

Epidemiology of animal-related injuries in a high-income developing country

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ABSTRACT

BACKGROUND: The objective of this study was to investigate the incidence, mechanisms, types, anatomical distribution, and outcome of animal related-injuries in Al-Ain, the United Arab Emirates in order to improve preventive measures.

METHODS: The study included all patients admitted to Al-Ain Hospital with animal-related injuries for more than 24 hours or the patients who died in the Emergency Department between March 2003 and March 2007.

RESULTS: There were eighty-nine (2.3%) patients, of whom 99% were males. The median age of the patients was 30 (range, 5-89) years. Camel-related injuries were the most common (84.3%) injuries followed by cow-related injuries (6.7%). 88.7% of the injuries occurred at work. Animal kick was the most common mechanism of injury (32.6%) followed by falls (30.3%). Upper extremity was the most commonly injured region. The median Injury Severity Score (ISS) was 4 (range, 1-13) and the median hospital stay was 6 (range, 1-53) days.

CONCLUSION: The majority of animal-related injuries were caused by camels. Experience in handling the animals, a good knowledge of animal behavior along with using safety devices and prevention education can reduce the toll of animal-related injuries.

Key words: Animals; epidemiology; hospitalization; injury; mechanism.

INTRODUCTION

Animal-related injuries are associated with considerable morbidity and mortality worldwide. These injuries vary by region depending on the type, size, and behavior of animals living in that geographical region, and on the profession, tradition, and sport activities of the inhabitants.^[1-4] These injuries can be due to direct contact with animals like horses, camels, cattle, and dogs, or indirect contact caused by the collision of motor vehicles with large animals like kangaroos, moose, camels, and deer.^[5]

The United Arab Emirates (UAE) is a high-income developing

country with a fast growing economy related to oil exports. Professions like farming and herding are rarely practiced by the UAE citizens, and since workers in these areas are usually immigrants, the necessity to hiring immigrants with relevant experiences arises.^[6,7]

The endemic animals inhabiting the UAE are camels and cattle. Camels, which are traditional animals of the UAE, are used in racing and in banquets in social events. Cattle are mainly raised for dairy products industry or as a source of fresh meat. Street dogs are very scarce in the UAE because they are well-controlled by local authorities.

Camel-related injuries have been previously well-studied.^[8-10] Nevertheless, the general magnitude of animal-related injuries in the UAE has not been previously studied. Therefore, this study was conducted to study the incidence, mechanisms, types, anatomical distribution, and outcome of animal related-injuries in Al-Ain, the UAE so as to give recommendations on preventive priorities.

MATERIALS AND METHODS

This study was performed in Al-Ain, which is the largest city

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located in the east of Abu Dhabi Emirate of the UAE, with a population of 463.000 inhabitants during the study period.^[7] Trauma patients in need of admission were managed in two major hospitals of Al-Ain (Al-Ain and Tawam Hospitals). About eighty percent of the patients were treated in Al-Ain Hospital and this study included all patients admitted to Al-Ain Hospital with animal-related injuries for more than 24 hours or those who died after arrival to the hospital between March 2003 and March 2007. The data was prospectively collected from Al-Ain Hospital Trauma Registry.^[11,12]

The Local Ethics Committee of Al-Ain Health District Area had approved data collection of the Trauma Registry. Studied variables included patient demography, mechanism of injury, distribution and severity of injury, the length of hospital stay, and outcome. Injury Severity Score (ISS), as a global marker of injury severity, was calculated manually using the Abbreviated Injury Scale (AIS) 1998 handbook.^[13] The population data was retrieved from the general census of the UAE for the year 2005.^[7] The data was analyzed with the PASW Statistics 18, SPSS Inc, USA.

RESULTS

There were three thousand eight hundred and sixty patients included in the Trauma Registry of Al- Ain Hospital. Out of these, eighty-nine (2.3%) patients had animal-related injuries. The estimated annually hospitalized patients in Al-Ain with animal-related injury was 6/100 000. Eighty-eight (98.9%) were male patients. The median age of the patients was 30 (range, 5-89) years. Patients from the Indian subcontinent were the most commonly injured patients (80.7 %) (Table 1).

Camel-related injuries were the most common (84.3%) followed by cow related-injuries (6.7%) (Table 2). In forty-five patients whose professions were known, there were thirty-one (63.3%) camel caregivers, eleven (22.4%) farm workers, and five (10.2%) camel jockeys. In sixty-two patients with known place of trauma, forty-six (74.2%) of the injuries occurred

Table 1. Nationality of the patients with animal-related injuries, Al-Ain, the United Arab Emirates 2003-2007

Nationality	n	%
Pakistani	46	52.3
Bangladeshi	17	19.3
Indian	8	9.1
UAE	6	6.8
Sudanese	3	3.4
Others	8	9.1
Total	88	100

One patient had missing data.

in farms and nine (14.5%) at camel race sites. Animal kick was the most common mechanism of injury followed by falls while riding (Table 2). All horse-related injuries were due to fall from a horse.

Upper extremity was the most commonly injured body region followed by the lower limbs (Table 3). The median ISS was 4 (range, 1-13) and the median Glasgow Coma Scale (GCS) was 15 (range, 8-15). Three patients (3.4%) were admitted to the Intensive Care Unit (ICU) with a median ICU stay of one day (range, 1-11). Median hospital stay was 6 (range, 1-53) days. There was no mortality.

DISCUSSION

There is a need for information about the incidence and magnitude of animal-related injuries in the UAE so as to develop injury prevention strategies against it. This study showed that 6 out of 100.000 people is the estimated number of patients annually hospitalized for animal-related injuries in our city. Although the number of admitted patients in the current study was small, it constituted 2.3% of all admitted trauma patients. Their mean hospital stay was six days, occupying

Table 2. Animal-related injuries: different animals and their mechanisms of injury, Al-Ain, the United Arab Emirates 2003-2007

	Kick		Fall		Bite		Blow		Crushed		Stepped on		Others		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Camel	28	37.3	22	29.3	17	22.7	2	2.7	1	1.3	2	2.7	3	4	75	84.3
Cow	1	16.7	-	-	1	16.7	1	16.7	-	-	-	-	3	50	6	6.7
Horse	-	-	4	100	-	-	-	-	-	-	-	-	-	-	4	4.5
Fox	-	-	-	-	1	100	-	-	-	-	-	-	-	-	1	1.1
Snake	-	-	-	-	1	100	-	-	-	-	-	-	-	-	1	1.1
Donkey	-	-	1	100	-	-	-	-	-	-	-	-	-	-	1	1.1
Sheep	-	-	-	-	-	-	-	-	-	-	-	-	1	100	1	1.1
Total	29	32.6	27	30.3	20	22.5	3	3.4	1	1.1	2	2.2	7	7.9	89	100

Table 3. Animal-related injuries by anatomical region, Al-Ain, the United Arab Emirates 2003-2007. (Number of patients=89)

Region	n	%
Head and face	20	22.5
Neck	1	1.1
Chest	18	20.2
Abdomen	11	12.4
Pelvis	2	2.2
Spine	5	5.6
Upper limb	25	28.1
Lower limb	22	24.7

Patients may have more than one injured region; therefore, total percentage adds up to more than 100%.

about two hospital beds each day. On the other hand, this study did not show the overall number of animal-related injuries in our city because those who died before arrival to the hospital and those who did not seek medical advice at all were not included. Furthermore, mild injuries were treated in the Emergency Department and patients were discharged home. Other authors have found that animal-related injuries constitute 0.2%-8.3% of all trauma admissions.^[14-17] A previous study from our city has found that animal-related injuries constitute 7% of all occupational injuries.^[6]

Majority of our patients were middle-aged males. Males are injured more by animals than females, which is a predominance also reported by others.^[3,14-19] Other studies from Turkey, Tanzania, Saudi Arabia, and Poland have demonstrated that most patients with animal-related injuries are middle-aged.^[14,15,17,20]

Almost 80% of the patients with animal-related injuries in our study were from the Indian subcontinent, reflecting their high percentage in the UAE population.^[7] A previous study on occupational injuries in Al-Ain has found that 96% of the hospitalized patients with work-related injuries are immigrants, 98% are males, and 69% are middle aged.^[6] Most animal-related injuries in our study were considered work-related injuries since they occurred in farms and racing fields.

Large animal-related injuries are usually blunt.^[15,16,21] The leading mechanism of injury among our patients was animal kick followed by fall while riding, and animal-bites. Camels were responsible for 84% of admissions due to animal-related injuries, which could be attributed to their presence in the Arabian Peninsula, their size and behavior, and being linked with the UAE tradition and activities. Camel racing has a social and economic importance. Furthermore, about three quarters of patient profession was related to camels. A study from Saudi Arabia has found that camels are the most common cause of animal-related injuries necessitating hospitalization.^[20] A nine-

year prospective study on camel-related injuries in Al-Ain has presented that camel kick is the most common mechanism of injury followed by falls and bites.^[9] Others have put forward that animal kicks are responsible for 16-58% of animal-related injuries.^[2,3,14,18-20,22]

Similar to others, our study suggested that the most common injured body regions were the upper and lower extremities.^[2,9,15,16,18,19] Head and face, and chest were the second most common injured body regions. Norwood et al. have stated that upper extremity injuries caused by large animals are predictors of head and torso injuries.^[3] Shahan et al. have found that injury patterns are affected by patient age. Very young patients who are short and injured by animal-kick are associated more with head injuries.^[23] In a study by Nawaz et al., 56% of the children having camel-related injuries have suffered head injuries.^[10]

Prevention and control of animal-related injuries hold different approaches. The victim can be protected against the force of impact. To illustrate, highways between major cities in the UAE have been fenced by properly designed metallic barriers to prevent the collision of motor vehicles with large animals. This measure has been effective in reducing this type of collision in the UAE in a dramatic way.^[5] Similarly, using a muzzle to cover the animal mouth can prevent bite injuries.^[8,9]

Protective equipments are effective in reducing the severity of the injury. Using helmets and face guard reduce the severity of head injury among equestrians.^[2,22,24] Those who are riding large animals should use helmets and other protective gears.^[23]

Legislation plays a role in preventing and reducing injuries. Banning children from participating camel racing in the UAE in 2005 and complete replacement of them by robots have completely prevented injuries related to child camel jockeys.^[25] Legislation to mandate using of protective equipment when handling or riding large animals will reduce animal-related injuries.^[10,23]

Education and training are other important preventive measures to reduce the burden of trauma. Understanding animal behavior, training workers on dealing with animals, teaching safe falling techniques to animal riders, and increasing awareness through educational campaigns are recommended to prevent animal-related injuries.^[2,9,10,19,24,26]

Limitations of the Study

We studied only hospitalized patients in one of the two main hospitals in our city. Many patients with dog and rat bites were treated in our Emergency Department without being admitted to the hospital, which highlights the need for a future prospective study on animal-related injuries in the Emergency Department to better understand the magnitude of animal-related injuries in our setting.

Furthermore, the period of our study was between 2003 and 2007. Our Trauma Registry was the only registry in the UAE at that time and it was supported by a research fund from our university. The registry including the data of the injuries that occurred after 2007 could not be reached mainly due to lack of financial support.^[11]

Animal-related injuries constitute 2.3% of the hospitalized trauma patients in our setting. The majority of animal-related injuries in Al-Ain were caused by camels. Experience in handling the animals, a good knowledge of animal behavior along with using safety devices and education can reduce the toll of animal-related injuries and their consequences.

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KLİNİK ÇALIŞMA - ÖZET

Yüksek gelirli gelişmekte olan ülkelerde hayvanların neden olduğu yaralanmaların epidemiyolojisi

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AMAÇ: Koruyucu önlemleri iyileştirme amacıyla Birleşik Arap Emirliklerinde Al-Ain ilinde hayvanların neden olduğu yaralanmaların insidansı, mekanizmaları, tipleri, anatomik dağılımı ve sonucunu incelendi.

GEREÇ VE YÖNTEM: Mart 2003 ile Mart 2007 yılları arasında hayvanlar tarafından yaralandıktan 24 saatten uzun bir süre sonra Al-Ain Hastanesine getirilen ve acil serviste ölen hastaların hepsi incelendi.

BULGULAR: Seksen dokuz (%2.3) hastanın %99'u erkek hastalardan ibaretti. Hastaların ortanca (aralığı) yaşı 30 (5-89 yaş) yaşındaydı. En sık de-velerin (%84.3), daha sonra ineklerin (%6.7) neden olduğu yaralanmalar görülmekteydi. Yaralanmaların %88.7'si isteyken oluşmuştu. En sık görülen yaralanma hayvan çiftesi (%32.6) ve düşmeler (%30.3) sonucu oluşmuştu. En sık üst ekstremitelere yaralanmıştı. Ortanca (aralık) ISS, 4 (1-13) ve hastanede yatış süresi 6 (1-53 gün) idi.

TARTIŞMA: En çok develerin neden olduğu yaralanmalar görülmüştür. Hayvanlarla uğraşmada deneyim, hayvan davranışlarını iyi bilme, güvenli cihazların kullanılması ve yaralanmalardan koruyucu eğitim hayvanların neden olduğu yaralanmaların oranını azaltabilmektedir.

Anahtar sözcükler: Epidemiyoloji; hayvanlar; hospitalizasyon; mekanizma; yaralanma.

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