Open Access Emergency Medicine

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Consumer Products Nerve Injuries Among Patients Products Presenting to United States Emergency Departments Between 2012 and 2021: A Nationwide Cohort

Arjun Ganga[1], Taif Mukhdomi[2], Eric J Kim[1], Eric Ly[3], Yash Patel[3], Korinne N Dankievitch[3], Mark C Kendall[3]

[1]Warren Alpert School of Medicine, Brown University, Providence, RI, 02903, USA; [2]Department of Pain, Pain Zero, New Albany, OH, 43054, USA; [3]Department of Anesthesiology, Warren Alpert School of Medicine, Brown University, Providence, RI, 02903, USA

Correspondence: Mark C Kendall, Department of Anesthesiology, Warren Alpert School of Medicine, Brown University, 593 Eddy Street, Davol #129, Providence, Rhode Island, 02903, USA, Tel +414-444-5172, Email mark.kendall@lifespan.org

Introduction: Nerve injuries and resultant pain are common causes of emergency department (ED) visits in the United States. Injuries often occur either due to activity (ie sports related injury) or due to consumer products such as stairs or bedframes. We investigated the incidence of consumer product-related nerve injuries (CPNIs) in patients who presented to the ED in the United States.

Materials and Methods: The National Electronic Injury Surveillance System was queried to identify patients presenting to US EDs between 2012 and 2021 with CPNIs. The cohort was categorized by age: 1) 0–17-year-olds, 2) 18–64-year-olds, 3) and 65+ year-olds. The primary outcomes were the type of injury and the location of injury.

Results: A total of 14,410 CPNIs were reported. There was an increase in yearly CPNIs (β = 4763, (95% confidence interval 1940–7586); P = 0.004). The majority (11,547/14,410, 80.1%) of injuries were among adults. Elderly females encountered more CPNIs than males (52.5% vs 47.8%, P = 0.002). Stairs were most involved in nerve injuries among adults (8.21%) and children (3.96%) whereas beds or bedframe injuries were most frequent (12.0%) among the elderly. Sciatica was the most common diagnosis (≥60%) followed by radiculopathy (≥20%) in adults >18 years of age. Among adults aged 18 to 29, the upper trunk, lower arm, and wrist was more frequently involved, while these areas were less commonly involved in adults aged 40 to 49. Compared to adults, the pediatric and elderly patients presented with more traumatic spinal cord injuries.

Conclusion: Sciatica, radiculopathy, and traumatic spinal cord injury were the most common diagnoses following CPNIs. Children and the elderly tended to present with more severe CPNIs than the general adult population. Further investigations exploring interventions to lower the burden of CPNIs, improve consumer product safety, and reduce potentially chronic and debilitating injuries are necessary.

Keywords: consumer product, nerve injury, emergency departments, traumatic injury

Introduction

Pain is the leading cause of emergency department (ED) visits in the United States.[1] Of the various causes of pain, peripheral neuropathic pain due to extremity trauma or degenerative spine conditions drives a significant portion of ED utilization.[2–4] Low back pain, which is thought to affect over 85% of the population at some point in their lives, is estimated to be the primary complaint of 3% of ED visits annually.[5,6] Many nerve injury patients have complex conditions with multiple comorbidities, and experience chronic pain long after their ED visit.[7–11] In cases of extremity trauma, up to 86% of patients with acute pain following hospital discharge develop chronic pain.[11] Timely management of nerve injuries at EDs, or swift referral to specialists, can help reduce the likelihood that patients develop chronic pain and lasting disability.

Received: 19 July 2024
Accepted: 14 January 2025
Published: 24 January 2025

Many nerve injuries are associated with the use of potentially dangerous consumer products (ie stairs, bedframes, bathtubs).[12–14] Prior investigations on consumer-product related nerve injuries (CPNIs) are limited to sports-related injuries, with minimal exploration of injuries sustained by more widely used consumer products.[13,14] The US Consumer Product Safety Commission operates a publicly available National Electronic Injury Surveillance System (NEISS) which monitors patients with CPNIs presenting to participating EDs in the United States. Understanding the causes of nerve injuries, particularly those related to non-sports consumer products, is essential to tailoring care, prevention strategies, and patient education to the broader population.

The aim of this descriptive observational cohort study was to investigate the incidence and describe the characteristics of common nerve injuries related to consumer products among various age groups over the ten years (2012–2021) using a large national database. We hypothesized that there would be sex and age-based patterns among the CPNI cases examined. We also sought to describe national case estimates for nerve injuries related to consumer products.

Materials and Methods

This study was reviewed by the Institutional Review Board of Lifespan (IRB#1983823) which determined that this research did not involve human subjects and 45 CRF 46 did not apply. The study followed STROBE recommendations.[15]

The NEISS is a publicly accessible electronic database that obtains data from a cohort of 100 participating EDs to report nationwide estimates of product-related injuries. Each of the participating EDs vary in size and capacity and report case data for every visit associated with a consumer product. NEISS data is updated daily, and missing information is followed-up with participating hospital personnel whenever possible, usually within the first seven days since injury. The dataset represents a probability sample of all the EDs nationwide and provides annual estimates of consumer product-related injuries. The database is under the supervision of the United States Consumer and Product Safety Commission, which updates the sampling frame annually. The NEISS database and national estimate algorithm have been utilized in dozens of prior studies and have been shown to be reliable.[16–21]

We queried the NEISS database for all nerve damage injuries (injury code: 61) for all consumer products over a ten-year period between January 1, 2012 to December 31, 2021. Cases were excluded if they 1) did not involve a nerve injury, 2) the nerve injury involved a sports related consumer product or 3) if the corresponding patient narratives were incomplete or missing. The diagnosis and body part codes were interpreted using the NEISS coding manual. Two authors (AG and EK) independently reviewed each case narrative, discussed, and confirmed the diagnosis and mechanism of injury. If a decision could not be resolved, a third reviewer (TM) made the final decision. Individual case narratives were used to classify injuries. Although the database provides the diagnosis codes, the accuracy of these codes was previously reported to be approximately 70%.[22] To increase accuracy, diagnoses were obtained from case narratives written by the ED providers as they provided more detailed information than numerical codes. When the exact type of nerve injury was unclear (ie, if the narrative contained phrasing such as "nerve injury" with no additional detail), patients were placed in the non-specific injury category.

Patient and injury data variables extracted from the dataset included age, sex, race, alcohol involvement, recreational drug use, location of the injurious event, body part involvement, disposition from ED (observed and discharged, admitted, or deceased), and consumer products associated with each nerve injury. The cohort was categorized by age: 1) 0–17-year-olds, 2) 18–64-year-olds, 3) and 65+ year-olds. Adults aged 18 to 64 were further subdivided into the following age groups: 18–29-years-old, 30–39-years-old, 40–49-years-old, and 50–64-years-old. The primary study outcomes were the type of injury and the location of injury.

Descriptive characteristics were calculated for all study variables. Pearson's chi-squared test was used to compare frequencies among groups. Using the yearly national estimates provided by the database, we conducted simple linear regression modeling to map potential trends in the volume of nerve injuries observed in EDs nationally throughout the study period. The relationship between CPNIs and study period year was analyzed by Pearson's correlation coefficient. Statistical analysis was performed using Microsoft Excel (version 2016; Microsoft, Redmond, WA, USA) and GraphPad Prism (version 8.0.0 for Windows, GraphPad Software, San Diego, California USA, www.graphpad.com). P values of <0.05 were considered statistically significant.

Results

Our cohort included a total of 14,410 CPNIs presenting to participating EDs in the United States between 2012 and 2021. No cases were excluded. There were no missing case narratives for any patients.

For the study period, the weighted estimates represent 684,565 (95% confidence interval (CI) 549,721–821,177) CPNIs nationwide or about 68,545 injuries per year. Throughout the study period, there was a statistically significant increase in yearly CPNIs (β = 4763, 95% CI 1940–7586; P = 0.004) (Figure 1). There was a 58.5% increase in presentations over the study period, (R^2 = 0.81, P < 0.005). The decrease in reported cases during 2020–21 can be attributed to the COVID-19 pandemic, which caused major changes in healthcare practices, as many people avoided hospitals for non-urgent matters due to concerns about protentional exposure. The rise in cases observed during 2017 and 2019 may be due to increased awareness and access to health insurance coverage resulting in greater utilization of emergency services as more people obtained health insurance. When examining consumer product-related injuries on a yearly basis throughout the study period, there was a 32.5% increase from 2015 to 2016.

The characteristics of patients who were diagnosed with a nerve injury related to consumer products are presented in Table 1. The mean age of our cohort was 47.3 years old with a standard deviation of 17.7 years. The majority of injuries were among adults 18 to 64 years of age, accounting for 80.1% (11,547/14,410) of the cohort. In contrast, pediatric patients up to 17 years old comprised the lowest volume 3.3% (480/14,410) of ED visits. Adults aged 65 years or older accounted for 16.5% (2383/14,410) of injuries. The study population was similar among males and females (51.9% and 48.1%, respectively). Caucasian patients were the most common (44.1%) however 36.5% of cases did not have information on race. In the pediatric and the adult population, CPNIs were more common in males. In contrast, elderly females encountered significantly more CPNIs compared to males (1245/2383, 52.2% vs 1138/2383, 47.8%, P = 0.002). No alcohol involvement as well as no recreational drug use was reported by 36.5% and 36.6%, respectively. However, majority of the study population (63%) did not state either the use of recreational drugs or alcohol. Regarding the location of the incident, the place of residence or home was the most frequent (45.9%, 6614/14,410) among adults (44.2%, 5105/11,547) and the elderly (59.4%, 1415/2383, Figure 2). Places of recreation were the most common location among the pediatric population (35.8%, 172/480). The majority (90.2%, 12,991/14,410) of patients presenting to the ED

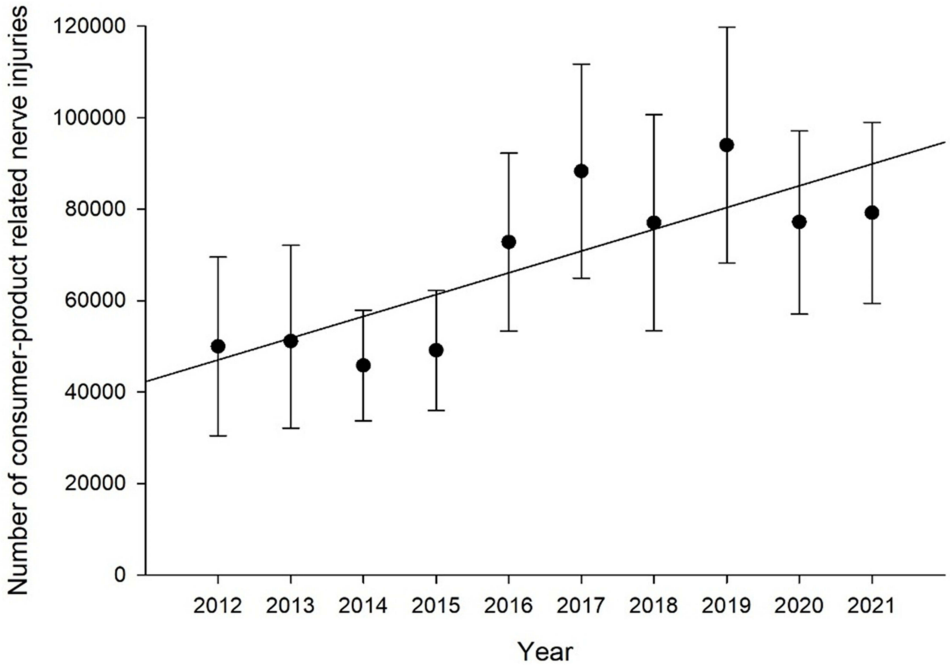

Figure 1 National estimates of consumer-product related nerve injuries presenting to the ED from 2012 to 2021 (β = 4,763, P = 0.004). There was a 58.5% increase in presentations over the study period (R^2 = 0.81, P < 0.005).

https://doi.org/10.2147/OAEM.S486863

Table 1 Patient Demographics and Disposition

Variable	Total (n=14,410)	Percent
Age (y)		
0–17	480	3.3
18–64	11,547	80.2
≥ 65	2383	16.5
Sex		
Male	7477	51.9
Female	6933	48.1
Race		
Caucasian	6353	44.1
African American	1999	13.9
Asian	143	1.0
American Indian/Alaska Native	61	<1
Native Hawaiian/Pacific Islander	28	<1
Other	566	3.9
Not stated	5262	36.5
Alcohol involvement		
Yes	65	<1
No	5266	36.5
Not stated	9079	63.0
Recreational drug involvement		
Yes	61	<1
No	5270	36.5
Not stated	9079	63.0
Disposition		
Released Following Examination and Treatment	12,991	90.2
Treated and Transferred	126	<1
Treated and Admitted	1088	7.5
Held For Observation	142	1.0
Left Without Being Seen or Against Medical Advice	61	<1
Died	2	<1

Note: Data is presented as *n* (%).

were treated and released. However, in the pediatric and elderly groups, it was common for patients to be admitted to hospitals for nerve injuries, with proportions of 20.4% (98/480) and 14.8% (354/2383), respectively. Non-elderly adults were admitted less frequently (5.51%, 636/14,410).

In all three age groups, the lower trunk was the body part most commonly affected (72.8%, 10,498/14,410), followed by the neck (10.1%, 1450/14,410). Lower arm and wrist involvement were more common in the pediatric population (8.54%, 6.88%, respectively). Adults and the elderly saw similar incidence of the head (<2%), face (<1%) and lower leg (<2%) injuries. Across all age groups, sciatica was the most common diagnosis (58.6%, 8445/14,410). The second most frequent diagnosis among both the non-elderly adults and the elderly was radiculopathy, with a proportion of 23.2% (2684/11,547) and 19.8% (473/2383), respectively. However, in pediatric patients, the second most frequent diagnosis was traumatic spinal cord injury (17.9%, 86/480). Traumatic spinal cord injuries were also present among elderly patients (7.89%, 188/2383) and were more common compared to non-elderly adults (4.37%, 505/11,547). There were higher proportions of pediatric and elderly patients presenting with traumatic spinal cord injuries compared to non-elderly adults as well ($P < 0.001$). Other common diagnoses included carpal tunnel syndrome (3.4%, 488/14,410), neuropraxias (1.8%, 257/14,410) and radial nerve compressions (1.4%, 200/14,410). The five most commonly involved body parts, consumer products, and diagnoses across age groups are listed in Table 2.

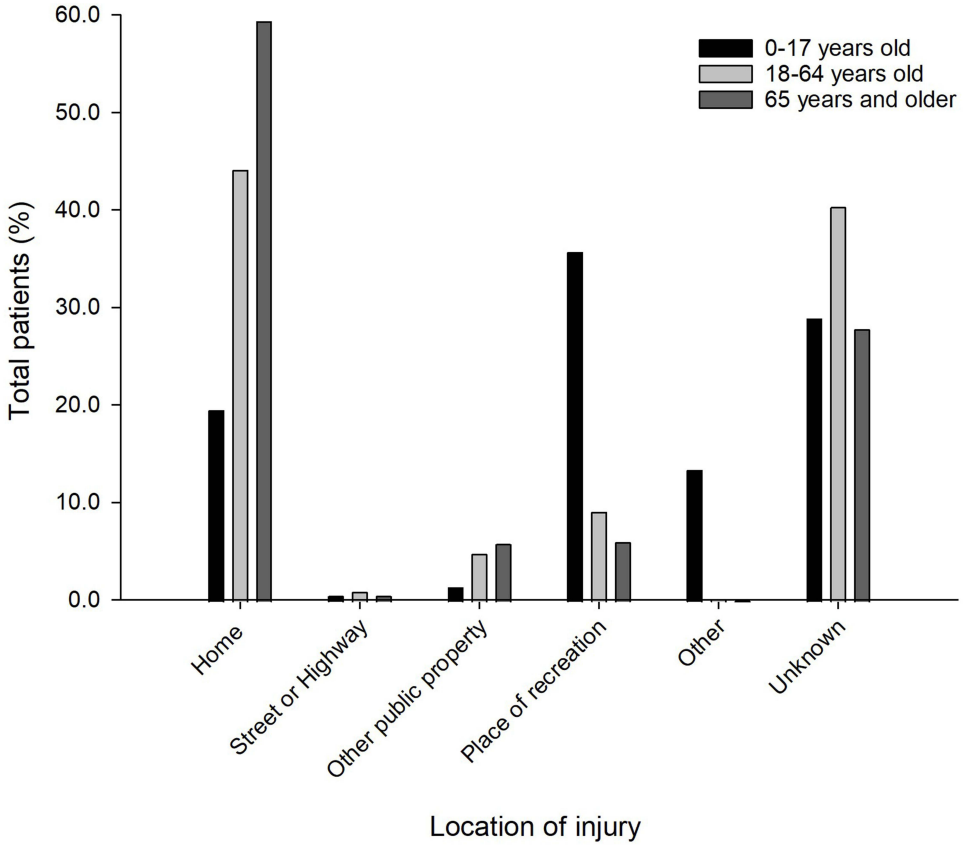

Figure 2 Percentage of patients who sustained a consumer product nerve injury and presenting to the US ED categorized by location of injury.

The percentage of total consumer product nerve injuries reported to participating emergency departments during 2012–2021 is presented by year in Figure 3. The greatest percentage of CPNIs occurred between the years 2017–2021, with the most CPNIs occurring during 2019.

In adults aged 18 to 64, CPNIs predominately involve the lower trunk, accounting for over 65% of these injuries (Table 3). Among adults aged 50 to 64, the neck is the second most commonly affected body part, representing 11.4% of cases. In contrast, among adults aged 18 to 29, the upper trunk, lower arm, and wrist are more frequently involved, while these areas are less commonly involved in adults aged 40 to 49. Exercise without equipment, such as aerobic exercises and workout videos, was the most frequent consumer product associated with CPNI's in adults aged 18 to 29, contributing to 10.6% of cases (198/1858). The involvement of stairs resulting in CPNIs among adults aged 30 to 64 was similar among groups, ($P \leq 0.05$). The most common diagnosis among adults aged 40 to 64 is sciatica, representing 61.4% of cases (4232/6895). In younger adults aged 18 to 29, traumatic spinal cord injury (6.3%, 117/1858), carpal tunnel syndrome (4.8%, 89/1858) and peripheral paresthesia (3.0%, 55/1858) occurred more frequently than in any other age group. Radiculopathy was the most common diagnosis among adults aged 30 to 49, accounting for 52.8% of cases (1416/2684).

Nerve injuries were associated with over 400 unique consumer product types. Therefore, we chose to focus on the 10 products most frequently involved in CPNIs (Table 4). In both children and non-elderly adults, nerve injuries were most commonly associated with stairs, with proportions of 3.96% (19/480) and 8.21% (948/14,410), respectively. However, in elderly patients, the consumer product most commonly associated with nerve injuries was beds (12.0%, 286/2383). In non-elderly adult patients, the second most common consumer product was exercising without equipment (instructional videos, aerobic videos, etc). (7.58%, 875/11,547) followed by beds (6.19%, 715/11,547). For patients older than 65 years old, injuries were often attributed to stairs (7.97%, 190/2,383), chairs

Table 2 The Most Common Anatomy, Consumer Product Involvement, and Diagnosis of Patients of Different Age Groups

Variable	Age			National Weighted Estimate of Cases	*P*
	0–17 (n = 480)	18–64 (n = 11,547)	≥65 (n = 2,383)		
Body parts involved					
Trunk, lower	155 (32.3)	8,581 (74.3)	1,753 (73.6)	517,334	<0.001
Neck	68 (14.2)	1,128 (9.)	254 (10.7)	73,601	0.005
Wrist	33 (6.9)	339 (2.9)	59 (2.5)	22,823	<0.001
Arm, lower	41 (8.5)	300 (2.6)	53 (2.2)	19,437	<0.001
Trunk, upper	39 (8.1)	282 (2.4)	65 (2.7)	17,336	<0.001
Consumer products involved					
Stairs	19 (3.9)	948 (8.2)	190 (7.9)	60,980	0.005
Exercise without equipment (aerobic, workout videos)	6 (1.3)	875 (7.6)	153 (6.4)	47,095	<0.001
Beds, bedframes, other, or not specified	5 (1.0)	715 (6.2)	286 (12.0)	50,121	<0.001
Boxes/containers	2 (0.42)	631 (5.5)	94 (3.9)	37,890	<0.001
Floors or flooring materials	6 (1.6)	501 (4.3)	131 (5.5)	46,700	<0.001
All other products	414 (86.3)	5,843 (50.6)	1,184 (49.7)	–	<0.001
Diagnosis					
Sciatica	118 (24.6)	6,895 (59.7)	1,432 (60.1)	–	<0.001
Traumatic spinal cord injury	86 (17.9)	505 (4.4)	188 (7.9)	–	<0.001
Radiculopathy	45 (9.4)	2,684 (22.2)	473 (19.8)	–	<0.001
Carpal tunnel syndrome	39 (8.1)	372 (3.2)	77 (3.2)	–	<0.001
Peripheral paresthesia	21 (4.4)	196 (1.7)	40 (1.7)	–	<0.001

Notes: Data presented as *n* (%). Data was analyzed using Chi-square or Fisher's exact test to compare proportions across age groups. Diagnoses were derived from case narratives.

(5.96%, 142/2,383), and floors or flooring materials (5.50%, 131/2,383). In the pediatric cohort, weightlifting equipment (2.29%, 11/480), chairs (1.46%, 7/480), and exercise without equipment (1.25%, 6/480) were also associated with CPNIs.

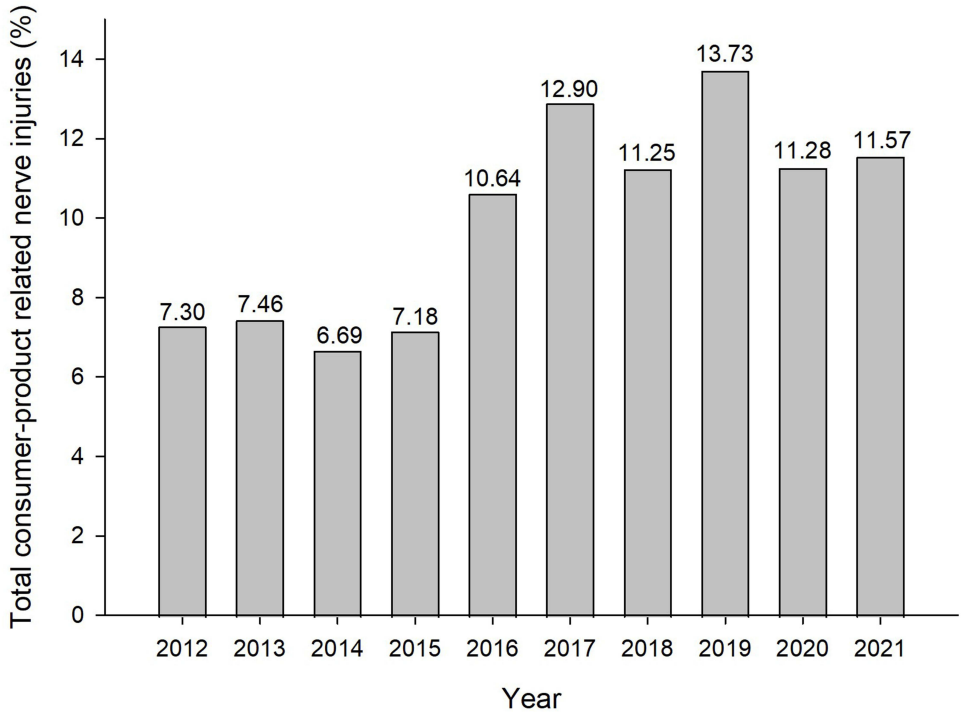

Figure 3 Percentage of total consumer product nerve injuries reported to participating emergency departments during 2012–2021 by year.

Table 3 The Most Common Anatomy, Consumer Product Involvement, and Diagnosis of Adult Patients From 18 to 64 years Old

Variable	Age				*P*
	18–29 (n = 1,858)	30–39 (n = 2,827)	40–49 (n = 2,958)	50–64 (n = 3,904)	
Body parts involved					
Trunk, lower	1,236 (66.5)	2,138 (75.6)	2,285 (77.3)	2,922 (74.9)	<0.001
Neck	143 (7.7)	252 (8.9)	288 (9.7)	445 (11.4)	<0.001
Wrist	87 (4.7)	91 (3.2)	64 (2.2)	97 (2.5)	<0.001
Arm, lower	83 (4.5)	69 (2.4)	64 (2.2)	84 (2.2)	<0.001
Trunk, upper	61 (3.3)	62 (2.2)	65 (2.2)	94 (2.4)	0.071
Consumer products involved					
Stairs	123 (6.6)	244 (8.6)	254 (8.6)	328 (8.4)	0.056
Exercise without equipment (aerobic, workout videos)	198 (10.6)	319 (7.8)	196 (6.6)	262 (6.7)	<0.001
Beds, bedframes, other, or not specified	68 (3.7)	166 (5.9)	181 (6.1)	300 (7.7)	<0.001
Boxes/containers	78 (4.2)	159 (5.6)	172 (5.8)	222 (5.7)	0.072
Floors or flooring materials	62 (3.3)	100 (3.5)	145 (4.9)	194 (4.97)	0.002
All other products	1,329 (71.5)	1,839 (65.1)	2,010 (67.9)	1,788 (57.8)	<0.001
Diagnosis					
Sciatica	976 (52.5)	1,687 (59.7)	1,856 (62.8)	2,376 (60.9)	<0.001
Traumatic spinal cord injury	117 (6.3)	101 (3.6)	95 (3.2)	192 (4.9)	<0.001
Radiculopathy	362 (19.5)	683 (24.2)	733 (24.8)	906 (23.2)	<0.001
Carpal tunnel syndrome	89 (4.8)	105 (3.7)	80 (2.7)	98 (2.5)	<0.001
Peripheral paresthesia	55 (3.0)	42 (1.5)	41 (1.4)	58 (1.5)	<0.001

Notes: Data presented as n (%). Data was analyzed using Chi-square test to compare proportions across age groups. Diagnoses were derived from case narratives.

Table 4 Ten Most Common Causes of Consumer Product-Related Nerve Injuries

Consumer Product	Total	National Weighted Estimates of Cases	Male	Female
Stairs	1,157 (8.03)	60,980	495 (42.8)	662 (57.2)
Exercise without equipment (aerobic, workout videos)	1,034 (7.2)	47,095	509 (49.2)	525 (50.8)
Beds, bedframes, other, or not specified	1,006 (6.9)	50,121	404 (40.2)	602 (59.8)
Boxes/containers	727 (5.1)	37,890	319 (43.9)	408 (56.1)
Floors or flooring materials	638 (4.4)	46,700	276 (43.3)	362 (56.7)
Bathtubs or showers	587 (4.1)	31,124	238 (40.5)	349 (59.5)
Furniture, not specified	511 (3.6)	27,144	275 (53.8)	236 (46.2)
Chairs, or not specified	496 (3.4)	24,642	230 (46.4)	266 (53.6)
Weightlifting (activity/apparel/equipment)	445 (3.1)	20,604	357 (80.2)	88 (19.8)
Sofas couches, davenports, divans or studio couches	368 (2.6)	18,739	194 (52.7)	174 (47.3)

Note: Data presented as n (%).

Discussion

Our findings demonstrate that CPNIs are highly prevalent with approximately 68,000 injuries occurring each year across all age groups during 2012–2021. Overall, we found that sciatica, radiculopathy, traumatic spinal cord injury, and carpal tunnel syndrome were the most common diagnoses following CPNIs. Moreover, we also found that most patients presenting to the ED with CPNIs were white males aged 19 to 64 years old. However, among elderly patients, injuries were more common among females, which may be due to increased frailty despite longer life expectancy among elderly

women.[23–25] CPNIs occurred most often in the home; these most commonly involved stairs, exercise without equipment, and beds. A majority of injuries did not require admission to the hospital, as over 90% of patients were released from EDs following examination and treatment.

It was notable that there was a significant increase in CPNIs throughout the study period, with an estimated annual average increase of 4,763 CPNIs per year. This is consistent with trends reported in prior studies. Li et al reported that between 2009 and 2018, the rate of peripheral nerve injury associated with sports activity increased significantly in the United States, with the incidence of peripheral nerve injuries per 1,000,000 persons more than doubling during this period (from 21.5 to 51.9 per 1,000,000 persons).[12]

In our study, the increase of traumatic spine injuries may have contributed to the increase incidence of CPNIs. It is well recognized that falls are the leading cause of spinal cord injury. A prior study reported that between 2009 and 2017, prescriptions for medications that increase fall risk and fall-related mortality increased.[26,27] The increased rate of medication prescriptions for fall risk was particularly prominent among elderly females.[27] Our finding is similar as we observed that elderly female patients to be at elevated risk for severe CPNIs. In light of these findings, it is especially important for physicians to counsel elderly patients on associated injury risks when prescribing these types of medications.

We observed a 48% increase in CPNI incidence between 2015 and 2016. This increase may have been due to the surge in Americans acquiring health insurance as a factor of the Affordable Care Act going into effect in 2014.[28] Therefore, an increasing number of people may have sought treatment for CPNIs, given that costs were possibly alleviated through health coverage. Additionally, the decrease in cases between 2020 and 2021 can potentially be attributed to decreased care-seeking behavior driven by the COVID-19 pandemic.

We also found that CPNIs appear more severe among children and the elderly. Children and elderly patients experienced a higher proportion of traumatic spinal cord injuries resulting in hospital admission than the general population. Our finding is similar to previous studies that reported peripheral nerve injuries were more common than previously identified among the pediatric trauma population, and are often severe, involving objects such as glasses and knives.[29–31] Elderly patients have been shown to be more likely to experience falls, more severe injuries, have more comorbidities, and have slower recovery times following peripheral nerve injuries, further supporting the notion of increased CPNI severity among the elderly.[32–35] Increased attention to nerve injuries in children and elderly patients may decrease the occurrence of long-lasting disability and the development of chronic pain in this population.

We discovered that over 400 consumer products were associated with nerve injuries. Among the most common consumer products reported, stairs were associated with 8% of injuries across all age groups. This finding is supported by Blazewick et al, who investigated stair-related injuries querying a national database from 1990 to 2012.[36] The authors found that over 1,000,000 stair-related injuries occurred every year, with injuries most commonly occurring in patients 11–60 years-old. Moreover, other investigations have reported similar findings that stairs are a common source of severe injury.[37–42] Potential modifiable factors that can reduce stairway fall risk include the implementation of handrails in the place of residence, parent education on safe stair practices for their children, and physical changes in stair heights which have been effective in preventing stair-related injuries.[43–46]

Among elderly patients, bed and bedframe-related injuries resulting in nerve injuries were the most common. Falls from beds have been shown to be a significant cause of injury among the elderly, causing fractures, brain hemorrhages, and lacerations.[47,48] While bed rails are commonly used in nursing care facilities and hospitals to reduce falls, the equipment remains controversial given its potential for fatal entrapment and other injuries, especially among patients experiencing delirium.[39,49] Therefore, future investigations on the prevention of bed-associated nerve injuries may choose to focus on alternative interventions such as lower bed heights or bed exit alarms.

Our findings should be interpreted within the context of several limitations. While the NEISS query included cases for CPNIs presenting to EDs, the database did not contain cases treated in other healthcare facilities, such as in urgent care centers or in-office appointments with providers such as primary care physicians. Additionally, inputs for individual patient narratives were heterogeneous and not standardized. Thus, based on provider-by-provider reporting, informative data in the form of highly specific diagnoses or the exact mechanism of injury of the product could not be ascertained. Third, nerve injuries were not graded using a standardized metric (eg, Sunderland classification) limiting further

quantitative analysis on injury severity. However, ED disposition data was available, providing some insight into the severity of each injury. Fourth, we choose to classify ages into 3 groups. Future studies investigating younger and older children are warranted as they exhibit different physical activity. Finally, the NEISS database does not provide clinical follow-up information, preventing further analyses that could help identify potential risk factors for negative outcomes and the development of long-term sequelae such as chronic pain.

Conclusion

In summary, patients with CPNIs reporting to the EDs increased over a 10-year period from 2012 to 2021. Stairs were most commonly involved in nerve injuries among children and adults whereas bed or bedframe injuries were more frequent among the elderly. Among younger adults, the upper trunk, lower arm, and wrist were more frequently involved in CPNIs, while these areas were less commonly involved in older adults. Sciatica was the most common diagnosis, with radiculopathy and traumatic spinal cord injury also accounting for a notable portion of cases. Children and the elderly tended to have more severe CPNIs than the general population, highlighting a need for better prevention and treatment strategies among these populations. It is important to monitor patterns of nerve injuries and their incidence by age group to increase awareness among physicians and better counsel patients regarding preventive measures to limit future nerve injuries associated with common consumer products. Increased rigor in nationwide nerve injury monitoring can contribute to the prevention of chronic pain conditions and nerve injury-associated disabilities. Further investigations exploring interventions to lower the burden of CPNIs, improve consumer product safety, and reduce potentially chronic and debilitating injuries are necessary.

Disclosure

The authors report no conflicts of interest in this work.

References

1. FastStats. Available from: https://www.cdc.gov/nchs/fastats/emergency-department.htm. Accessed Jan 8, 2024.
2. Padovano WM, Dengler J, Patterson MM, et al. Incidence of nerve injury after extremity trauma in the United States. *Hand N Y N*. 2022;17(4):615–623. doi:10.1177/1558944720963895
3. Hooker EA, Mallow PJ, Oglesby MM. Characteristics and trends of emergency department visits in the United States (2010–2014). *J Emerg Med*. 2019;56(3):344–351. doi:10.1016/j.jemermed.2018.12.025
4. Tapp M, Wenzinger E, Tarabishy S, Ricci J, Herrera FA. The epidemiology of upper extremity nerve injuries and associated cost in the US emergency departments. *Ann Plast Surg*. 2019;83(6):676–680. doi:10.1097/SAP.0000000000002083
5. Edwards J, Hayden J, Asbridge M, Gregoire B, Magee K. Prevalence of low back pain in emergency settings: a systematic review and meta-analysis. *BMC Musculoskelet Disord*. 2017;18(1):143. doi:10.1186/s12891-017-1511-7
6. Della-Giustina D. Evaluation and treatment of acute back pain in the emergency department. *Emerg Med Clin North Am*. 2015;33(2):311–326. doi:10.1016/j.emc.2014.12.005
7. Althagafi A, Nadi M. Acute Nerve Injury. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing.
8. de Lange JWD, Duraku LS, Power DM, et al. Prevalence of post-traumatic neuropathic pain after digital nerve repair and finger amputation. *J Plast Reconstr Aesthetic Surg*. 2022;75(9):3242–3249. doi:10.1016/j.bjps.2022.06.033
9. Miclescu A, Straatmann A, Gkatziani P, Butler S, Karlsten R, Gordh T. Chronic neuropathic pain after traumatic peripheral nerve injuries in the upper extremity: prevalence, demographic and surgical determinants, impact on health and on pain medication. *Scand J Pain*. 2019;20(1):95–108. doi:10.1515/sjpain-2019-0111
10. Ciaramitaro P, Mondelli M, Logullo F, et al. Traumatic peripheral nerve injuries: epidemiological findings, neuropathic pain and quality of life in 158 patients. *J Peripher Nerv Syst*. 2010;15(2):120–127. doi:10.1111/j.1529-8027.2010.00260.x
11. Berube M, Choiniere M, Laflamme YG, Gélinas C. Acute to chronic pain transition in extremity trauma: a narrative review for future preventive interventions (part 1). *Int J Orthop Trauma Nurs*. 2016;23:47–59. doi:10.1016/j.ijotn.2016.04.002
12. Li NY, Onor GI, Lemme NJ, Gil JA. Epidemiology of peripheral nerve injuries in sports, exercise, and recreation in the United States, 2009-2018. *Phys Sportsmed*. 2021;49(3):355–362. doi:10.1080/00913847.2020.1850151
13. Mehta NK, Siegel J, Cowan B, et al. Head and neck injury patterns among American football players. *Ann Otol Rhinol Laryngol*. 2022;131(5):463–470. doi:10.1177/00034894211026478
14. Ootes D, Lambers KT, Ring DC. The epidemiology of upper extremity injuries presenting to the emergency department in the United States. *Hand N Y N*. 2012;7(1):18–22. doi:10.1007/s11552-011-9383-z
15. Schulz KF, Altman DG, Moher D, CONSORT Group. CONSORT 2010 statement: updated guidelines for reporting parallel group randomised trials. *BMJ*. 2010;340:c332. doi:10.1136/bmj.c332.
16. Diamond PT, Gale SD. Head injuries in men's and women's lacrosse: a 10-year analysis of the NEISS database. *Brain Inj*. 2001;15(6):537–544. doi:10.1080/02699050010007362

17. McGwin G. Incidence of emergency department treated eye injury in the United States. *Arch Ophthalmol*. 2005;123(5):662. doi:10.1001/archopht.123.5.662
18. Haring RS, Sheffield ID, Canner JK, Schneider EB. Epidemiology of sports related eye injuries in the United States. *JAMA Ophthalmol*. 2016;134(12):1382–1390. doi:10.1001/jamaophthalmol.2016.4253
19. Kim T, Nunes AP, Mello MJ, Greenberg PB. Incidence of sports-related eye injuries in the United States: 2001-2009. *Graefes Arch Clin Exp Ophthalmol*. 2011;249(11):1743–1744. doi:10.1007/s00417-010-1556-x
20. Pollard KA, Xiang H, Smith GA. Pediatric eye injuries treated in US emergency departments, 1990-2009. *Clin Pediatr*. 2012;51(4):374–381. doi:10.1177/0009922811427583
21. Moren Cross J, Griffin R, Owsley C, McGwin G. Pediatric eye injuries related to consumer products in the United States, 1997-2006. *J Am Assoc Pediatr Ophthalmol Strabismus*. 2008;12(6):626–628. doi:10.1016/j.jaapos.2008.07.005
22. Thompson MC, Wheeler KK, Shi J, et al. Surveillance of pediatric traumatic brain injuries using the NEISS: choosing an appropriate case definition. *Brain Inj*. 2014;28(4):431–437. doi:10.3109/02699052.2014.887146
23. Corbi G, Cacciatore F, Komici K, et al. Inter-relationships between gender, frailty and 10-year survival in older Italian adults: an observational longitudinalFrailty and 10-year survival in older Italian adults: an observational longitudinal study. *Sci Rep*. 2019;9(1):18416. doi:10.1038/s41598-019-54897-2
24. Almeida M, Kosman KA, Kendall MC, De Oliveira GS. The association between labor epidural analgesia and postpartum depression: a systematic review and meta-analysis. *BMC Women's Health*. 2020;20(1):99. doi:10.1186/s12905-020-00948-0
25. Gordon EH, Hubbard RE. Differences in frailty in older men and women. *Med J Aust*. 2020;212(4):183–188. doi:10.5694/mja2.50466
26. Ko HY. Current Epidemiology of Spinal Cord Injuries. In: Ko HY editor. *Management and Rehabilitation of Spinal Cord Injuries*. Springer Nature Singapore; 2022:233–249. doi:10.1007/978-981-19-0228-4.
27. Shaver AL, Clark CM, Hejna M, Feuerstein S, Wahler RG, Jacobs DM. Trends in fall related mortality and fall risk increasing drugs among older individuals in the United States,1999–2017. *Pharmacoepidemiol Drug Saf*. 2021;30(8):1049–1056. doi:10.1002/pds.5201
28. Tolbert J, Drake P, Damico A, 2023. Key Facts about the Uninsured Population. KFF. Available from: https://www.kff.org/uninsured/issue-brief/key-facts-about-the-uninsured-population/. Accessed January 8, 2024.
29. Costales JR, Socolovsky M, Sánchez Lázaro JA, García R Á. Peripheral nerve injuries in the pediatric population: a review of the literature. Part I: traumatic nerve injuries. *Childs Nerv Syst*. 2019;35(1):29–35. doi:10.1007/s00381-018-3974-8
30. Missios S, Bekelis K, Spinner RJ. Traumatic peripheral nerve injuries in children: epidemiology and socioeconomics. *J Neurosurg Pediatr*. 2014;14(6):688–694. doi:10.3171/2014.8.PEDS14112
31. Walco GA, Dworkin RH, Krane EJ, LeBel AA, Treede RD. Neuropathic Pain in Children: special Considerations. *Mayo Clin Proc*. 2010;85(3 Suppl):S33–S41. doi:10.4065/mcp.2009.0647
32. Fillenbaum GG, Pieper CF, Cohen HJ, Cornoni-Huntley JC, Guralnik JM. Comorbidity of five chronic health conditions in elderly community residents: determinants and impact on mortality. *J Gerontol a Biol Sci Med Sci*. 2000;55(2):M84–89. doi:10.1093/gerona/55.2.m84
33. Appeadu MK, Bordoni B. Falls and Fall Prevention in Older Adults. In: statPearls. Available from: http://www.ncbi.nlm.nih.gov/books/NBK560761/. Accessed Jan 8, 2024.
34. Vaishya R, Vaish A. Falls in older adults are serious. *Indian J Orthop*. 2020;54(1):69–74. doi:10.1007/s43465-019-00037-x
35. Al-Aama T. Falls in the elderly. *Can Fam Physician*. 2011;57(7):771–776. doi:10.1136/bmj.b3692
36. Blazewick DH, Chounthirath T, Hodges NL, Collins CL, Smith GA. Stair-related injuries treated in United States emergency departments. *Am J Emerg Med*. 2018;36(4):608–614. doi:10.1016/j.ajem.2017.09.034
37. Hörauf JA, Nau C, Mühlenfeld N, Verboket RD, Marzi I, Störmann P. Injury patterns after falling downstairs-high ratio of traumatic brain injury under alcohol influence. *J Clin Med*. 2022;11(3):697. doi:10.3390/jcm11030697
38. Joffe M, Ludwig S. Stairway injuries in children. *Pediatrics*. 1988;82(3 Pt 2):457–461. doi:10.1542/peds.82.3.457
39. Wallberg CD, Smart DM, Mackelprang JL, Graves JM. Stair-related injuries among pregnant women treated in United States emergency departments. *Matern Child Health J*. 2021;25(6):892–899. doi:10.1007/s10995-021-03141-3
40. Boele van Hensbroek P, Mulder S, Luitse JSK, van Ooijen MR, Goslings JC. Staircase falls: high-risk groups and injury characteristics in 464 patients. *Injury*. 2009;40(8):884–889. doi:10.1016/j.injury.2009.01.105
41. Kendrick D, Zou K, Ablewhite J, et al. Risk and protective factors for falls on stairs in young children: multicentre case-control study. *Arch Dis Child*. 2016;101(10):909–916. doi:10.1136/archdischild-2015-308486
42. Pearson M, Garside R, Moxham T, Anderson R. Preventing unintentional injuries to children in the home: a systematic review of the effectiveness of programs supplying and/or installing home safety equipment. *Health Promot Int*. 2011;26(3):376–392. doi:10.1093/heapro/daq074
43. Kunzler MR, da Rocha ES, Dos Santos CS, Ceccon FG, Priario LA, Carpes FP. Should we consider steps with variable height for a safer stair negotiation in older adults? *Work*. 2018;59(1):15–21. doi:10.3233/WOR-172658
44. Harper SA, Corbridge S, Long C, et al. Safe stairway negotiation: role of distractions and handrail use. *J Safety Res*. 2022;82:314–322. doi:10.1016/j.jsr.2022.06.007
45. Anderson O, Boshier PR, Hanna GB. Interventions designed to prevent healthcare bed-related injuries in patients. *Cochrane Database Syst Rev*. 2012;1:CD008931. doi:10.1002/14651858.CD008931.pub3
46. Kibayashi K, Shimada R, Nakao K. Accidental deaths occurring in bed: review of cases and proposal of preventive strategies. *J Forensic Nurs*. 2011;7(3):130–136. doi:10.1111/j.1939-3938.2011.01109.x
47. Shanahan DJ. Bedrails and vulnerable older adults: how should nurses make "safe and sound" decisions surrounding their use? *Int J Older People Nurs*. 2012;7(4):272–281. doi:10.1111/j.1748-3743.2011.00285.x
48. Marques P, Queirós C, Apóstolo J, Cardoso D. Effectiveness of bedrails in preventing falls among hospitalized older adults: a systematic review. *JBI Database Syst Rev Implement Rep*. 2017;15(10):2527–2554. doi:10.11124/JBISRIR-2017-003362
49. Palese A, Longhini J, Businarolo A, Piccin T, Pitacco G, Bicego L. Between restrictive and supportive devices in the context of physical restraints: findings from a large mixed-method study design. *Int J Environ Res Public Health*. 2021;18(23):12764. doi:10.3390/ijerph182312764