-/post-tests, EHR chart review, and participant feedback surveys. This project plan was reviewed by the Texas A&M University-Corpus Christi Institutional Review Board (IRB) for project/study classification and this DNP project was determined to be exempt under the Exempt Category 1 status.

### **Intervention**

A retrospective facility budget was conducted as well as a gap analysis, risk, and forcefield analysis. The facility's gap analysis identified a need for a formal and consistent nurse EBP fall educational program. The facility's risk assessment determined potential barriers that could have affected the success of this project. The project utilized three phases: (1) pre- project activities such as identifying nurses within the HHA that meet inclusion criteria (2) initiating the process of educating HHA nurses about fall prevention using the STEADI toolkit online training and evaluating knowledge pre and post training (3) monitoring project adherence, data collection and analysis, and assess the project's impact on the nurses and CDHE population, as seen in Figure 1.



**Figure 1:** STEADI Study Phases and Timeline; Note: Figure depicts project phases and timeline between February 1, 2023, to April 30, 2023.

The budget provided the project projected cost. Potential barriers to this improvement project included cost, time, and limited participation, identified in the facility’s force field analysis. Testing schedule and adherence timeline are seen in Figure 1. The project team consisted of the project director. The project director approached every possible participant, provided contact information, and conducted and oversaw project activities. These activities included obtaining consent forms, maintaining confidentiality and security, documenting, analyzing, and reporting the project’s fall-related data. Details of the project relayed to participants by the project director included voluntary participation and withdrawal, reimbursement, and participation expectations. Lastly, the project director was available throughout the project.

A week before project initiation, the project director initiated the project recruitment. Posters and flyers were displayed and located in the agency lobby and contained the same information. The project director approached potential participants at the HHA’s lobby to determine participation interest. All nurses, RNs and LVNs (n=8), and the HHA’s CDHE were approached and informed about the project and its expectations and asked if they were interested in participating. Nurses and CDHE that agreed, were provided with a voluntary participation consent form for completion before project initiation. The participants received written and verbal instructions, and a randomly drawn personal

identifier to use in place of their names. The project documents were retained and accessible only to the project director for the required duration.

To reduce elderly fall rates, experts recommend nurses STEADI train and use its EBP interventions in an effort to decrease fall rates, improve fall prevention awareness, and provide families the tools to keep their loved ones safe [10,12,24,25,26,27,28,19]. STEADI incorporates the American and British Geriatrics Societies’ Clinical Practice Guidelines for fall prevention. STEADI’s three elements are that nurses’ screen patients for fall risk, assess modifiable risk factors, and intervene to reduce risk using effective clinical and community strategies, as seen in Figure 2. STEADI toolkit includes an education component to improve the HHA nurse’s fall knowledge and practice (assessment, instruction, and documentation) and reduce CDHE fall incidence (see Figure 2). The home health nurses completed the pre-test, underwent STEADI training, then completed the post-test on day one. The pre-/post-test result data from day one was collected and analyzed by the project director. The participants learned, implemented, and performed the STEADI algorithm in their daily routines on CDHE documenting assessment, falls, treatments, and referrals in the EHR for the remainder of the project period. The project director collected data throughout the project completing data analysis on the last day of the project period.

STEADI Algorithm for Fall Risk Screening, Assessment, and Intervention among Community-Dwelling Adults 65 years and older

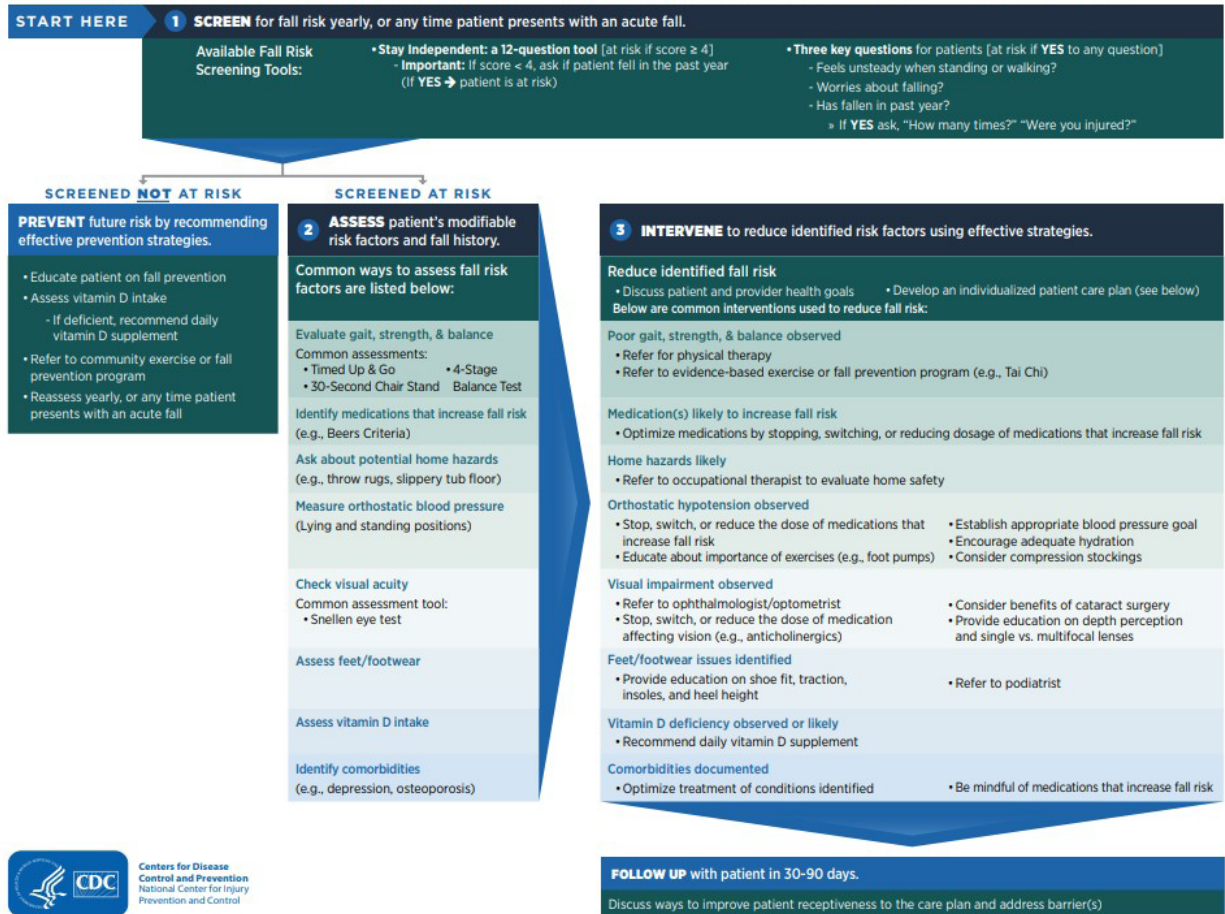


Figure 2: STEADI Algorithm; Note: Algorithm form the Centers for Disease Control and Prevention National Center for Injury Prevention and Control. 2019. <https://www.cdc.gov/steady/pdf/steady-algorithm-508.pdf>.

Results

Data Collection

This project used pre/post-tests, participant feedback surveys, and a cumulative fall report. No personal identifying data was included in the study; thus, confidentiality was ensured. The project director collected data, secured confidential documents in sealed envelopes, and stored them in a locked file cabinet in a locked private office within the facility. The project director accessed the facility's EHR system using password-encrypted limited access. Primary data collection consisted of STEADI: Older Adult Fall Prevention Online Course -Pre/Post-Test, the CDC's post-STEADI training evaluation, and the HHA's average of three months (November 1, 2022-January 31, 2023) fall rate. Secondary Data Collection consisted of pre-STEADI training Home Health Survey, the preceding year's (2022) documented fall assessments, therapies, current documented STEADI assessments, fall incidence data, related treatments, and referrals.

Measurement Tools

This project's measurement tools comprised surveys, tests, a training evaluation, EHR fall rates, and fall assessment data. Measurement tools included: the pre-STEADI training Home Health Survey retrieved from the Agency for Healthcare Research and Quality (AHRQ) [7, 34], the pre/post-test from the CDC's STEADI toolkit STEADI: Older Adult Fall Prevention Online Course, and the post-STEADI training Participation Survey from the World Journal of Emergency Surgery [35], Permission was obtained for their

use prior to beginning the QI project. STEADI tools and materials are publicly available and its validity is supported through statistical data. Lohman et al. [27] gathered cohort data from five annual rounds (2011-2015) on adults aged 65 and older from the National Health and Aging Trends Study to evaluate the predictive utility of STEADI. They found that STEADI has a 95% CI on estimating fall risk. Johnston et al. [36] conducted a quantitative cohort study, examined the effects of STEADI and found that older adults with a fall prevention plan of care are 0.6 times less likely to have fall-related hospitalization than those without one ( $p=.041$ ). These evidenced-based tools provide a roadmap to implement fall prevention interventions and employee training. Greater patient safety awareness through pre-post testing, decrease fall incidences, results will determine the efficacy of both tools used and project outcome achievement [37].

## Implementation

The three project phases were implemented immediately prior to and during the project's three-month period: identifying the project's key nursing staff, conducting staff training, and analyzing monthly patient fall report data. The facility employs different disciplines; however, only RNs and LVNs ( $n=8$ ) were approached for this project. The group consisted of eight nurses servicing the CDHE population.

The pre-STEADI training Home Health Survey retrieved from the AHRQ [34] was used to analyze the nurses' demographics and perception of the agency's current educational and clinical process. The test results evaluated participants' knowledge and the effects of the STEADI training. Paired sample t-tests measured the impact of STEADI on participants, CDHE, and the organization's need to sustain change through the adoption of new protocols using the STEADI toolkit beyond the three-month period. Paired Sample t-Test was completed for the pre-versus post-STEADI: Older Adult Fall Prevention Online Course Test, which measured the difference of test baseline scores amongst nurses. Data collection of CDHE fall assessments performed pre- versus post- STEADI education calculated the difference of pre-versus post-STEADI fall assessments conducted for the CDHE population. Lastly, pre-versus post-program CDHE fall rate analysis measured the difference of pre-versus post-program CDHE fall statistics. Key risk factors for patient screening related to modifiable and future fall risk prevention strategies identified for the HHA's use of the STEADI Algorithm and fall risk assessment tool were retrieved from the survey. The central tendency identified specific inclusion characteristics for participants using score distribution mode and mean for those at greater risk for falls. HHA's utilization of the STEADI toolkit for fall risk assessments combined with the implementation preventive measures for those identified at higher risk provided a snap shot of how the nurses' interventions positively impacted patient safety. The project's timeline of implementation

phases and data evaluation of the project's impact on decreased patient fall rates and the HHA's vision for future practice and policy sustainability going forward.

## Data Analysis

Data analysis consisted of the pre/post-STEADI comparison. Urban et al. [38], a mixed method study, identified that pre-post-test comparisons are valid in evaluating knowledge. Studies indicate that comparison of program results are indicators of nurse training and application of knowledge to practice [12,24,39,27,15,40].

## Pre-Data Analysis Screening

A paired-sample t-test was used to determine whether there was a statistically significant mean difference between the HHA nurses' fall prevention knowledge post-STEADI education compared to the HHA nurses' fall prevention knowledge pre-STEADI education. There were no outliers in the data, as assessed using a boxplot with a threshold of values greater than 1.5 box lengths from the edge of the box considered outliers. The difference in scores for the prevention knowledge pre-STEADI and prevention knowledge post-STEADI were normally distributed as assessed by Shapiro-Wilk's test ( $p = .557$ ).

## Objectives

This project aimed to utilize STEADI to improve nurses' knowledge and practice and reduce falls in the Community-Dwelling Hispanic Elderly (CDHE) population. The first objective was to improve the HHA nurses' fall prevention knowledge post-Stop Elderly Accidental Death and Injury (STEADI) education by 10% of the baseline score. A convenience sample of nursing personnel were recruited and consented to participate in completing the STEADI: Older Adult Fall Prevention Online Course -Pre-test, online STEADI training, and post-test administered by the project director. The sample description, variable, and collection data were collected. The sample consisted of eight nurses ( $Mage = 46.75$ ), both males and females, who were either licensed vocational nurses (LVNs) or registered nurses (RNs). The years of experience varied across all nurses ( $M = 17.25$ ,  $SD = 9.36$ ), with LVNs having, on average, more experience than RNs. Similarly, the years of home health experience varied across all nurses ( $M = 5.88$ ,  $SD = 8.73$ ), with LVNs having, on average, more years of home health experience than RNs. Paired-sample t-tests were completed for the pre-versus post-STEADI: Older Adult Fall Prevention Online Course Test, which measured the difference of test baseline scores. HHA nurses' fall prevention knowledge post-STEADI education score ( $M = 98.75$ ,  $SD = 3.54$ ) increased compared to the HHA nurses' fall prevention knowledge pre-STEADI education score ( $M = 62.50$ ,  $SD = 12.82$ ), with a statistically significant mean score increase of 36.25, 95% CI [24.48, 48.02],  $t(7) = 7.283$ ,  $p < .001$ ,  $d = 2.58$  (Table 1).

Pre/Post-STEADI T-Test Time Difference	M	SD	SE	95% CI		t	df	p	Cohen's D
				Lower	Upper				
Aim 1: Met Online Training STEADI Post Test Results - STEADI Pre Test Results	36.25	14.079	4.978	24.48	48.02	7.28	7	<.001	2.58
Aim 2: Met Fall Assessments STEADI Post Test Results - STEADI Pre Test Results	30	6.25	3.6	14.49	45.51	8.321	2	0.007	6.25
Aim 3: Met CDHE Falls STEADI Post Test Results - STEADI Pre Test Results	-1.67	0.577	0.3	-3.1	-0.232	-5	2	0.019	0.577

**Table 1:** STEAI Study Results; Note: STEAI study results between February 1, 2023, to April 30, 2023.

The second objective was to improve nurses' use of evidenced based practice (EBP) (STEADI) fall assessments by 30% by the end of the three-month project period. A paired sample t-test was used to compare the difference between performed nursing assessments on the community-dwelling Hispanic elderly (CDHE) pre-versus post-STEADI training. The t-test concluded a significant difference between the assessments conducted by nurses pre- versus post- STEADI education. Eight or one hundred percent (100%) of the nurses at the HHA participated in the implementation of STEADI. Forty-six or one hundred percent (100%) of the CDHE at the HHA participated in the STEADI fall assessments performed by the nurses. The CDHEs were half male and female. All the elderly who participated (n=48) were Hispanics above the age of sixty-five (n=48), mean age of 76 years (range 60-93), received assistance with activities of daily living (ADL) (95%), had polypharmacy (90%), and used adaptive aids (76%). All patients had chronic conditions, comorbidities, difficulty leaving their home without assistance, and were under a physician's care.

The CDHE fall rate pre (November 1, 2022, to January 31, 2023) versus post (February 1, 2023, to April 30, 2023) STEADI implementation analysis indicated that from November 1, 2022, to January 31, 2023, there were fifty-four fall assessments, with all assessments conducted by RNs. From February 1, 2023, to April 30, 2023, there were one hundred forty-four fall assessments, with a majority (56%) of assessments conducted by LVNs compared to RNs (44%), thus, positively affecting the fall assessment behavior in nurses. Using the percent change equation  $((V2-V1)/V1)$ , there was a 167% percent increase between the number of fall assessments before and after STEADI implementation. Further used was a directional paired t- test (one tail) to investigate if there was a statistically significant difference in the average falls assessments before and after STEADI implementation. Results showed a difference in the average falls assessments (M = 30),

with a statistically significant mean difference,  $t(2) = 8.321, p = .007$ . In other words, there was a statistically significant difference in that the average number of fall assessments increased from pre (M = 18, SD = 3.46) to post (M = 48, SD = 3) (Table 1).

Lastly, the third project aim was to decrease the CDHE quarterly fall rate by a 25% by the end of the three-month period (February 1, 2023, to April 30, 2023) STEADI implementation. The CDHE fall rate pre (November 1, 2022, to January 31, 2023) versus post (February 1, 2023, to April 30, 2023) STEADI implementation analysis indicated that from November 1, 2022, to January 31, 2023, there were seven (7) falls, two (2) were repeat falls and one (1) fall resulted in severe injury with hospitalization by a patient with a history of repeated falls. From February 1, 2023, to April 30, 2023, there were two falls. Using the percent change equation  $((V2 - V1)/V1)$ , there was a 71% percent decrease between the number of falls before and after STEADI implementation. These results suggest STEADI nursing education, based upon evidence, positively affects fall reduction in home health care over a short period. A paired t-test was used to investigate if there was a directional paired t-test (one tail) in the average falls before and after STEADI implementation. Results showed a difference in the average falls (M = -1.67) with a statistically significant mean difference,  $t(2) = -5.00, p = .019$ . In other words, there was a statistically significant difference in that the average number of falls decreased from pre (M = 2.333, SD = .577) to post (M = .667, SD = .577) (Table 1).

## Discussion

### Limitations

The nurses' knowledge, application of fall assessment skills, and the desire to prevent falls fueled the nurses' dedication to decrease falls for CDHE. The greatest challenge was a lack of patient awareness of their fall risk and a lack of consistent fall



risk assessments conducted by facility nurses. Most CDHE were Spanish speakers and one hundred percent (100%) of the nurses were fluent in speaking, reading, and writing in English and Spanish; therefore, language barriers did not influence their ability to educate or care for the CDHE. However, training and testing barriers were especially challenging on the first day of employee training, posing a potential threat to the success of the project. The facility's willingness to allow flexibility with the testing schedule, concessions to adhere to budget constraints, and altering timeline mitigated challenges helped avert implementation delays. Developing trusting relationships with nurses at all levels and the CDHE population encouraged a positive working partnership for fall prevention interventions in the CDHE's homes during the implementation period. Over three months, one hundred percent (100%) of the HHA nursing staff participated in the educational process and implementation of fall prevention measures for the CDHE population. Within that timeframe, the STEADI-educated nurses reduced falls by 71%. To further support facilitation of the projects training process, training costs were allocated to the facility's budget with limitations set allowing the nurses to be trained during their regularly scheduled work hours.

### **Interpretation**

There are three main recommendations for CDHE fall prevention in home health care: (1) every nurse is recommended to participate in the fall education and prevention process to be knowledgeable and prudent using STEADI (2) as explained by Waxman [41], support and compliance from the facility's leaders, coalition activist, employees at all levels, and key stakeholders are necessary for project sustainability (3) communication is needed to sustain a project plan (AHRQ, 2017). A continuum of communication about fall related practice and care is recommended for the nurses and all who care for the CDHE.

The facility had eight nurses, and all nurses were expected to participate, online web- based training via the CDC website was utilized to mitigate the shortage of nurses. The web- based training accommodated schedule variables and the number of nurses testing simultaneously. Mitigation plans including clarification and explanation of project purpose, goals, and benefits are recommended [41,42]. Mitigations to the project's barriers were adherence to budget, avoidance of waste, flexibility with training schedules, and project timeline adherence.

The HHA test results and fall rates determined the STEADI training effects on the agency and the need to revise training information, materials, and procedures. The project's findings were disclosed to the agency facilitator and reported to the agency leaders. The AHRQ (2017) identifies that STEADI is effective in a fall quality improvement (QI) system.

Information sharing with key stakeholders to meet policy requirements, guideline compliance, and QI activities that monitor

outcomes ensures sustainability (AHRQ, 2017). Necessary measures to sustain change in this facility is the adoption of a fall-related QI, policy, procedure, vision, and mission. Change to policy strategies include a systematic evidence-based fall-related process [43,16,44]. This project will continue to evolve and improve based on evidence through replication. Tests and survey results will determine the HHA's future development of STEADI training [45]. Further studies to assess the impact of fall related EBP education and nurse knowledge on elderly falls is needed.

### **Sustainability Plan**

For sustaining CDHE fall prevention measures, the HHA shares its vision and mission with the support and compliance of its key stakeholders, the agency's leaders, coalition activists, and employees at all levels. To ensure continual and consistent fall identification and prevention measures, the HHA adopted policies and procedures, including the STEADI toolkit. For a systematic fall prevention clinical practice maintenance, the HHA adopted an educational nurse STEADI training policy, including nursing staff refresher training during orientation for new nurses and annually for current nursing staff. To systematically identify and address fall patterns and risk, the HHA adopted a long-term quality initiative that tracks, analyzes, and evaluates fall incidence, rate, and outcome, and results are presented to key stakeholders quarterly.

### **Implication for Change**

An evaluation of elderly patient fall-associated medical expenditures cost billions (95% CI) [20]. An estimated fifty billion dollars in federal funds are spent annually on fall-related direct medical costs, with 75% of the cost covered by Medicare and Medicaid [1]. Studies identify STEADI as an effective fall protocol for current and future home health use and can consistently reinforce nursing practice and facility policy [16]. The STEADI toolkit includes EBP handouts, tools, and techniques that home health can adapt to meet policy and practice guidelines and reduce costs [42]. According to guidelines, HHA organizations should implement EBP fall programs that engage nurses in identifying elderly risk factors, strategies, and assessment tools to minimize fall risk [25,26,7]. Reducing falls can reduce costs. CDHEs are experiencing substantial falls that negatively impact their health, independence, and cost. The findings of the implementation of the STEADI toolkit enhanced nurse training and CDHE fall assessments and improved the agency's CDHE fall outcomes by 71%. Interestingly, educating nurses with EBP fall training increased nurse knowledge and practice and reduced falls over ninety (90) days. This project has impacted the overall facility's healthcare practice by using evidence-based training practices for policy development. Comparing various types of fall-related EBP education on the impact on nurses' knowledge would be interesting. Other fall-related educational sources to explore are home modifications and information technology.

## Conclusion

Initiating EBP in CDHE fall prevention training and interventions consists of: 1) identifying fall risk using EBP (STEADI) education, application, and implementation [8,23,28], 2) using effective clinical and community strategies, to eliminate risk factors in patients' environment [7,10], and 3) incorporating care coordination efforts using an interdisciplinary approach with therapy, specialist referrals, adaptive aids, and community resources [8, 21]. Using STEADI in this project incorporated training and interventions needed to ensure that the HHA met regulatory guidelines for improved healthcare practice. Most importantly, this project improved the CDHE care, quality of life, and their outcomes. The project identified that fall risk assessment is essential in ensuring safe nursing practice while improving patient care, and is also beneficial for a CDHE improved quality of life free from fall-related injuries or fatalities. Millions of dollars could be saved if one hundred percent (100%) of home health nurses participated in an evidence-based fall program such as STEADI. Using STEADI as an educational tool to improve the nurse's fall knowledge and practice was imperative to reduce fall rates through screening. Through collaboration and teamwork with patient safety at the core of this quasi-experimental quality improvement DNP project, STEADI, positively influenced the nurses' knowledge and application into practice. This project's intervention decreased CDHE falls and laid the foundation for the HHAs compliance with CMS quality standard to reduce falls in the home health elderly population.

## Acknowledgement

I thank Texas A&M University-Corpus Christi, particularly Dr. Tammy Walker-Smith, for the support and guidance that made this study possible. I sincerely appreciate the Home Health Agency, its patients, staff, and brave nurses who agreed to participate in this study, aspired to enrich their knowledge, protect older adults from falls, and improve the well-being of others.

## Ethical Considerations

This project collected personal health information and was HIPAA compliant. For project site allocation and planning, the HHA Medical Director provided a letter of support.

## Conflict Of Interest

There are no potential conflicts of interest that may influence the results or interpretations of the manuscript.

## References

1. Americas Health Ranking United Health Foundation. (2021a). Falls-65\*.
2. National Center for Health Statistics (2021) 2019 United States unintentional injuries. Centers for Disease Control and Prevention.
3. Centers for Disease Control and Prevention (2020a) Older adult falls reported by state.
4. Centers for Disease Control and Prevention (2020c) Trends in nonfatal falls and fall related injuries among adults aged ≥65 years - United States, 2012-2018.
5. Americas Health Ranking United Health Foundation. (2021b). Senior data.
6. Mielenz TJ, Kanno S, Jia H, Pullyblank K, Sorensen J, et al. (2020) Evaluating a two-level vs. three-level fall risk screening algorithm for predicting falls among older adults. *Frontiers in Public Health* 8: 373.
7. Centers for Disease Control and Prevention (2020b) STEADI for professional's education.
8. US Preventive Services Task Force (2018) Interventions to Prevent Falls in Community Dwelling Older Adults: US Preventive Services Task Force Recommendation Statement. *J Americ Med Assoc* 319: 1696-1704.
9. Rajagopalan R, Litvan I, Jung TP (2017) Fall prediction and prevention systems: Recent trends, challenges, and future research directions. *Sensors (Basel)* 17: 2509.
10. Chase JD, Russell D, Huang L, Hanlon A, O'Connor M, et al. (2020) Relationships between race/ethnicity and health care utilization among older post-acute home health care patients. *J Appl Gerontol* 39: 201-213.
11. Centers for Medicare and Medicaid (2020 02a). Home Health Quality Reporting Program.
12. Alamgir H, Muazzam S, Nasrullah M (2012) Unintentional falls mortality among elderly in the United States: Time for action. *Injury* 43: 2065-2071.
13. Hakvoort L, Dikken J, van der Wel M, Derks C, Schuumans M (2021) Minimizing the knowledge-to-action gap; Identification of interventions to change nurses' behavior regarding fall prevention, a mixed method study. *BMC Nursing* 20: 80.
14. Cho My, Jang SJ (2020) Nurses' knowledge, attitude, and fall prevention practices at south Korean hospitals: A cross-sectional survey. *BMC Nursing*, 19: 108.
15. Phelan EA, Mahoney JE, Voit JC, Stevens JA (2015) Assessment and management of fall risk in primary care settings. *Med Clin of North Am* 99: 281-293.
16. Hanlin ER, Delgado-Rendón A, Lerner EB, Hargarten S, Fariás R (2013) Fall risk and prevention needs assessment in an older adult Latino population: A model community global health partnership. *Prog Community Health Partnersh* 7: 191-199.
17. Gonzalez EC, Lawson KA (2014) The impact of fear of falling on functional independence among older adults receiving home health services. *The Open Journal of Occupational Therapy* 2: 1.
18. Currie L (2008) Fall and injury prevention. In: R. G. Hughes. (Ed.), *Patient safety and quality: An evidence-based handbook for nurses* 195-250.
19. Sears N, Baker GR, Barnsley J, Shortt S (2013) The incidence of adverse events among home care patients. *Int J Qual in Health Care* 2: 16-28.
20. Florence CS, Bergen G, Atherly A, Burns E, Stevens J, et al. (2018) Medical costs of fatal and nonfatal falls in older adults. *J Am Geriatr Soc* 66: 693-698.

21. Frieson CW, Tan MP, Ory MG, Smith ML (2018) Editorial: Evidence-based practices to reduce falls and fall-related injuries among older adults. *Front Public Health* 6: 222.
22. Homann B, Plaschg A, Grundner M, Haubenhofer A, Griedl T, et al. (2013) The impact of neurological disorders on the risk for falls in the community dwelling elderly: A case-controlled study. *BMJ Open* 3: e003367.
23. Romagnoli KM, Handler SM, Hochheiser H (2013) Home care: More than just a visiting nurse. *BMJ Qual Saf* 22: 972-974.
24. El-Khoury F, Cassou B, Dargent-Molina P (2013) The effects of fall prevention exercise programmes in fall induced injuries in community-dwelling older adults: Systematic review and meta-analysis of randomized controlled trials *Bri Med J* 347: f6234.
25. American Geriatric Society (2010) AGS releases guideline for prevention of falls in older persons. *Family Physician*, 81: 81-81.
26. US Preventive Services Task Force. (2017). Fall prevention in community-dwelling older adults: Interventions. US Preventive Services Task Force Final Recommendation Statement. *JAMA* 319: 1696-1704.
27. Lohman MC, Crow RS, DiMilia PR, Nicklett EJ, Bruce ML, et al. (2017) Operationalisation and validation of the stopping elderly accidents, deaths, and injuries (STEADI) fall risk algorithm in a nationally representative sample. *J Epidemiol Community Health* 71: 1191-1197.
28. Mora Pinzon M, Myers S, Jacobs EA, Ohly S, Bonet-Vázquez M, et al. (2019) "Pisando Fuerte": An evidence-based falls prevention program for Hispanic/Latinos older adults: Results of an implementation trial. *BMC Geriatrics* 19: 258.
29. U.S. Census Bureau (2019) Quick facts Webb County Texas.
30. Schildmeijer K, Unbeck M, Ekstedt M, Lindblad M, Nilsson L (2018) Adverse events in patients in home healthcare: A retrospective record review using trigger tool methodology. *BMJ Open* 8: e019267.
31. Bodenheimer T, Sinsky C (2014) From triple aim to quadruple aim: Care of the patient requires care of the provider. *Ann Fam Med* 12: 573-576.
32. Centers for Disease Nursing-Theory.org. (2016) Nola Pender - Nursing Theorist.
33. Pender N (2011) The health promotion model manual.
34. Agency for Healthcare Research and Quality (2013) Preventing falls in hospitals: A toolkit for improving quality of care.
35. *World Journal of Emergency Surgery* (2021) Questionnaire post training post evaluation.
36. Johnston YA, Bergen G, Bauer M, Parker EM, Wentworth L, et al. (2019) Implementation of the stopping elderly accidents, deaths, and injuries initiative in primary care: an outcome evaluation. *Gerontologist* 59: 1182-1191.
37. Taing D, McKay K (2017) Better strength, better balance! Partnering to deliver a fall prevention program for older adults. *PubMed.gov. Can J Public Health* 108: e314-e319.
38. Urban K, Wright PB, Hester AL, Curran G, Rojo M, et al. (2020) Evaluation of an education strategy versus usual care to implement the STEADI Algorithm in primary care clinics in an academic medical center. *Clin Interv Aging* 15: 1059- 1066.
39. Gillespie LD, Robertson MC, Gillespie WJ, Lamb SE, Gates S, et al. (2012) Interventions of preventing falls in older people living in the community. *Cochrane Database syst Rev* 9: CD007146.
40. Yang K, Colorito KM, Bowles KH, Woomeer GR, Murtaugh CM (2019) Home care providers' experience of translating evidence-based fall prevention programs into practice. *Home Health Care Serv Q* 38: 182-193.
41. Waxman KT (Ed) (2017) Financial and business management for the nurse practitioner (2nd ed.). Springer.
42. Control and Prevention. (2017) Important facts about falls.
43. Centers for Disease Control and Prevention (2019) Stop elderly accident death and injury.
44. Moran K, Burson R, Conrad D (2017) The doctor of nursing practice scholarly project. A framework for success (3rd ed.). Jones & Bartlett Learning.
45. Centers for Medicare and Medicaid (2020 01b) Home Health Star Rating System.
46. Centers for Medicare and Medicaid (2018) Center for clinical standards and quality/quality, safety & oversight group.
47. Agency for Healthcare Research and Quality. (2022). Preventing falls in hospitals.