

RETROSPECTIVE INVESTIGATION OF PATIENT FALLS IN A UNIVERSITY HOSPITAL WITHIN THE SCOPE OF PATIENT SAFETY



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Abstract

This study was designed to investigate patient falls in a university hospital within the scope of patient safety according to variables such as age, gender, time interval when the fall occurred, clinic/polyclinic etc. where the fall occurred and the scene of the fall. Our study is a descriptive type retrospective study. The population of the study consisted of 280 inpatient/outpatient fall event notification records reported between 01.01.2020-31.12.2023 in a university hospital in Izmir. No sample selection was made in the study and the entire population was included in the sample. Institutional permission and ethics committee approval were obtained before the research. Analyses were performed with the SPSS Statistics 29 program. Data were analysed by descriptive statistics (number, percentage, mean, standard deviation), correlation test and Pearson chi-square test. The mean age of the patients who fell was 60.07 ± 22.81 years, the majority were male (58.2%), and the age range of 65 years and older was the age group with the highest number of falls (52.5%). Among the patients, 91.1% were in the adult group and 8.9% were in the paediatric group. It was determined that patients fell most frequently while getting out of bed (45.4%) and in the patient room (54.6%). It was found that 78.9% of the patients had no damage as a result of the fall, 20.7% had mild injury, and 0.4% had severe injury. The fall rates of the patients according to years varied between 0.02% and 0.07%, and the highest number of falls occurred in the adult emergency department. It was determined that 22.1% of the falls occurred between 00:01-04:00. When the fall rates by branches were examined, it was observed that paediatrics and emergency department were lower than other branches (8.6%, 8.9%, respectively). It was observed that 54.3% of the patients who fell had a high pre-fall risk assessment. We determined that patients most frequently fell in the patient room while trying to get out of bed. Incident reporting systems that contain all the information needed about patient falls may provide the opportunity for corrective action for incidents that may occur due to falls. Educational interventions to increase the competence of healthcare professionals and preventive interventions to prevent inpatient falls should be prioritised in medical specialities with high fall rates.

1. Introduction

Patient safety is one of the current and important issues addressed within the scope of improving the quality of health care (Özlu ZK 2015). Patient safety includes the prevention, reporting and analysis of medical errors that lead to undesirable events during health care services and all measures taken by health institutions and their employees to eliminate or reduce the problems caused by errors in patients (Famolaro, T 2018). The most common patient safety problem in hospitals is "patient falls" (Bouldin et al., 2013; Özlu ZK 2015, Top E 2019, Trinh et al., 2019). Joint Commission International has identified one of the international patient safety goals as reducing the risk of harm to inpatients as a result of falls (JCI 2017). According to WHO, a fall is defined as "being accidentally left on the floor or at a lower level, except for deliberate changes in position to lean on furniture, walls or other objects" (Severo IM 2014). The Turkish Language Association (TDK) defines a fall as 'to go down from above by leaving the place where it is located, held or by losing its foothold and balance' (TDK, 2024). Falls can cause minor or major injuries such as pain, bleeding, abrasions, fractures and subdural haematoma and head trauma, and may even result in death (Bouldin et al., 2013; Zhao, Y. 2015, Kobayashi et al., 2017; Trinh et al, 2019). In addition, falls are among the priority issues of hospitals as they can trigger anxiety, distress, depression, fear of reduced physical activity, as well as prolonging the length of hospital stay of patients and increasing costs (Lakatos BE 2009, Dunne et al., 2014, Morello et al., 2015, Radecki B 2018). Prevention of falls is an important goal in the healthcare quality system, and the incidence of falls is recognised as an indicator of quality of care (Joint Commission International, 2021; The National Database of Nursing Quality Indicators, 2010).

In the UK, 10% of all adult patient deaths reported in relation to patient safety were found to be related to patient falls (Donaldson LJ 2014). It was found that the average cost per fall-related injury was 3611 dollars in Finland and 1049 dollars in Australia (WHO 2021). In the UK National Institute for Health and Care Excellence report, it was stated that the cost of patients falls to the National Health System totalled 2.3 million pounds per year (NHS 2017).

Falls are usually reported as the number of falls per 1000 patient days or the percentage of falls among treated patients (Chang et al., 2022; Williams et al., 2014; Zhao and Kim, 2015). In acute care, fall rates range from 0.4-9 falls per 1000 patient days (Bouldin et al., 2013; Chang et al., 2022; Williams et al., 2014; Zhao and Kim, 2015). These rates are higher in internal medicine, rehabilitation and neurology units and lower in surgery and obstetrics units (Bouldin et al., 2013; Lerdal et al., 2018; Thomas & Balmforth, 2021; Williams et al., 2014; Zhao & Kim, 2015).

Critical care units have lower fall rates than inpatient units, with a rate of approximately 1.0 (range 0.5-1.7) falls per 1000 patient days (Thomas & Balmforth, 2021; Williams et al., 2014). In inpatients, the rate of falls with injury ranges from 0.5 to 0.9 falls per 1000 patient days (Bouldin et al., 2013; Staggs et al., 2015; Williams et al., 2014). The highest injury fall rates are in adult rehabilitation (1-1.7 per 1000 PD) and psychiatry units (1.8 per 1000 patient days), while the lowest rates are in adult surgical (0.6-0.7), critical (0.2-0.4) and gynaecology care units (0.1) (Bouldin et al., 2013; Staggs et al., 2015; Williams et al., 2014). Studies have reported that patient falls are multifaceted, including intrinsic and extrinsic factors (Oliver D 2010, Severo IM 2014). Intrinsic factors include the patient's age, gender, medical condition, mobility impairment, while extrinsic factors include institutional structures and environmental factors (Zhao 2015, Zhao 2018). Aging is a well-known risk factor for falls and fall-related injuries (Fischer, I. D 2005, Abreu H. C. A. 2015). However, evidence suggests that fall severity and serious fall-related injuries are much more complex, and therefore it is recommended to examine multilevel factors associated with fall severity (Zhao, Y 2019).

In order to evaluate the falls of inpatients in healthcare institutions and to analyse the causes of falls, "Patient Fall Rate Indicator" has been developed by NQF (National Quality Forum) in the USA and SKSH (Hospital for Quality Standards in Health) in Turkey and implemented in existing healthcare facilities. Thus, the causes of patients' falls are analysed in depth and risk factors are evaluated (NGF 2019, SKS 2022)

Patients fall rates in hospitals are an important indicator of care. The low rate of patient falls is an indication that care, patient and companion training and patient observation are adequate. In addition, it is aimed to protect the patient's health and prevent secondary injuries by preventing patient falls. At this point, health professionals should perform education, counselling, care and evaluation processes comprehensively in the prevention of patient falls. Determination of all risk factors that may cause falls of patients hospitalised in hospitals, examination and analysis of the causes will ensure that protective measures are taken in a timely manner in patient falls. Thus, damage to patients can be prevented and at the same time, quality, effective and efficient healthcare services can be provided.

The aim of this study was planned as descriptive and cross-sectional in order to retrospectively examine patients who falls within the scope of patient safety in a university hospital. In our study, What is the relationship between the age of the patient in the event of patient falls? (1), In which units do patient falls occur most frequently? (2), In which areas of the clinic do patient falls

occur more frequently? (3) and in which time interval do patient falls occur more frequently? (4).

2. Materials and Methods

2.1. Research design

This research is a descriptive retrospective study.

2.2. Population and sample of the study

The population of the study consists of 280 patients who fell from all inpatients and outpatients at Dokuz Eylül University Application and Research Hospital between 01.01.2020 - 31.12.2023. The sample of the study consists of events that occurred between 01.01.2020 and 31.12.2023 and were reported to the Unintentional Event Notification System of the hospital's information management system (n=280).

2.3. Data collection tool

The data of this retrospective study were collected from the archive of the quality unit of the hospital with the data set created by the researchers in line with the literature by classifying the patients according to variables such as age, gender, time interval when the fall occurred, clinic/polyclinic where the fall occurred, and the place of the incident where the fall occurred in the hospital information management system used by the hospital. Patient names were not used within the scope of KVKK and were anonymized.

2.4. Data collection process

With the data set created by the researchers in line with the literature, permission was obtained from the Chief Physician of Dokuz Eylül University Hospital (02/02/2024-5017). Afterwards, the quality unit was contacted and the data archived in electronic and written media were transferred to Microsoft Excel format and evaluated.

2.5. Statistical Evaluation of Data

Descriptive statistics (number, percentage, arithmetic mean, standard deviation), correlation test and Pearson chi-square test were used to evaluate the data obtained from the research. The data were analysed with SPSS 29 package programme. For significance, $p < 0.05$ was accepted.

2.6. Ethics committee declaration

The research was carried out within the scope of the ethics committee approval obtained from Dokuz Eylül University Social and Human Sciences Scientific Research Publication and Ethics Committee (05/03/2024-38).

3. Findings

It was observed that the number of patients falling between 2020-2023, which was examined within the scope of the study, was 280. In order to determine the rate of falling patients in each year, the number of falling patients was calculated according to the total number of inpatients in the same period. As can be seen in Table 1, the fall rates vary between 0.02-0.07 according to years. (table 1)

Table 1. Frequency of Falls by Year

Year	Number of falling patients	Total Number of Patients	Patient Falling Rate by Years
2020	76	1028520	0,07
2021	62	1424645	0,04
2022	47	1678939	0,02
2023	95	1754669	0,05

Analysis of the distribution of 280 patients according to clinics showed that adult emergency 28 (10%), oncology 24 (8.6%), geriatrics 23 (8.2%), general surgery 20 (7.1%) and pandemic service 18 (6.4%). (table 2)

Table 2. Distribution of Fall Rates According to the Total Number of Inpatients and Outpatients

Department	Frequency	Percent
Emergency Department	28	10,0
Oncology	24	8,6
Haematology	9	3,2
Physical Therapy And Rehabilitation	15	5,4
General Surgery	20	7,1
Internal Medicine 1	17	6,1
Internal Medicine 2	9	3,2
Cardiology	14	5,0
Thoracic Cardiovascular Surgery	10	3,6
Ear Nose Throat Surgery	6	2,1
Urology	7	2,5

Neurology	11	3,9
Neurosurgery	6	2,1
Psychiatry	12	4,3
Paediatric Infection	9	3,2
Paediatric Haematology Oncology	8	2,9
Paediatric Surgery	6	2,1
Day Treatment Centre	4	1,4
Orthopaedics	7	2,5
Policlinic	2	,7
Geriatrics	23	8,2
Chest Diseases	10	3,6
Radiology	2	,7
Pandemic Service	18	6,4
Coronary Icu	2	,7
Total	280	100,0

Classification of the clinics where falls occurred under four groups as surgical branches, internal departments, emergency departments and paediatric wards and the rates of falling patients among these groups were analysed. The rate of patients falling in

internal medicine wards ranked first with 62.5% (175 patients). In paediatric wards, it ranked fourth with 8.6% (24 patients) (table 3).

Table 3. Patient Ratios According to Specialities

Unit	Frequency	Percentage %
Surgical ward	56	20,0
Internal Medicine	175	62,5
Paediatrics	24	8,6
Emergency Service	25	8,9
Total	280	100

When the demographic characteristics of the patients who fell were analysed, it was seen that the mean age was 60.07 ± 22.81 years, 91.1% were adults, 58.2% were male, the age range with the highest number of falls was 65 years and over (52.5%), and the patient who fell was minimum 1 year old and maximum 93 years old. When the distribution of the patients according to the

place where they fell was analysed, it was seen that the most frequent falls occurred in the patient's room (54.6%), followed by the bathroom/toilet (27.2%). When the activities performed at the time of the fall were analysed, it was observed that the most common activity was getting out of bed (37.9%) (Table 4).

Table 4. Demographic Characteristics of Falling Patients and Place of Fall / Activity at the Time of Fall

Variable	Number	Percentage %	
Gender	Female	117	41,8
	Male	163	58,2
Years	0-18 years	25	8,9
	19-35 years	15	5,4
	36-45 years	11	3,9
	46-64 years	82	29,3
	65 years and over	147	52,5
Adult / Child Status	Child	25	8,9
	Adult	255	91,1
Falling place	Patient room	153	54,6
	Toilet/Bathroom	76	22,9

	Corridor	31	11,1
	Other	20	7,1
Activity during the fall	getting out of bed	127	45,4
	toilet/bathroom	76	27,2
	while walking	53	18,9
	while sitting	24	8,6
Falling Time Interval	08:00-12:00	45	16,1
	12:01-16:00	53	18,9
	16:01-20:00	52	18,6
	20:01-24:00	36	12,9
	24:01-04:00	62	22,1
	04:01-07:59	32	11,4
Change of Consciousness after a Fall	None	270	96,4
	Yes	10	3,6
Severity of Injury After Fall	None	221	78,9
	Minor injury	58	20,7
	Severe injury	1	0,4
	Death	0	0
Risk of Falling before a Fall	Low risk	128	45,7
	High risk	152	54,3
Risk of Falling after a Fall	Low risk	27	9,6
	High risk	253	90,4

When the time interval was analysed, the most falls occurred between 00:01-04:00 (18.9%). The second most occurred between 16:01-20:00 hours with 18.6%. It was determined that only 3.6% of the patients had a change in consciousness after the fall, 20.7% had mild injury, 0.4% had severe injury and there was no death as a result of the fall. In the risk assessment performed before the fall, patients were divided into two groups as low risk and high risk. While the rate of patients with high risk score in the pre-fall itaki was 54.3%, the rate of patients with high risk score in the post-fall itaki was 90.4% (Table 4).

Age and gender were analysed as factors affecting fall risk. A correlation test was performed to evaluate whether there was a relationship between age and fall risk, and it was found that there was a moderate positive relationship ($r=0.550$; $p=0.036$) (Table 4). On the other hand, the relationship between gender and fall risk was analysed by Pearson Chi-Square test and no significant relationship was found ($p=0.212$). (Table 5)

Table 5. Relationship Analysis Between Age and Fall Risk

Falling risk	Age
	r: 0,550
	p: 0,036
	n: 186

4. Discussion

Evaluation of the fall risks of patients receiving inpatient/outpatient treatment in hospitals and analyses of falling patients is one of the indispensable quality indicators of care services.

It is evaluated within the Health Quality Standards Indicator Management published by the Ministry of Health. When calculating the rate of falling patients, the formula "total number of patient falls in the relevant period / Total number of patients hospitalised + Total number of outpatient admissions) x 1000" is used (SKS Indicator Management 2.3). (SKS Indicator Management 2.3) In some studies conducted abroad, it is seen that patient fall rates are calculated with patient hospitalisation days (Chang et al., 2022; Williams et al., 2014; Zhao & Kim, 2015).

It has been stated that assessing the risk of falls and identifying risk factors should be the top priority in preventing falls from the day the patients are admitted to hospital (SDS 6.1).

The Ministry of Health, General Directorate of Health Services, Department of Quality and Accreditation in Health aims to report patient falls to the "Unintended Event Notification System" in the information management system of hospitals and then to analyse the fall incidents and to carry out improvement studies. (BCS 6.1)

When evidence-based guidelines are examined; falls are caused by internal factors such as medication, external/environmental factors such as wet and slippery floors, inadequate lighting, inappropriate furniture and slippers, personal factors such as loss of vision, physical condition and the patient's state of consciousness. In studies, it has been found that at least two of these factors are present in patients who fall. In the literature review, it was stated that the causes of falls include age, length of hospital stay, secondary treatment, intravenous treatment, medications, patient's state of consciousness, mobility, pain, insomnia, problems with vision, assisted walking, walking speed, bed edges, layout of the unit, gender, obesity, need for toilet, diarrhoea and vomiting. As a result of the evaluation of fall risk assessment tools, movement status, mental status, problems related to excretion and medications were accepted as the most important risk factors (RNAO 2017).

In our country, studies on the development of a notification system for events that threaten patient and employee safety have been initiated in healthcare institutions since 01 July 2011 and it was decided to establish a reporting system called "Safety Reporting System (GRS)". Security Reporting System activities at national level started in 2016. In the Health Quality Standards SKS Hospital Set (Version 6.1) published on 14.03.2020, the name of the Safety Reporting notification system was changed to "Unwanted Event Notification System (IOBS)". (Ministry of Health, T. C. Health Quality Standards Hospital Set Version 6.1. 2020) (Arslanoğlu A 2023).

Considering the rates of patients falling according to years in our study; the lowest rate of falls belongs to 2022 with 0.02. The year with the highest number of fall events belongs to 2020 with a rate of 0.07.

In the study conducted by Kılıç Ü et al. in 8 hospitals in 2018; the fall rate was found to be 0.05 (Kılıç Ü, 2021). In the study conducted by Lyu H. et al. in 2022, in which the fall rates between 2018-2020 were examined; 0.0783-0.0776-0.0691/ 1000 hospitalisation days occurred respectively. In 2020, which was the most intense period of the Covid 19 pandemic, the total number of patients was found to be the lowest (1028520) compared to other periods, but the fall rate was the highest (0.07) compared to other periods. In this study, similar to our study, fewer patient hospitalisations (550105) and fewer patient falls (76) occurred during the Covid 19 pandemic period (Lyu H, 2022).

In the study conducted by Barbosa et al. between 2011-2014, the fall rates were 1.61-1.83-1.62 and 1.112/1000 hospitalisation days, respectively. In this study, only fall rates were given. The

number of patients admitted to hospital in those years was not given. And unlike our country, the fall rate is calculated by a different formula (1000 hospitalisation days) (Barbosa AS 2019).

The reason for the differences between years may be related to the quality and hospital accreditations/ ministerial evaluations movements, where there are initiatives to encourage healthcare professionals to report adverse events, including falls. Another reason for the differences between the years is estimated to be due to the Covid 19 pandemic that occurred in early 2020, when fewer patients were admitted to the hospital and patients were isolated alone in clinic rooms.

Falls are the leading cause of both fatal and non-fatal injuries in people aged 65 years and older (Centres for Disease Control and Prevention, 2005). It has been observed in many studies that the age factor is effective on the risk of falls and increases the risk of falls. Individual factors that cause falls are age, physical inactivity, taking more than one medication, dizziness, neurological diseases, presence of more than one equipment, changes in the state of consciousness. Gait and balance disorders, incontinence, sensory loss, fatigue, insomnia, existing hip fractures, depression are also among the individual risk factors (RNAO, 2017).

When age was considered as a risk factor for falls in our study, the mean age of the patients was found to be 60.07 ± 22.81 . The age range in which falls were most common was patients aged 65 years and over with a rate of 52.5%. When the national and international literature is examined; the age range in which falls are most common is 65 years and older patients with a rate between 34.4-68.3% (Mülayim Y 2011; Kobayashi, 2017; Barbosa AS, 2019; Kılıç, 2021; Grooth, 2020; Ghosh, 2022; ASLAN, 2022; Heikkilä, 2022; Lyu H, 2022).

Considering the gender risk factor; males constitute 58.2%. When the national and international literature is analysed; the most common gender of falls is males with a rate of 54-61.8% (Kobayashi, 2017; Kılıç, 2021; Grooth, 2020; Ghosh, 2022; Aslan, 2022; Lyu H, 2022). In the studies conducted by Barbosa A, Heikkilä A, Singh I, Mülayim Y and colleagues, the fall rate of women was found to be high (between 50.7-56.6%) (Barbosa, 2019; Heikkilä, 2022; Singh, 2015; Mülayim, 2011).

In our study, when the distribution of clinic-based fall events was examined, it was observed that the highest number of fall events was adult emergency 28 (10%), oncology 24 (8.6%), geriatrics 23 (8.2%), general surgery 20 (7.1%) and pandemic service 18 (6.4%). . When the national and international literature was examined, it was observed that the five clinics with the highest number of patients per patient were internal medicine (18.2%),

neurology (15.9%) and paediatric clinics (14.1%), general surgery (11.2%), intensive care units (4.7%), respectively (Kılıç Ü 2021). In another study, it was observed that neurology (26%), gastroenterology (18%), paediatrics (13%), cardiology (5%), respectively (Kobayashi, 2017).

In our study, branch-based falls were categorised as surgical, internal, paediatric and emergency service and fall rates were examined. Patient falls occurred mostly in internal medicine units with a rate of 62.5% and least in paediatric units with a rate of 8.6%. When the research conducted by Heikkilä A et al. was examined, the internal branch was the unit where the most patient falls occurred with 44.2%, and the oncology branch with 2.4% was the unit where the least patient falls occurred (Heikkilä, 2022). When the study conducted by Hong Lyu et al. was examined, 44.4% of the falls occurred mostly in internal units and 3.9% in the emergency department (Hong Lyu, 2022). In the study conducted by Kılıç Ü et al. 55.8% of falls occurred in internal units and 14.1% in paediatric units. In line with the results found, our study is in parallel with literature (Kılıç, 2021). Compared to internal branches, the reason for the lower incidence of falls in surgical branches is thought to be the high frequency of post-op follow-up and the restriction of mobilisation for a certain period of time.

In this study, when the distribution of the patients according to the place where they fell / activity at the time of the fall was analysed; 54.6% of the falls occurred in the patient room, 22.9% in the toilet/bathroom and 18.9% in the corridor. When the national and international literature was examined; 35.1-68.8% falls occurred in the patient room, 10-31.2% in the toilet-bathroom and 3.8-13% in the corridor (Kobayashi ,2017; Kılıç, 2021; Aslan, 2022; Ghosh, 2022).

1-10% of falls cause serious consequences such as fracture, subdural haematoma or death (Ackerman DB 2010). In this study, when the general condition/injury/change in consciousness of the patients after a fall was analysed, it was found that 3.6% of the patients had a change in consciousness and 20.7% had mild injury. When the national and international literature was analysed, it was found that 5.9-12.4% of the patients had a change in consciousness and 4.1-27.3% were slightly injured.

When the fall times of the patients in this study were analysed, the most common time interval was between 00:01-04:00 (18.9%). Secondly, it occurred between 16:01-20:00 hours with 18.6%. When the fall time interval was examined in the literature; In the study conducted by Barbarosa AS, the highest rate of falls occurred at night with a rate of 43.9%, in the study conducted by Hong L et al; the highest rate of falls occurred between 00:00-

04:00 hours with a rate of 22.88%, and secondly between 04:00-08:00 hours with a rate of 22.22%. It is thought that the reason for the greater rate of falls during night hours is the low illumination at night and the patient's desire to get up on his own without lifting his companion.

5. Conclusion

Preventing the risk of falls in inpatients in hospitals is an important quality indicator in health care services. Many undesirable events ranging from mild injuries to death may occur after a fall, and may also lead to prolonged hospitalization. In the study, it was observed that the fall experiences of hospitalized patients varied at different rates between hospitals. In addition, it was determined that the age of the patient increased the risk of falls and the clinic where the patient was treated had an effect on the fall event. On the other hand, gender did not have a significant effect on fall rates. It is important to inform hospital administrators and all relevant employees according to the risk analysis of patient falls and to ensure that they take an active role in corrective/preventive studies.

The incidence rate of falls assessed in the study was within the standards presented by national and international literature. Night shift and patient room were the most frequent time and place of falls, respectively. The findings of the study contributed to knowing the profile of patients prone to falls, leading to the development of the necessary preventive measures and encouraging professionals to carry out the reporting of this adverse event, guaranteeing patient safety and qualifying the care provided. The findings have contributed to the involvement of professionals in the prevention and safety of patients, as well as to the promotion of scientific knowledge for the education and training of new nurses and the expansion of new research on the subject. It is important to point out some limitations of the present study, although it contributes to the knowledge about falling cases in hospital institutions. The crossover design in a single institution does not allow generalisations. Finally, it is important to highlight the emotional exhaustion experienced by the professional when he/she realises that the patient has fallen, as well as the damage that such an event does to the image of the institution. These findings reinforce the importance of awareness and continued concern for the development of studies that support preventive measures available to all involved in inpatient care.

References

1. Abreu, H. C. A. et al. Incidence and predicting factors of falls of older inpatients. *Rev. Saude Publica* 49, 37 (2015).
2. Ackerman DB, Trousdale RT, Bieber P, Henely J, Pagnano MW, Berry DJ. Post operative patient falls on an

- orthopedic inpatient unit. *The Journal of Arthroplasty*. 2010;25(1):10-14.
3. Bouldin, E. L., Andresen, E. M., Dunton, N. E., Simon, M., Waters, T. M., Liu, M., Daniels, M. J., Mion, L. C., & Shorr, R. I. (2013). Falls among adult patients hospitalized in the United States: Prevalence and trends. *Journal of Patient Safety*, 9, 13–17.
 4. Chang, W. P., Jen, H. J., & Huang, T. W. A. (2022). Retrospective cross-sectional study on the risk factors of recurrent falls among inpatients. *Journal of Nursing Care Quality*, 37(2), E31–E37. <https://doi.org/10.1097/NCQ.0000000000000585>
 5. Donaldson LJ, Panesar SS, Darzi A. Patient-safety-related hospital deaths in England: Thematic analysis of incidents reported to a National Database, 2010-2012. *PLOS Med*. 2014;11(6): e1001667.
 6. Dunne, T. J., Gaboury, I., & Ashe, M. C. (2014). Falls in hospital increase length of stay regardless of degree of harm. *Journal of Evaluation in Clinical Practice*, 20(4), 396–400. <https://doi.org/10.1111/jep.12144>
 7. Famolaro, T., Yount, N., Hare, R. et al. (2018). Hospital Survey on Patient Safety Culture 2018 User Database Report. (Prepared by Westat, Rockville, MD, under Contract No. HHS 290201300003C). Rockville, MD: Agency for Healthcare Research and Quality; AHRQ Publication No. 18-0025-EF.
 8. Fischer, I. D. et al. Patterns and predictors of inpatient falls and fall-related injuries in a large academic hospital. *Infect. Control Hosp. Epidemiol*. 26(10), 822–827 (2005).
 9. International Joint Commission. Joint Commission International Accreditation Standards for Hospitals (Including Standards for Academic Medical Centers Hospitals). 6th ed. USA: Joint Commission Resources; 2017:52-54.
 10. Joint Commission International. (2021). Joint commission international accreditation standards for hospitals (7th ed., pp. 7–8). Joint Commission International.
 11. Kobayashi, K., Imagama, S., Ando, K., Inagaki, Y., Suzuki, Y., Nishida, Y., Nagao, Y., & Ishiguro, N. (2017). Analysis of falls that caused serious events in hospitalized patients. *Geriatrics & Gerontology International*, 17(12), 2403–2406.
 12. Lakatos BE, Capasso V, Mitchell MT, et al. Falls in the general hospital: Association with delirium, advanced age, and specific surgical procedures. *Psychosomatics*. 2009;50(3):218-226
 13. Lerdal, A., Sigurdson, L. W., Hammerstad, H., Granheim, T. I., Risk Study Research Group, & Gay, C. L. (2018). Associations between patient symptoms and falls in an acute care hospital: A cross-sectional study. *Journal of Clinical Nursing*, 27(9–10), 1826–1835.
 14. Morello, R. T., Barker, A. L., Watts, J. J., Haines, T., Zavarsek, S. S., Hill, K. D., Brand, C., Sherrington, C., Wolfe, R., Bohensky, M. A., & Stoelwinder, J. U. (2015). The extra resource burden of in-hospital falls: A cost of falls study. *Medical Journal of Australia*, 203(9), 367. <https://doi.org/10.5694/mja15.00296>
 15. Murray, G. R., Cameron, I. D. & Cumming, R. G. The consequences of falls in acute and subacute hospitals in Australia that cause proximal femoral fractures. *J. Am. Geriatr. Soc*. 55(4), 577–582 (2007).
 16. National Health Service. The incidence and costs of inpatient falls in hospital. 2017. Available at: https://improve.nhs.uk/document/s/1473/Falls_summary_July_2017.Pdf
 17. National Quality Forum (NQF). Erişim Linki: http://www.qualityforum.org/Projects/nr/Nursingsensitive_Care_Initial_Measures/Nursing_Sensitive_Care__Initial_Measures.aspx. [Erişim Tarihi: 15.03.2019].
 18. Oliver, D., Healey, F. & Haines, T. P. Preventing falls and fall-related injuries in hospitals. *Clin. Geriatr. Med*. 26(4), 645–692 (2010).
 19. Özlü ZK, Yayla A, Özer N, Gümüş K, Erdağ S, Kaya Z. Cerrahi hastalarda düşme riski. *KTBD*. 2015;(3):94-99.
 20. Radecki B, Reynolds S, Kara A. Inpatient fall prevention from the patient's perspective: A qualitative study. *Appl Nurs Res*. 2018; 43:114-119.
 21. Registered Nurses' Association of Ontario (RNAO). (2017). Preventing of falls and reducing injury from falls. Erişim Adresi: http://rnao.ca/sites/rnao-ca/files/bpg/Preventing_Falls_FINAL_WEB.pdf.
 22. Sağlıkta Kalite Standartları Hastane(SKS-Versiyon-6); Revizyon-01). 2. Baskı: Ankara: Pozitif Matbaa; 2022.
 23. Severo IM, Almeida MA, Kuchenbecker R, Vieira DFVB, Weschenfelder ME, Pinto LRC, et al. Risk factors for falls in hospitalized adult patients: an integrative review. *Rev Esc Enferm USP*. 2014;48(3):540-54. <https://doi.org/10.1590/S0080-623420140000300021>
 24. Staggs, V. S., Mion, L. C., & Shorr, R. I. (2015). Consistent differences in medical unit fall rates: Implications for research and practice. *Journal of the American Geriatrics Society*, 63(5), 983–987. <https://doi.org/10.1111/jgs.13387>
 25. The National Database of Nursing Quality Indicators®. (2010). Guidelines for data collection on the American Nurses Association's national quality forum endorsed

- measures: Nursing care hours per patient day skill mix falls with injury. <https://docpl.ayer.net/14461873-Guidelines-for-data-collection-on-the-american-nurses-associations-national-quality-forum-endorsed-measures.html>
26. Thomas, A. N., & Balmforth, J. E. (2021). Patient safety incidents describing patient falls in critical care in north West England between 2009 and 2017. *Journal of Patient Safety*, 17(2), e71–e75. <https://doi.org/10.1097/PTS.0000000000000574>
 27. Top E. Hasta düşmelerini önleyici hemşirelik girişimlerinin uygulanma durumu ve etkileyen faktörler [yüksek lisans tezi]. Aydın: Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü; 2019.
 28. Trinh, L. T. T., Assareh, H., Wood, M., Addison-Wilson, C., & Sathiyaseelan, Y. (2019). Falls in hospital causing injury. *Journal for Healthcare Quality*, 42(1), 1–11. <https://doi.org/10.1097/JHQ.0000000000000179>.
 29. Williams, T., Szekendi, M., & Thomas, S. (2014). An analysis of patient falls and fall prevention programs across academic medical centers. *Journal of Nursing Care Quality*, 29(1), 19–29. <https://doi.org/10.1097/NCQ.0b013e3182a0cd19>
 30. World Health Organization. Falls. Available at: <https://www.who.int/news-room/fact-sheets/detail/falls>.
 31. Zhao, Y. et al. Evidence on fall and injurious fall prevention interventions in acute care hospitals. *J. Nurs. Adm.* 49(2), 86–92 (2019).
 32. Zhao, Y. L. et al. Multilevel factors associated with injurious falls in acute care hospitals. *J. Nurs. Care Qual.* 33(1), 20–28 (2018).
 33. Zhao, Y. L., & Kim, H. (2015). Older adult inpatient falls in acute care hospitals: Intrinsic, extrinsic, and environmental factors. *Journal of Gerontological Nursing*, 41(7), 29–25. <https://doi.org/10.3928/00989134-20150616-05>
 34. (Web-based injury statistics query and reporting system (WISQARS). National Center for Injury Prevention and Control, Centers for Disease Control and Prevention.)