Effects of the Coordinated Transitional Care (C-TraC) Intervention on Hospital Readmission Rates Among Veterans Enrolled in the Montana Veterans Health Administration

by

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Abstract

Hospital readmissions are a source of physical and economic burden to patients and the healthcare system. Factors such as age, admitting diagnosis, and geographic location increase the patient's risk for hospital readmission during the transition from hospital to home following an admission for a severe or chronic illness. Implementing the evidence-based, nurse-driven Coordination Transition of Care (C-TraC) intervention has been shown to decrease readmission rates for those identified at high-risk for readmission. A quasi-experimental study design using a pre- and post-intervention comparison was implemented and assessed to determine if the C-TraC intervention would impact hospital readmission rates of veterans identified as high-risk for readmission within 30 days of hospital discharge in the Montana Veterans Healthcare System (MVHS). Pre- and post-implementation MVHS data were collected from the Veteran Administration (VA) Strategic Analytics for Improvement and Learning (SAIL) database. The data were analyzed using a Chi-Square test to evaluate if implementation of the C-TraC intervention post-discharge influenced hospital readmission rates. The results are promising early in the project study (p = .083), but do not show a statistically significant association at p = <0.05. Continued use of the C-TraC intervention in MVHS over an extended period will allow for further evaluation. If the initial data pattern continues, it would follow a trajectory comparable to previous studies, and prove to be statistically significant in reducing readmission rates.

Keywords: transition of care interventions, reducing readmissions, readmission risk factors, Veterans Administration, PACT nurse.

Contents

Chapter 1: Introduction

Hospital readmissions in the United States create significant emotional, physical, and financial burdens to individuals and the healthcare system (HealthStream, 2021). An evidence-based focused transition of care (TOC) intervention was implemented to reduce the readmission rates of Montana veterans enrolled in the Veterans Administration (VA) healthcare system and alleviate some of the associated burdens (Acher et al., 2017; Kind et al., 2012; Kind et al., 2016; Reese et al., 2019). On October 1, 2012, the Affordable Care Act (ACA) introduced the Hospital Readmissions Reduction Program (HRRP) to reduce the number of patients readmitted to an acute care setting within 30 days of discharge (Centers for Medicare & Medicaid Services [CMS], 2021c; U.S. Department of Health and Human Services, 2017). To encourage better post-discharge follow-up, and improve patient outcomes, the HRRP began requiring CMS to reduce reimbursement to acute care facilities by up to 3% for higher-than-expected readmission rates for specific diagnoses (Kaiser Health News & Rau, 2021; McIlvennan et al., 2015; U.S. Department of Health and Human Services, 2020). McIlvennan et al. (2015) reported prior to the implementation of HRRP almost 20% of the patients defined as Medicare admissions had a readmission within 30 days of discharge. Despite HRRP efforts to reduce readmission numbers and cost, 2018 nationwide data revealed 3.8 million readmissions occurred in public hospitals within 30 days of discharge (14% per 100 admissions) at an approximate cost of $57,760,000,000 inclusive of self-pay, hospital write-offs, and insurance payments (Weiss & Jiang, 2018).

Readmission Risk

The transition from hospital to home following an admission for a severe or chronic illness has been identified as a period of increased risk for potentially avoidable hospital readmissions, particularly in vulnerable populations (Fisher et al., 2016; Kansagara et al., 2011). A readmission prompts nursing examination of care limitations and needs (Dizon & Renking, 2017; Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al., 2012; Kind et al. 2016). The nursing assessment findings assist the healthcare team members in providing necessary interventions for the most vulnerable patients to decrease hospital readmission rates and improve patient outcomes (Hamar et al., 2016; Kind et al., 2016).

Older age, residing in a rural geographic location, and certain hospital admission diagnoses have been identified as risk factors for unplanned hospital readmissions (Weeks et al., 2009). Older individuals often have comorbidities creating challenges when recovering from illness (Charles et al., 2020). Individuals residing in rural locations often lack access to primary and acute medical care making post-hospitalization follow-up difficult or sometimes non-existent (Gilmore-Bykovski et al., 2014; Kind et al., 2012; Weeks et al., 2009). The Agency for Healthcare Research and Quality (AHRQ) data identifies the following diagnoses with the highest readmission rates, in order from most to least: septicemia, heart failure (HF), diabetes mellitus with complications (DM-C), chronic obstructive pulmonary disease (COPD), pneumonia (PNA), and acute or unspecified renal failure (RF) (Weiss & Jiang, 2018). CMS currently reduces facility reimbursement for readmissions within 30 days of discharge for the following diagnoses: acute myocardial infarction (AMI), COPD, HF, PNA, coronary artery bypass graft (CABG), and elective total hip and knee replacement (CMS, 2021c; Krumholz et al., 2013).

Veterans Administration

Overview

The VA is the largest integrated healthcare system in the United States comprised of more than 9 million enrolled veterans, 1,293 facilities (including 171 inpatient medical centers), and over 350,000 employees (U.S. Department of Veterans Affairs, 2022a). There are healthcare systems in the United States with larger numbers in specific categories, but do not compare overall to the VA (HCA Healthcare, 2019; Kaiser Permanente, 2022).

Approximately 50% of veterans have or are eligible to receive Medicare (CMS, 2021b). Veterans with alternative health insurance options may choose to use the private sector for medical care (Farmer et al., 2016). CMS calculates hospital readmission rates using Medicare data from the private sector on patients 65 years and older (CMS, 2021a). The government agency status held by the VA prevents financial penalization for hospital readmission by CMS; however, the VA strives to meet or exceed Medicare guidelines (Anhang Price et al., 2018). To build trust among the veteran patient population, the VA began reporting data on readmission rates within VA medical centers to CMS in 2011 (CMS, 2021b).

Quality measures and performance are benchmarked quarterly by the VA with other VA facilities and the private sector (Anhang Price et al., 2018). Collected data is evaluated and reported through the Strategic Analytics for Improvement and Learning (SAIL) program (U.S. Department of Veterans Affairs, 2021).

The Montana VA Hospital System

The Montana VA Health System (MVHS) is inclusive of a singular VA acute care facility with 34 beds, located in Helena, MT (VA Montana Healthcare, 2021). The SAIL data collected from Fort Harrison VA Medical Center for fiscal year 2021 is inclusive of all admissions regardless of age and indicates a readmission rate of 10.67%, placing the facility in the 50th percentile when compared to all other VA hospitals in the United States (U.S. Department of Veterans Affairs, 2021). The average readmission rate reported by Montana private sector hospitals in 2021 for ages 65 – 74 only was 16% per 100 admissions, 2% higher than the national average (United Health Foundation, 2022). Given the 2021 data reported by MVHS was only for readmission to the Fort Harrison facility and CMS only calculated readmission rates for Medicare patients over 65, the combined impact likely resulted in Montana VA 2021 readmission rates of almost 4% less than the national average and 5.425% less than the state average were an under-representation (CMS, 2021b; United Health Foundation, 2022; U.S. Department of Veterans Affairs, 2021). The data represented validates the need for an evidence-based transitional care intervention to promote a consistent, systematic process for tracking data, and further reduce readmission rates (United Health Foundation, 2022; U.S. Department of Veterans Affairs, 2021). The nurse-driven Coordination Transition of Care (C-TraC) intervention, which has been used in other VA facilities, has been shown to decrease readmission rates for those identified as a high-risk for readmission (Acher et al., 2017; Driver et al., 2021: Gilmore-Bykovski et al., 2018; Kind et al., 2012; Kind et al., 2016).

Payment of Healthcare Services in the Public Sector

A veteran qualifies for payment of services at a non-VA facility if:

- The veteran lives more than 40 miles from the nearest VA facility providing needed services, and
- The veteran resides in one of the five states with the lowest population density.

(U.S. Department of Veterans Affairs, 2022b).

Since Montana is one of the five qualifying states with the lowest density, and 72% of Montana veterans live in a highly rural area, a large population of Montana veterans meet the criteria for the paid use of non-VA facilities (VA Montana Healthcare System, 2017). Access to non-VA facilities is a great benefit for Montana veterans, allowing easier access to care located closer to home. The logistics issue has presented challenges in collecting accurate data due to the lack of an electronic medical record interface between the private sector and the VA (U.S. Department of Veterans Affairs, 2023b). To overcome the identified challenges, the Montana VA recently hired liaison nurses for non-VA hospitals in Montana to facilitate communication and discharge planning (D. Reeser, personal communication, February 11, 2022). Mr. Reeser (personal communication, February 11, 2022) also noted liaison nurses notify the primary care team when a veteran is admitted to a non-VA hospital, but a formal process was not in place prior to implementation of the project study.

Patient Aligned Care Team (PACT) Model

Transitional care programs, both multidisciplinary and nurse-driven, have been shown to reduce hospital readmission rates when compared with routine standards of care (Chen et al., 2018; Griffiths et al., 2021; Hamar et al., 2016; Kind et al., 2012). Primary care within the VA uses a patient aligned care team (PACT) model providing an opportunity for process improvement to reduce readmission rates for Montana veterans (U. S. Department of Veterans Affairs, 2022b). All enrolled veterans using the VA for primary care work in partnership with members of an assigned PACT team (U. S. Department of Veterans Affairs, 2022b). PACT teams are comprised of a provider, care management registered nurse (RN), and an administrative assistant, with other ancillary staff included on an as-needed basis (U.S. Department of Veterans Affairs, 2022b). The PACT RN oversees and guides the care of the veterans on his or her assigned team (U.S. Department of Veterans Affairs, 2022b). Historically, the post-discharge follow-up practice has taken place only with admissions to the Montana VA hospital system due to a lack of integrated systemic communication between the VA system and non-VA healthcare facilities (U.S. Department of Veterans Affairs, 2022d). Unpublished raw data of post-hospitalization discharge follow-

up by PACT registered nurses at five Montana VA outpatient clinics showed inconsistent post-discharge communication (DenBleyker, D., 2022). Establishing an improved communication system and process utilizing the PACT model for Montana veterans recently discharged from acute care facilities was an integral part of the evidence-based coordinated transitional care (C-TraC) patient intervention for this project (Bertsimas et al., 2020; Dizon & Reinking, 2017; Finlayson et al., 2018; Kind et al., 2016).

Significance to Nursing

The American Association of College of Nursing (AACN) highlighted the significance of nursing actions in assisting patients to adapt and adjust to life and health circumstances with a focus on obtaining positive outcomes (AACN, 2006). A nurse-driven transitional care intervention aligns with the AACN quality standards. The implementation of this study supports the AACN position and exemplifies the Doctor of Nursing Practice (DNP) Essentials (American Association of College of Nursing, 2006). Study attributes include integrating knowledge and information into practice; leading change through quality improvement; and using evidence-based practice to improve practice and patient outcomes related to readmission rates (AACN, 2006).

Purpose Statement

The purpose of this quality improvement study was to determine if the implementation of a focused, evidence-based, transitional care patient intervention, for Montana veterans identified at high risk for readmission following discharge from an acute care facility, would reduce the number of readmissions within 30 days of discharge when compared with current practice.

Theoretical Framework

Self Care Deficit Theory (SCDT) Overview

Dorothea Orem's self-care deficit theory (SCDT) is part of a larger general nursing theory made up of three components: the theory of the nursing system, the theory of self-care, and the theory of self-care deficit (Hartweg, 1991). Orem developed her theory by examining the nursing profession and defining how the nursing role fits into healthcare, specifically, as it relates to patient care (Petiprin, 2021). Orem's general nursing theory answers what nurses do, what is produced by the nurse, and what results

nurses are seeking (Hartweg, 1991, p. 13). The SCDT is based on the premise nursing should promote the necessary education and support to help patients and caregivers achieve the goal of becoming independent in self-care (Petiprin, 2021).

The SCDT examines the self-care steps taken by individuals to maintain independence (Hartwig, 1991; Petiprin, 2021). The ability to remain independent can be influenced by many factors such as culture, environment, education, economics, situations, and/or circumstances (Hartweg, 1991). For example, an individual may have knowledge about smoking causing cancer, but not have the desire or motivation to quit due to cultural influence. Choices negatively impacting health may lead to issues decreasing the individual's ability to care for self and cause undue dependence on others (Hartwig, 1991). Individuals have the right to make independent choices not always in their best interest but can be educated to consider better alternatives (Petiprin, 2021). Using the lens of the SCDT, the nurse can assess the impact on an individual and/or family's ability to care for themselves and provide appropriate nursing interventions (Orem & Taylor, 2011). Nursing interventions provide the education, care, and support needed to help direct motivated individuals into actively participating in maintaining independence (Hartweg, 1991; Orem & Taylor, 2011).

The Self Care Deficit Theory (SCDT) and the Nurse

Self-care deficits may include age-related decline, chronic disease, or acute illness (Hartweg, 1991). Nursing support and guidance during periods of selfcare deficit has been shown to assist patients in returning to adequate levels of self-care (Attaallah et al., 2021; Söderhamn & Cliffordson, 2001). Nursing diagnoses are used in the SCDT to focus on the human effects of illness and evaluate how a situation impacts an individual's ability to care for themselves or someone else (Orem & Taylor, 2011; Renpenning et al., 2011). Transitions from acute care settings back to a patient's home, particularly in vulnerable populations, present increased risk for rehospitalization and prompts the nursing examination of care limitations and needs (Fisher et al., 2016; Kansagara et al., 2011; Robinson & Hudali, 2017; Weiss & Jiang, 2021). The SCDT recognizes the experience and education nurses possess, which culminate in the skill set needed for identification of potential risk factors during the transitional period

(Hartwig, 1991; Orem & Taylor, 2011; Renpenning et al., 2011). The identified interventions necessary to begin the restoration-of-self-care process for both patient and caregivers during the transitional period are implemented as part of the nursing care plan (Orem & Taylor, 2011; Renpenning et al., 2011).

The Self Care Deficit Theory (SCDT) and the C-TraC Intervention

Penney et al. (2018) noted interventions assisting patients in adaptation to new circumstances and situations are more likely to reduce readmission than education alone. The SCDT supports a nurse-driven, focused transitional care intervention identifying situational patient and caregiver needs, while using nursing knowledge and support to return individuals to self-care independence (Petiprin, 2021). Using the SCDT nurses recognize the potential for negative consequences, assess individual and family needs, and provide support, education, and resources to enable patients and caregivers to return to independence (Petiprin, 2021). The C-TraC is a nurse-driven intervention designed to identify patient and caregiver concerns, review discharge instructions and medications, provide emergency contacts, discuss resource needs, and schedule face-to-face follow-up visits as indicated (Madison Veteran Administration, 2020). The C-TraC intervention aligns well with SCDT to address readmission rates (Driver et al., 2021; Kind et al., 2016; Orem & Taylor, 2021; Renpenning et al., 2011).

Research (PICO) Question

For Montana Veterans identified as high risk for hospital readmission within 30 days of discharge (P), will the nurse-driven, post-hospitalization C-TraC intervention by the PACT RN (I) decrease readmission rates (O) as compared to the current practice (C)?

Hypotheses

- ***H(o):*** The focused, evidence-based coordinated transitional care (C-TraC) intervention following acute care discharge for Montana veterans identified at high risk for readmission will have no effect on readmission rate within 30 days of discharge.
- H(a): The focused, evidence-based coordinated transitional care (C-TraC)] intervention following acute care discharge for Montana veterans identified at high risk for readmission will have no effect on the readmission rate within 30 days of discharge.

Study Variables

Independent Variable

The independent variable is the Coordinated Transitional Care (C-TraC) intervention.

Dependent Variable

The 30-day hospital readmission rate of veterans that receive the transitional care intervention (C-TraC) when compared with 30-day readmission rate of veterans prior to implementation of the transitional care intervention (C-TraC).

Key Definitions

- *Care Assessment Need (CAN) Score* – scoring system used by the Veterans Health Administration (VHA) to identify veterans at risk for hospitalization or death within 90 days to a year (Fihn & Box, 2013).
- *Coordinated-Transitional Care (C-TraC)* - a telephone-based, nurse-driven transitional care program developed to reduce 30-day rehospitalizations by improving the transition of care from hospital to home (Madison Veteran Administration, 2020).
- *Geriatric Research, Education, and Clinical Center (GRECC)* – Specific to the VA, these are centers of excellence focused on improving geriatric care. Established by Congress in 1975 to improve care for older veterans, train VA employees to care for older veterans, increase knowledge, and improve care through research (U.S. Department of Veterans Affairs [VA], 2022c).
- *Patient Aligned Care Team (PACT)* – the Veteran's Administration (VA) approach to patient centered primary care, comprised of a healthcare team working with veterans toward disease prevention, wellness, and improved outcome (VA, 2022d).
- *Readmission* - an unplanned rehospitalization after a recent discharge. Hospitals are penalized under the Affordable Care Act for readmitted patients with certain diagnoses within 30 days of discharge (Centers for Medicare and Medicaid Services, 2021c).

- *Risk Factor* - something that increases the likelihood of an unwanted consequence (Medical Provider, 2022).
- *Transition of Care (TOC)*- in healthcare this is defined as movement from one care setting to another, i.e., acute care hospital to rehabilitation or home (Agency for Healthcare Research and Quality, 2018).
- *Veteran* - a veteran is someone who served in active duty in one of the branches of the military and was discharged under conditions other than dishonorable (Law for Veterans, 2022).

Introduction Summary

There is compelling evidence the transition from hospital to home is a time of increased risk for readmission with certain diagnoses and vulnerable patient populations (Bowles et al., 2014; Fisher et al., 2016; Gilmore-Bykovski et al., 2014; Kansagara et al., 2011; Weeks et al., 2009). With the introduction of the HRRP, reimbursements were reduced for hospitals with higher-than-expected readmission rates (Centers for Medicare & Medicaid [CMS], 2021c; HealthStream, 2021). Despite the introduction of these penalties, in 2018 there remained approximately 3.8 million hospital readmissions within 30 days of discharge in the United States at an estimated cost of greater than $57 billion (Weiss & Jiang, 2018). Although financial penalties are not imposed on the VA for higher-than-expected readmission rates, the VA strives to meet Medicare guidelines and began reporting readmission rates to CMS in 2011 to promote transparency, build trust among veterans, and improve quality of care (Anhang Price et al., 2018; CMS, 2021b).

Transitional care interventions can reduce hospital readmission rates (Chen et al., 2018; Griffiths et al., 2021; Hamar et al., 2016; Kind et al., 2012; Taupin et al., 2021). Interventions including referral to primary care and assistance in adapting to change are likely to be more successful than education alone (Gilmore-Bykovski et al., 2014; Griffiths et al., 2021; Kind et al., 2012; Penney et al., 2018). Primary care in the VA is based on a PACT model focusing on patient-centered care provided by a primary care team coordinated by the RN care manager (U.S. Department of Veterans Affairs, 2022b). The C-TraC

intervention, developed by the Geriatric Research, Education, and Clinical Center (GRECC) at the VA in Madison, WI, is a nurse-driven transition of care (TOC) intervention designed to reduce hospital readmissions (Madison Veteran Administration, 2020). The C-TraC intervention aligns with the SCDT and promotes nursing practice within the uniquely defined role of nursing care (Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al. 2012; Kind et al., 2016). This quality improvement study integrated the validated C-TraC intervention into the current PACT model within the rural primary care VA practices of Montana to reduce readmission rates for veterans (Madison Veteran Administration, 2022).

Chapter 2: Integrated Review of the Literature

Search Strategies

The literature search was conducted using multiple computer databases which included PubMed, Cumulative Index to Nursing and Allied Literature Plus, Agency for Healthcare Research and Quality (AHRQ), Department of Veterans Affairs, Centers for Medicare & Medicaid Services (CMS), Cochrane Library, and OVID Clinical Edge. Filters included article type (clinical trial, meta-analysis, randomized controlled trial, review, and systematic review) and publication dates from 2012 to 2022. Truncation was used for the following keywords/terms: Affordable Care Act (ACA), Hospital Readmission Reduction Program (HRRP), transition of care (TOC) interventions, reducing readmissions, readmission risk factors, predicting readmission, rural health risks, Veterans Affairs readmission rates, self-care deficit theory, and self-care deficit factors.

Inclusion and Exclusion Criteria

Inclusion criteria incorporated studies from an adult population, high risk diagnoses, use of TOC intervention, high risk for readmission, full text available, written in English, and published from 2009 through 2022. Most selected articles were from 2018 to present, but older articles were considered and included if relevant. Studies of patients with pediatric, adolescent, mental health, oncology, and women's health-related diagnoses were excluded. Following exclusion criteria, 49 articles were reviewed, consisting of 20 related specifically to TOC interventions, 10 systematic studies of readmission risks and

strategies for readmission reduction, six studying risk factors associated with readmission, and three related to self-care deficit.

Review of Literature

Early studies of hospitalization readmission rates, following implementation of the ACA and HRRP, indicated the programs were successful in reducing readmissions (Gai & Pachamanova, 2019; Kaboli et al., 2012; Myers et al., 2020; Nuti et al., 2016; Wasfy et al., 2017). Later studies have shown mixed results and prompted concerns, particularly when associated with high-risk diagnoses and mortality outcomes (Bertsimas et al., 2020; Charles et al., 2020; Kind et al., 2012; Penney et al., 2018). A variety of TOC interventions have been studied and implemented with a goal of reducing likelihood of readmission. Studies reviewed included broad-spectrum reviews, inpatient interventions, and post-discharge interventions (Bertsimas et al., 2020; Griffiths et al., 2021; Kind et al., 2012; Penney et al., 2018). Regardless of intervention type, results indicate any type of transitional care intervention from hospitalization to discharge is more effective than no intervention (Bowles et al., 2014). Overall, the literature review yielded three themes: factors contributing to readmission, TOC, and TOC interventions.

Theme 1: Factors Contributing to Readmission

Similarities/Strengths in Evidence. Many studies examining readmission rates support a high risk for readmission related to certain diagnoses and demographics for both VA and non-VA individuals (DeCoster et al., 2013; Gupta et al., 2018; Heidenreich et al., 2010; Nuti et al., 2016; Pandey et al., 2016; Press et al., 2021). The AHRQ identifies diagnoses associated with high risk for readmission (Weiss & Jiang, 2018). Three of those high-risk diagnoses (COPD, HF, and PNA) are included among diagnoses CMS imposes penalties on in-patient facilities for readmission within 30 days of discharge (CMS, 2021). Additionally, living in a rural location, regardless of diagnosis, has been identified as a risk factor for readmission (Gilmore-Bykovski et al., 2014; Kind et al., 2012; Weeks et al., 2009). The VA uses a care assessment need (CAN) score to identify veterans at risk for hospitalization or death within 90 days to a year (Fisher et al., 2016). A CAN score of 70 or greater indicates frailty and increased likelihood of post-hospitalization complications or readmission (Ibrahim, 2020; Ruiz et al., 2018).

Differences/Weaknesses in Evidence. Many studies lack evidence to support why certain diagnoses are linked with higher readmission rates (DeCoster et al., 2013; Fancher & Williams, 2021; Fisher et al., 2016; Gupta et al., 2018). The studies often use small convenience samples or systematic reviews, incorporating a variety of interventions without conclusive evidence of which individual or combination of interventions may work (DeCoster et al., 2013; Griffiths et al., 2021; Kansagara et al., 2011; Press et al., 2021).

Theme Summary. The combined information from the reviewed studies supports the proposed project, targeting an intervention for Montana veterans at high risk for readmission based on diagnosis, CAN score, and/or demographics (DeCoster et al., 2013; Fisher et al., 2016; Gilmore-Bykovski, 2014; Ibrahim, 2020; Ruiz et al., 2018; Weeks et al., 2009). Many Montana veterans are at risk regardless of diagnosis or CAN score because 72% reside in rural or highly rural locations (Akerman, 2020). The CAN score considers age and location in addition to other factors such as medications, high use of services, and certain diagnoses to further assist in targeting veterans who may be more vulnerable (Ruiz et al., 2018). The lack of easy access to face-to-face and post-hospitalization care increases the importance of a transitional care plan to mitigate potential complications requiring readmission (Gilmore-Bykovski et al., 2014; Ibrahim, 2020; Weeks et al., 2009).

Theme 2: Transition of Care

Similarities/Strengths in Evidence. A variety of broad-spectrum studies have examined TOC interventions from acute care to home setting (Bertsimas et al., 2020; Dizon & Reinking, 2017; Kripalani et al., 2014; Penney et al., 2018; Taupin et al., 2021). Recurrent themes in these reviews include the importance of communication between patients and the primary care team and need for coordination of care to include the involvement of patients and caregivers (DeCoster et al., 2013; Griffiths et al., 2021; Kripalani et al., 2014; Penney et al., 2018; Saluja et al., 2019). Regardless of type of intervention, Bowles et al. (2014) found some form of TOC intervention was better than none. Primary care teams know a patient's history and have established a relationship, which makes the care team a key component in coordinating successful transition from acute care to home (Griffiths et al., 2021). Communication with

the primary care team soon after discharge can help prevent medication errors and identify additional post-discharge care needs (DeCoster et al., 2013; Kripalani et al., 2014; Saluja et al., 2019).

Differences/Weaknesses in Evidence. Systematic studies of transitional care interventions lacked specific details for individual interventions (Bertsimas et al., 2020; Dizon & Reinking, 2017; Finlayson et al., 2018; Fisher et al., 2016; Kripalani et al., 2014; Penney et al., 2018). Most of the studies reviewed were smaller studies and were limited to examination of recurrent themes (Bertsimas et al., 2020; Bowles et al., 2014; Kripalani et al., 2014; Reese et al., 2019; Wasfy et al., 2017).

Theme Summary. The recurring themes from broad-spectrum reviews related to TOC include the importance of timely post-discharge communication with the primary care team, inclusion of patient and/or caregiver(s), and care coordination (Hamar et al., 2016; Kripalani et al., 2014; Penney et al., 2018; Reese et al., 2019; Saluja et al., 2019; White et al., 2014). The identified themes support the use of the C-TraC to connect the PACT RNs with the assigned patients and/or caregivers within 72 hours of discharge, by including timely communication with the patient and/or caregiver for coordination of post-discharge care (DeCostar et al., 2013; Griffiths et al., 2021; Kind et al., 2016; Kripalani et al., 2014; Saluja et al., 2019).

Theme 3: Transition of Care Intervention

Similarities/Strengths in Evidence. A variety of TOC interventions have been implemented and studied, with a goal of reducing the likelihood of readmissions (Acher et al., 2017; Attaallah et al., 2021; Bae-Shaw et al., 2020; Charles et al., 2020; Chen et al., 2018; Driver et al., 2021; Garnier et al., 2018; Gilmore-Bykovski et al., 2014; Hamar et al., 2016; Kind et al., 2016; Kind et al., 2012; Van De Graaf et al., 2021). The process of initiating a TOC intervention typically begins with the identification of those at high-risk based on age or diagnosis (Bowles et al., 2014; Charles et al., 2020; Chen et al., 2018; Driver et al., 2021; Finlayson et al., 2018; Garnier et al., 2018; Krumholz et al., 2013). The TOC interventions typically target teaching and review of discharge instructions (Bertsimas et al., 2020; Bowles et al., 2014). Some TOC interventions identify high-risk patients and implement a follow-up intervention post discharge, which may include one or more phone calls, home visits, and/or post discharge scheduled

follow-up visits (Charles et al., 2020; Chen et al., 2018; Van De Graaf et al., 2021). Many TOC interventions combine the approach by initiating contact while the patient is still inpatient and continuing through after the patient is discharged (Bae-Shaw et al., 2020; Dizon & Reinking, 2017; Finlayson et al., 2018; Garnier et al., 2018; Hamar et al., 2016; Kind et al., 2016; Kind et al., 2012; Weiss et al., 2019; White et al., 2014).

Differences/Weaknesses in Evidence. Many of the intervention studies are limited to a short duration, small sample size, specific diagnosis, and/or location (geographic, unit, specific hospital systems) and have not been tested in other settings (Bowles et al., 2014; Chen et al., 2018; Dizon & Reinking, 2017; Finlayson et al., 2018; Weiss et al., 2019; White et al., 2014). Small sample size and limitation of diagnoses, geographic location, hospital units, and/or hospital systems limit generalizability to population at large.

Theme Summary. The evidence supports the use of TOC interventions in reducing hospital readmissions (Bae-Shaw et al., 2020; Charles et al., 2018; Gilmore-Bykovski et al., 2014; Kripalini et al., 2014; Van De Graf et al., 2021). Kripalani et al. (2014) noted multifaceted approaches tend to be more successful, but most studies show some improvement with any type of TOC intervention. The C-TraC intervention proposed for this project has been shown to reduce readmissions in a variety of settings and diagnoses over a 12-year period (Bae-Shaw et al., 2020; Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al., 2016; Reese et al., 2019).

Literature Summary

The review of literature provides evidence certain diagnoses and demographics are associated with increased risk for hospital readmission following discharge from an acute hospitalization (CMS, 2021c; DeCoster et al., 2013; Gupta et al., 2018; Heidenreich et al., 2010; Nuti et al., 2016; Pandey et al., 2016; Weiss & Jiang, 2021). A TOC intervention has been shown to decrease the likelihood of readmission and highlights the importance of timely communication from primary care, inclusion of patient and/or caregiver(s), and coordination of care (DeCoster et al., 2013; Griffiths et al., 2021; Kripalani et al., 2014; Penney et al., 2018; Saluja et al., 2019).

A review of several types of TOC interventions indicate use of a multifaceted approach is likely to be more successful in reducing readmissions, but most studies show some improvement in decreasing readmissions with any type of intervention (Bae-Shaw et al., 2020; Dizon & Reinking, 2017; Hamar et al., 2016; Kind et al., 2016; Kripalani et al., 2014). The C-TraC intervention has been shown to reduce readmissions over a 12-year period and in a variety of settings (Acher et al., 2017; Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al., 2012; Reese et al., 2019). The C-TraC intervention was designed to address the needs of a veteran population comparable to Montana since the veterans were residing in rural areas and lacking easy access to home health or primary care (Gilmore-Bykovski et al., 2014; Kind et al., 2012). The evidence supports the utilization of the C-TraC by the PCAT for Montana veterans discharged from an acute care hospitalization as a strong predictor of decreased readmission rates supporting this quality improvement study (Acher et al., 2017; Attaallah et al., 2021; Dizon & Reinking, 2017; Gilmore-Bykovskyi et al., 2014; Kind et al., 2012; Kind et al. 2016; Reese et al., 2019).

Chapter 3: Methods

Study Design

This study fit the Montana VA criteria for a performance improvement project (C. Zal-Herwitz, personal communication, September 22, 2022). A quasi-experimental, quantitative study design utilizing a pre- and post-intervention comparison to assess if a post-hospitalization TOC intervention has an impact on the hospital readmission rate within 30 days of discharge among Montana VA veterans was implemented (Frost, 2020a). A quasi-experimental design is appropriate because the comparison of pre-intervention readmissions to post-intervention readmissions was not randomized and did not include patient identifiers (U.S. Department of Veterans Affairs, 2021). Frost (2020b) noted this type of design sometimes makes causality difficult to prove, but it allows for timely completion and immediate use of the intervention. The design aligned well with the timeline of the proposed project, which was able to be implemented quickly with a target completion of less than 3 months.

Study Sample

Pre-Intervention Sample Access/Recruitment

Pre-intervention data was collected by reviewing the readmission data reported in the Montana VA Strategic Analytics for Improvement and Learning (SAIL) reports for the 3 months immediately prior to the implementation of the study (U.S. Department of Veterans Affairs, 2023a). The data collected included the number of veteran admissions and readmissions within 30 days from discharge to the Montana VA hospital and community hospitals (non-VA) in which the VA was used as payor. Community hospital admission and readmission information was available for review in SAIL due to the implementation of liaison nurses in early 2022, which allowed for tracking (D. Reeser, personal communication, February 11, 2022; U. S. Department of Veterans Affairs, 2023a).

Upon implementation of the study, veterans being discharged from an acute care setting who had a working telephone and were identified as high risk for readmission by a liaison nurse or primary care RN, using the performance improvement C-TraC study eligibility guidelines (DenBleyker, 2023; Figure 1), were offered the option to schedule a routine discharge follow-up phone call, receive the focused C-TraC intervention phone call(s), or decline discharge follow-up contact.

Post-Intervention Sample Access/Recruitment

Post-intervention data was collected weekly by reviewing the C-TraC-specific transition of care (TOC) template (Figure 2) under the note title “Transitions of Care Telephone Contact” in the VA electronic medical record to determine if a readmission occurred within 30 days of discharge for study participants (Kind et al., 2012; Madison Veteran Administration, 2020). The gathered post-intervention data was compared with the readmission data reported in the Montana VA SAIL reports for the 3 months prior to implementation of the intervention to establish a comparative readmission percentage rate (U.S. Department of Veterans Affairs, 2023a).

A *priori power* analysis was used to estimate sample size and was based on comparable studies using the same post-discharge intervention tool (Acher et al., 2017; Gilmore-Bykovski et al., 2014; Kind et al., 2012; Reese et al., 2019). Based on an anticipated effect size of 0.5, the power level of 0.95, and a probability of 0.05, the minimal sample size for a 2-tailed hypothesis is 212, or 106 per group (Soper, 2022).

Inclusion Criteria

Veterans who met the inclusion criteria for the C-TraC post-hospitalization intervention following an acute care hospitalization included:

- admission to any VA or non-VA hospital during the specified dates in which a veteran chose to use the VA as payer as recorded in the VA electronic medical record (EMR); and one or more of the following:
  - a diagnosis identified as high risk for readmission by CMS under HRRP to include HF, COPD, PNA, AMI, CABG, and elective total hip or knee replacement (CMS, 2021c);
  - a CAN score of 70 or higher (Fihn & Box, 2013; Ibrahim, 2020);
  - a home address greater than 40 miles from a VA facility (Gilmore-Bykovski et al., 2014; Kind et al., 2012; U.S. Department of Veterans Affairs, 2022b; Weeks et al., 2009); and/or
  - age 65 or older at the time of discharge (CMS, 2021; Madison Veteran Administration, 2020).

Exclusion Criteria

- Veterans meeting inclusion criteria were excluded if the veteran:
  - was discharged from an observation unit or bed;
  - was discharged from a mental health unit;
  - left against medical advice;
  - had a primary admitting diagnosis related to women's health (i.e., gynecology or obstetrics), oncology diagnosis, or related to a mental health disorder, to include alcohol or substance abuse withdrawal; or
  - was discharged to a rehab facility, hospice care, or long-term care facility.

Study Setting

The C-TraC intervention is a series of RN-initiated, weekly, post-discharge, follow-up phone calls occurring for up to 4 weeks (maximum), or until the veteran is seen for a face-to-face appointment

with his or her provider. The calls are made to the veteran's residence and are initiated from the primary care clinic by the Montana PACT RN where the veteran is assigned (U.S. Department of Veterans Affairs, 2022b). The intervention information is documented by the PACT RN in the electronic medical record using the Transitions of Care Telephone Contact note (Kind et al., 2012; Madison Veteran Administration, 2020).

Protection of Human Subjects

IRB Approval/Project Type

The study is limited to the number of total patients meeting the inclusion criteria and to data currently being tracked and reported in the pre- and post-intervention data collection by the Montana VA (U.S. Department of Veterans Affairs, 2021). No patient identifiers were included as part of the external data tracking or direct interactions with patients. Radford University IRB found this study was not human subject research and granted approval to proceed on January 27, 2023 (IRB Reference #2023-006).

Measures Used to Protect Subjects

Access to the VA information system is protected and requires a personal identity verification (PIV) card. In addition to a PIV card, information is further secured in a protected computer information storage area assigned to the student investigator. The student investigator was able to provide access as required to the principal investigator.

Data was collected using the VA SAIL report data for Montana VA (U.S. Department of Veterans Affairs, 2023a). The deidentified SAIL report was specific to the number of veterans readmitted within 30 days of initial discharge. The SAIL program does not include any patient identifiers and is securely stored for greater than 3 years in computerized records within the VA SAIL program (U.S. Department of Veterans Affairs, 2021).

To ensure patient confidentiality and protection following implementation of the study, a weekly list of veterans who were discharged from an acute care setting was obtained by the DNP student investigator through use of the VA SAIL hospital admission report (U.S. Department of Veterans Affairs, 2023a). The student investigator identified veterans who received the C-TraC intervention by searching

the EMR for the Transitions of Care Telephone Contact note. The student investigator assigned a deidentified code to each record to be stored in the secure, encrypted VA information system for a minimum of 3 years. Non-identifying information was extracted and documented on a separate spreadsheet. Information on the spreadsheet included veteran's deidentified code; date of discharge; C-TraC qualification (CAN score, age, diagnoses, geographic location); date of each C-TraC intervention call (up to a total of 4 or until veteran is seen for a face-to-face primary care visit); date of primary care visit if applicable; and readmission status (Y/N). The spreadsheet is stored in the secure, encrypted VA information system for a minimum of 3 years.

Risks/Benefits

The proposed study was discussed with members of the Montana VA primary care, education, and executive committees. The study met qualifications as determined by the VA for a performance improvement project and was signed off by appropriate staff members. IRB approval through Radford University was granted on January 27, 2023 (IRB Ref#2023-006). There is minimal risk for participants in the proposed study, solely related to an unlikely potential for data breach within the VA EMR or data collection program. The C-TraC intervention has the potential to benefit participants by reducing the likelihood of hospital readmission. The nurse driven intervention provides a review of medication changes, identification of care needs, and providing education related "red flags" that would indicate a need to follow-up with primary care (Madison Veteran Administration, 2020).

Instruments

The evidence-based instrument used for the transitional care intervention was developed by the GRECC at the William S. Middleton Memorial Veterans Hospital in Madison, WI (Madison Veteran Administration, 2020). The C-TraC intervention was introduced in 2010 as a post-discharge, nurse-initiated intervention, designed to prevent hospital readmission in patients identified as high risk for readmission (Kind et al., 2012; Madison Veteran Administration, 2020). The C-TraC targets veteran populations located in rural areas lacking easy access to home health or primary care services, and/or with an additional associated risk for hospital readmission (Gilmore-Bykovski et al., 2014; Kind et al., 2012).

C-TraC has shown success and sustainability over a 12-year period in a variety of VA and non-VA settings (Acher et al., 2017; Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al., 2016; Reese et al., 2019). The C-TraC was administered using the required procedural steps (Madison Veteran Administration, 2020; Figure 2). For the purpose of this study, data was collected from each Transitions of Care Telephone Contact note identifying whether the veteran was readmitted within the 30-day period after being discharged from the hospital and compared with the total admissions during the same 30-day period. Readmission information from the post intervention period was then compared with readmissions for the 3-month period prior to implementation of the project study. The C-TraC is not a scored instrument and is used for data and communication tracking only. C-TraC was selected for this study for several reasons including:

- Montana is geographically spread out with a substantial portion of the veteran population living in very rural or remote locations similar to Wisconsin (Akerman, 2020).
- Like the veterans in Wisconsin, many Montana veterans are located far away from easy access to follow-up care or home health (Akerman, 2020).
- C-TraC was originally designed for the VA system, using the same tools to access information, and has a designed template for the existing EMR (Kind et al., 2012; Madison Veteran Administration, 2020).
- The initial C-TraC study took place over an 18-month period with baseline data 6 months prior to intervention for comparison (Kind et al., 2012). Data is not reported by month; however, results after 18 months showed decreasing readmission hospitalization rates from 34% in the baseline group to 23% in the post-intervention group ($p = 0.013$, 95%, CI 0.33 – 0.90) (Kind et al., 2012). The 18-month period allowed for the program to fully develop and be evaluated for sustainability over time. Subsequent studies using C-TraC have shown comparable results (Driver et al., 2021; Kind et al., 2016; Reese et al., 2019). Scores are interpreted based on the number of hospital readmissions within 30 days for patients

receiving the C-TraC intervention when compared to patients who did not receive the intervention (Gilmore-Bykovski, 2014; Kind et al., 2012; Kind et al., 2016).

Procedure

The steps for the procedure are based on the C-TraC intervention requirements (Madison Veteran Administration, 2020).

Project Implementation Process

Step 1: Identification of Eligible Subjects. Veterans enrolled in the VA system are provided care when admitted to a VA hospital, or a non-VA hospital if they live greater than 40 miles from the closest VA facility. Non-VA hospitalizations are approved and paid for by the VA as part of the Care in the Community program if the veteran requests VA as payment source (U.S. Department of Veterans Affairs, 2022b). The Montana VA system has recently hired a liaison nurse for each non-VA hospital in Montana to improve communication and facilitate discharge planning (D. Reeser, personal communication, February 11, 2022). Liaison nurses notify the assigned PACT RN of hospital admissions at non-VA hospitals by charting a note in the EMR and identifying the PACT RN as an additional signer (D. Reeser, personal communication, February 11, 2022). Veterans are identified as high risk for readmission by a liaison or PACT RN based on the study inclusion criteria as defined by C-TraC (Figure 1). Eligible subjects, or their caregiver, are contacted by the PACT RN upon notification from liaison nurse of hospital pending discharge date and offered the option of scheduling a routine discharge follow-up call, participate and schedule C-TraC call(s) beginning within 48-72 hours from discharge, or decline discharge follow-up contact (Figure 3).

Step 2: Coordination and Scheduling of Post-Discharge Call for Eligible Participants. Type I or II testing errors may arise if the transitional intervention is not used consistently by altering the sample size (Kim et al., 2020). To mitigate this possibility, PACT RNs and providers were introduced to C-TraC and the EMR template during monthly, statewide, and primary care meetings to ensure consistency in the delivery of the C-TraC intervention. Additional training and reinforcement were provided during weekly regional primary care meetings. Following introduction and training, the PACT RNs reviewed

notifications of veteran hospitalizations and determined if the veteran met criteria for high risk of rehospitalization based on diagnosis, age, CAN score, and/or geographic location as defined in the inclusion criteria (Gilmore-Bykovski et al., 2014; Kind et al., 2012; Kind et al., 2016; Madison Veteran Administration, 2020). The PACT RN spoke with patient and/or caregiver to explain post discharge options and notified the liaison nurse of the need to include scheduling of the C-TraC phone visit in the discharge planning process for veterans identified at high risk for readmission who agreed to participate in the C-TraC intervention. The PACT RN and liaison nurse worked collaboratively with VA primary care clinic schedulers to ensure the C-TraC phone visit with the PACT RN was scheduled within 48-72 hours of discharge from the hospital.

Step 3: Completion of Post-Discharge Phone Calls and C-TraC Documentation. The PACT RN followed up with the veteran and/or caregiver via a post-discharge phone call within 72 hours of discharge. The C-TraC intervention was completed with the veteran and caregiver and documented in the EMR Transitions of Care Telephone Contact note. Weekly phone calls to the veteran continued for a total of 4 weeks, or until the veteran was seen at a face-to-face visit with the primary care provider (Figure 3). Data was pulled from the EMR by the student investigator for patients with documented C-TraC Transitions of Care Telephone Contact notes. A deidentified code was assigned to each patient to eliminate patient identifiers. Each patient was reviewed weekly and tracked for a total of 30 days to determine if readmission occurred. Information is kept on a protected spreadsheet. The discharge date, diagnosis, inclusion qualifier (CAN score, age, diagnosis, location), date(s) of C-TraC calls, date of face-to-face appointment if applicable, and readmission status (Y/N) were tracked.

Data Collection

Pre-Intervention Data Collection. Data from the Montana VA SAIL report was collected from the 3 months immediately prior to implementation of the quality improvement study (U. S. Department of Veterans Affairs, 2021). The information collected included 30-day readmission rates based on diagnoses identified as high risk by CMS (Centers for Medicare and Medicaid Services, 2021c). Identifying information was assigned a deidentification code on a secured spreadsheet. The admissions and

readmissions for each 30-day period for the 3-month period prior to study implementation was entered into SPSS.

Post-Intervention Data Collection. The Montana VA IT department provided the DNP student investigator with a list of "Transitions of Care Telephone Contact" notes in the EMR weekly following the start of the intervention period. The student assigned a deidentification code and extracted non-patient identifying information documented on a secured spread sheet. A total of 31 admissions were evaluated in the post-intervention month. This number was comparable to the average monthly admission rates for the 3 months prior to implementation. The data from the de-identified spreadsheet was entered into SPSS for statistical analysis of post-intervention evaluation of readmission rates when compared with pre-intervention readmission rates.

Data Fidelity

The C-TraC intervention uses a template designed by the VA in Madison, Wisconsin for the VA electronic medical record that is in use among all VA facilities (Madison Veteran Administration, 2020). Templates are accessed by note title and all templates require each section to be completed before it will allow the person documenting to save and sign the note (Figure 2). This built-in mechanism within the VA electronic medical record ensures data fidelity among users when completing the C-TraC intervention.

Data Protection

The data is collected using an existing encrypted reporting system within the Montana VA that excludes external tracking of patient identifiers (U.S. Department of Veterans Affairs, 2019). Data is stored within the encrypted VA electronic system as directed by the information technology (IT) department to ensure protection and is stored for a minimum of 3 years. Access to the VA information system is protected and requires a personal identity verification (PIV) card. In addition to a PIV card, information is further secured in a protected computer information storage area assigned to the student investigator within the encrypted VA electronic system.

Data Management

Data Analysis Software

The Statistical Package for the Social Sciences (SPSS) software program was used to calculate the data collected in the study (Pallant, 2020).

Data Organization and Selection

Data was cleaned prior to analysis to search for missing information or outliers. There were no outliers identified. Missing information and mis-coded information were corrected prior to analysis.

Data Analysis

A p value of < 0.05 is considered statistically significant and would allow for rejection of the null hypothesis (Kim et al., 2020). The defined value is in line with the C-TraC studies done at the GRECC in Madison, WI (Kind et al., 2012). A Chi-Square test was used, as this is a study of comparison of differences in 30-day readmission rates, which is nominal variable, between pre and post C-TraC intervention group (Kim et al., 2020). The study meets the assumption associated with a Chi-Square test as both test variables were dichotomous (Kim et al., 2020).

Chapter 4: Results

Overview

The purpose of this quality improvement study was to determine if the implementation of a focused, evidence-based, transitional care patient intervention, for Montana veterans identified at high risk for readmission following discharge from an acute care facility, would reduce the number of readmissions within 30 days of discharge when compared with current practice. Pre- and post-implementation data was analyzed using SPSS software to perform a Chi-Square test to determine if the C-TraC tool, utilizing nurse engagement as part of a primary care team post-discharge follow-up, influenced hospital readmission rates when compared with the pre-intervention group. The C-TraC intervention shows promising results in the preliminary report, $p = .083$ (Table 1, Figure 4). The null hypothesis cannot be rejected based on this result. Using measurements comparable to the original C-TraC study the results are not statistically significant at $p < 0.05$ (Kind et al., 2012). Continued use of the

C-TraC intervention in MVHS over an extended period will allow for a larger post-intervention sample size for comparison.

Description of the Sample

Pre-Intervention Data

The data collected prior to implementation of the C-TraC intervention consisted of the number of hospital admissions and readmissions among Montana veterans enrolled in the VA healthcare system, and who used the VA as payer source, for the months of December 2022, January 2023, and February 2023 using the VA SAIL report (U.S. Department of Veterans Affairs, 2023a). There was no additional data obtainable from the pre-intervention SAIL reports. The total number of hospital admissions was 104 and distributed fairly evenly over the 3 months (December 2022 = 39, January 2023 = 37, and February 2023 = 28; average of 34.6 per month over the 3-month period).

Post-Intervention Data

The study was implemented on March 10, 2023. The DNP student investigator obtained a weekly list of hospital admissions (U.S. Department of Veterans Affairs, 2023a). The EMR was searched for the "Transitions of Care Telephone Contact" note to determine which veterans received the C-TraC intervention. There was a total of 31 admissions during the post-intervention period, consistent with the average number of monthly admissions identified in the data collected for the 3 months prior to implementation. Each veteran that received the initial C-TraC phone call was reviewed by the DNP student weekly, for a total of 30 days, to determine if hospital readmission had occurred. For purposes of this project study, the pre- and post-intervention readmission rates were compared.

Additional demographic information was obtained from the post-implementation data, which may prove useful for future studies. Of the 31 admissions, 10 qualified based on a CAN score of 70 or higher, eight based on age greater than 65, seven based on CMS qualifying diagnosis, and six based on geographic location greater than 40 miles from a VA facility. This is a small data set but shows a similar distribution pattern (Figure 8). Future studies might include comparison of qualifiers with readmission rates to determine if any are linked to higher incidences of readmission.

The 31 veterans that received the C-TraC intervention received the initial call within 48–72 hours, 10 received a second phone call, three received a total of three phone calls, and one received four phone calls (Figure 9). This resulted in approximately 50% of participating veterans lacking the full number of weekly calls the C-TraC intervention is meant to provide. There was no documentation explaining the lack of additional phone calls. Post-implementation meetings are scheduled to discuss the process and determine what factors may be impacting the decreased compliance in the additional weekly follow-up calls.

Interestingly, the lack of additional calls did not appear to impact readmission rates, as there were only three readmissions post-intervention for a total of 9.6% compared to the pre-intervention readmission rate of 24.04% over the 3-month period (Table 1, Figure 4). Reasons for the post-intervention readmissions included identification of a red flag during first C-TraC call that required readmission, one sent by the provider at the follow-up visit, which was scheduled due to RN concern during the initial C-TraC call, and one identified as needing to go to emergency room (and subsequently readmitted) due to concerning symptoms reported during the C-TraC phone call. Further exploration may be useful. It could be that a more detailed discharge phone call within 72 hours would have a significant impact in reducing readmission rates and identifying concerning symptoms allowing for early intervention.

Project Variables

The independent variable for this study is the Coordinated Transitional Care (C-TraC) intervention. The dependent variable is the 30-day hospital readmission rate of veterans that received the C-TraC intervention when compared with the 30-day readmission rate of veterans prior to implementation of C-TraC.

Analyses of Research Question/Hypothesis Testing

The research question for this study asked if for Montana Veterans identified as high risk for hospital readmission within 30 days of discharge, will the nurse-driven, post-hospitalization C-TraC intervention by the PACT RN have an effect on readmission rates as compared to the current practice? The data was analyzed using a Chi-Square test to determine if there was an association between hospital

readmission rates and the implementation of the C-TraC intervention. The study meets the assumption associated with a Chi-Square test as both test variables were dichotomous (Kim et al., 2020). The preliminary results are close to being statistically significant, $x^2(1) = 2.99$, $p = 0.83$ (Table 1, Figure 4), but did not allow a rejection of the null hypothesis at $p < 0.05$.

The initial pre-implementation sample size of 104 is adequate for analysis; however, the post-implementation sample size of 31 is small and encompasses a shorter length of time. A longer period of implementation will provide a larger post-implementation comparison group and reduce the risk of a type II error, which can occur with a small sample size (Kim et al. 2020). A comparison of the post-implementation results with the individual pre-implementation months is inconclusive, showing similar results in December, $x^2(1) = 2.91$, $p = .088$ (Table 2, Figure 5), no significance in January, $x^2(1) = 1.148$, $p = 0.284$ (Table 3, Figure 6), and more significance, though not yet statistically significant, when compared with February, $x^2(1) = 3.46$, $p = .063$ (Table 4, Figure 7). Like the original C-TraC study, there will need to be continued use of the intervention over a longer period to determine if it shows significant and sustainable improvement (Kind et al., 2012).

Additional Analysis

Additional analysis on the data collected was not needed to answer the purpose statement and hypothesis beyond what was originally planned for the project study.

Summary

The purpose of this quality improvement study was to determine if the implementation of a focused, evidence-based, transitional care patient intervention, for Montana veterans identified at high risk for readmission following discharge from an acute care facility, would have an effect on the number of readmissions within 30 days of discharge when compared with current practice. The preliminary results of this project study showed that readmissions after the C-TraC intervention was implemented were lower than readmission prior to the C-TraC intervention (9.7% vs. 24.04%) (Table 1, Figure 5). However, when compared to the combined 3 months prior to implementation, it did not show statistically significant results at $p = < 0.05$. Preliminary results are close to statistically significant at $p = 0.083$. The

post-implementation sample size was small but showed a low readmission rate after the first 30 days when compared with the whole pre-implementation group. A larger sample size over an extended period of use of the C-TraC intervention implementation would help in determining if sustainable improvement is achieved as it was in the original study (Kind et al., 2012).

Chapter 5: Discussion

Conclusions

Relationship to Prior Research

Previous studies have indicated a transition of care intervention at time of discharge is likely to decrease the risk of readmission and highlights the importance of timely communication from primary care, inclusion of patient and/or caregiver(s), and coordination of care (DeCoster et al., 2013; Griffiths et al., 2021; Kripalani et al., 2014; Penney et al., 2018; Saluja et al., 2019). The initial results of this study support these findings. All eligible veterans who chose to participate in the C-TraC post-discharge follow-up intervention received an initial call within 72 hours of discharge. Even when many patients did not receive the full number of subsequent weekly C-TraC phone calls, the readmission numbers were lower at 9.68% when compared to pre-intervention at 24.04% (Table 1, Figure 4).

The C-TraC intervention has been shown to reduce readmissions over a 12-year period and was designed to address the needs of a veteran population comparable to Montana, located in rural areas and lacking easy access to home health or primary care (Acher et al., 2017; Driver et al., 2021; Gilmore-Bykovski et al., 2014; Kind et al., 2012; Reese et al., 2019). The early findings in this study indicate that the intervention has the potential to have a similar outcome in the Montana veteran population (Table 1, Figure 4).

Observations

Many veterans (34) did not receive all the C-TraC calls (Figure 9) and were not seen for a face-to-face primary care provider visit. Follow-up meetings with PACT nurses have been scheduled to further explore why this is occurring and determine steps needed to ensure the proper number of calls are completed, but it is interesting to note fewer calls did not result in higher readmission numbers. Perhaps a

single, detailed, focused call is enough to identify needs and provide the necessary tools and education to prevent readmissions.

Initially the PACT RNs expressed concern the intervention would add to their workload and take more time. However, since implementation, several have stated having a focused template, and support keeping the post-discharge phone call on track, targeting the information needed more efficiently. Providers have also voiced appreciation for timely notification of patient needs for consults, medications and/or follow-up visits, all of which are summarized in the C-TraC note. Timely resolution of identified needs may be one of the reasons the intervention has been successful in reducing readmissions. It is reassuring to hear positive feedback from staff and acknowledgment of the intervention's potential usefulness.

Theoretical Model

The C-TraC intervention and self-care deficit theory (SCDT) support the essential role nursing plays in the care of patients and patient outcomes. Penney et al. (2018) noted interventions assisting patients in adaptation to new circumstances and situations are more likely to reduce hospital readmission than education alone. C-TraC is a nurse-driven, focused transitional care intervention identifying situational patient and caregiver needs (Kind, 2012). Nurses use knowledge of nursing diagnoses to identify potential concerns and patient/caregiver needs. Nursing supports patients and assists in returning individuals to self-care independence (Petiprin, 2021). Using the SCDT and C-TraC intervention, nurses recognize the potential for negative consequences, and provide the necessary support, education, and resources to enable patients and caregivers to return to independence (Petiprin, 2021). The C-TraC intervention aligns well with SCDT to target a reduction in readmission rates (Driver et al., 2021; Kind et al., 2016; Orem & Taylor, 2021; Renpenning et al., 2011).

Limitations

The initial preliminary findings of this state-wide study are promising in showing a reduction of the hospital readmission rate after the C-TraC intervention was implemented. However, the post-intervention sample size is small and does not show a statistically significant result. The preliminary

sample size is similar to the average size for the three preceding individual months, but it is small in comparison to the total size of the pre-intervention sample. It remains to be seen if the promising trend continues, and as a result it is currently not possible to reject the null hypothesis. The pre- and post-intervention groups occurred during the winter season, which may have contributed to a seasonal impact on hospital admission and readmission rates (Akintoye et al., 2017; Kahn & Halder, 2014). Additionally, there is limited information about the pre-intervention group. It is not possible to know if the readmitted veterans from the pre-intervention group would have qualified for the C-TraC intervention, or if those readmitted received any type of post-discharge follow-up from the initial hospital discharge. These details would allow for a more detailed comparison. The post-intervention group consists of veterans that qualified for the intervention and agreed to participate. The study will need to continue for a longer duration, with a larger sample size, to determine if there is a significant decrease in hospital readmission rates.

The study was conducted in the Montana VA healthcare system. The sample lacks diversity as a result. In addition to being comprised of all veterans, over 90% of veterans in Montana are male, 89% Caucasian, and over 50% are age 65 or older (VA Montana Healthcare, 2021). The C-TraC intervention was created for use within the VA system in a location with a very similar demographic as the Montana VA (Kind et al., 2012). These features made it a very good choice for this study, but it means the results may not be generalizable to the civilian population, or in a more diverse and/or populated setting.

Implications for Future Research

In addition to continuing the study in the Montana VA system, future study within the VA system that includes more diverse and populated settings, such as large urban areas with a variety of ethnicities and more females, would help determine if the C-TraC intervention is successful because it addresses the unique needs of this population or translates to a broader demographic. There has been a small successful study using the C-TraC intervention in a civilian setting (Kind et al., 2016). If the intervention is found to be successful for a more diverse veteran population, perhaps it would carry over to the general population.

The C-TraC template could be modified to include some additional information. Presently the template does not provide the reason that a veteran qualified. The information can be obtained but requires a search in the medical record. Identification of needs and potential concerns is often directly linked to the qualifier. For example, a veteran who lives greater than 40 miles from a VA facility may also lack access to other services that play a role in prevention of complications. It would be useful and time saving to have the qualifier auto populated into the template. The active medication list could also be auto populated into the note, saving the RN from having to click back and forth from the active medication list while doing the medication reconciliation. The scheduling of the initial follow-up phone call could be linked to automatically schedule three more weekly phone visits, reducing the risk of missing additional calls.

In the future, it would be interesting to examine the post-intervention readmissions within 30 days to identify what might be lacking in the C-TraC intervention, what might have been avoidable, and possibly recognizing situations that could be predicted and addressed prior to discharge.

Implications for Practice

If the C-TraC study continues to show a decrease in readmissions for Montana VA veterans, it will decrease the costs associated with readmissions. As previously noted, 2018 nationwide data revealed 3.8 million readmissions occurred in public hospitals within 30 days of discharge, or 14% per 100 admissions, at an approximate cost of $57,760,000,000 inclusive of self-pay, hospital write-offs, and insurance payments (Weiss & Jiang, 2018). Readmissions are also costly for the VA and take money away from other services and programs. A reduction in readmissions frees up resources that can be used to improve quality of care for all of Montana veterans. In 2021 the average cost per inpatient hospitalization day in Montana was $1,867 (Kaiser Family Foundation, 2023). Applying this information to the 104 patients that were readmitted in the pre-implementation phase of the study, it cost the Montana VA approximately $194,168 per day versus $5,601 per day for the three veterans who were readmitted after implementation of the C-TraC intervention. If the intervention continues to show a reduction in

readmissions over time, it has the potential of saving the Montana VA a great deal of money, which could then be allocated to different services.

Advanced practice nurses (APNs) should be leaders in introducing and integrating practices, like C-TraC, that improve patient care and outcomes, while highlighting nursing skills and contributions to patient outcomes. The APN has a unique perspective in understanding the medical diagnoses and treatment, but also the impact illness and hospitalization has on other aspects of patient and families' lives. The APN knows the education and skills unique to the registered nurse. C-TraC recognizes those skills and allows the RN to practice at his or her full scope of practice.

Conclusion

The purpose of this quality improvement study was to determine if the implementation of a focused, evidence-based, transitional care patient intervention, for Montana veterans identified at high risk for readmission following discharge from an acute care facility, would reduce the number of readmissions within 30 days of discharge when compared with current practice. The preliminary results of this project study showed that readmissions after the C-TraC intervention was implemented were lower than readmission prior to the C-TraC intervention (9.7% vs. 24.04%; Table 1). However, when compared to the combined 3 months prior to implementation, it did not show statistically significant results at $p = < 0.05$. The post-implementation sample size was small but showed a low readmission rate after the first 30 days when compared with the whole pre-implementation group. A larger sample size over an extended period of use of the C-TraC intervention implementation would help in determining if sustainable improvement is achieved.

Chapter 6: Tables and Diagrams

Table 1

Comparison of Total Pre- and Post-Intervention Readmissions

			PREPOST		
			Pre-intervention	Post-intervention	Total
Readmission	Yes	Count	25	3	28
		% within PREPOST	24.0%	9.7%	20.7%
	No	Count	79	28	107
		% within PREPOST	76.0%	90.3%	79.3%
Total		Count	104	31	135
		% within PREPOST	100.0%	100.0%	100.0%

Note. N = 135 (n = 104 admissions pre-intervention; 31 post-intervention). A total of 25 patients were readmitted from the pre-intervention group (December 2022 through February 2022) and a total of three were readmitted from the post-intervention group.

Table 2

Comparison of December Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions

Readmission * PREPOST Crosstabulation

			PREPOST		
			December	Post-intervention	Total
Readmission	Yes	Count	10	3	13
		% within PREPOST	25.6%	9.7%	18.6%
	No	Count	29	28	57
		% within PREPOST	74.4%	90.3%	81.4%
Total		Count	39	31	70
		% within PREPOST	100.0%	100.0%	100.0%

Note. N = 70 (n = 39 December admissions pre-intervention; 31 post-intervention). A total of 10 were readmitted from the pre-intervention group in December 2022 as compared to three who were readmitted from the post-intervention group.

Table 3

Comparison of January Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions

Readmission * PREPOST Crosstabulation

			PREPOST		
			January	Post-intervention	Total
Readmission	Yes	Count	7	3	10
		% within PREPOST	18.9%	9.7%	14.7%
	No	Count	30	28	58
		% within PREPOST	81.1%	90.3%	85.3%
Total		Count	37	31	68
		% within PREPOST	100.0%	100.0%	100.0%

Note. N = 68 (n = 37 January admissions pre-intervention; 31 post-intervention). A total of seven were readmitted from the pre-intervention group in January 2023 compared to three who were readmitted from the post-intervention.

Table 4

Comparison of February Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions

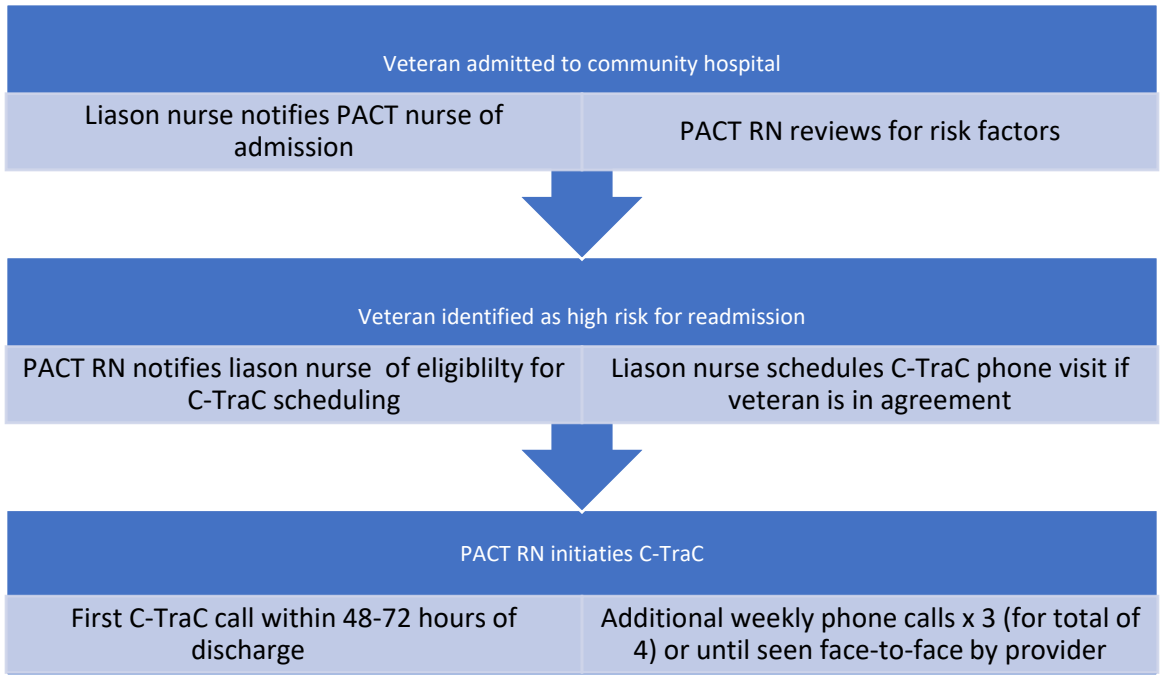
Readmission * PREPOST Crosstabulation

			PREPOST		
			February	Post-intervention	Total
Readmission	Yes	Count	8	3	11
		% within PREPOST	28.6%	9.7%	18.6%
	No	Count	20	28	48
		% within PREPOST	71.4%	90.3%	81.4%
Total		Count	28	31	59
		% within PREPOST	100.0%	100.0%	100.0%

Note. N = 59 (n = 28 admissions pre-intervention; 31 post-intervention). A total of eight patients were readmitted from the pre-intervention group in February 2023 compared to three who were readmitted from the post-intervention group.

Figure 1

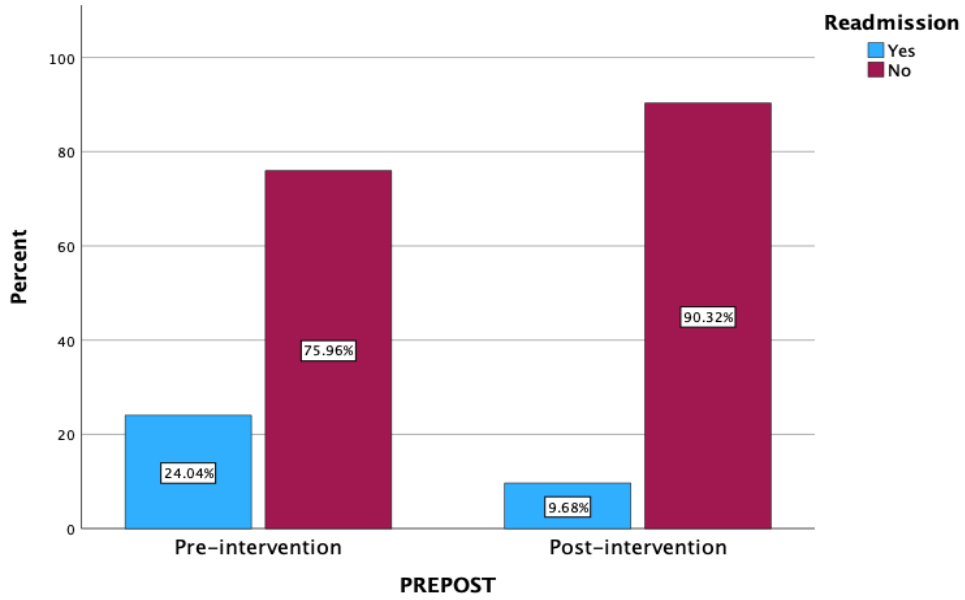
C-TraC Intervention Process Flow



Note. This diagram shows the C-TraC intervention process from the time of hospitalization through completion of the intervention.

Figure 2

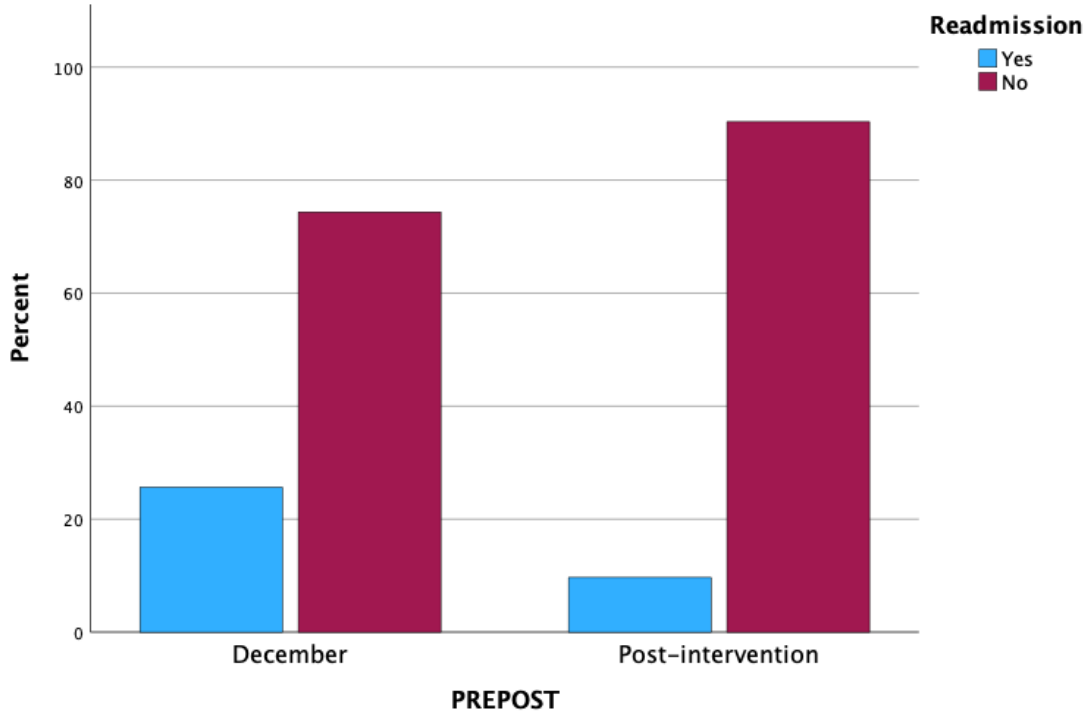
Comparison of Pre- and Post-Intervention Admissions and Readmissions



Note. N = 135 (n = 104 admissions pre-intervention; 31 post-intervention). A total of 25 patients were readmitted from the pre-intervention group (December 2022 through February 2023) and a total of three were readmitted from the post-intervention group (30 days). This figure shows results and compares the percentage of readmissions between the pre- and post-intervention groups. A reduction is noted from 24.04% readmission rate in the pre-intervention group to only 9.68% in the post-intervention group. However, the pre-intervention group represents a period of 3 months while the post-intervention group was 30 days.

Figure 3

Comparison of December 2022 Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions

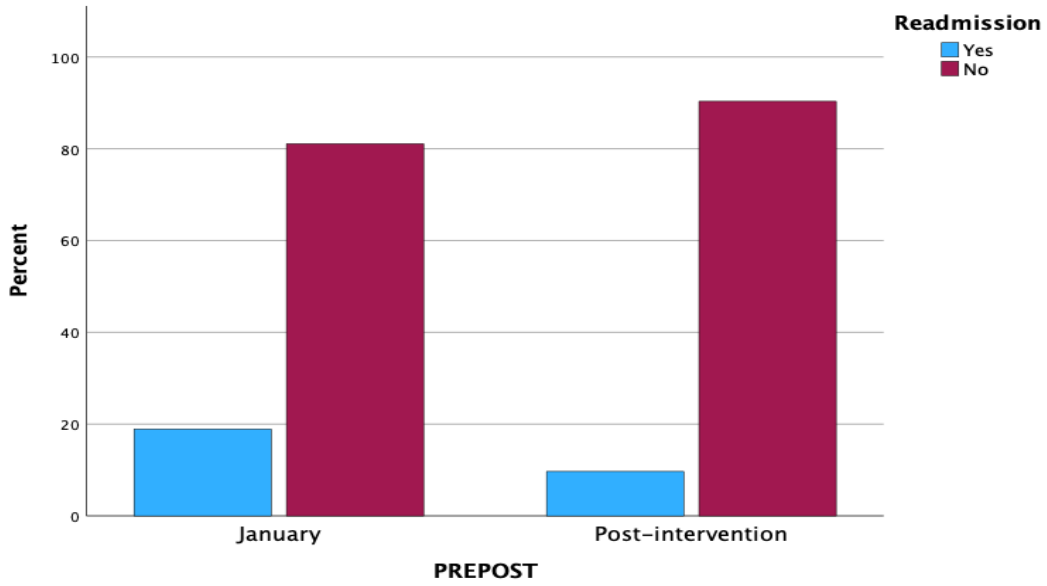


Note. N = 70 (n = 39 December admissions pre-intervention; 31 post-intervention). A total of 10 were readmitted from the pre-intervention group and a total of three were readmitted from the post-intervention.

This figure shows results and compares the percentage of readmissions between the December pre-intervention group and the post-intervention group. A similar change in the percentage of reduction from pre-intervention to post-intervention was found in December 2022 as compared to the overall project comparison.

Figure 4

Comparison of January 2023 Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions

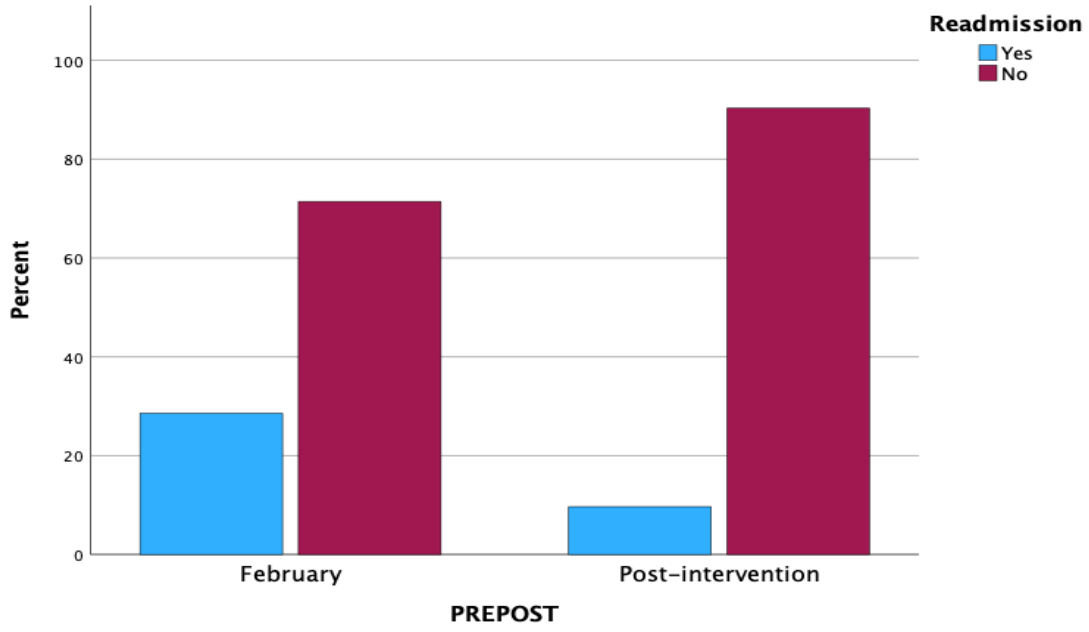


Note. N = 68 (n = 37 January admissions pre-intervention; 31 post-intervention). A total of seven were readmitted from the pre-intervention group and a total of three were readmitted from the post-intervention.

This figure shows results and compares the percentage of readmissions between the January pre-intervention group and the post-intervention group. Although a reduction in readmission is seen, the amount of the reduction is not as high when compared to the overall project.

Figure 5

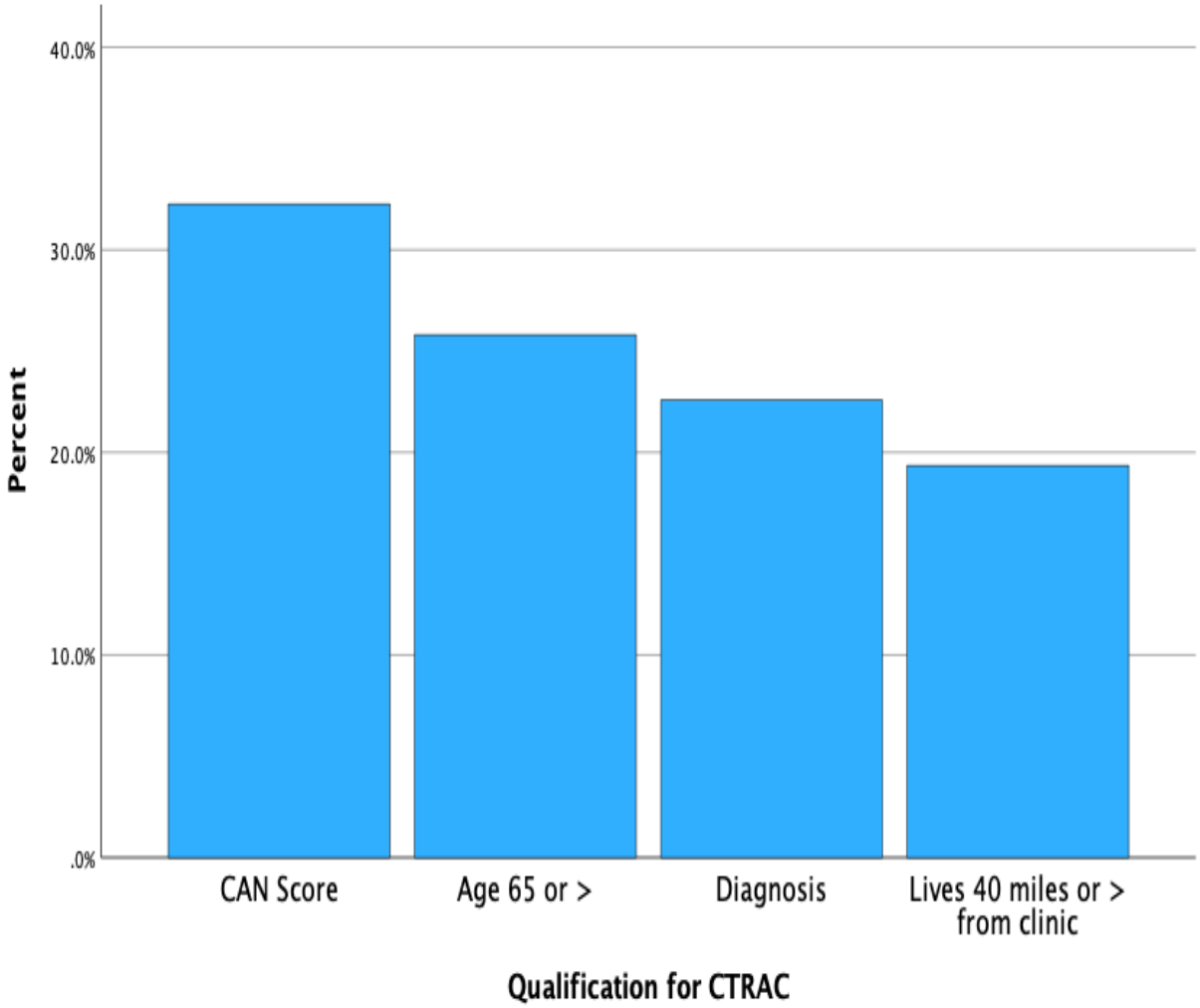
Comparison of February 2023 Pre-Intervention Admissions and Readmissions to Post-Intervention Admissions and Readmissions



Note. N = 59 (n = 28 admissions pre-intervention; 31 post-intervention). A total of eight were readmitted from the pre-intervention group in February 2023 and a total of three were readmitted from the post-intervention group. This figure shows results and compares the percentage of readmissions between the February 2023 pre-intervention group and the post-intervention group. The February 2023 results were also similar to the overall project findings.

Figure 6

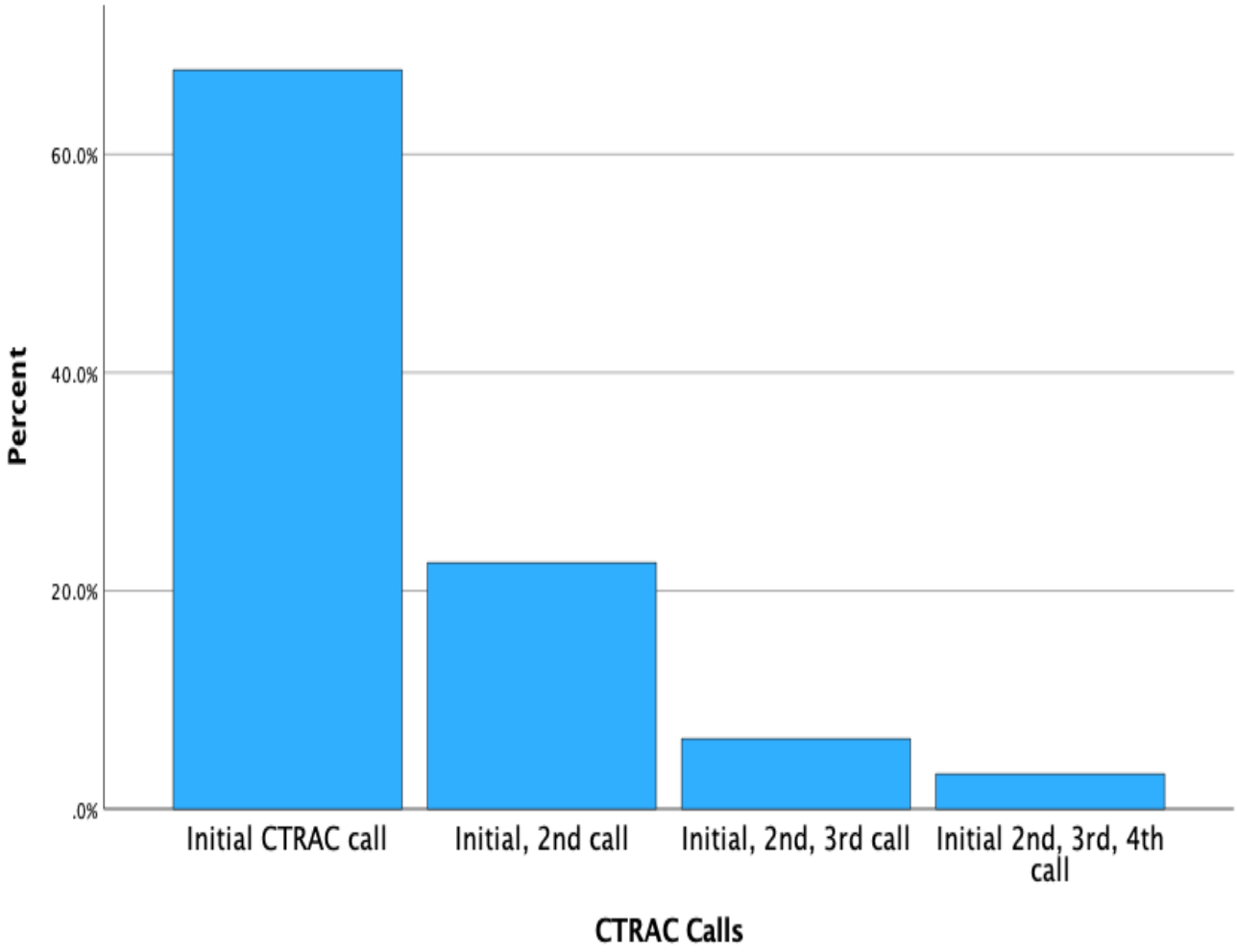
Comparison of Qualifications for C-TraC Intervention Among Post-Intervention Group



Note. N = 31 (31 post-intervention participants). A total of 12 participants (38.7%) qualified for the C-TraC intervention based on a CAN score of 70 or higher, 10 (32.3%) qualified based on age of 65 or greater, five (16.1%) qualified based on a diagnosis identified as high risk for readmission, and four (12.9%) qualified based on living 40 miles or greater from a clinic.

Figure 7

C-TraC Phone Calls Received by Post Intervention Group



Note. All 31 participants in the post-intervention group received the initial C-TraC phone call. Ten (32.3%) of the participants received an initial and second call. Three (9.7%) received the initial call, a second, and a third call. One participant (3.2%) received the initial call and weekly calls for the next 3 weeks for a total of four calls.

Appendix A

Coordinated Transitional Care (C-TraC) Intervention Eligibility Requirements

Purpose

Decrease hospital readmission rates for Montana Veterans enrolled in the Montana VA Healthcare System

Participant Eligibility

- Recently discharged from an acute care hospital in Montana paid for by the Montana VA Healthcare System
- Age 65 or older at the time of discharge from an acute care hospital in Montana paid for by the Montana VA Healthcare System regardless of discharge diagnosis, CAN score, or home address.

OR

- Age 64 or younger and meet at least one of the following criteria:
    1. Home Address > 40 miles from nearest VA facility

       AND/OR

    2. A Care Assessment Need (CAN) Score > 70

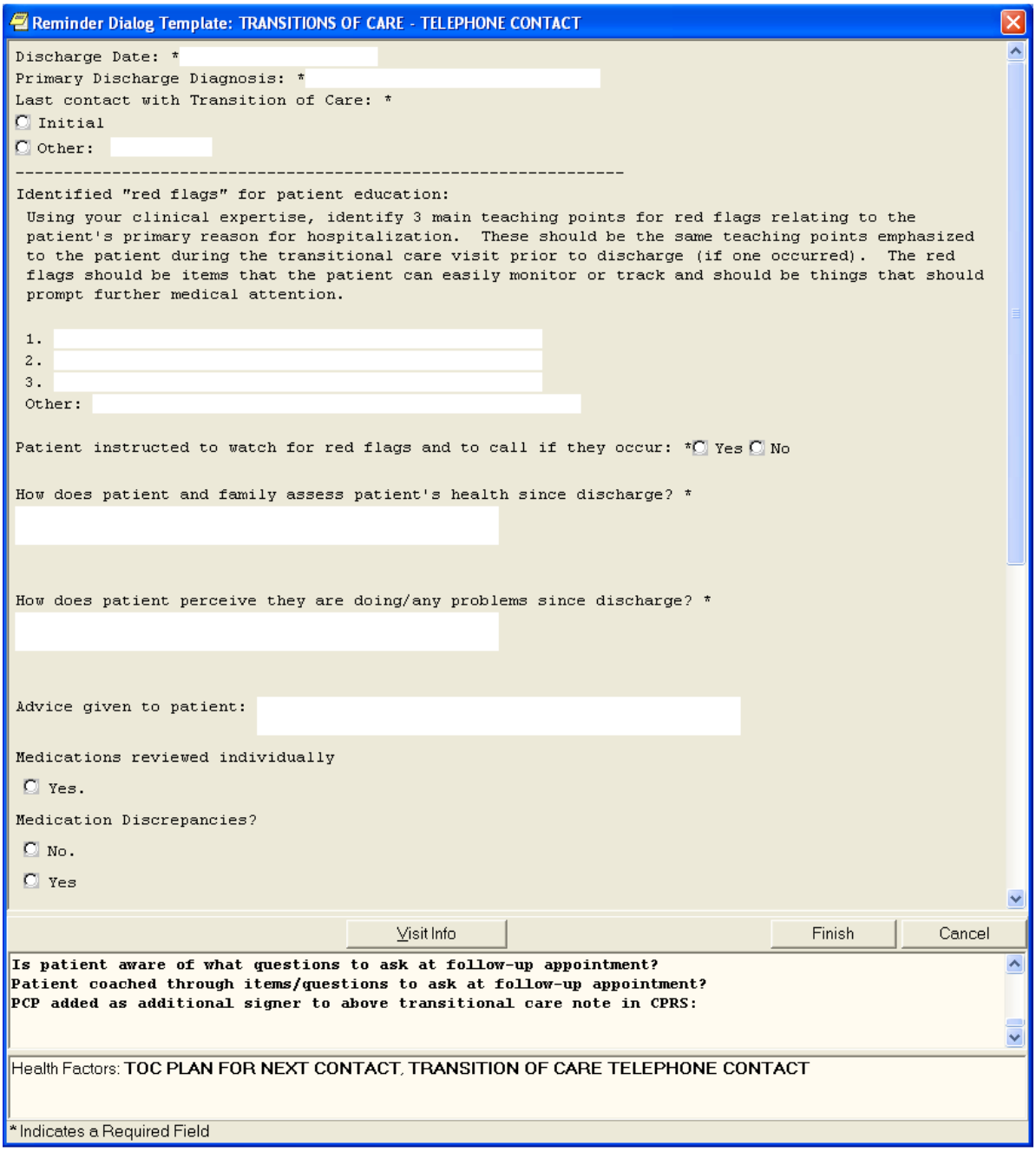
       AND/OR

    3. Discharged from an acute care hospital in Montana paid for by the Montana VA Healthcare System with one of the following diagnoses identified as high risk for readmission:

       o Heart Failure
       o Chronic Obstructive Pulmonary Disease
       o Pneumonia
       o Acute Myocardial Infarction
       o Coronary Artery Bypass Graft Surgery
       o Elective Total Hip or Knee Replacement

Appendix B

C-TraC Transitions of Care Telephone Contact Template



Note. The transition of care telephone note uses this template, which is designed for the electronic medical record presently used by all VA healthcare centers.

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