Geriatric Nursing xx (2017) 1–4

Contents lists available at ScienceDirect

Geriatric Nursing

journal homepage: www.gnjournal.com

Feature Article

Does acute care for the elderly (ACE) unit decrease the incidence of falls?

Ahmed Abdalla, MD *, Mehul Adhaduk, MD, Raad A. Haddad, MD, Yanal Alnimer, MD, Carlos F. Ríos-Bedoya, MPH, ScD, Ghassan Bachuwa, MD, MHSA, MS

Internal Medicine Residency Program, Hurley Medical Center, Michigan State University, 1 Hurley Plaza, Flint, MI 48503, USA

ARTICLE INFO

Article history:
Received 5 July 2017
Received in revised form
10 October 2017
Accepted 16 October 2017
Available online xxx

Keywords:
Acute care for the elderly
ACE
Falls
Morse Fall Score
Older patients

ABSTRACT

To determine whether acute care for the elderly (ACE) units decrease the incidence of patient falls compared to general medical and surgical (GMS) units, a non-concurrent prospective study included individuals aged 65 and older admitted to ACE or GMS units over a 2-year span was done. There were 7069 admissions corresponded to 28,401 patient-days. A total of 149 falls were reported for an overall incidence rate (IR) of 5.2 falls per 1000 patient-days, 95% CI, 4.4/1000–6.1/1000 patient-days. The falls IR ratio for patients in ACE unit compared to those in non-ACE units after adjusting for age, sex, prescribed psychotropics and hypnotics, and Morse Fall Score was 0.27/1000 patient-days; 95% CI, 0.13–0.54; $p < 0.001$. So, an estimated 73% reduction in patient falls between ACE unit and non-ACE units. Hospitals may consider investing in ACE units to decrease the risk of falls and the associated medical and financial costs.

Introduction

The geriatric population is at risk for many adverse events during hospitalizations. Falls are one of the most common complications of elderly patients during their stay in acute care settings. Besides minor and major injuries, falls are also associated with increased hospital length of stay, fear of immobilization, and inability to return home quickly, leading to increasing healthcare costs.[1–7]

Patient falls during hospitalizations are common and have been estimated at 3.56 falls/1000 patient-days for adult patients (21 years old and older).[8] In elderly patients, many factors contribute to a higher incidence of falls, including immobilization and starting o new medications.[9] In addition, falls in the elderly are associated with significant mortality and morbidity.[10] For example, accidental falls in institutional care could result in hip injury, with an estimated incidence rate of 20 per 1000 person-years.[11] Moreover, elderly patients experience delayed recovery and more long-term physical and psychological effects as a result of falls than their younger counterparts.[2] Hence the importance of preventing falls in this age group is paramount.

The Joint Commission International emphasizes fall risk prevention among hospitalized patients. Fall prevention is now a cornerstone in the hospital accreditation process. The Centers for Medicare and Medicaid Services (CMS) have labeled falls during the hospital stay as preventable events that should not occur. Consequently, CMS is not reimbursing for healthcare costs associated with hospital falls.[8]

To decrease the incidence of falls and other adverse outcomes in the elderly while in the hospital, special units have been designed and named Acute Care for the Elderly (ACE) units. These ACE units are specially designed to provide better care and to improve clinical outcomes in elderly patients.[12] After comprehensive geriatric assessment with the complementary principles of quality improvement, ACE units were developed in 1990. This system is based on four main elements: patient-centered care, a specially designed environment, review of medical care, and planning for discharge to help patients maintain or achieve independence in basic activities of daily living.[13,14] A systematic review by Fox et al. showed geriatric patients in ACE unit had almost 50% fewer falls than their peers in usual care units.[15] Another study in 2011, however, showed no statistically significant difference in the risk of falls, with a fall rate of 4.8 falls/1000 patient-days in the ACE unit compared to 6.7 falls/1000 patient-days in

Abbreviations: ACE, acute care for the elderly; GMS, general medical and surgical; MFS, Morse Fall Score.

Conflicts of interest: None.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

* Corresponding author.
E-mail address: aabdall2@hurleymc.com (A. Abdalla).

0197-4572/$ – see front matter © 2017 Elsevier Inc. All rights reserved.
https://doi.org/10.1016/j.gerinurse.2017.10.011

the usual care unit[12] (see discussion). The primary aim of this study was to evaluate whether an ACE unit at a community-based teaching hospital decreased the risk of falls in patients ages 65 years old and above during their hospital stay. The secondary aims were to evaluate the effect of age, sex, length of stay, use of psychotropic and hypnotic medication and Morse Fall Score on the incidence of falls in the geriatric population during their hospital admission.

Methods

Study setting and patient population

Following institutional review board approval, a non-concurrent prospective study was conducted using the electronic medical record (EMR) system at a community-based teaching hospital. Patients ages 65 years and older who were admitted to the institution's ACE unit between July 1, 2013, and August 31, 2015, were compared to those admitted to the general medical and surgical (GMS) units. The starting date for this study was July 1, 2013, as it was the opening date for the institution's ACE unit. All patients admitted to ACE or GMS units during the study period were included. Patients from critical care units (intensive care unit, cardiac care unit, and progressive care unit) were excluded because such patients receive a higher acuity of care and are less likely to be ambulatory, hence they have less of a risk of falls.[8]

Data collection and outcome measures

Patient falls were collected after the nurses assigned to the patients reported them in the hospital's secure, online adverse event reporting system and EMR. A fall was defined as a sudden, unintentional coming down from a standing, sitting, or horizontal position, slipping from a chair to the floor, a patient found on the floor and an assisted fall.[16] Data on age, sex, race/ethnicity, prescribed psychotropic and hypnotic medications, and Morse Fall Score (MFS) were collected from the EMR. A total of 7069 admissions corresponding to 28,401.61 patient-days and 149 falls were included in this study.

Morse Fall Score

The MFS's purpose is to predict the risk of falling. It consists of six subscales, each of which identifies factors that increase the risk of falling. Briefly, the MFS examines an individual's fall history and co-morbid conditions as indicators of disease severity. The MFS also examines patient characteristics that might increase the risk of falling. Specifically, it evaluates whether a patient moves with the assistance of aids, needs treatment that requires physical obstacles such as intravenous lines, and whether the patient is mentally intact. The MFS maximum total possible score is 125. Morse and colleagues suggested a cut-off score of 45 as indicative of a high risk of falling.[17] Generally, the MFS has shown poor predictability for fall risk with variable sensitivity and specificity of this score.[18,19] In a study done by Kim et al. to evaluate sensitivity and specificity of fall risk scores, the MFS was found to have a sensitivity and specificity of 88% and 48% respectively when using 25 as a cutoff for high risk of falling.[18] In another study by O'Connell, the MFS was found to have a sensitivity and specificity of 83% and 29% respectively when using 45 as the cutoff.[20]

At this institution, nursing staff assess adult inpatients using the MFS on admission to the hospital, every 8 h, after any fall or change in the medical status of the patient, and after every transfer from one unit to another within the hospital. The patient's MFS total score is documented in the patient's EMR.

ACE unit

An ACE unit was opened at the institution on July 1, 2013. It has 9 beds and was designed to improve the functional outcomes of elderly patients 65 years and older. It has a specially designed environment, interdisciplinary care, early discharge planning, and ongoing review of medical care. The ACE unit uses the following tools to reach its goals: specially trained nursing staff and senior-friendly amenities, such as special lighting, non-skid flooring, low beds, and soothing sounds/low noise policies. With the special training, ACE unit staff address seniors' specific needs regarding nutrition, proper sleep patterning, early delirium detection, skin integrity, and medication management. The main services that differentiate the ACE unit from GMS units and help to decrease the fall rate are early physical and occupational rehabilitation to prevent functional decline, patient-centered care to prevent cognitive decline and senior-friendly environment to prevent mental and physical decline.[15] Multidisciplinary rounds along with nurses specially trained in elderly care also help to decrease the incidence of falls in ACE unit.

This institution's ACE and GMS units have similar nurse to patient ratios, both of which are about 1: 5. The decision to admit a patient to ACE unit or a GMS unit depends mainly on an emergency department physician screening for the risk of developing geriatric syndromes.

Data analysis

Before proceeding to do any statistical analysis, the presence of data outliers and out-of-range values was assessed. Thereafter, data cleaning and editing were performed through a series of frequencies, proportions, descriptive statistics (e.g., mean, median, and standard deviation) and figures (e.g., histograms and box and whisker plots). After this process, bivariate analysis such as Fisher's exact tests for categorical variables and Student's t-tests and analysis of variance tests for continuous variables were performed to determine any associations between the study's explanatory variables (i.e., age, sex, prescription medications, and MFS) and the hospitalization unit (i.e., ACE and GMS).

To examine the relationship between admission to the ACE unit and risk of patient falls after controlling for selected covariates, a zero-inflated Poisson (ZIP) model was selected. The ZIP model was chosen because falls are a count explanatory variable, the data on falls was highly skewed with an excess number of zeros, and there was no evidence of over-dispersion. This model has also been recommended to examine clinical data with these characteristics based on its fit, decreased bias, smaller mean-squared errors, and higher precision.[21] All analyses were done using Stata statistical software package (Stata Corporation, College Station, TX). The usual 0.05 Type I error threshold for statistical significance was used for all analyses.

Results

From a study population of 7069 patients, a total of 149 falls were reported during the study period for an incidence rate (IR) of 5.2 falls per 1000 patient-days (PD), 95% confidence interval (CI) 4.4/1000 PD−6.1/1000 PD. The incidence rate ratio (IRR) for patients in the ACE unit compared to those in non-ACE units was 0.96 (95% CI: 0.56, 1.63). Table 1 shows characteristics of patients in the ACE and non-ACE units. The mean age of the study population was 76.4 years (SD ± 8.3) with females composing 60.6% of the patients.

Given the high proportion of zeros and the count nature of the response variable, the zero-inflated Poisson (ZIP) model was used to control for potential confounders in the multivariate