Original Article

Characteristics of Inpatient Falls in a Hospital Setting: A Retrospective Study from Turkey

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Abstract

Background: Patient falls are the most common adverse safety event in hospitals. Thus, both health institutions and healthcare professionals working in these institutions need to understand the characteristics of patient falls and factors associated with them. However limited studies have been conducted specifically on this topic for hospitalized patients in Turkey.
Aims: The aim of this study was to define the frequency of inpatient falls, the characteristics of patients who fall, conditions leading to falls and fall-related characteristics.
Methodology: A retrospective study design was used. The study is based on the results of follow-up observations of fall cases in hospitalized patients between January 1, 2012, and December 31, 2017. Data were encoded and analyzed with descriptive statistics, the chi-square test, and and Fisher's exact tests using IBM SPSS Statistics version 22.0.
Results: The fall rate was 0.89 per 1000 patient bed days. Our findings showed that falls in the hospital setting were more common in 0-6 and 65 years and over age groups. According to our findings a significant relationship was found between age and factors such as the location of fall, the cause of fall, conditions leading to a fall and the presence and absence of a companion.
Conclusions: The results obtained from the study show that each hospitalized patient should be assessed for fall risks by considering their individual characteristics, fall scales should be used and risk reduction strategies should be implemented for high-risk patients and their caregivers.

Key Words: Falls, hospitalized patients, patient safety.

Introduction

As well as being a priority for all health organizations around the world, improvement of patient safety is a critical concern. Patient falls (PFs) are closely associated with both patient safety and the quality of nursing care in all healthcare settings (Lee, 2018). PFs are the most commonly encountered situation among hospitalized patients (HPs) as well as the most reported unwanted events that jeopardize patient safety (McKechnie et al., 2015; Chang et al., 2015; Singh et al., 2015). Falls among HPs and serious injuries related to them may extend the length of hospital stay, decreased quality of life as well as anxiety and fear in patients, relatives and caregivers and cause permanent disabilities or even death (Majkusová and Jarošová, 2014; Costa-Dias et al. 2014; Dunne et al., 2014). Moreover, it is known that fall-related serious injuries damage the national economy in both the manufacturing and service sectors through the attendant loss of labor (Baris et al. 2018).

Despite the efforts made to prevent falls, incidents of falls in hospitals cannot be controlled effectively. In the United States (USA), falls among HPs are estimated to range between 700.000 and 1.000.000 in a year (Kafantogia et al. 2017). However, the frequency of falls varies according to countries and regions, and even from hospital to hospital, and different fall rates

are found in the literature. In the results of various studies, the incidence of falls per 1000 patient days was reported to be 2.3-3.1 (Anderson et al., 2014; Fields et al. 2015). In a different study, the fall rate was found to range between 2% and 5%, and between 2.2 and 19.0 per 1000 patient days (Walsh et al. 2011). In addition, PFs are among the most common causes of secondary injuries and can lead to serious injuries or even death in patients (Oliver et al., 2010; Dunne et al., 2014). In the study conducted by Bouldin et al., (2013) investigating 315.817 reports of falls, it was found that 82.332 of the falls resulted in minor, moderate or major injuries and that 0.2% resulted in death. Fall-related injuries increase the need for healthcare services and require extra treatment costs and an extended length of hospital stay (Haines et al., 2013; Chang et al. 2015). It was reported that the average cost of fall-related injury was US$14.000 and that the hospital costs of patients who fell and were injured were over US$420.000 when compared to those who did not fall (Haines et al., 2013; Kafantogia et al., 2017). According to the findings of a study conducted in Turkey, the extra hospital cost of serious fall-related injuries was US$3.302.60 and the average additional length of hospital stay was 14.61 days (Baris et al. 2018).

However, many falls are predictable and multi-factor interventions can reduce falls and fall-related injuries (Tzeng et al. 2016; Kafantogia et al. 2017). Recording and analyzing cases of fall is one strategy for preventing PFs in healthcare institutions. These analyses of factors related to cases of falling in hospital can significantly reduce falls by guiding health professionals on what measures should be taken to prevent patient safety being jeopardized, and on what action should be carried out (Stenberg and Wann-Hansson 2011). In Turkey, a national Safety Reporting System Turkey (SRS^{TR}) was developed by the Department of Quality and Accreditation in Health at the Ministry of Health. The SRS^{TR} is a system that focuses on the improvement of patient safety and allows clinicians, health workers and healthcare managers to record and manage medical errors in hospitals that injure patients or that are recognized to be potentially harmful, as well as adverse clinical cases related to patient safety. The SRS^{TR} follows five principles: anonymity, voluntariness, nonpunitive actions, confidentiality, and mutual learning. All reports within the scope of the SRS^{TR} are made to the Quality Management Units (QMU) of the hospitals using case reports. According to the National Analysis Report for the SRS^{TR}, the ten most frequent patient safety issues in hospitals were PFs and it was determined that 2870 of the 7921 cases reported as patient safety issues by 2018 were be PFs (Safety Reporting System, SRS^{TR} 2018).

Among the team members providing healthcare, nurses are the ones who interact most with the patient. This makes nurses important in ensuring patient safety and preventing PFs. Nurses cannot completely prevent PFs in hospitals; however, they can minimize the risk by implementing practices to prevent falls. Combining information on the risk factors for falls with nursing practices can lead to successful outcomes for preventing falls (Lovallo et al., 2010; Godlock et al., 2016; Lee, 2018). Determining the level of risk with regard to whether a patient may fall is thus very important, and conducting studies to understand the factors that contribute to the fall risk and the characteristics of falls is necessary to prevent them. Although various studies have been conducted to assess the prevalence of PFs and patients' fall risks in Turkey, there is only a limited number of studies investigating the characteristics and effects of falls that have occurred in hospital settings (Mülayim and İntepeler, 2011; Yüce and Kavak, 2017; Baris et al., 2018). Considering all these factors, the results of this study will increase the awareness of hospital managers and nurses about the characteristics of PFs and about what measures should be taken to reduce fall rates, and will help them implement interventions to effectively prevent falls.

Aim of the Study

This study thus aimed to define the frequency of falls in HPs, the characteristics of patients who fall, conditions leading to falls and fall-related characteristics, and to raise awareness about what measures should be taken to improve preventive interventions.

Methodology

Design and Sample

This retrospective type of study was carried out in a public hospital with 1200 beds in the Afyonkarahisar province in the Aegean region of Turkey. This hospital provides treatment services to 1.104.225 outpatients and 42.451 inpatients on average per year. The study is based on the

results of follow-up observations of fall cases in HPs between January 1, 2012, and December 31, 2017. In the study, the data obtained from the related case reports of inpatient falls that were reported on the SRS[TR] were used. The sample of the study consisted of 205 fall cases out of 254.709 HPs for at least 24 hours in inpatient clinics of the same hospital between January 1, 2012, and December 31, 2017. Unreported and unrecorded falls were not included in the study.

Data collection

In this study, a fall was defined as an "unwanted change (of position) onto a lower area, surface or the ground in an individual previously standing, sitting or reaching out". The fall-related case reports (FCR) that were reported within the scope of the SRS[TR] and that constituted the source of study data were reported to the QMU of the hospital by the nurses who witnessed or were informed about the fall, and who filled them in within 24 hours of the fall. Nurses who reported the cases were not obliged to give their names on the form. The FCR includes variables associated with characteristics such as patient's age, gender, diagnosis, the clinic in which the patient is hospitalized, fall risk score, as well as data related to the location of the fall, time of fall, conditions leading to the fall, cause and type of fall, presence of a fall-related injury, interventions made to the patient after the fall. The missing information on the FCR was accessed by reviewing patient data from patient records. All of these data on patients who fell obtained from the FCR within the SRS[TR] were transferred to the Falling Patient Information Form to be analyzed in the study by the researchers and recorded in the statistical program.

Data analysis

The fall rates per 1000 patient day per year were calculated using the equation (number of patients who fell / patient day) x 1000. All statistical analyses were made using SPSS version 22.0 (Armonk, NY: IBM Corp.) package software and $p<0.05$ were considered statistically significant. The data involving the characteristics of the patients who fell and the fall-related characteristics were analyzed using descriptive statistics and giving number and percentage. Depending on the size of the tables, chi-square and Fisher's exact tests were used to analyze inferential statistics including the correlation between the age group of the patients and location, cause, type of fall, fall conditions, presence of a companion during falling and giving the risk scores of the patients who fell as means and standard deviations.

Ethical considerations: For the research, approval was obtained from the Clinical Research Ethics Committee of a University (No. 2017/204) in accordance with Helsinki Declaration and written approval was obtained from the institution in which the data about the patients who fell was collected.

Results

Characteristics of falling patients

A significant number of the falls occurred in the patient group aged 65 years and over (42.4%) and in the patient group aged 0-6 years (27.4%). More than half of the patients (n= 124, 60.5%) who fell were male. Considering the primary diagnoses of the patients, it was determined that 30.2% (n= 62) had a neurological and 18.5% (n= 38) had a cardiac condition. One hundred ten patients fell when not under the care of anyone and that 46.3% (n= 95) of the patients fell mostly when with a companion. The great majority of falls reported (n= 178, 86.8%) occurred in patients in the high-risk group. The majority of the patients (n= 172, 83.9%) did not get injured from falling and that 84.8% of those who got injured from falling (n= 33) had minor injuries (Table 1).

Characteristics of inpatient falls

Within the SRS[TR], 205 fall cases were reported between 2012 and 2017, corresponding to 0.89 per 1000 patient days (Figure 1). It was determined that 29.3% (n= 60) of the 205 patient falls reported in the five-year period were encountered in 2017 and that the rate of reporting PFs increased as the year 2017 approached (Table 2). Eighty four falls were occurred in internal clinics, 24.9% (n= 51) in pediatric, and 16.1% (n= 33) in physical therapy and rehabilitation clinics. The majority of the falls (40%) were experienced between 16:01 and 00:00 hours. Most of the falls occurred in the patients' rooms (n= 128, 62.4%) and in the toilet/bathroom (n= 45, 22.0%). Fifty four patients fell due to dizziness, 24.9% due to unraised bed borders and 15.6% due to loss of balance. Nearly one third of the falls (n= 60, 29.3%) reported were falling down from height (from bed), 18.0% (n= 37) were falling during the time in toilet/bathroom (Table 2).

Table 1. Characteristics of falling patients (*n*= 205)

Variable	*n*		*%*
Age Group			
0-6	56		27.4
19-40	16		7.8
41-64	46		22.4
65 years and over	87		42.4
Gender			
Female	81		39.5
Male	124		60.5
Primary Condition			
Neurological	62		30.2
Respiratory	52		25.3
Cardiac	38		18.5
General Surgical/ Neurosurgical	21		10.2
Infectious disease	7		3.4
Psychiatric	6		2.9
Metabolic/endocrinal	5		2.4
Renal	4		1.9
Orthopedic	4		1.9
Oncological	3		1.4
Gynecological	3		1.4
Companion			
Yes	95		46.3
No	110		53.7
Companion			
Friend/relative	88		92.7
Health personnel (nurse, technician)	4		4.2
Assisting personnel	3		3.1
Fall-related Injuries			
Yes	33		16.1
No	172		83.9
Type of Fall-related injuries (*n*= 33)			
Major	5		15.2
Minor	28		84.8
Post-Fall Treatment[*]			
Suture/dressing	15		7.3
Radiological examination	98		47.8
Consultation	127		62.0
Status of Fall Risk[**]			
High risk	178		86.8
Low risk	27		13.2
Mean Fall Risk Score	***Min***	***Max***	***M ± SD***
0-16 years	5	25	13.65 ±4.32
17 - ≥ 65 years	1	21	9.56 ± 3.50

Abbreviations: *M, mean; SD, standard deviation.* [*]Multiple interventions were performed for one patient
[**] ≥5 points on the IFRS, ≥15 points on the HFRS

Table 2. Characteristics of inpatient falls

Years	Number of Inpatients	Number of Reported Falls	
		n	***%***
2017	53894	60	29.3
2016	57420	47	22.9
2015	55536	42	20.5
2014	35012	35	17.1
2013	28097	10	4.9
2012	24750	11	5.4
The clinic where fall occurred			
Pediatric Clinic		51	24.9
Physical Therapy and Rehabilitation Clinic		33	16.1
Internal Clinic			
Internal Medicine		24	11.7
Pulmonary Medicine		22	10.7
Neurology		18	8.8
Cardiology		15	7.3
Psychiatry		5	2.4
Surgical Clinic			
General surgery		19	9.3
Neurosurgery		5	2.4
Orthopedics		4	2.0
Gynecology and Obstetrics		3	1.5
Intensive Care Unit		6	2.9
Time of Fall			
08:00-16:00		71	34.6
16:01-00:00		82	40.0
00:01-07:59		52	25.4
Location of Fall			
Patient’s room		128	62.4
Toilet/bathroom		45	22.0
Hall		23	11.2
Intensive Care Unit		5	2.4
Operating room		3	1.5
Radiology Unit		1	0.5
Cause of Fall			
Dizziness		54	26.3
Unraised bed borders		51	24.9
Loss of balance		32	15.6
Slipping on a wet floor		21	10.2

Tripping over/getting entangled in equipment	13	6.3
Unlocked bed/wheelchair brakes	13	6.3
Broken devices (unraised bed borders, non-functioning bed and stretcher brakes)	10	4.9
Sleeping on an age-inappropriate bed	7	3.4
Agitation	4	2.0
Conditions Leading to Fall		
Falling down from a height (from bed)	60	29.3
Falling while getting up from bed (ground-level falling)	49	23.9
Falling during mobilization (ground-level falling)	46	22.4
During time in toilet/bathroom (ground-level falling)	37	18.0
Falling from wheelchair (ground-level falling)	7	3.4
Falling during transfer(ground-level falling)	6	2.9
Type of Fall		
Anticipated physiological	164	80.0
Unanticipated physiological	7	3.4
Accidental	34	16.6
Total	205	100.0

Characteristics of inpatient falls according to age group

All the patients in the 0-6 age group (100.0%) and the majority of the patients in the 65 years and over age group (n= 50, 57.5%) fell in their rooms. The majority of the patients in the 0-6 age group (n= 37, 71.2%) fell due to unraised bed borders, while the primary causes that led patients in 65 and over age group to fall were found to be dizziness (32.2%) and loss of balance. All the patients in the 0-6 age group fell from a height, and that the patients in the 19-40 and 41-64 age groups fell during mobilization (n= 10, 50.0%, and n= 19, 41.3%, respectively). Falling while getting out of bed (n= 37, 42.5%) and falling in the toilet/bathroom (n= 23, 26.4%) were found to be the most common conditions leading to falls in patients aged 65 years and over. Half of the patients (n= 26, 50.0% in the 0-6 age group fell during the day shift (08:00-16:00), and patients aged 65 years and over fell during the evening (n= 36, 41.4%) and night (n= 28, 32.2%) shifts. Thirty three patients (63.5%) in the 0-6 age group fell when under the care of someone else, while half of the patients (n= 10) in the 19-40 age group and the majority of the patients in 41-64 (n= 28, 60.9%) and 65 and over age groups (n= 53, 60.9%) were alone at the time of fall. It was determined that "anticipated physiological falls" were most frequently experienced in all age groups. All of the major injuries were found to occur in the 65 years and over age group. A statistically significant difference was found between the age groups of the patients who fell and the location of the fall, cause of falls, conditions in which they fell, the presence of a companion ($p<0.001$). (Table 3).

Table 3. Characteristics of inpatient falls according to age group

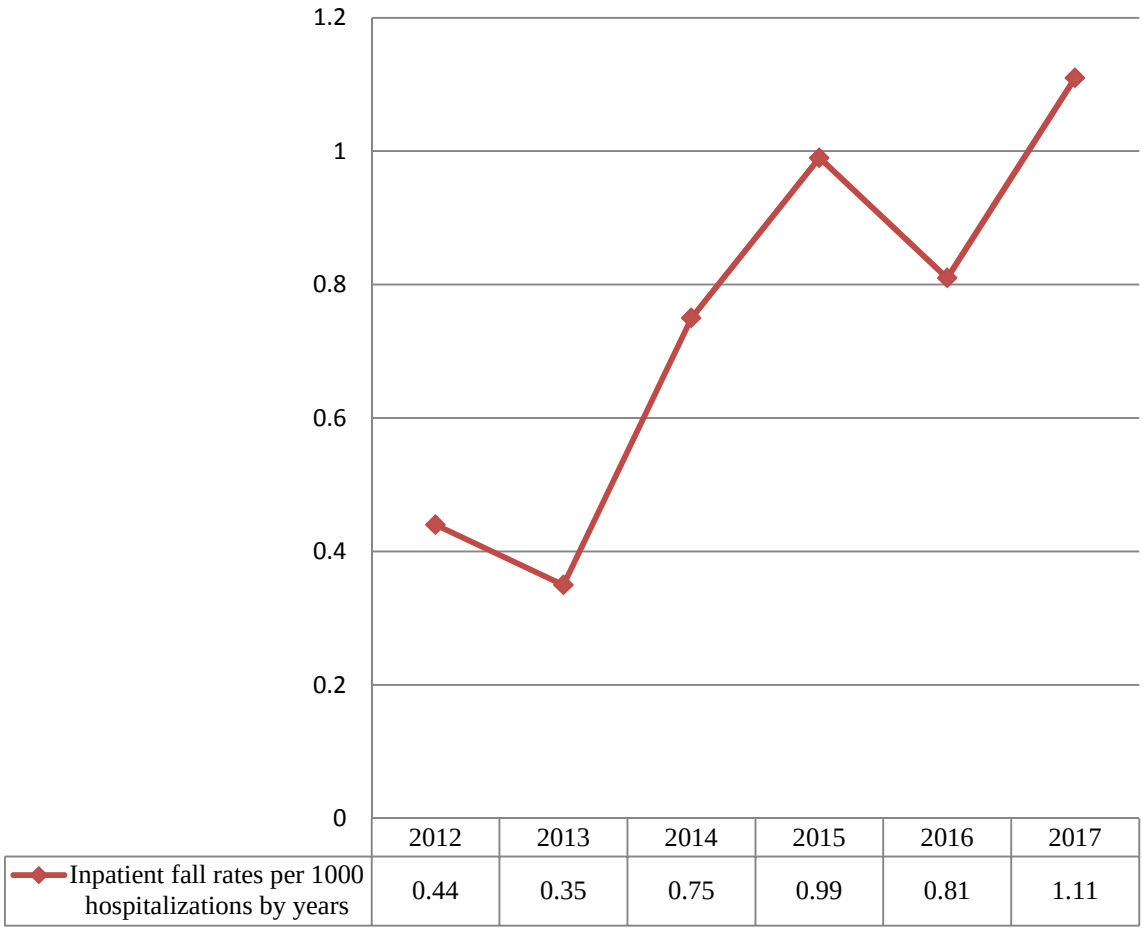
	Age Groups								
Variable	0-6 (*n*= 52)		19-40 (*n*= 20)		41-64 (*n*= 46)		≥ 65 (*n*= 87)		
Location of Fall	n	%	n	%	n	%	n	%	
Patient's room	52	100.0	7	35.0	19	41.3	50	57.5	
Operating room	-	-	-	-	1	2.2	2	2.3	
Intensive Care	-	-	-	-	1	2.2	4	4.6	
Imaging Unit	-	-	-	-	1	2.2	-	-	$p < 0.001^{*}$
Toilet/bathroom	-	-	4	20.0	18	39.1	23	26.4	
Hall	-	-	9	45.0	6	13.0	8	9.2	
Cause of Fall									
Dizziness	-	-	7	35.0	19	41.3	28	32.2	
Unraised bed borders	37	71.2	2	10.0	-	-	12	13.8	
Loss of balance	-	-	3	15.0	13	28.3	16	18.4	
Slipping on a wet floor	-	-	1	5.0	7	15.2	13	14.9	
Tripping over/getting entangled in equipment	-	-	2	10.0	2	4.3	9	10.3	$p < 0.001^{**}$
Sleeping on an age-inappropriate bed	13	25.0	-	-	-	-	-	-	

Broken devices (unraised bed borders, non-functioning bed and stretcher brakes)	2	3.8	1	5.0	3	6.5	4	4.6	
Unlocked bed/wheelchair brakes	-	-	2	10.0	1	2.2	4	4.6	
Agitation	-	-	2	10.0	1	2.2	1	2.2	
Conditions leading to Fall									
Falling down from a height (from bed)	52	100	2	10.0	-	-	6	6.9	
Falling while getting up from bed (ground-level falling)	-	-	3	15.0	9	16.9	37	42.5	
Falling during mobilization (ground-level falling)	-	-	10	50.0	19	41.3	17	19.5	$p < 0.001^{**}$
During time in toilet/bathroom (ground-level falling)	-	-	1	5.0	13	28.3	23	26.4	
Falling from wheelchair (ground-level falling)	-	-	3	15.0	2	4.3	2	2.3	
Falling during transfer (ground-level falling)	-	-	1	5.0	3	6.5	2	2.3	
Time of fall									
08:00-16:00	26	50.0	8	40.0	14	30.4	23	26.4	
16:01-00:00	16	30.8	9	45.0	21	45.7	36	41.4	$p= 0.104^{*}$
00:01-07:59	10	19.2	3	15.0	11	23.9	28	32.2	
Companion									
Yes	33	63.5	10	50.0	18	39.1	34	39.1	
No	19	36.5	10	50.0	28	60.9	53	60.9	$p= 0.029^{*}$

Type of Fall									
Anticipated physiological	37	71.2	17	85.0	36	78.3	74	85.1	
Unanticipated physiological	-	-	1	5.0	3	6.5	3	3.4	p= 0.097*
Accidental	15	28.8	2	10.0	7	15.2	10	11.5	
Fall-related injuries (n= 33)									
Major	-	-	-	-	-	-	5	26.4	
Minor	3	100.0	3	100.0	8	100.0	14	73.6	

p < 0.05 *Chi-Square test, **Fisher's Exact Test

Figure 1 Inpatient fall rates per



1000 hospitalizations by year

Discussion

This retrospective study describes the characteristics of falls occurring in inpatients over a five-year period in a hospital setting. It can be seen that the number of reported falls increased in the last three-year period compared to the previous two years. The reason for this increase in the fall rates per 1000 patient days may be the result of increased awareness among workers about the necessity of reporting each case, beyond an absolute increase in the number of patients who fell. However, the fall rates of the patients are lower in our study than those in the literature. An important reason for this may be the fact that our study data depend on retrospective records based on people's reports. The importance of reporting incidents that threaten patient safety in the health field is generally emphasized; however, there are some obstacles such as being punished, attribution of blame for the incident to the individual or lack of feedback about the reported incidents to this (Yaprak and İntepeler, 2015; Ugur et al., 2016). The current reported fall rates in this study may also have been affected by these reasons. On the other hand, in Turkey this may also be associated with the fact that patient safety in healthcare facilities is a new topic and that there is still an insufficient culture of patient safety.

Age is considered an important intrinsic factor causing falls and it has been stated that older age is associated with a greater possibility of further falls (Chang et al., 2015; Cox et al., 2015). In this study, it was found that a significant proportion of falls occurred among patients in the 65 years and over and 0-6 years age groups. The tendency to fall increases due to physiological and health-related factors associated with aging (Chen et al., 2010). Studies show that the frequency of falls within 60 years and over age group is higher (Halfon et al., 2001; Aizen et al., 2007; Towne et al., 2014; Majkusová & Jarošová, 2014). However, a significant part of the falls occurring in hospitals are encountered in the pediatric patient group. Patients in this group are among those at high risk of falls because of their developmental characteristics; their neuromotor, physical, sensory, cognitive, and psychosocial functions are still in the process of developing (Hill-Rodriguez et al., 2009; Kingston et al., 2010; Fujita et al., 2013; Jamerson et al., 2014).

Our study results show that falls are more common in internal clinics in which patients mostly require long-term care, in physical therapy and rehabilitation clinics and in pediatric clinics where the care and treatment of child patients, who are known to be one of the most at-risk groups for falls, is maintained. Studies state that inpatient falls are more frequent in internal and rehabilitation clinics than in surgery clinics (Hitcho et al., 2004; Kerzman et al., 2004; Schwendimann et al., 2008; Lovallo et al., 2010; Majkusová and Jarošová, 2014). In internal clinics, patients have diseases affecting the circulatory, cognitive and myoneural systems, requiring a prolonged length of hospital stay. For these reasons, the fall-related risk factors can be high. In rehabilitation clinics in which long-term care is required, patients can also be further exposed to fall-related risks during rehabilitation and self-efficacy training. These may be the reasons for falls occurring at significant levels in the daytime in internal and rehabilitation clinics. Although there are many studies in the literature on adult falls, there are very few data on pediatric falls (Hill-Rodriguez et al., 2009; Jamerson et al., 2014). As seen in our study, falls in pediatric clinics constitute an important proportion of the falls occurring in hospitals for reasons arising from the child's own behavior, the hospital setting or the parents who accompany the child during his/her hospitalization.

In our study, it was determined that the patients who fell mostly had neurological, respiratory and cardiovascular conditions. It has been reported that some diseases may cause a fall risk. The most significant of these diseases are associated with neurological and cardiac problems (Shuto et al. 2010; Kenny et al., 2013). The risk of orthostatic hypotension, which can lead to falls, increases in cardiovascular disorders; moreover, symptoms such as tachycardia and arrhythmia are also associated with falls (Edelstein and Brown, 2000; de Carle and Kohn, 2001; Mamum and Lim, 2010). On the other hand, neurological diseases are shown to be among the fall risk factors and these diseases have been determined to increase the fall risk (Shuto et al., 2010; Mamum and Lim, 2010; Healey, 2010; Kenny et al., 2013). In addition, studies investigating the relationship between medications and falls have associated an increased fall risk with medication and underlying medical conditions (Costa Dias et al., 2014).

Recording the time of fall helps determine during what time of the day the patients fell. Based on these data, measures can be taken to prevent falls,

according to daily time periods (Majkusová and Jarošová, 2014). However, there are no evidential data on the relationship between falls and shifts or time of day (Cox et al., 2015). In our study, it was determined that inpatients fell more frequently during the day (08:00-16:00) and evening (16:01-00:00) shifts. In addition, patients in the 0-6 age group were found to fall mostly during the day shift and patient aged 65 years and over were found to fall mostly during the evening and night shifts. McKechnie et al., (2015) found that patients fell mostly during the day and evening shifts, as in our study. However, they determined that there was a significant relationship between nursing shifts and the distribution of falls, unlike in our findings. In a study conducted by Jamerson et al., (2014) examining pediatric fall cases, it was determined that patients in infancy and the pre-school period generally fell in the day time. The fact that in our study patients in the 65 years and over age group fell mostly during the evening and night shifts may arise from the low number of nurses on duty at these times compared to during the day, the decrease in the number of nurses' rounds, as well as the urgent need developing for patients in this age group especially to go to the toilet, as well as issues such as not wanting to disturb their companions, trying to get up suddenly without help, thinking that they can attend to their needs themselves, and not being fully awake after having slept.

This study found that the majority of the patients fell when they were alone, that patients in the 0-6 age group constituted the majority of the patients who fell in the presence of a companion. Our findings are similar to the findings of the study conducted by Chang et al., (2015). Pediatric patients, who are especially at risk because they are dependent on others, require the help and supervision of an adult to be protected from accidents such as falls and for a safe environment to be established. In many countries, family members accompany the patient and are involved in the care during the hospital stay. However caregivers accompanying the patient are agreed to be one of the most important environmental factors in terms of fall risk (Tzeng and Yin, 2009; Almis et al., 2017). Studies have shown that increasing the awareness of parents/family members accompanying the patients about falls and their consequences reduces the fall rates among HPs (Lee et al., 2013). Nurses in hospitals in Turkey, tend to be dependent on family members in order to provide care. This requires an increase in the awareness of companions about patient falls. In our findings, the fact that the majority of the patients fell when they were alone, that the majority of the patients, especially in the 0-6 age group, fell even when they were with a companion suggests that those with them did not consider the fall risks, did not sufficiently implement measures to prevent falls or did not imagine that the patient would fall.

Our findings showed that all patients in the 0-6 age group fell in their rooms, approximately one-quarter of the patients aged 65 years and over and the majority of the patients in the 41-64 age group fell in the toilet/bathroom, while the patients in the 19-40 age group mostly fell in the hall while walking. Studies that support our findings suggest that falls occur mostly in the patient's room, toilet or bathroom especially among the patients in the 0-6 years and 65 years and over age groups, who are at risk because of their dependency on others, and that falls in the 19-40 age group occur mostly during activities among patients who have the ability to move by themselves (Jamerson et al., 2014; McKechnie et al., 2015; Chang et al., 2015; Guillaume et al., 2016).

It was found that patients fell mostly due to dizziness, unraised bed borders and loss of balance. In addition, unraised bed borders and age-inappropriate beds constituted the main causes of falls among the patients in the 0-6 age group. In various studies on this topic, older age groups were mostly reported to fall due to factors related to health status such as loss of balance and dizziness (Hitcho et al., 2004; Kerzman et al., 2004; Chang et al., 2015). On the other hand, it was determined that falls in the pediatric age group were generally associated with environmental factors (Jamerson et al., 2014; Chang et al., 2015). The findings of the study conducted by Almis et al., (2017) indicated that parents accompanying the child have an important role in pediatric inpatient falls.

When the conditions in which the patients fell are examined, situations such as falling down from a height (falling from bed) and falling while getting up from bed (ground-level falling) were the most common conditions found in this study. In addition, the patients in the 19-40 and 41-64 age groups mostly fell while moving around and the patients aged 65 years and over fell mostly while getting up from bed and during time spent in the

toilet/bathroom. In the study conducted by Majkusová and Jarošová (2014), it was reported that falling from bed and falling while getting up from bed constituted an important part of the falls in acute and long-term care units. Similar results were also reported by Chang et al., (2015) and it was reported that patients in the 0-6 age group fell by jumping off the bed or fell over due to an unraised bed border. In addition, patients in the older age group were found to fall while going to the toilet, walking and moving. Our findings reveal that interventions to prevent falls may differ according to the patients in different age groups.

In the literature, anticipated physiological falls and accidental falls constitute a significant part of the cases seen in hospitals (McKechnie et al., 2015; Cox et al., 2015). Our findings show that the majority of the fall cases are anticipated physiological falls; moreover, accidental fall cases in all age groups constitute the second common type of fall. In addition, the fact that most of the falls in our study occurred in the high-risk groups is consistent with this finding. Once again, these results emphasize that most of the falls in the high-risk group could be prevented if the necessary measures are taken and that preventive strategies should be implemented in order to reduce or eliminate negative consequences for patients at risk of falling.

Our findings reveal that the majority of the patients were not exposed to fall-related injuries, while all major injuries occurred in the patients aged 65 years and over. in the studies that associated fall-related injuries with age, it was reported that the fall-related injuries developed mainly in patients in the age groups of 41-64 years and 65 years and over (Etman et al., 2012; Chang et al., 2015). Our findings are consistent with the literature. It is known that many imaging services (X-ray, computerized tomography and magnetic resonance) are used for the post-fall diagnosis and assessment and that this contributes to an increase in cost (Towne et al., 2014; Baris et al., 2018). Our study found that post-fall services such as radiological examination, consultation, dressing/suture, all of which increase patients' hospital expenses and indirectly place a burden on the economy of the country, had been implemented.

Conclusions

PFs are among the serious problems that must be considered from the outset in all healthcare facilities. Some clinically important issues associated with patient falls have been identified in this study. According to our research, falls in the hospital setting were more common in 0-6 and 65 years and over age groups. Another finding of our study is that pediatric falls are generally caused by environmental factors, and the causes of falls in the patient group aged 41 years and over are health-related. While most of the pediatric falls occurred even under the care of someone else, most of the falls in the older age group occurred when patients were alone. These results show that the patient's companions play an important role as an environmental factor in falls, especially in the case of the pediatric patients. In addition, the fact that the majority of falls affected patients known to be at a high risk of fall demonstrated again the importance of assessing this risk and preventing falls by taking the necessary measures for high-risk patients. In our study, although the majority of the falls were anticipated physiological falls, the fact that many of the patients fell in their rooms and toilets/bathrooms suggests that questions need to be asked about the effects of unfamiliar environments on patient falls. In this regard, nurses, particularly those working during the day and evening shifts, should be more conscious of the need to consistently and comprehensively identify incidents of fall and patients and companions should be made aware of the risk of falls. Appropriate legal duties and protocols should be defined in health institutions in order to promote patient safety and intervention programs should be developed for the prevention of falls. During this process, factors such as the number of nurses and the physical arrangement of areas used by the patients should be considered, and a safe and appropriate environment should be provided to prevent inpatient falls.

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