

Research Article

The Working Processes and Safety Measures Reduce Falls in a Multilevel Geriatric Hospital

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Abstract

Objective: Fall is a common event in elderly that could harm independence, prolongs hospitalization and increases mortality, as well as becoming a burden on health systems.

Methods: More than five hundred reports of unusual events were examined between 2014 and 2016, before and after the implementation of new management system, included change in working and supervising processes, in addition to using new safety measures for reducing of falls.

Results: There was decrease in the number of falls in 2018 compared to 2016 (21%, $p \leq 0.04$) after new program implementation. The number of falls with physical injuries decreased ($p \leq 0.04$).

Discussion: Implementation of new working processes and safety measures for falls prevention, close supervision on work processes among nursing and clinical teams, the use of new equipment and technology contributed to lowering of the total number of falls, improve patients' falling profile and the damage as a result of falls in geriatric facilities.

Keywords: Falls prevention; Geriatric patients; New working processes; Safety measures

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Introduction

Elderly people are a major risk group for falls. Approximately, 60% of community indwelling elderly fall annually, part of them twice or more each year; the mean fall incidence rate among institutionalized elders is almost 3 times higher than in community elders [1]. Falls are the most frequently reported adverse incident in nursing homes that contribute to the occurrence of fractures. Studies show that leading factors associated with falls among elderly patients include; a history of prior falls, impaired cognition, wandering or impulsive behavior, use of psychotropic medications, urinary incontinence, lack of exercise and low staffing levels [2]. Falls are associated with restricted mobility, a decline in ability to carry out activities causing an increase of morbidities; mortality and use of health care services [3-5]. The severity of fall related complications increases with age. The primary sequels of falls include fractures, head injuries and post-fall anxiety [6]. The reduction in mobility and independence are often serious enough to result in admission to hospital or nursing homes. The total cost of fall injuries for older people is projected to reach \$32.4 billion by 2020 [7,8].

Estimating the potential risk factor for falls upon hospitalization is an important aspect in order to detect high risk patients and adjusting the nursing environment to their needs. Despite the extensive dealing with falls and related issues, no clear evidence for the independent effectiveness of environmental modification or education programs [7]. The common tool to identify and clearly mark high fall risk patients is the Morse Fall Scale (MFS). The MFS is a rapid and simple method of assessing a resident's likelihood of falling, widely used in acute care settings, marking the patient's environment (bed, medical chart etc.), using technological or mechanical alerting systems [9]. The purpose of this our study is to check the impact of the implementation of a new working and supervision processes in addition to the use of new safety measures on fall prevention.

Methods

Setting and sample: The study was conducted in multilevel geriatric hospital, affiliated with medical school with capacity of 341 beds, the age of admitted patients was over 65. This is a standard practice in our hospital to fill out the report of every unusual event, including falls. The report is being filled out by team included the nurse and medical doctors, in order to all relevant information of a specific event, including patient's personal information, date, time and location of fall, such as bed, bathroom or outdoor and the damage causes as a result of fall. The report also includes the primary level of fall risk estimated by MFS.

Study design: We used a retrospective comparative analysis in aim to evaluate the impact of the implementation of new working and supervision processes in addition to the new safety measures used during 2017 on fall prevention in our hospital. All reports of fall events during the years 2016-2018 were reviewed. Therefore, the year 2016 and 2018 were respectively before and after new process implementation.

Data collection: In order to examine the effectiveness of those procedures and safety measures, the total number of falls, number of bed's falls and the falls index (the number of falls for 1000 hospitalization days) were compared along the years.

Measurements/Instruments: For fall risk assessment we examined and compare MFS of 150 randomized patients from each of those three years. In addition to fall events reports, demographical information regarding the entire patients was collected. In order to reduce the falls number there were implemented changes in supervision and working processes.

Supervision carried by the nursing management and technical teams and includes inspection the safety of tools, such as emergency bells, height, breaks and rails of beds, ensuring all safety-grips, removing visual obstacles from hallways and passages, ensuring night lighting works properly. Real-time inspections of nurse supervisor following every fall event to ensure that all working processes were carried out as required.

Working processes includes: Creating fall's prevention recommendations and implementing the letter for nursing teams; identification high risk patients for fall, using MFS, on admission and one week thereafter, increasing fall prevention awareness by lectures, clinical discussions, training and education seminars.

Additional measures were; routine visits in the patient's rooms and restrooms in each clinical ward in attempt to identify pre-falling situations and prevent patients' physical restraints when not required. Use of elements of bed assisting in prevention of falls from a high bed's position, such as adjusting the bed to zero level, the bathing-chairs with safety belt. The use of the Early Sense System- sensor and bedside monitor, continuously detecting patient vital signs and movement patterns in contactless manner.

Ethical consideration: This study was approved by the Institutional Review Board of the S.H.H. (IRB approval number: 171).

Data analysis: The Mahn-Whitney U-test was performed to examine the differences in demographic data between 2016-2018. The model to describe the probability for falls was Poisson distribution, while fall rate was defined as: $\lambda = (1000 \cdot \text{NOF}) / \text{NOHD}$ (NOF- number of falls, NOHD-number of hospitalization days, and λ - fall rate, examined annually).

The total rate of falls, falls with physical damage and the determination of the distribution of the Morse score values (non-risk, low to moderate risk and high risk) in the years 2016, 2017 and 2018 were compared using Chi-Square test.

Results

Five hundred twenty reports of unusual events were examined between 2016 and 2018, before and after the implementation of new management system, of those 486 were reports on fall events. The demographic data, presented in table 1; there weren't significant difference in patient's age and gender in all three years. The MRF was done in 150 randomized patients on admission in the years 2016, 2017 and 2018; the data are presented in table 2. Statistically significant differences were found between 2016 and 2018. There was 52(34.6%) patients with high-risk score in 2018 compared to 21(14%) in 2016.

Year	Inpatients			Age		
	Total	% Male	% Female	Average	Minimum	Maximum
2016	3553	37.74%	62.26%	81.86	52	107
2017	3679	37.48%	62.52%	82.21	56	110
2018	3585	39.80%	60.20%	82.18	51	111

Table 1: Demographic data of patients.

Year	Non-risk (0-25)	Low to moderate risk (25-45)	High risk (>45)
2016	46	73	31
2017	37	61	52
2018	21	51	78

Table 2: Morse falls risk score (out of 150 inpatients charts).

There was decrease in the number of falls after new program implementation; in 2016 compared to 2014 ($p \leq 0.041$) and 2015 ($p \leq 0.012$) (Table 3). The number of post-fall's injury decrease following the implementation of new program comparing the data of 2018 and 2016 years ($p \leq 0.041$) (Table 3).

Year	Number of hospitalization days	Total no. of reported falls events			Falls rate*	Bed falls	Bed falls rate*
		Total	injury	No injury			
2016	108085	174	23	151	1.6098	48	0.44
2017	109378	168	16	152	1.5360	53	0.48
2018	113169	144	9	135	1.2724	34	0.3

Table 3: Fall's events analysis.

*number of falls per 1000 hospitalization days.

Discussion

This study shows that the difference between years before and after implementation of new working processes and safety measures for falls prevention is identified, and the total number of falls significantly reduced. This is despite of the fact that more patients with high fall risk score were identified in this year. In addition, the total number of falls with injury was significantly lower in 2018 comparing to two previous years. Falls pose a substantial financial burden on healthcare systems. Extensive research from systematic reviews and meta-analyses has established effective approaches for reducing falls among older people, although uncertainties and controversy remain [10].

We found articles described a prevention programs and its effects on the incidence of falls in geriatric hospital wards. Von Renteln-Kruse et al., presented study with the intervention included fall-risk assessment on admission and reassessment one week after a fall; they show that a structured multifactorial intervention reduced the incidence of falls, but not injurious falls, in a hospital ward setting with existing geriatric multidisciplinary care [11]. Miake-Lye et al., show that multicomponent programs for falls prevention among inpatients reduce relative risk for falls by as much as 30% [12]. Aimee Lees how that use of multifactorial assessments and interventions has led to a decrease in fall rates by 25% to 40% [13]. Weinberg presented that fall prevention initiative was associated with a significant reduction in fall and fall-related injury rates [14].

Tinetti et al., in attempt to translate the fall prevention recommendation into the covered service asked the question who should participate in a fall prevention exercise program [15]. Leipzig et al concluded that exercise and physical therapy reduced falling by about 13%, vitamin D supplementation by 17%, and multifactorial risk assessment by 6% [16]. The United State Preventive Services Task Force (USPSTF) recommends exercise or physical therapy and vitamin D supplementation to prevent falls in community-dwelling adults aged 65 years or older who are at increased risk for falls [17]. Dykes [18] assessed the effectiveness of interventions designed to reduce falls by older people in nursing care facilities and hospitals. The use of a fall prevention measures compared with usual care significantly reduced rate of falls.

Exercise in subacute hospital settings appears effective but its effectiveness in nursing care facilities remains uncertain [19].

Fall prevention strategies have a significant but small effect on fall rates despite the use of complex, multidisciplinary interventions. Additional randomized trials are needed to examine the possible benefits of multidisciplinary fall prevention strategies in the acute inpatient setting [20]. As mentioned above fall events have emotional as well as physical and financial implications. Prevention of falls is a major factor in successful rehabilitation of the patients. In attempt to try to reduce the number of falls we decided to use closed supervision in addition to new safety measures, such as Early-Sense.

Conclusion

Administration and implementation of new working processes and safety measures for falls prevention, close supervision on work processes among nursing and clinical teams, the use of new equipment and additional technology to assist in alerting of bed leaving attempts, contributed to lowering of the total number of falls, improve patients' falling profile and the damage as a result of falls in geriatric facilities. The additional challenge is the decrease of number of restraints of patients, using close supervision and reducing the number of falls of such patients.

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