

Analysis of Adult Patients Admitted to the Emergency Department Due to Home Accidents: a Retrospective Study

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Abstract

Objective: Trauma patients constitute one of the predominant groups presenting to emergency departments. Although the home environment is regarded as safe, it contains numerous factors that may cause trauma and is identified as the leading source of injury after traffic accidents. The objective of this study was to emphasize home accidents and their associated problems and to propose solutions by highlighting emerging injury data.

Materials and Methods: This study retrospectively examined the files of patients aged over 18 years who presented to the Emergency Department in 2024 with diagnoses related to "trauma," "accident," or "injury" and whose epicrisis indicated trauma sustained at home. Patients' demographic data, the location of the accident within the home, the type of injury, the affected anatomical site, the causative factor, the diagnostic tests ordered, and the prognosis were documented.

Results: Among the 320 patient files accessed, the most common home accidents occurred in rooms (39.6%, n=127). It was determined that 34.4% of the injuries resulted from physical trauma, with crushing being the predominant injury type (43.4%, n=139). The most frequently affected anatomical region was the lower extremity (27.2%, n=87). Gender classification revealed that women were significantly more likely to sustain injuries on slippery surfaces, whereas men were injured due to incorrect tool use.

Conclusion: Through more extensive initiatives, strategies can be formulated during the construction and furniture selection phases, with designs tailored according to age and gender. Identifying human or environmental factors that cause accidents enables the implementation of strategies to prevent home accidents.

Keywords: Emergency department, home accidents, trauma

Introduction

Trauma patients constitute one of the predominant groups presenting to emergency departments. Although the home environment is regarded as safe, it contains numerous elements that may induce trauma and is identified as the leading source of injury after traffic accidents [1]. Patients frequently forgo hospital care because the trauma is minor [2]. Consequently, comprehensive information regarding the causes and consequences of home accidents remains unavailable.

Risks can arise from household items, such as slippery floors, restricted movement in confined areas, misplaced objects, and

insufficient lighting. Human-induced factors include inadequate visual or auditory acuity, the incorrect or inexperienced use of sharp tools, neglecting safety procedures in daily routine tasks, carelessness, and distraction.

Home accidents include any incidents that transpire within indoor areas, such as rooms, kitchens, and bathrooms, or external areas, such as gardens, garages, and storage rooms. Studies indicate that injuries predominantly occur in rooms and kitchens [3]. Although accidents are characterized as unforeseen traumas, home accidents are predictable and preventable [4].

Research indicates that elderly individuals are predominantly



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injured by falls, attributable to pathophysiological alterations associated with chronic illnesses, their prescribed medications, and advanced age. The risk of falling was shown to increase during the mandatory stay-at-home phase of the COVID-19 pandemic [5]. A separate study in the United States revealed that falls, poisonings, and burns occurring within the home resulted in fatal outcomes and found the mortality rate from home accidents to be 6.83 per 100,000, in contrast to the overall accident rate [6]. A study in Iran revealed that 0.4% of patients who experienced a home accident died, whereas 13% required long-term treatment for survival [7]. These studies provided overarching categories but failed to specify the precise factors contributing to the accidents, such as human, environmental, or object-related factors.

Previous studies investigating home accident-related emergency department presentations in our country have largely focused on the pediatric population or relied on questionnaire-based methodologies. In contrast, the present study evaluated adult patients presenting to the emergency department and aimed to contribute to the literature by systematically categorizing injury patterns and clinical outcomes in this population. The research was conducted in the only emergency department serving the city center and the largest healthcare facility in the province, thereby providing a comprehensive representation of regional cases. By highlighting the epidemiological characteristics and emerging injury trends associated with home accidents, this study seeks to raise awareness and propose evidence-based preventive strategies.

This study assessed home accidents in the adult population based on actual injury data and outcomes from emergency department visits, in contrast to the existing literature. The objective was to highlight home accidents and their resultant issues while providing solutions derived from the collected data. Although accidents are characterized as unforeseen events, home accidents are foreseeable and preventable [8].

Materials and Methods

This study was structured as retrospective, cross-sectional, and descriptive. The files of patients aged over 18 years who presented to the Emergency Department of Kırklareli Training and Research Hospital from January 1 to December 31, 2024, with diagnoses related to “trauma,” “accident,” or “injury” and whose epicrisis indicated trauma sustained at home were retrieved from the archive and analyzed.

Patients’ demographic data, the location within the home where the accident occurred, the type of injury, the affected anatomical site, the causative factor of the injury, the diagnostic tests ordered

in the emergency department, and the patient’s prognosis were documented, followed by statistical analysis.

Within the injury mechanisms, tools and objects were classified into three categories: cutting, penetrating, and crushing. Cutting tools included knives, peelers, can openers, blenders, and saws; penetrating tools comprised knitting needles, screwdrivers, drills, and screws; and crushing tools included hammers and vegetable mashers. Similarly, objects were categorized as cutting, such as glassware and metal items; penetrating, such as screws embedded in furniture, pens, and clothes hangers; and crushing, such as furniture, cabinets, and drawers as heavy objects.

The primary outcome pertained to prognosis in the emergency department, whereas the secondary outcome related to prognosis in the ward after patient admission.

Patients under 18 years of age, those transferred to another hospital with indeterminate outcomes, and patients whose records were inaccessible were excluded from the study.

Age classification was established by analyzing patterns in age distribution and societal age groups. Descriptive statistics revealed that the young and middle-aged groups dominated the age distribution. Consequently, these intervals were maintained at a reduced width. The age interval of 18 to 35 years was regarded as the young adulthood period. The 36–50 age group was regarded as the stage of maturity in adulthood; thus, it was termed middle age. The age range of 51–65 years was classified as the adult group, as it marks the preliminary phase of transition from employment to retirement. The age group of 66 years and over was designated as the post-retirement old period [9].

The study was approved by the Scientific Research Ethics Committee of Kırklareli University Faculty of Medicine (P20250018-06/14.04.2025).

Statistical Analysis

The analyses were performed using SPSS 27.0 software. Mean, standard deviation, median, minimum, maximum, frequency, and percentage values were used for the descriptive statistics of the data. The distribution of variables was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. The Mann–Whitney U test was used to analyze non-normally distributed quantitative independent data, whereas the chi-square test was used to analyze qualitative independent data.

Results

A total of 320 patient files that met the study criteria were accessed. Of the patients, 53.1% (n=170) were female, whereas

46.9% (n=150) were male. The mean age was 45.43±18.49 years (median: 43), with the highest proportion of presentations from patients aged 18–35 years (36.8%, n=118). The most prevalent home accidents occurred in the rooms of the house (39.6%, n=127). It was determined that 34.4% of the injuries resulted from physical trauma, with crushing being the predominant injury type (43.4%, n=139). The predominant cause of injury was identified as slippery surfaces (33.1%) (Table 1). The most frequently affected anatomical region, considering multiple injuries, was the lower extremity (27.2%, n=87). X-rays were identified as the most commonly requested diagnostic test in emergency department evaluations, accounting for 67.5% of requests. The predominant pathology identified was soft tissue injury, observed in 62.2% of all age groups, whereas the least common pathologies were finger amputation (0.3%, n=1) and the concurrent occurrence of femur fracture, scalp laceration, and intracranial hemorrhage in a single patient (0.3%, n=1). Although multiple procedures were performed in some cases, prescriptions (81.5%) and wound dressings (23.5%) were the most frequently administered interventions in the emergency department (Table 2).

To evaluate the effects of age and sex on the factors contributing to home accidents, multinomial logistic regression analysis was performed. The dependent variable, “cause of injury,” was categorized into three groups: environmental factors, such as slippery surfaces and falls; human error, such as carelessness, improper use of tools, and inadequate protective measures; and household arrangement, such as misplaced furniture or objects. “Environmental factors” were designated as the reference category.

The independent variables included age as a continuous variable and sex as male and were entered into the model. The analysis was conducted using a multinomial logistic regression approach, and model parameters were estimated using the Newton method implemented in the statsmodels library. The multinomial logistic regression model demonstrated a statistically significant overall fit (likelihood ratio $\chi^2=24.71$, $p<0.001$). The model explained 3.6% of the variance according to McFadden’s pseudo R^2 . Increasing age was associated with lower odds of both human error-related injuries (OR=0.97, 95% CI: 0.96–0.99) and household arrangement-related injuries (OR=0.98, 95% CI: 0.96–0.99) compared with environmental causes. Male sex was significantly associated with human error-related injuries (OR=1.90, 95% CI: 1.11–3.25). Logistic regression analysis, using environmental factors as the reference category and stratified by age and sex, revealed a significant decrease in human error-related accidents with advancing age ($p<0.05$); however, no significant correlation was observed between age and accidents associated with home configuration ($p>0.05$). A significant sex disparity was observed in accidents

Table 1. General characteristics of patients

Variables	Mean±SD/n(%)
Gender	
Female	170 (53.1)
Male	150 (46.9)
Mean age	45.43±18.49
Age	
18-35	118 (36.8)
36-50	78 (24.4)
51-65	67 (21)
66 over	57 (17.8)
In which part of the house?	
Room	127 (39.6)
Living room	118 (36.8)
Bed room	7 (2.2)
Dining room	2 (0.6)
Corridor	58 (18.1)
Garden	58 (18.1)
Kitchen	52 (16.3)
Bathroom	23 (7.2)
Stairs	1 (0.3)
Entree	1 (0.3)
Mechanism of Injury	
Caused by a tool	
Penetrating	8 (2.5)
Crushing	4 (1.25)
Blunt	31 (9.7)
Caused by an object	
Penetrating	22 (6.9)
Crushing	13 (4.1)
Blunt	81 (25.3)
Sharp	33 (10.3)
With chemical substance	2 (0.6)
°Physical	110 (34.4)
Heat	16 (5.0)
*Type of Injury	
Burn	
First degree	13 (4.1)
Second degree	5 (1.6)
Third degree	1 (0.3)
Soft tissue injury	
Abrasion	93 (29.0)
Laceration	63 (19.7)
Crush	155 (48.4)
Perforation	6 (1.9)
Cause of Injury	
Improper use of tools	47 (14.7)
Carelessness	84 (26.3)
Fall	1 (0.3)
Misplaced objects	79 (24.7)
Slippery surface	106 (33.1)
Inadequate protection	3 (0.9)

°Physical trauma: fall, sprain, hit etc., * Patients have multiple findings

Table 2. Findings from physical examination, evaluation, and intervention in the emergency department

*Pathology	
Soft tissue trauma	
Soft tissue injury	199 (62.2)
Laceration	53 (16.5)
Burn	16 (5.0)
Amputation	1 (0.3)
Fracture	50 (15.6)
Other	6 (1.8)
*Diagnostic tool	
X-Ray	216 (67.5)
Computed tomography	38 (11.8)
Ultrasound	1 (0.3)
*Primary intervention	
Prescription	261 (81.5)
Dressing	75 (23.5)
Suture	37 (11.5)
Splint	55 (17.2)
Hospitalization (Operation)	6 (1.8)
Analgesia	42 (13.1)
Eye irrigation	5 (1.5)
Removal of a foreign object from the eye	1 (0.3)
* Patients have multiple findings, other: Conjunctivitis, intracranial hemorrhage	

attributable to household organization ($p < 0.05$). The prevalence of incidents attributed to home configuration was higher among males (Table 3).

Gender classification revealed that women sustained significantly more injuries on slippery surfaces, whereas males were injured due to improper tool use ($p < 0.05$). A statistically significant association was found between sex and cause of injury, with a small-to-moderate effect size (Cramer’s $V = 0.21$) (Table 4).

The lower extremities were identified as the most frequently injured anatomical region, whereas the lip was the least affected (Fig. 1).

Table 3. Correlation between environmentally induced injuries and other categories (p)

Variable	OR	%95 CI	p
Human error and. environmental factors			
Age	0.97	0.96-0.99	p<0.001
Gender (male)	1.90	1.11-3.25	p=0.019
Household arrangement and environmental factors			
Age	0.98	0.96-0.99	p=0.008
Gender (male)	1.56	0.85-2.86	p=0.148
OR: Odds ratio; CI: Confidence interval			

Table 4. Predominant injury causes by gender

Cause of injury	Male (n)	Female (n)	p
Improper tool use	31	15	0.0037
Fall	0	1	1.000
Carelessness	40	44	0.918
Misplaced objects	38	40	0.754
Slippery surface	38	68	0.0098
Inadequate protection	1	2	1.000
Chi-square test: $\chi^2 = 14.18$, $df = 5$, $p = 0.014$, Cramer’s $V = 0.21$			

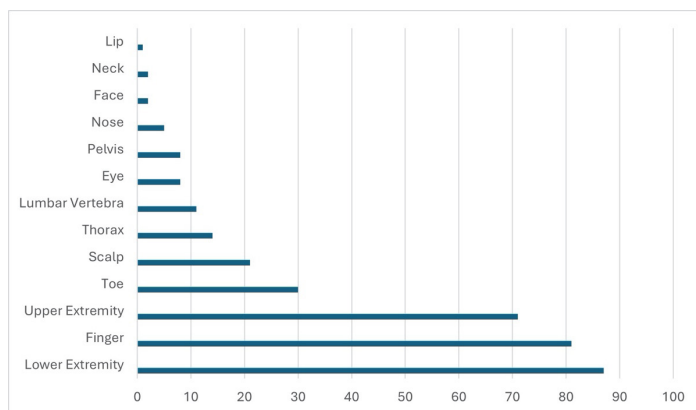


Figure 1. Distribution of anatomical regions of injury

Analysis of age categories revealed that the younger population sustained injuries more frequently. Carelessness was established as the predominant cause of injury in the 18–35 age group, whereas slippery surfaces were responsible for injuries in the other age categories (Table 5).

Discussion

This study revealed that female patients experienced physical trauma from falls on slippery surfaces, whereas male patients sustained injuries while using tools. Younger patients exhibited a higher susceptibility to home accidents attributable to carelessness, whereas older patients showed increased vulnerability to home accidents resulting from falls on slippery surfaces. Furthermore, it was ascertained that accidents attributable to human factors, including carelessness, improper tool use, and inadequate protection, diminished with age, while accidents associated with home configuration were more prevalent among males. This study indicates that the older population exhibits greater caution than younger individuals; nonetheless, they are more susceptible to accidents resulting from environmental variables, such as slippery floors. Although the statistical model used in this study was statistically significant, its explanatory power was

Table 5. Distribution of injury causes by age group

Age Group	Incorrect use of tools	Fall	Carelessness	Misplaced objects	Slippery surface	Inadequate protection	Total
18-35 (Young)	19	0	42	32	24	1	118
36-50 (middle age)	11	1	20	19	26	1	78
51-65 (Adult)	7	0	16	17	27	0	67
66+ (elderly)	10	0	6	11	19	1	57
Total	47	1	84	79	106	3	320

modest, suggesting that additional environmental or behavioral variables may contribute to injury mechanisms. Consequently, age-sensitive interventions, such as automated lighting, fall detection sensors, or auditory alert systems, are advisable for elderly adults. Contemporary safe residences can be tailored to an individual's sex and age. These findings can be considered when implementing preventive measures against home accidents.

The literature indicates that female patients experience a higher incidence of home accidents [10]. This study revealed similar results. Moreover, the observation that female patients sustained trauma from falling on slippery surfaces may stem from the perception of cleaning activities as women's responsibilities and the increased time women spend at home. Male patients' involvement in repair activities may account for the elevated incidence of tool-related injuries [11]. This circumstance also suggests that user guidelines are not being followed when professional tools are used. Cultural disparities and the distribution of home responsibilities may have influenced these outcomes.

The study indicated that injuries were more prevalent in the rooms of the home. The risk of accidents is likely to increase in environments where individuals spend prolonged periods of time. Upon examination of the files, it was noted that these individuals sustained physical trauma, including falls and sprains in the extremities, which were attributed to carelessness and misplaced objects, resulting in lacerations, abrasions, and crush injuries. The high incidence of extremity injuries relative to other anatomical regions substantiates our perspective [12]. To prevent such injuries, furniture dimensions should be selected in accordance with the architectural characteristics of the home. Items should not be placed in confined or hazardous areas, and objects that obstruct movement or pose a risk of injury should not be left on the floor [13].

A survey released in the United States indicated that the incidence of home accidents has diminished over the years, albeit at a slower rate compared with other categories of accidents [14]. A separate study estimated the annual expenditure to be \$217 billion.

Despite being preventable, home accidents pose a considerable public health concern due to the risks of injury, diminished quality of life, and associated costs [15]. This study found that most patients sustained soft tissue injuries and were discharged with a prescription. All patients survived. This circumstance may generate the false impression that home accidents do not result in significant problems; however, the presence of patients with third-degree burns, fractures, and amputations who underwent surgery indicates a need for increased attention and care. It indicates that home accidents should not be underestimated [16].

Conclusion

This study provides a comprehensive analysis of adult home accident-related emergency department presentations and demonstrates that such injuries are predominantly associated with environmental factors, particularly slippery surfaces. The lower extremities were the most frequently affected anatomical region, and soft tissue injuries constituted the majority of pathologies. Although severe injuries were rare, the high frequency of emergency department utilization and diagnostic imaging highlights the clinical burden of home accidents. The results of this study indicate that home accidents in adults are not random events but follow identifiable demographic patterns.

The establishment of safer home environments is achievable through practical and low-cost measures that consider structural, human, and environmental factors. Preventive strategies include the use of non-slip rugs, the installation of additional handrails in staircases and bathrooms, the placement of frequently used items within easy reach, the avoidance of clutter and unstable stacking, adequate lighting, the proper use of household appliances according to instructions, and refraining from using professional tools without appropriate experience.

Beyond individual-level precautions, broader preventive strategies may be integrated into the construction and furniture selection phases, with designs adapted to age- and sex-specific needs. Identifying the human and environmental determinants of home

accidents is essential for developing targeted interventions and reducing the overall burden of home-related injuries.

The classification of injury mechanisms and their demographic associations provides valuable insight into targeted prevention strategies. Emergency department data can serve as an important source for identifying modifiable risk factors and developing age- and sex-specific safety interventions in home environments.

Limitations Study

The study has specific limitations attributable to its retrospective design. The patients' educational level, presence of comorbidities, including mental health disorders or conditions affecting vision or hearing, living arrangements, home design features, such as wet floor protection and adequate lighting, household occupancy, and the time of day, day or night, of the incident could not be ascertained. Therefore, interpretations related to gender roles or behavioral characteristics should be made cautiously. Although lower rates of human error-related injuries were observed among older adults, the dataset did not include detailed information on activity patterns, mobility status, or exposure to high-risk domestic tasks. Consequently, alternative explanations, such as differences in exposure or functional capacity, cannot be excluded. Moreover, all participants included in the study were managed as outpatients. Therefore, individuals transported by ambulance or presenting with impaired consciousness and a diagnosis of trauma may not have had the exact mechanism or location of injury clearly documented. As a result, some home accident cases may have been misclassified or underrepresented in the dataset.

Furthermore, as this study was performed at a single center, the results cannot be generalized. However, as the largest emergency department in the province was assessed, the findings may be indicative. Future prospective investigations will yield more accurate information. Consequently, the severity of home accidents can be assessed, allowing for the implementation of preventive strategies.

Ethics

Ethics Committee Approval: The study was approved by the Scientific Research Ethics Committee of Kırklareli University Faculty of Medicine. (P20250018-06/14.04.2025).

Informed Consent: Retrospective study.

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