Adıyaman Üniversitesi Sağlık Bilimleri Dergisi, 2025;11(1):43-50
doi:10.30569.adiyamansaglik.1569876

E-ISSN: 2458-9176

ADIYAMAN ÜNİVERSİTESİ SAĞLIK BİLİMLERİ DERGİSİ
JOURNAL OF HEALTH SCIENCES OF ADIYAMAN UNIVERSITY

Research Article/Özgün Araştırma

Forensic medical evaluation of dog bite injury cases admitted to a university hospital

Bir üniversite hastanesine başvuran köpek ısırığına bağlı yaralanma olgularının adli tıbbi açıdan değerlendirilmesi

Uğur DEMİR[1], Hüseyin KAFADAR[1], Fırat ÖZDEN[1], Muhiddin AKİZ[1], Neslihan ERİN[1], Mehmet ÇELİK[2]

[1]Harran University, Medical Faculty, Department of Forensic Medicine, 63290, Şanlıurfa-Turkey
[2]Harran University, Medical Faculty, Department of Infectious Diseases and Clinical Microbiology, 63290, Şanlıurfa-Turkey

Atıf gösterme/Cite this article as: Demir U, Kafadar H, Özden F, Akiz M, Erin N, Çelik M. Forensic medical evaluation of dog bite injury cases admitted to a university hospital. *ADYÜ Sağlık Bilimleri Derg*. 2025;11(1):43-50. doi:10.30569.adiyamansaglik.1569876

Abstract

Aim: This study aims to contribute to the literature by examining the demographic characteristics of cases presenting to the hospital due to dog bites, the anatomical locations of the wounds, rabies prophylaxis, and whether they were evaluated as forensic cases.

Materials and Methods: During a three-year period, the epicrisis reports of patients admitted to Şanlıurfa Harran University Hospital with diagnosis codes for dog bites or strikes according to ICD-10 were retrospectively reviewed along with records in the fonet system.

Results: The average age of the 297 cases in our study was 17.15±14.82. Among the cases, 76.1% were male, 66.0% were children under 18 years old. The highest number of admissions occurred in the fall season with 90 cases (30.3%) and December had the highest number of cases with 46 (15.5%). The most frequently injured body part was the hands (21.5%). Rabies vaccination was administered to 287 cases (96.6%), it was observed that a judicial report was prepared for 22 of 297 cases (7.4%).

Conclusion: Dog bites remain a significant public health issue in our country. Physicians encounter a considerable number of dog bite cases during hospital admissions. Institutional training is necessary for both medical and forensic evaluations of dog bites.

Keywords: Dog bite; Judicial notice; Judicial report.

Öz

Amaç: Köpek ısırıkları nedeniyle hastaneye başvuran olgularının demografik özellikleri, yaraların anatomik lokazisyonları, kuduz profilaksisi, adli olgu olarak değerlendirilip değerlendirilmediği incelenerek literatüre katkı sağlanması amaçlanmıştır.

Gereç ve Yöntem: 3 yıllık dönemde Şanlıurfa Harran Üniversitesi Hastanesi'ne başvuran hastaların, ICD-10'a göre köpek tarafından ısırılma veya darbelenme tanı kodu ile fonet sisteminde yer alan kayıtlar ile birlikte düzenlenen epikriz raporları retrospektif olarak incelendi.

Bulgular: Çalışmamızda 297 olgunun yaş ortalaması 17,15±14,82 idi. Olguların %76,1'i erkek ve %66,0'sı 18 yaş altı çocuklardı. Başvurular 90(%30,3) vaka ile en çok sonbahar mevsiminde, 46(%15,5) vaka ile en çok aralık ayında görüldü. Olguların en sık yaralandığı vücut bölgesi eller (%21,5) idi. Olguların 287'sine (%96,6) kuduz aşısı yapıldığı, 297 olgunun 22'sine(%7,4) adli rapor düzenlendiği gözlendi.

Sonuç: Köpek ısırıkları ülkemizde hala önemli bir halk sağlığı sorunudur. Hekimler hastane başvurularında azımsanamayacak kadar köpek ısırıkları vakaları ile karşılaşmaktadır. Köpek ısırıklarının hem tıbbi hem adli olarak değerlendirilmesi için kurum içi eğitimlerin verilmesi gerekmektedir.

Anahtar Kelimeler: Köpek ısırığı; Adli bildirim; Adli rapor.

Yazışma Adresi/Address for Correspondence: Uğur DEMİR, Harran University, Medical Faculty, Department of Forensic Medicine, 63290, Şanlıurfa-Turkey, E-mail: ugurdmr81@gmail.com

Geliş Tarihi/Received:18.10.2024 **Kabul Tarihi/Accepted:**20.01.2025 **Yayım Tarihi/Published online:**23.04.2025

Introduction

Dog bites are still a significant public health problem worldwide because they can cause serious injuries and various infections. Although there is no definitive data in the world, it is thought that ten million injuries occur each year due to dog bites.[1] In the United States, dog attacks constitute approximately 0.3%-1% of all emergency room visits and this number is estimated to reach 4.5 million per year.[2,3,4]

In Turkey, approximately 250,000 rabies risk contacts are reported annually with dogs being the leading cause and an average of 1 to 2 rabies cases are seen per year.[5] The number of stray dogs in Turkey is rapidly increasing and these stray dog attacks cause various public health problems.[6,7] These attacks cause serious injuries, infection risks and economic losses to people.[8]

Dog bites can cause traumatic damage to tendons and nerves, disability, infections such as rabies, psychological and emotional trauma, hospitalization and in rare cases death.[9] In addition, if a person is attacked by a dog, a lawsuit can be filed against the owner according to the articles in both the Turkish Code of Obligations and the Turkish Penal Code. Municipalities and governorships are jointly responsible for the damages caused by stray dogs.[10] Therefore it is of great legal importance that cases applying to hospitals due to animal attacks are evaluated as forensic cases.

The literature generally addresses rabies risk contact cases. In our study, unlike the literature, only cases injured as a result of dog bites were included and the forensic medical evaluation of these cases was aimed. In this study, we aimed to contribute to the literature by examining the demographic characteristics of dog bite cases that applied to the emergency department in a 3-year period, the anatomical locations of the wounds, rabies prophylaxis and whether they were evaluated as forensic cases by the physician.

Materials and Methods

Type of the study

This study is a retrospective study of dog bite cases admitted to the Emergency Department of Şanlıurfa Harran University Hospital.

The sample size of the study

Cases that applied to Harran University Faculty of Medicine Hospital with a dog bite or strike diagnosis code in the 3-year period between 01.01.2021 and 31.12.2023 were evaluated by examining their epicrisis notes and forensic reports through the hospital registration system. Cases recorded with the International Classification of Diseases-10 (ICD-10) coding and dog bite or strike diagnosis code were determined through the Hospital Information Management System (Fonet). Epicrisis notes and forensic reports of each case were examined. Cases with incomplete epicrisis notes and cases in which dog bite was not clearly mentioned in the epicrisis notes were not included in the study.

Data collection tools

The epicrisis notes and forensic reports of the cases were retrospectively reviewed via the Hospital Fonet system. The cases were evaluated in terms of age, gender, whether the application was evaluated as forensic by the physician, anatomical localization of the injury in the body, frequency of hospital admissions after dog bites according to months and seasons and whether rabies vaccination was administered.

Data analysis

Data analysis was performed using SPSS 25.0 for Windows (SPSS Inc., Chicago, IL). Descriptive statistics for categorical variables were given as numbers and percentages, and for numerical variables as mean and standard deviation. Invariant groups were compared using Chi-Square Tests (Pearson Chi-Square, Fisher's Exact Test) and statistical alpha significance level was accepted as $p<0.01$.

Ethics committee approval

This retrospective study was carried out with the permission of the Clinical Research Ethics Committee of Harran University Rectorate (decision number: 2024/05/01, dated: April 29, 2024).

Results

Retrospective clinical follow-ups and forensic reports of cases who applied to the Emergency Department of Harran University Faculty of Medicine with a dog bite or trauma diagnosis code based on the International Classification of Diseases-10 (ICD-10) between 2021-2023 were analyzed through our hospital's Fonet system. A total of 297 cases were included in the study and the mean age was 17.15 ± 14.82 years. Of these, 196 cases (66.0%) were children under the age of 18, while only 5 cases (1.7%) were over the age of 65. Of the cases included in the study, 226 (76.1%) were male and 71 (23.9%) were female.

A total of 21 cases (7.1%) were found to have injuries in more than one anatomical region due to dog bites. The most frequently injured anatomical regions were the hands in 64 cases (21.5%) and the legs in 60 cases (20.2%). There was a genital injury in one case and a pregnant individual in one case. The most commonly injured area in male patients was the hands (54 cases, 18.2%), while the most commonly affected areas in female patients were the legs (11 cases, 3.7%) and feet (12 cases, 4.0%). Forensic reports were prepared for 22 cases (7.4%), of which 18 (6.1%) were male and 4 (1.3%) were female (Table 1).

Table 1. Demographic characteristics of dog bites, localization of ınjury, rabies prophylaxis, evaluation as a forensic case.

Age Range	**Male n**	**Female n**	**Total n (%)**	**P-** ***p*=0,636**
0-17	148	48	196 (%66.0)	
17-34	47	15	62 (%20.9)	
35-64	27	7	34 (%11.4)	
>65	4	1	5 (%1.7)	
Total	226	71	297 (%100)	
Body Location of Injury*	**Male n**	**Female n**	**Total n (%)**	***p*=0,212**
Head and Neck	24	6	30 (%10.1)	
Back	10	8	18 (%6.1)	
Shoulder	10	2	12 (%4)	
Arm-Forearm	26	10	36 (%12.1)	
Hand	54	10	64 (%21.5)	
Chest	10	0	10 (%3.4)	
Abdomen	6	0	6 (%2.0)	
Gluteal	16	2	18 (%6.1)	
Thigh	16	4	20 (%6.7)	
Leg	49	11	60 (%20.2)	
Foot	12	12	24 (%8.1)	
Genitalia	1	0	1 (%0.3)	
Unknown	14	12	26 (%8.6)	
Seasons	**Male n**	**Female n**	**Total n (%)**	***p*=0,456**
Spring	46	9	55 (%18.5)	
Summer	55	20	75 (%25.3)	
Autumn	66	24	90 (%30.3)	
Winter	59	18	77 (%25.9)	
Forensic Evaluation	**Male n**	**Female n**	**Total n (%)**	***p*=0,515**
Forensic Case	18	4	22 (%7.4)	
Not Evaluated as a Forensic Case	208	67	275 (%92.6)	
Rabies Prophylaxis	**Male n**	**Female n**	**Total n (%)**	***p*=0,226**
Yes	220	67	287 (%96.6)	
No	6	4	10 (%3.4)	

*There was multiple trauma in 21 cases

There was no statistically significant difference between age groups and body regions.

In 196 pediatric cases, dog bite injuries most commonly affected the hands (46 cases, 15.5%). In addition, head and neck injuries were seen in 30 cases (10.1%), of which 24 (8.1%) involved children (Figure 1).

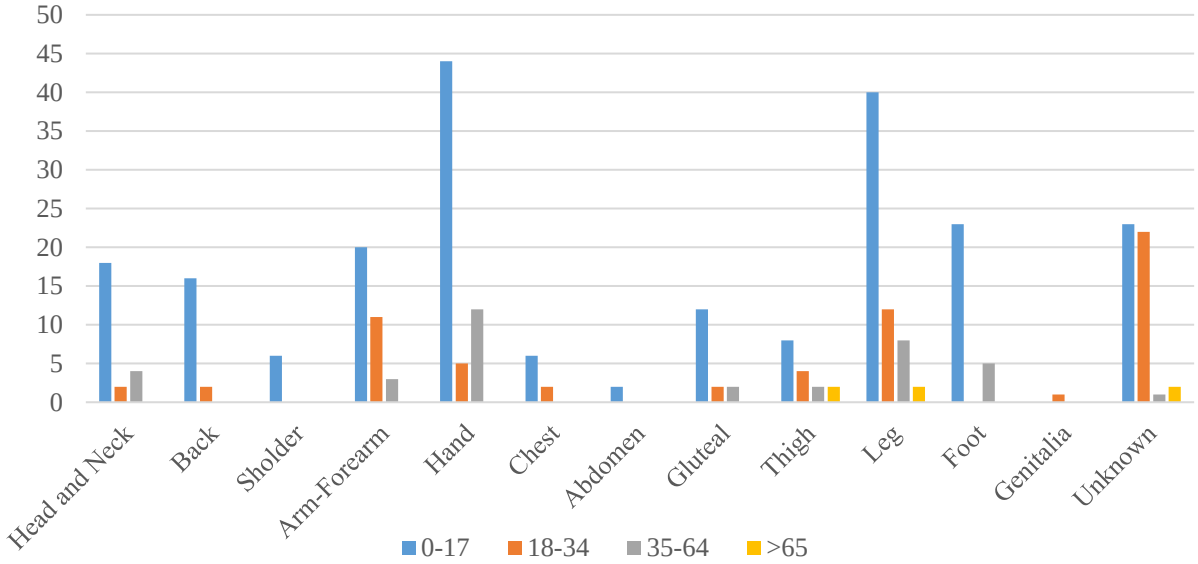

Figure 1. Localization of dog bites by age range.

When the seasonal and monthly distribution of dog bite cases was examined, the highest number of cases was seen in the fall (90 cases, 30.3%) and the lowest number of cases was seen in the spring (55 cases, 18.5%) (Table 2). The highest number of cases was seen in December (46 cases, 15.5%), while the lowest number of cases were seen in February and March (14 cases, 4.7% each) (Figure 2). Rabies vaccination prophylaxis was administered to 287 cases (96.6%) during hospitalization and 10 cases (3.4%) were not vaccinated. In the 22 general forensic examination reports examined, It was observed that the injuries of 12 cases were mild enough to be treated with simple medical intervention, and the injuries of 5 cases were not so mild that they could be treated with simple medical intervention. 2 cases had injuries that caused tissue loss, 2 cases had injuries that invaded fascia and muscle, 1 case had a fracture.

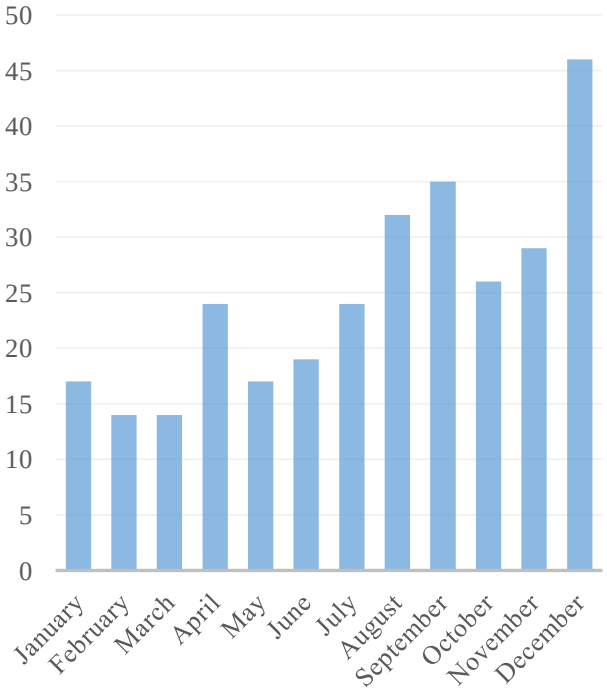

Figure 2. Distribution of dog bites by month.

Table 2. Forensic cases and seasonal changes according to age ranges

	0-17 n (%)	18-34 n (%)	35-64 n (%)	>65 n (%)
Seasons				
Spring	40 (13.47)	10 (3.37)	5 (1.68)	0 (0)
Summer	46 (15.49)	20 (6.73)	7 (2.36)	2 (0.67)
Autumn	61 (20.54)	18 (6.06)	11 (3.70)	0 (0)
Winter	49 (16.50)	14 (4.71)	11 (3.70)	3 (1.01)
Forensic Evaluation				
Forensic Case	12 (4.04)	4 (1.35)	6 (2.02)	0 (0)
Not Evaluated as a Forensic Case	184 (61.96)	58 (19.53)	28 (9.43)	5 (1.68)

No statistically significant difference was found between age groups and seasons.

Discussion

Traffic accidents, firearm and explosive injuries, cutting-piercing-crushing tool injuries, assault-force cases, as well as animal scratches and bites are stated as cases of forensic nature.[11] Most cases attacked by dogs go to the hospital for cosmetic problems that may be caused by the injury, wound infection and rabies vaccination.[12] All physicians in the world and in our country have the responsibility to intervene medically in judicial cases, prepare a judicial report and report. This issue is clearly emphasized in Article 280 of the Turkish Penal Code.[13]

According to Article 177 of the Turkish Penal Code, "Any person who releases an animal under his/her supervision in a manner that may endanger the life or health of others or who shows negligence in taking them under control shall be punished with imprisonment of up to six months or a judicial fine".[14] Articles 67 and 68 of the In the Turkish Code of Obligations, it is stated that the person who takes on the care and management of a dog temporarily or permanently is liable to compensate for the damage caused by the dog to someone else, and this situation is defined as one of the types of strict liability, and in private law, if the dog is a pet, the owner is held responsible for the damage caused by the dog, and municipalities and governorships are held responsible for the damage caused by stray dogs.[10,15] According to Article 280 of the Turkish Penal Code, "A health professional who does not report the situation to the competent authorities or delays in doing so despite encountering an indication that a crime has been committed while performing his/her duty shall be punished with imprisonment of up to one year".[14] Healthcare workers, especially physicians, frequently encounter cases that present as a result of trauma or are suspected of trauma and they fulfill the responsibility of evaluating, documenting and reporting as a forensic case.[16] In our study findings, only 7.4% of 297 cases were evaluated as forensic cases by physicians, while in the animal bite study by Derinöz et al.[17], 56.4% of the cases were evaluated as forensic cases. It is thought that forensic case reports are low due to the busy emergency services and the lack of sufficient knowledge of healthcare workers about the need to report dog bites as forensic cases.

Various studies have been conducted on dog attacks and it is seen that different results are reached in terms of gender and age. Our study findings are that the average age of the cases was 17.15 ± 14.82 and 76.1% of the cases were male. In the study conducted by Morzycki et al.[2], the average age of the cases was 41 and 62% of these cases were female. In the study conducted by Yılmaz et al.[18], the average age of the cases applying to the emergency room due to dog bites was 26.6 and 76.4% of them were mostly male. In the animal bite study conducted by Derinöz et al.[17], the average age of the cases was 11 and 61.7% of the cases were male. In the study conducted by Söğüt et al.[19] on rabies risk contact cases, the average age was 21.1 and 67% of the cases were male. In the study conducted by Temiz et al.[20], the average age of the cases applying to the rabies vaccination center was 21.63 and 78.6% were male. In the study by Loder et al.[21], the average age was 28.9 and 52.6% were male. Our own study findings support the findings of the studies by Söğüt et al.[19] and Temiz et al.[20]. It is thought that in the Eastern and Southeastern regions of our country, it is related to the fact that men are more involved in social life and are in the outside environment from a young age.

The most commonly injured body parts in dog bites are generally known to be the extremities.[22] In our study findings, the most injured body locations were the hands (21.5%) and the legs (20.2%) out of 297 cases. In the pediatric age group, the most common injury was seen in the hands (15.5%). In the head and neck region, it was 8.1%. It was observed that head and neck injuries were higher in children than in other age groups. In the study conducted by Morzycki et al.[2] in 2019, it was seen that the hands were injured in 56% of the cases, in the study conducted by Park et al.[9] in 2019 on 9962 cases, the most common injury was in the upper extremity with 33.3%, in the study conducted by Derinöz et al.[17] on animal bites in children, it was seen that the hands were injured in 34%, in the study conducted by McGuire et al.[23] on children, it was seen that

the face was injured in 42.9% and in the study conducted by Yılmaz et al.[18], it was seen that the upper extremity was injured in 48.2%. In the study conducted by Temiz et al.[20] on cases applying to the rabies vaccination center, it was seen that the trunk-extremity was injured in 69.6% of the cases and the hand was injured in 24.8%. Injuries due to dog attacks are most commonly found in the pediatric group in some studies, but the extremities are most commonly injured in the general population. Considering the size of dogs, the head and neck region are seen as the areas that dogs can reach during an attack in children, and the legs and thighs in the adult population. In addition, bites are expected to be seen in these anatomical localizations because people use their hands to defend themselves.

According to our study findings, when the frequency of dog bite cases was examined according to seasons and months, it was seen that 30.3% of the cases were mostly applied to the hospital in the autumn season and 15.5% in December. In the study conducted by Can et al.[24] in the Erzurum region of our country, 69.9% of the cases that applied to the emergency room due to animal bites and contact were dog attacks, 28.1% of them were in the spring months. In the study conducted by Morzycki et al.[2] in 2019, 29% of the cases were seen in the summer months. In the animal bite study conducted by Derinöz et al.[17] 31.9% were seen in the spring and 31.9% in the summer, in the study by McGuire et al.[23], 16.5% were seen most frequently in July. In many studies, it was seen that the cases were mostly in the spring and summer months. In our study, the fact that dog bite cases were mostly in the autumn season can be explained by Şanlıurfa's climate conditions, socio-cultural differences, the fact that the summer months are very hot, and people spend more time outside in the autumn months due to cooler air temperatures.

The most important cause of rabies risk contact cases in the world is dogs. Being infected with the rabies virus causes various problems both medically and economically.[25] Rabies virus is fatal once a person is infected.[26] Since rabies can be prevented by vaccination, it is extremely important to apply rabies prophylaxis immediately after or before contact.[27] In our study, 96.6% of the cases were vaccinated against rabies at the time of emergency admission after contact. In the study conducted by Morzycki et al.[2], only 1% of cases attacked by dogs were given post-exposure rabies vaccination; in the animal bite and rabies risk contact study conducted by Kara et al.[4], 97.6% of the cases received rabies vaccination after contact; in the study conducted by McGuire et al.[23], 4.4% of the cases received rabies vaccination after contact; in the study conducted by Joshua et al. [28], 45.5% of the cases received rabies prophylaxis after contact; in the study conducted by Gündüz et al.[29], evaluating dog and cat bites, 72.5% of the cases received rabies vaccination after contact. In the literature, while rabies vaccination is applied at very low rates in studies conducted abroad, it is seen that rabies vaccination is applied at high rates after contact in studies conducted in our country and in our current study. It was stated that this difference is due to the fact that the dogs are unvaccinated, ownerless and cannot be easily monitored.

Limitations

As stated in the materials and methods section of the study, the data evaluated were determined through the Hospital Information Management System (Fonet) with the International Classification of Diseases-10 (ICD-10) coding and dog bite or strike diagnosis code. Epicrisis notes and forensic reports of each case were examined. Cases with incomplete epicrisis notes and cases where dog bite was not clearly stated in epicrisis notes were not included in the study, limiting the number of cases to 297. In addition, since our study was conducted in a single center, there were limitations in the number of cases. Incomplete information of patients whose anatomical localization information of the injured person in our study was not added to the epicrisis or forensic report was defined as unknown data.

Conclusion

The occurrence of dog attacks and bites in our country indicates the existence of a public health problem that has not yet been solved.

Studies published in Turkey show that most dog attacks are caused by stray dogs. The increase in the number of stray dogs creates many negativities in social life and the Amendments made to the Animal Protection Law in order to prevent these negativities were published in the Official Gazette on 02.08.2024 and entered into force. We will be able to see the effects of this law which has been implemented in some cities on injuries caused by dog attacks and emergency room visits more clearly in the coming years. Dog bite injury cases should be recorded regularly and each case should be approached with care. In addition, it is of great importance to provide regular training to physicians and healthcare professionals on the subject of dog bite cases that should be evaluated as forensic cases. These trainings should be planned both before and after graduation and the knowledge and awareness of healthcare professionals should be increased.

Ethics Committee Approval

This retrospective study was carried out with the permission of the Clinical Research Ethics Committee of Harran University Rectorate (decision number: 2024/05/01, dated: April 29, 2024). Our study was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent

Data concerning the study were collected with the permission of the Şanlıurfa Harran University Hospital.

Author Contribution

All of the authors contributed at every stage of the study

Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Financial Disclosure

The authors received no financial support for the research, authorship, and/or publication of this article.

Peer-review

Externally peer-reviewed.

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