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Occupational and Nonoccupational Chainsaw Injuries in the United States: 2018–2022

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Abstract

Chainsaws are widely used in various occupational settings, including forestry, landscaping, farming, and by homeowners for tasks like tree felling, brush clearing, and firewood cutting. However, the use of chainsaws poses significant risks to operators and bystanders. This research quantified and compared occupational and nonoccupational injuries caused by contact with chainsaws and related objects during the period from 2018 to 2022. The emergency department and OSHA (Occupational Safety and Health Administration) data were used to characterize the cause and nature of the injuries. Results suggest that for this five-year period an estimated 127,944 people were treated in U.S. emergency departments for chainsaw-related injuries. More than 200 non-fatal and 57 fatal occupational chainsaw-involved injuries were found during the same period. Landscaping and forestry were the two industries where most of the occupational victims were employed. Upper and lower extremities were the most likely injured body parts, with open wounds from cuts being the most common injury type. The majority of fatal injuries were caused by falling objects such as trees and tree limbs while using a chainsaw. Our suggestions to reduce injuries include proper training and wearing personal protective equipment, as well as making sure any bystanders are kept in a safety zone away from trees being cut.

Keywords: chainsaw; injury; nonfatal; surveillance; emergency department

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1. Introduction

Chainsaws are powered hand tools commonly used in various residential, farming, and occupational settings. While chainsaws are indispensable tools in industries such as forestry and landscaping, their use poses significant hazards to both users and bystanders. Chainsaws are primarily employed for cutting wood, whether for tree felling, limbing, or bucking. According to the National Institute for Occupational Safety and Health (NIOSH), chainsaws are essential tools in forestry, where they facilitate the efficient harvest of timber, but they are also one of the most dangerous tools [1]. In landscaping, chainsaws are also essential for pruning and removing trees, allowing for the management of plant life in urban environments [2]. Additionally, in disaster response scenarios, chainsaws are utilized for clearing debris, which underscores their importance in emergency management [3].

Although research investigating the nature of injuries from chainsaw accidents is relatively rare, the few papers providing details indicate that injuries are often severe. For instance, a retrospective analysis of chainsaw injuries in a major urban hospital found

that 85% of patients required surgical intervention, with 20% experiencing long-term disability [4]. These findings underscore the critical need for additional research looking at the characteristics of chainsaw-related injuries so that more effective safety measures and training programs can be designed to mitigate risks.

Chainsaw-related injuries are a significant concern, with numerous studies documenting their prevalence and severity. According to the National Institute for Occupational Safety and Health, chainsaws account for a considerable portion of total injuries in the forestry and tree-care sectors [5]. A study by Baird et al. highlighted that the most common injuries include lacerations, fractures, and amputations, predominantly affecting the hands, legs, and feet [6]. The authors noted that improper use and lack of training were primary factors contributing to these incidents. Lack of training and improper safety practices can also lead to bystanders being seriously injured during tree-felling activities using a chainsaw [7].

The U.S. Bureau of Labor Statistics (BLS) reports that chainsaw injuries account for a significant percentage of all tool-related injuries in the workplace [8]. A study by Tapp et al. found that nearly 60% of chainsaw injuries involved cuts to the hands and legs, often resulting in severe damage that necessitates surgical intervention [9].

Moreover, chainsaw operation exposes users to high noise levels, often exceeding 100 decibels, leading to potential hearing loss [10]. Prolonged exposure to vibration can cause hand-arm vibration syndrome, characterized by symptoms like numbness and reduced dexterity, further complicating chainsaw operation [11]. Carbon monoxide (CO) and respirable dust exposure are also common hazards for workers using chainsaws [12].

The hazards associated with chainsaws can be attributed to various factors, including equipment design, user error, and environmental conditions. Older chainsaws lack adequate, modern safety features, which can exacerbate injury risks. A study by Slappendel et al. examined factors affecting work-related injuries for forestry workers, including chainsaw design [13]. Furthermore, environmental conditions, such as uneven terrain and adverse weather, can complicate chainsaw operations, leading to a higher incidence of accidents [14].

User error remains a predominant factor in chainsaw-related injuries. Research indicates that inexperienced operators are more prone to accidents, particularly when using chainsaws in challenging conditions [15]. Older persons who are so-called 'occasional wood cutters' are also known to be at higher risk (e.g., [16]). A lack of training and ignorance of safety protocols are also contributing factors in incidents; studies have shown that comprehensive training significantly reduces the risk of injuries among chainsaw operators [17].

Our objectives with this paper were to quantify occupational and nonoccupational injuries related to chainsaws; also characterized were chainsaw-related fatalities encountered in occupational settings. Collecting and analyzing both occupational and nonoccupational injuries provides a unique opportunity to identify the cause and nature of such incidents. Most previous work has focused on occupational users of chainsaws, so an additional contribution of this paper is to describe injuries and causes to nonoccupational users. The paper provides suggestions for improving safety outcomes for both operators and bystanders, noting the important differences in occupational and nonoccupational settings.

2. Materials and Methods

Two different methods were utilized to collect data for this manuscript. Data on occupational injuries were available from government databases, but data on nonoccupational injuries had to be obtained from different sources. As an analysis of publicly available de-identified data, this study is exempt from Institutional Review Board review.

Nonoccupational injuries were identified using data from the National Electronic Injury Surveillance System (NEISS) of the U.S. Consumer Product Safety Commission (CPSC) [18]. The NEISS collects emergency department data from approximately 100 hospitals selected as a probability sample of all 5000+ U.S. hospitals with emergency departments [19]. The dataset includes details such as patient demographics, incident date, diagnosis, injury location, patient outcome, and a brief description of the incident [20]. Even though race and injury location were available in the dataset; these variables were missing or not stated in 28.5% and 33% of NEISS emergency department (ED) visit records, respectively. Missing or unspecified data were observed in only 0.15% of cases for the injured body part variable. Additionally, occupational injuries treated in emergency departments are reported through NEISS-Work and, therefore, were not included in the NEISS dataset.

For the period from 1 January 2018, to 31 December 2022, all cases in the NEISS database related to the product code 1411 (chainsaw) were queried. National estimates were generated using weights provided by the NEISS. The SPSS Version 30 (SPSS Inc., Chicago, IL, USA) complex samples function was used to create 95% confidence intervals descriptive analysis, and chi-square analysis. Statistical significance was $p < 0.05$. When variable subgroups had fewer than 20 records and estimates below 1200, 95% confidence intervals (CIs) were not calculated, as such estimates are considered unstable and potentially unreliable [21].

The R statistical software (Version 4.3.2, R Foundation for Statistical Computing, Vienna, Austria) was utilized to assess the annual variation in the estimated number of chainsaw injuries. An Analysis of Variance test (ANOVA) was conducted to analyze the count of chainsaw injuries grouped by month and year. The conventional normal theory ANOVA did not yield a statistically significant result ($p > 0.05$) for the impact of the year on the average estimated chainsaw injuries. Subsequently, multiscale trend modeling was carried out using Generalized Additive Models (GAMs) to capture potential nonlinear relationships between the response variable (in this case, estimated number of chainsaw injuries) and the explanatory variables.

Occupational chainsaw injuries were obtained from the Occupational Safety and Health Administration's (OSHA), Integrated Management Information System (IMIS) and the OSHA Severe Injury Database. The OSHA/IMIS databases were queried for the years 2018–2022, looking at all available cases [22]. The IMIS summaries provide details on injury incidents, including dates, locations, industry segment, and victim information such as occupation, age, and gender. The IMIS online database can be queried using various parameters such as description, abstract, keyword, industry code, OSHA office, and event dates. By searching with the term "chainsaw," lists of injury events and descriptions were obtained. Detailed investigation summaries for specific incidents were accessed.

Each incident description was reviewed, and only those where chainsaws were the primary or secondary source of injury were selected. In cases where the chainsaw is a secondary source, the event may not involve direct contact with the chainsaw and could include incidents such as falls. For example: "An employee was up in a tree, trimming branches with a chainsaw. The chainsaw cut his lanyard, causing him to fall approximately 18 feet to the ground. He suffered fractured vertebrae in his lower back, a punctured bowel, and was hospitalized." In this case, the primary source is "trees," the secondary source is "chainsaw," and the event type is "fall to lower level."

The data included the OSHA inspection number, injury date, North American Industry Classification System (NAICS) code, a narrative of the injury event, type of injury, and details about the employee's occupation, age, and gender. Additionally, cases were coded using the Occupational Injury and Illness Classification System (OIICS), version 2.01 [23].

The authors utilized the investigation summary information to categorize each case based on the injury source and the associated event or exposure.

OSHA Severe Injury Reports were retrieved from OSHA's website [24]. A severe injury, as defined in these reports, includes any work-related in-patient hospitalization, amputation, or loss of an eye involving one or more employees. Each record in the Severe Injury Reports represents an incident (i.e., injury event) that an employer was required to report to OSHA in compliance with regulatory requirements. The severe injury database provides information describing the incident, the name and address of the establishment where it happened, and NAICS industry code, and OIICS codes for the nature of the injury, affected body part, source of the injury, and the type of event or exposure. Data were available from the 38 U.S. states that are overseen by federal OSHA and not their own state-level OSHA departments. See Gomes et al. for a description of the system and databases [25].

3. Results

3.1. Nonoccupational Chainsaw Injuries

Between 2018 and 2022, an estimated 127,944 people were treated in an emergency department for chainsaw-related injuries (Table 1). The national mean age estimate in this population was 47.4 years old (95% CI 46.7–48.2). The oldest patient was 91 years old and the youngest was 18 months old. Most of the patients were male and almost 65.4% of them were white. Over the study period, an estimated 70 patients per day sought treatment at a U.S. emergency department for a chainsaw-related injury.

Table 1. Year and Victim demographics for non-occupational chainsaw-related injuries.

Variable		Number (n = 2528)	Estimated Patients (95% CI) (n = 127,944)	% of National Estimate (95% CI)
Year	2018	520	26,876 (24,529–29,223)	21.0% (19.2–22.9%)
	2019	463	24,715 (22,390–27,041)	19.3% (17.6–21.2%)
	2020	607	29,416 (27,027–31,805)	23.0% (21.2–24.9%)
	2021	474	21,162 (19,151–23,172)	16.5% (15.0–18.2%)
	2022	464	25,775 (23,410–28,139)	20.1% (18.4–22.0%)
Gender	Male	2394	121,060 (119,738–122,382)	94.6% (93.5–95.5%)
	Female	134	6884 (5585–8183)	5.4% (4.5–6.5%)
Age group	0–17	106	4940 (3811–6068)	3.9% (3.1–4.8%)
	18–24	189	8938 (7491–10,384)	7.0% (5.9–8.2%)
	25–34	387	19,872 (17,791–21,954)	15.5% (14–17.2%)
	35–44	451	21,942 (19,794–24,090)	17.1% (15.5–18.9%)
	45–54	461	23,616 (21,398–25,834)	18.5% (16.8–20.3%)
	55–64	474	24,643 (22,387–26,898)	19.3% (17.6–21.1%)
	65 and older	460	23,994 (21,741–26,247)	18.8% (17.1–20.6%)

A Generalized Additive Model (GAM) was incorporated two smooth terms: the month, represented by a cyclic cubic spline to address seasonal variations, and time (months from the study's commencement), depicted as a smooth function to capture long-term trends. The smooth term for the month showed a notably significant p-value, indicating compelling evidence of seasonal patterns in chainsaw injuries. A significant seasonal trend was observed in chainsaw injuries, with peaks occurring in the warmer months (late spring to summer) and declines in the colder months (winter) (Figure 1(Left)). Similarly, the smooth term for time also demonstrated a highly significant p-value, signifying a pronounced nonlinear trend over the duration of the study. Throughout the 5-year observation period, chainsaw injuries displayed notable fluctuations (Figure 1(Right)).

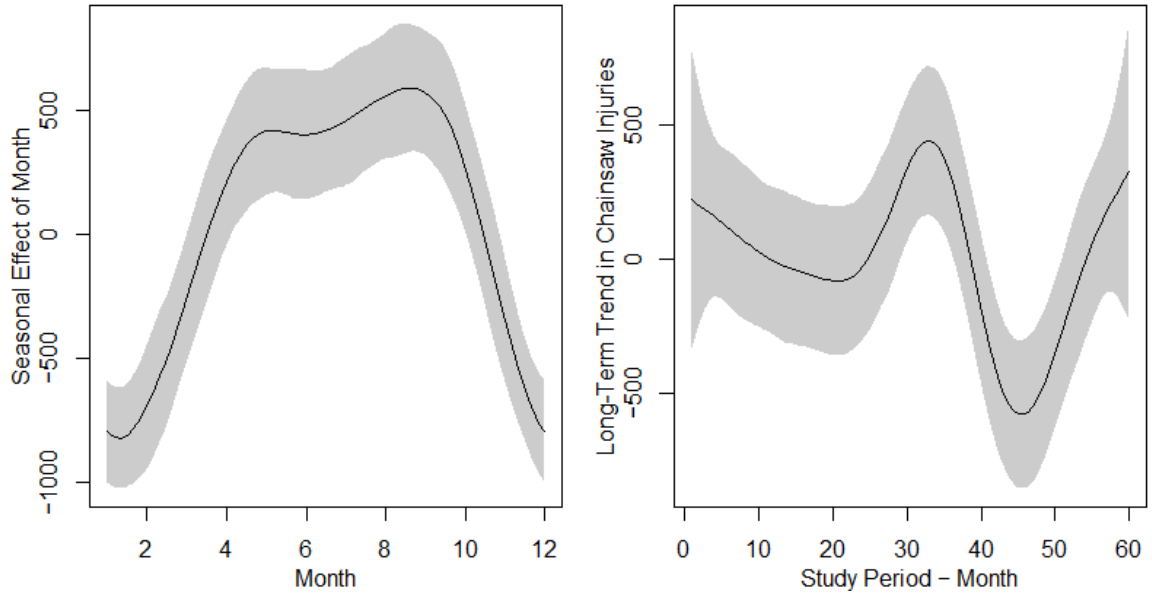


Figure 1. (**Left**) Seasonal and (**Right**) Long-term trends in monthly estimated number of chainsaw injuries modeled using GAM.

The most common injury type was an open wound (76.4%) followed by a fracture (7.3%) (Table 2). The upper and lower extremities were the two most injured body parts accounting for more than 80% of the patients. Eighty-five percent of the patients were treated/evaluated and released. Almost 15% of the patients were either hospitalized or transferred to another facility for further care.

Table 2. Injury characteristics of non-occupational chainsaw-related injuries.

Variable		Number (n = 2528)	Estimated Patients (95% CI) (n = 127,944)	% of National Estimate (95% CI)
Injury diagnosis	Open wound/amputation	1947	97,691 (95,240–100,142)	76.4% (74.4–78.2%)
	Fracture	190	9294 (7812–10,775)	7.3% (6.2–8.5%)
	Soft tissue injury	103	5780 (4561–6999)	4.5% (3.7–5.6%)
	Burns, foreign body, nerve	68	3622 (2668–4575)	2.8% (2.2–3.7%)
	Sprain or strain	55	3388 (2427–4350)	2.6% (2–3.5%)
	Traumatic brain injury	50	2240 (1507–2972)	1.8% (1.3–2.4%)
	Other [a]	115	5930 (4714–7145)	4.6% (3.8–5.7%)
Body part injured	Upper extremities	1085	54,399 (51,574–57,223)	42.5% (40.3–44.7%)
	Lower extremities	1056	53,834 (51,004–56,663)	42.1% (39.9–44.3%)
	Head and neck	253	13,082 (11,341–14,824)	10.2% (8.9–11.7%)
	Trunk	122	6068 (4848–7288)	4.7% (3.9–5.8%)
	Other [b,c]	12	561 (181–941)	0.4% (0.2–0.9%)

[a] Other category includes pain, cellulitis, injury, spasm, etc. [b] Other category includes unknown body parts and all body parts. [c] When the number is less than 20, the estimate is <1200 or the coefficient of variation is >33%, the estimate is not reliable.

3.2. Occupational Chainsaw Injuries

For the five-year period from 2018 to 2022, there were 202 non-fatal and 57 fatal occupational chainsaw-involved injuries. The top five states with the highest number of chainsaw injuries were California (n = 43, 16.6%), Florida (n = 43, 16.6%), Pennsylvania (n = 18, 6.9%), Texas (n = 12, 4.6%) and Alabama (n = 11, 4.2%).

Landscaping incurred the highest number of both fatal injuries (n = 33, 58%) and non-fatal (n = 92, 46%) injuries. By contrast, the Agriculture, Forestry, and Fishing (AgFF) sector incurred 25% (n = 14) of all fatal occupational injuries and 7.4% (n = 15) of nonfatal injuries. The construction industry sector reported 8.8% (n = 5) of fatal and 18.3% (n = 37)

of nonfatal injuries. Sex and age information were not available for 116 victims. Out of 143 victims with known demographics, all the victims were male (see Table 3). Victims' race information was not available.

Table 3. Year and Victim Demographics for occupational chainsaw-related injuries.

Variable		Fatal	Nonfatal	Total
Year	2018	7 (12.3%)	65 (32.2%)	72 (27.8%)
	2019	10 (17.5%)	57 (28.2%)	67 (25.9%)
	2020	9 (15.8%)	29 (14.4%)	38 (14.7%)
	2021	23 (40.4%)	27 (13.4%)	50 (19.3%)
	2022	8 (14%)	24 (11.9%)	32 (12.4%)
Gender [1]	Male	57 (100%)	86 (100%)	143 (100%)
	Female	-	-	-
Age group [1]	0–17	1 (1.8%)	1 (0.5%)	2 (0.8%)
	18–24	2 (3.5%)	11 (5.4%)	13 (5.0%)
	25–34	13 (22.8%)	25 (12.4%)	38 (14.7%)
	35–44	13 (22.8%)	22 (10.9%)	35 (13.5%)
	45–54	14 (24.6%)	10 (5%)	24 (9.3%)
	55–64	12 (21.1%)	14 (6.9%)	26 (10%)
	65 and older	2 (3.5%)	3 (1.5%)	5 (1.9%)

[1] Unknown variables were not included in the percentage calculations.

As detailed in Table 4, chainsaws were responsible for the highest number of incidents overall (53.3%), with a significant proportion being nonfatal (63.9%). Trees, tree limbs, logs, etc., accounted for the highest percentage of fatal incidents (66.7%). The predominant category of injury events in the OIICS was "contact with" injuries, accounting for 79.9% of all incidents, with a high proportion of both fatal (73.7%) and nonfatal (81.7%) incidents. Falls while using a saw were the second most common cause, making up 14.7% of all incidents, with a relatively even distribution between fatal (12.3%) and nonfatal (15.3%) incidents. Exposure to electricity has a significant fatality rate (12.3%) compared to its nonfatal rate (1%), indicating a higher risk of fatality when such incidents occur.

Table 4. OIICS characteristics of occupational chainsaw involved injuries.

OIICS Category	Fatal	Nonfatal	Total
Nature			
Crushing injuries	16 (28.1%)	4 (2%)	20 (7.7%)
Unspecified traumatic injuries	14 (24.6%)	-	14 (5.4%)
Traumatic injuries to bones/muscles	8 (14%)	54 (26.7%)	62 (23.9%)
Open wounds and amputations	7 (12.3%)	117 (57.9%)	124 (47.9%)
Electrocutions	7 (12.3%)	1 (0.5%)	8 (3.1%)
Intracranial injuries	5 (8.8%)	2 (1%)	7 (2.7%)
Multiple traumatic injuries		12 (5.9%)	12 (4.6%)
Other traumatic injuries		12 (5.9%)	12 (4.6%)
Body part injured			
Head and neck	19 (33.3%)	14 (6.9%)	33 (12.7%)
Multiple body parts	15 (26.3%)	30 (14.9%)	45 (17.4%)
Trunk	5 (8.8%)	10 (5%)	15 (5.8%)
Upper extremities	2 (3.5%)	64 (31.7%)	66 (25.5%)
Lower extremities	1 (1.8%)	79 (39.1%)	80 (30.9%)
Nonclassifiable	15 (26.3%)	5 (2.5%)	20 (7.7%)

Table 4. *Cont.*

OIICS Category	Fatal	Nonfatal	Total
Primary Source			
Trees, tree limbs, logs, etc.	38 (66.7%)	47 (23.3%)	85 (32.8%)
Chainsaws	9 (15.8%)	129 (63.9%)	138 (53.3%)
Machine, tool, electric parts	7 (12.3%)	3 (1.5%)	10 (3.9%)
Others	3 (5.3%)	23 (11.4%)	26 (10%)
Event			
Contact with objects and equipment	42 (73.7%)	165 (81.7%)	207 (79.9%)
Falls	7 (12.3%)	31 (15.3%)	38 (14.7%)
Exposure to electricity	7 (12.3%)	2 (1%)	9 (3.5%)
Others	1 (1.8%)	4 (2%)	5 (1.9%)

4. Discussion

Chainsaws should be recognized as a significant cause of severe injuries and fatalities in landscaping and forestry-related occupations, as seen in our data. They also cause a large number of non-occupational injuries for persons using the tools in residential and farming environments. Research efforts such as these can help illustrate the extent and nature of the hazards while also guiding work to increase the safety of saw operators. Comparing these results with existing work on tree-felling fatalities [7] suggests that safety educators should utilize a combined approach that emphasizes hazard recognition from both the saw and the object being cut. Injuries from contact with the chainsaws were shown to be largely preventable with proper personal protective equipment (PPE), whereas severe injuries and fatalities from the objects being cut were in most cases too significant to be avoided by even the most advanced PPE.

We found far fewer occupational injuries caused by the use of a chainsaw versus non-occupational. The number of occupational victims was low relative to the total number seen in an emergency room; there were 202 non-fatal occupational chainsaw-related injuries while there were nearly 128,000 victims seen in an emergency room for similar injuries. This could be in part because the only occupational injuries reported to government databases were the ones that met the threshold for severity. However, the use of PPE was very high in occupational settings compared to the lower levels of use by residential and occasional users, and thus lower percentages of upper/lower extremities injuries in occupational victims were seen. Higher levels of training could also explain the relatively low incidence of injuries suffered by workers.

Our results suggest that the use of chainsaws is generally a male endeavor; all occupational victims were male and only a small percentage of non-occupational victims were female. These results are reflective of previous research and suggest that public health officials and others seeking to reduce the burden of chainsaw injuries should focus their efforts on males.

Occupational fatalities from chainsaw use were fairly even across the year, although January was statistically the most hazardous month. Nonfatal injuries followed a similar pattern. In contrast, the non-occupational data show that most injuries occurred during March through October. Users in winter months must be aware of cold-related hazards (e.g., numb hands) that could contribute to injuries, while users in hot summer months must be aware of issues exacerbated by overheating or dehydration.

It was noteworthy that occupational chainsaw injuries went down in the first year of the pandemic (2020) while the number of non-occupational injuries was nearly 50% higher than the longer-term average. It is suspected that these trends may be in part due to the reduction in work hours by professional tree workers at the start of the pandemic and an

increase in residential use by persons forced to do tree trimming, firewood cutting, etc., without professional assistance.

4.1. Practical Recommendations

To enhance chainsaw safety, several recommendations have been put forth in the literature and are reinforced by our findings. Firstly, effective training programs are essential. According to a report by the American National Standards Institute (ANSI), chainsaw operators should undergo rigorous training that covers both theoretical knowledge and practical skills, including proper handling, maintenance, and emergency procedures [26]. Research indicates that formal training is effective with loggers (e.g., [27,28]) and operators receiving training are less likely to experience accidents [29]. Training should also include specific modules on recognizing hazards and mitigating risks in diverse operational environments. A recommendation that is difficult to implement is adequate training for non-professional users; there are many challenges to widespread training programs aimed at, for example, homeowners and other occasional users.

Additionally, the implementation of safety features in chainsaw design is crucial and recent advancements in technology have contributed to safety improvements. Innovations such as chain brakes, anti-kickback mechanisms, and improved grip designs can significantly reduce the likelihood of accidents [13]. Chainsaws equipped with kickback brakes significantly reduce the risk of injury from unexpected movement of the bar toward the user [30]. Furthermore, manufacturers are increasingly focusing on ergonomic designs to minimize vibration exposure, thus protecting operators from long-term health issues [31]. Manufacturers are encouraged to continue prioritizing these safety enhancements in their product lines, and users should not cut with older saw models not having modern safety features such as chain brakes.

Regular maintenance and inspections of chainsaws are also vital parts of safety-related training for saw operators. A study by Haggstrom and Edlund (2022) found that chainsaw operators are often not good at remembering such safety training and it should be reinforced regularly [32]. Operators should be (re)trained to conduct routine checks and maintenance, ensuring that all safety features are functional.

Employers in forestry and tree-care industries must follow OSHA guidelines and recommendations for proper training and safety practices [33,34]. Other agencies such as the American National Standards Institute have established guidelines for safe chainsaw operation, including the use of PPE such as helmets, eye protection, gloves, and chainsaw chaps [35]. Employers in large-area logging operations should consider hi-tech solutions, such as sensor systems to detect people in hazard zones around tree felling operations, to help reduce dangers to workers [36].

The higher prevalence of certain injuries (i.e., those that would be prevented with cut-resistant chaps) with nonoccupational users of chainsaws suggests that the non-professionals are wearing such PPE at a lower rate than the professionals. In particular, the findings that the lower extremities were the most injured body parts, accounting for more than 40% of the nonoccupational victims, are reflective of those sawyers not using safety chaps, steel-toed boots, etc. By contrast, approximately 30% of occupational victims suffered injuries to lower extremities. Further, injuries from the saw itself were a much lower percentage as an injury source for the occupational users, thus again suggesting that occupational users are not getting cut by their saws as frequently as are nonoccupational users. While it would be difficult to mandate PPE use by non-professionals, government agencies and others should endeavor to increase the use of PPE by occasional saw users.

4.2. Limitations

This study relied on secondary sources, which each have inherent limitations. For example, some companies may not report incidents to OSHA as required. The Severe Injury Reports data is limited to incidents within federal OSHA jurisdiction and does not include the 22 states with their own jurisdictions (e.g., California and Oregon). However, Federal OSHA jurisdiction does include federal government workers (e.g., the U.S. Forest Service, military bases, Border Patrol, etc.) in all states and thus incidents with those employees would be included.

The data from the National Electronic Injury Surveillance System (NEISS) is gathered from various hospitals across the United States, which might lead to potential sampling-related biases. As suggested by Gorucu et al. (2022), NEISS data faces several limitations, such as potential underrepresentation of rural hospitals [36]. This could result in an underestimation of the true number of injuries.

A major limitation of this study is the absence of exposure data (e.g., number of users, hours of equipment use), which prevents calculation of injury rates and meaningful epidemiological comparisons between occupational and non-occupational groups. Without denominators, observed differences in injury characteristics or severity cannot be interpreted as differences in risk.

Future research should focus on developing more effective injury prevention strategies and exploring the long-term health impacts of chainsaw use. Future research should also continue to explore innovative safety measures and training methodologies to further enhance chainsaw safety.

5. Conclusions

Despite their utility, chainsaws are inherently dangerous, and the risks associated with chainsaw operation are substantial, leading to injuries and fatalities. This paper has synthesized existing research on chainsaw hazards, focusing on user safety, injury statistics, and recommendations for safer practices.

Chainsaws are essential tools in industries such as forestry and landscaping but come with inherent risks that can lead to serious occupational injuries and fatalities. Residential, on-farm and other occasional uses are also widespread and lead to many additional nonoccupational injuries to users, as shown in our data. Injury rates remain a concern, highlighting the need for continued emphasis on safety practices, proper training, and technological advancements.

The paper highlights the prevalence of chainsaw-related incidents and emphasizes the need for effective training, the use of protective equipment and improved equipment safety features. The need is especially high for nonoccupational users of chainsaws. By addressing these issues, the risks associated with chainsaw operation can be significantly mitigated, promoting a safer working environment for users and bystanders alike.

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Data Availability Statement: Data was obtained from publicly available datasets and interested individuals can download from original source (see Section 2).

Conflicts of Interest: The authors declare no conflicts of interest.

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