

Analysis of fatal bull attacks on humans in Croatia and Bosnia and Herzegovina

Analiza smrtonosnih napada bikova na ljude u Hrvatskoj i Bosni i Hercegovini

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ABSTRACT

Every year, around the world, fatalities occur as a result of bull (*Bos taurus*) attacks on humans. Farmers, zootech-nicians, and veterinarians are most frequently exposed to such attacks, as well as accidental passersby such as hikers and walkers. A particular group consists of people who participate in rodeos and bullfighting events. Due to similar breeding conditions and purposes of bulls, the aim of this study was, to analyze fatal bull attacks on humans in Croatia and Bosnia and Herzegovina. Data on attacks were collected based on police reports and from publicly available sources or open media source. The study included the age and sex of the victims, the location of the attack, the breed, purpose, and housing method of the bulls, the cause and manner of the attack, and autopsy findings. It was determined that out of 11 cases, 9 fatalities involved men and 2 involved women. The victims' ages ranged from 42 to 77 years. Most attacks were caused by bulls kept on pasture. Breed did not influence the bulls' aggressiveness. The cause of the attack cannot always be determined; in our study, attacks were both provoked and unprovoked. Bulls are potentially equally aggressive regardless of their purpose. Autopsies of victims are not conducted regularly, nor is there systematic record-keeping of farm animal attacks by veterinary inspection authorities. Our research found that horned and polled (hornless) bulls are equally dangerous to humans. In the long term, detailed records of farm animal attacks on humans should be maintained. To prevent bull attacks, continuous education of people who work with or come into contact with bulls is necessary. The risk of attack can be reduced by using appropriate farm equipment, applying artificial insemination, and selecting breeding bulls based on temperament.

Keywords: bull, humans, fatal attack, causes

SAŽETAK

Svake godine diljem svijeta dolazi do smrtnih slučajeva kao posljedice napada bikova (*Bos taurus*) na ljude. Stočari, agronomi i veterinari najčešće su izloženi takvim napadima, kao i slučajni prolaznici poput planinara i šetača. Posebnu skupinu čine osobe koje sudjeluju u rodeima i borbama s bikovima. Zbog sličnih uvjeta uzgoja i namjene bikova, cilj ovog istraživanja bio je analizirati napade bikova na ljude sa smrtnim ishodom u Hrvatskoj i Bosni i Hercegovini. Podaci o napadima prikupljeni su na temelju policijskih izvješća i javno dostupnih izvora. Istraživanjem su obuhvaćeni dob i spol

žrtava, mjesto napada, pasmina, namjena i način držanja bikova, uzrok i način napada te nalazi obdukcije. Utvrđeno je da je među 11 slučajeva 9 žrtava bilo muškog, a 2 ženskog spola. Dob žrtava bila je u rasponu od 42 do 77 godina. Većinu napada uzrokovali su bikovi držani na pašnjaku. Pasma nije utjecala na agresivnost bikova. Uzrok napada nije uvijek moguće utvrditi; u ovom istraživanju napadi su bili i izazvani i neizazvani. Bikovi su potencijalno jednako agresivni bez obzira na svoju namjenu. Obdukcije žrtava ne provode se redovito, niti postoji sustavno vođenje evidencije o napadima domaćih životinja od strane veterinarske inspekcije. Naše istraživanje pokazalo je da su bezrožni bikovi i bikovi s rogovima jednako opasni za ljude. Dugoročno bi trebalo voditi detaljnu evidenciju o napadima domaćih životinja na ljude. Kako bi se spriječili napadi bikova, nužna je kontinuirana edukacija osoba koje radi s bikovima ili dolaze u kontakt s njima. Rizik od napada može se smanjiti korištenjem odgovarajuće opreme na farmama, primjenom umjetnog osjemenjivanja te odabirom rasplodnih bikova na temelju temperamenta.

Ključne riječi: bik, ljudi, smrtonosni napad, uzroci

INTRODUCTION

In Croatia and Bosnia and Herzegovina, bulls are used in various livestock production systems. The largest number of bulls are kept for fattening in barns, while a significantly smaller number are used for breeding and for bullfighting. Bull fattening is carried out on large farms where animals are kept in groups in pens, and to a lesser extent on family farms, often in tie-stall barns. In breeding, bulls are used in reproduction centers and for natural mating, most commonly in herds of beef cattle breeds. Bullfighting, although ethically questionable, is traditionally practiced in southern Croatia and parts of Bosnia and Herzegovina. Only purebred bulls are used for breeding, whereas both purebred animals and cross-breeds are used in fattening. Bullfights are based exclusively on bulls of unknown breed origin. For beef cattle breeds, bulls are introduced into breeding when they are older than 12 months. In reproduction centers, bulls aged 5 to 10 years are used. Bulls for fighting are 5 to 12 years old, and in fattening, they are kept up to 14 months. The body weight of adult bulls is also determined by breed and breeding objectives. The heaviest bulls are found in reproduction centers, where, depending on breed and age, they may weigh up to 1 400 kg. Bulls used for natural mating in herds typically weigh between 700 kg and 1 000 kg. While the number of dairy cows has significantly decreased (Croatian Agency for Agriculture and Food, 2024), interest in raising beef cattle breeds in pasture-based systems has been increasing. Global breeds such as Simmental, Limousin, Salers, Charolais, and Aberdeen Angus dominate. Interestingly, over the past ten

years, there has been continuous growth in the population of native cattle breeds such as Buša and Istrian cattle. Both breeds are raised for meat production. Since the rearing of such animals is based on pasture systems, interaction with humans (farmers, workers) is significantly reduced, which increases the risk of attacks on people. A particular risk to humans is posed by herds that include a breeding bull and cows with calves. In herds of Istrian cattle, attacks on people by cows with calves have been recorded, although without injuries. Historically, Istrian cattle were raised in barns and used as draft animals, with daily interaction with humans. Reduced contact or socialization with humans represents a risk due to potential attacks during the protection of calves (by cows) or the herd (by bulls). Fatalities may result from unprovoked and unforeseen actions, or from provoked and predictable actions of domestic animals (Byard, 2025). Sheldon et al. (2009) state that, excluding horses, bulls cause the highest number of injuries and fatalities in livestock production. The reactions of bulls are not conditioned by their daily routine, and their behavior cannot be predicted based on time of day or activity (Bacher et al., 2022).

Injuries caused by bulls result from goring with horns (penetrating injuries), head-butting (blunt-force injuries), and trampling with hooves (Norwood et al., 2000). The literature predominantly describes injuries caused by horned bulls (Idicula et al., 1991; Wasadikara et al., 1997; Hernandez et al., 2021). Horned bulls cause penetrating injuries to various parts of the body, primarily the chest and abdomen (Dogan et al., 2008). The same authors note that in animal attacks on humans, life and health are

threatened not only by direct trauma (impact, bite) but also secondarily by wound infections. In addition to stab wounds, human deaths may also result from blunt force trauma caused by head or leg strikes (Bury et al., 2011). The consequences of blunt force most commonly include fractures of the ribs, spine, and skull. Internal organ injuries may also occur, resulting in internal bleeding. These authors further note that injuries and deaths caused by domestic animals most frequently affect farm workers, veterinarians (Wiggins, 1989), and animal handlers. An analysis of the literature shows that most attention to injuries and fatalities has been given in countries where bulls are also used for entertainment, such as rodeo (Seifert et al., 2022) and bullfighting (Martinez-Ramos et al., 2006), which is understandable given the tradition of bull use in these contexts. In European Union countries, there is no comprehensive system for monitoring injuries and fatalities caused by domestic animals, particularly farm animals. Most monitoring focuses on injuries and deaths caused by machinery (European Commission, 2024). Information about fatalities resulting from cattle attacks is most often obtained from online media sources (Mirror, 2023; Independent, 2025; Stern, 2025). In Croatia and Bosnia and Herzegovina, insufficient attention is also paid to attacks by farm animals on humans, particularly those who work professionally with animals. This is evidenced by the fact that fatal bull attacks on humans have never been scientifically analyzed. In most cases, veterinarians, zootechnicians, and the general public learn about such incidents from the media (Slobodna Dalmacija, 2012; Jutarnji list, 2014), as there is no system requiring mandatory reporting of farm animal attacks resulting in injury or death. This paper presents an analysis of fatal bull attacks on humans in Croatia and Bosnia and Herzegovina. A detailed analysis of deaths caused by bull attacks may, in the long term, contribute to improving preventive measures aimed at reducing such incidents.

MATERIALS AND METHODS

This study analyzed fatal bull attacks on humans in Croatia and Bosnia and Herzegovina from 2011 to 2025. Data on the attacks were collected from police reports

and open media sources in Croatia and Bosnia and Herzegovina. The research included the age and sex of the victim, the location of the attack, the breed, purpose, and housing system of the bulls [KS1.1][a1.2], the cause and manner of the attack, and, finally, the injuries that resulted in death. Autopsies of the victims revealed the specific injuries and the cause of death. Based on the analysis of the attacks, measures to reduce the risk of bull attacks on humans in Croatia and Bosnia and Herzegovina will be proposed, taking into account the purpose for which the bulls were kept.

RESULTS AND DISCUSSION

Fatal bull attacks have been recorded in most countries where cattle are raised for meat and milk production (Dogan et al., 2008). A special category includes deaths resulting from bullfighting, rodeo events, and other forms of entertainment, such as the running of the bulls in Pamplona. Fatal attacks also affect individuals who accidentally find themselves near herds of cows that include bulls, such as hikers or people walking in nature (Jutarnji list, 2014; Mirror, 2023; Independent, 2025; Stern, 2025).

The study of fatal attacks on humans in Croatia and Bosnia and Herzegovina covered the period from 2011 to 2025. According to available data from police reports and open media sources, six fatalities occurred in Croatia and five in Bosnia and Herzegovina during the observed period. Table 1 presents data on bull attacks in Croatia from 2011 to 2024.

Based on the research results presented in Table 1, it is evident that there were significantly more male than female victims among the fatalities. The age of the victims ranged from 42 to 77 years, indicating a wide age range among those killed in fatal bull attacks. The breed was determined by the breeding goal, and it is evident that attacks most commonly involved bulls kept on pasture within a herd, which was recorded in four cases. Regardless of their purpose, bulls are always potentially dangerous to humans, as confirmed by a detailed analysis of two separate cases in which two men were killed.

Table 1. Overview of fatal bull attacks in Croatia between 2011 and 2024

Year of Attack	Sex	Age	Occupation	Breed	Purpose of the Bull	Location of Attack	Autopsy	Type of Injuries
2011	Male	56	Breeder	Simmental	Breeding	Pasture	Yes	Blunt injuries
2012	Male	76	Breeder	Crossbreed	Breeding	Barn	No	Blunt and penetrating injuries
2012	Male	42	Reproduction Center worker	Simmental	Breeding, semen collection	Corral	Yes	Blunt injuries
2014	Male	63	Hiker	Sayaguesa	Breeding	Pasture	Yes	Blunt and penetrating injury
2024	Male	58	Feedlot worker	Crossbreed	Fattening	Farm	No	Blunt injuries
2024	Female	77	Retiree	Crossbreed	Breeding	Yard	Yes	Blunt injuries

In one case, the bull had daily interaction with humans, while in the other case, the bull was kept in a herd on pasture without daily human contact. In both cases, based on the police investigation and autopsy findings, we established the course and cause of the attack. In a reproduction center, a Simmental-breed bull, 7 years old, killed a worker while he was cleaning the corral. Photographs from the police investigation at the scene show that the hornless bull attacked the worker while the corral was being washed with high-pressure water (Figure 1).



Figure 1. A corral where a hornless bull attacked a worker during cleaning (Source: Ministry of the Interior of the Republic of Croatia)

Based on the photos from the police investigation, it can be concluded that the bull's aggression was triggered by the sound of the washing equipment or the spraying of water. Considering that the worker's body was thrown over a two-meter-high fence with a single headbutt, we can infer that it was an extremely powerful strike preceded by a charge. This is further confirmed by the distance of the high-pressure water nozzle from the fence. From the police investigation photos and the autopsy findings, we can conclude that the bull lifted its head during the strike, throwing the victim over the fence. The injuries confirm the exceptional force of the bull's headbutt. The blunt force caused fractures of the sternum, ribs, and spine, as well as a head injury. In contrast to this case, which involved a bull that was in constant interaction with humans, the second case involved a bull kept in a herd with cows on a karst pasture. The victim was on the karst pasture (Figure 2), where a herd and a Sayaguesa bull were present.

This breed is used in bullfighting in Spain, while in Croatia, only a few individuals exist as part of a breed conservation project. Based on the police report, it can be concluded that the attack was unprovoked. The bull caused fatal injuries with a single strike. In addition to a penetrating wound to the chest and internal bleeding, fractures of the facial bones, clavicle, and ribs were recorded.



Figure 2. Karst pasture where the victim was attacked by a Sayaguesa bull (Source: Ministry of the Interior of the Republic of Croatia)

Death occurred due to a head strike and fracture of the cervical spine, not as a result of the penetrating wound. From these injuries, it can be concluded that the attacks were primarily frontal, except for one case in which the victim was attacked from the side, resulting in a penetrating injury. Based on injuries to the chest and head, it can be inferred that the bull kept its head lowered during the attack and lifted it while striking the victims' heads. Both cases confirm that bulls are equally dangerous to humans regardless of housing system, breed, or whether they have horns or are dehorned. In five cases, death resulted from a single strike, while in one case, the autopsy indicates that the bull continued striking the victim even after knocking them to the ground on a pasture where a herd of cows was present. The study found that autopsies were performed in four of the six cases. In two cases, the cause of death from the bull attack was determined at the scene, and no further autopsy was requested. Analysis of the autopsy findings shows that blunt force injuries predominated, except for one case in which a penetrating horn injury also occurred. Dogan (2008) notes that bull attacks regularly cause multiple injuries in humans. Among the victims, head injuries, fractures of the sternum, ribs, spine, and internal organ damage caused by blunt force were dominant. Since fatal bull attacks on humans often occur without witnesses, our research suggests that analyzing the location of the attack and the victim's injuries can help determine the

cause and course of the attack. Based on the analysis of attack locations and circumstances, it can be concluded that attacks on farms can be prevented through proper handling of bulls and the use of appropriate equipment. Bulls in herds on pasture pose a particular risk because equipment such as nose rings is used less effectively. Table 2 presents data on attacks in Bosnia and Herzegovina from 2012 to 2025.

Following Table 2, it is evident that between 2012 and 2025, five people were fatally injured by bulls in Bosnia and Herzegovina. The age range of the victims was similar to the data from Croatia. Three victims were attacked by bulls kept on pasture, while one victim was a spectator at a bullfight. In that case, the fatal attack occurred in a parking lot near the bullfighting arena (Figure 3).



Figure 3. The parking lot near the bullfighting arena, where the fatal attack occurred. (Source: Dnevni Avaz)

The victim approached the bull from the side, and the bull delivered a powerful lateral horn strike, causing a penetrating wound and arterial injury, which led to immediate exsanguination. In the 2012 attack, the bull killed a man and a woman. The police report stated that the bull showed pronounced signs of aggression and had to be euthanized at the scene. The investigation determined that death in both cases occurred due to head trauma (Dnevni Avaz, 2012). The aggression of bulls is confirmed by the multiple injuries sustained by a 70-year-old man, who had numerous wounds caused by horn strikes and trampling. The bull killed the owner of the farm where it was born and raised.

Table 2. Data on fatal bull attacks on humans in Bosnia and Herzegovina between 2012 and 2025

Year of Attack	Sex	Age	Occupation	Breed	Purpose of the Bull	Location of Attack	Autopsy	Type of Injuries
2012	Male	52	Breeder	Unknown	Breeding	Pasture	No	Blunt injuries
2012	Female	76	Breeder	Unknown	Breeding	Pasture	No	Blunt injuries
2015	Male	70	Breeder	Unknown	Breeding	Pasture	No	Blunt and penetrating injuries
2024	Male	44	Breeder	Unknown	Breeding	Pasture	No	Blunt injuries
2025	Male	71	Spectator	Unknown	Bullfight	Parking lot	No	Penetrating injury

From this, we can conclude that raising a bull on a farm and constant human interaction do not reduce its potential aggression. In both countries, the victims ranged in age from 42 to 77 years. In nine out of eleven cases, the victims were male. Idikula et al. (1991) state that men are injured at a ratio of 4:1 compared to women in bull attacks. Our findings are consistent with Dogan et al. (2008), who reported that out of 30 people killed in bull attacks, 24 were men and 6 were women. Six of the victims were breeders, two were farm workers, two were accidental passersby, and one was a retired woman living on a farm. Analysis of the victims' injuries in both countries shows that blunt-force injuries caused by head strikes predominated, while penetrating horn wounds were less frequent. As mentioned, most attacks in Croatia and Bosnia and Herzegovina occurred without witnesses. Given that bulls involved in the attacks were raised for different purposes, it is evident that bull aggression is not related to breed or intended use.

A major cause of fatalities is underestimating a bull's strength, unpredictable temperament, and potential aggression toward humans. Horned and dehorned bulls are equally dangerous. One method to reduce the risk of attacks is the use of artificial insemination in herds of beef cattle. Seasonal bull mating, for example, in spring or autumn, while keeping the bull separate from the herd for the rest of the year, is another option. Sweeten et al. (2023) note that artificial insemination is more expensive than using bulls, but it results in 5% long term higher con-

ception rates and is recommended for large production systems. The authors indicate that both breeding systems have advantages, although in the context of farm safety and preventing bull attacks, artificial insemination is preferable, especially in smaller herds kept on pasture. Bacher et al. (2022) suggest that bull aggression could be significantly reduced by selecting bulls based on their reactions to humans, prioritizing calm-tempered animals. To prevent bull attacks, continuous education of people working with bulls is essential. Risk can also be reduced by using appropriate farm equipment, implementing artificial insemination, and selecting bulls for breeding based on temperament.

CONCLUSIONS

Based on our research, we can conclude that men are significantly more likely to be fatally injured by bulls than women. Victims' ages ranged from 42 to 77 years. Breeders and farm workers are at the highest risk, whereas other groups, such as hikers, nature walkers, and bullfight spectators, face lower risk. We found that bull aggression is independent of breed, and crossbred bulls are as dangerous as purebred ones. In Croatia and Bosnia and Herzegovina, most fatal attacks occurred on pastures, primarily by breeding bulls. Due to their body mass, unpredictable temperament, and aggression, bulls are equally dangerous to humans regardless of whether they have horns or are dehorned. Fatal injuries are most often caused by blunt-force trauma from head strikes,

and much less frequently by horn injuries. This study shows that bulls are unpredictable and potentially dangerous to humans regardless of their purpose, whether for mating, semen collection, fattening, or bullfighting, and independent of the victim's occupation. In cases without witnesses, analyzing the attack location and the victim's injuries can help determine the course of the attack and, in some cases, the cause. To prevent attacks on humans, it is necessary to educate all people who come into contact with bulls, including farm workers, veterinarians, agronomists, and those who may approach bulls, such as spectators, hikers, or nature walkers. Interaction with bulls should be minimized according to their purpose. In fattening operations, all procedures, such as vaccination, should be performed using handling chutes. Bulls used for breeding in herds or reproduction centers must be fitted with a nose ring and handled using it during all human interactions. Temperament should also be considered in the selection of breeding bulls. The use of artificial insemination in beef cattle herds is another option that eliminates the need for direct bull handling. Establishing a system requiring veterinary inspectors and doctors to report bull and other farm animal attacks on humans would allow implementation of more effective preventive measures.

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