



Research

Dog bites in humans in a large urban agglomeration in the southwest of Poland, an analysis of forensic medical records



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ABSTRACT

Dog bite wounds represent most of all animal-related injuries. The statistics on the characteristics of dog bites in Poland are very limited. This study reviews statistics on dog bites to humans using forensic medical records obtained from the outpatient clinic of the Department of Forensic Medicine of the Medical University in Wrocław, spanning a period of 6 consecutive years (2005–2010). The analysis includes animal profile, circumstances of the biting incident, and injury description. Dependence among selected injury features was tested using the χ^2 Rao-Scott test. The analysis showed that the prevalent group of dog bite victims were adults bitten by dogs unfamiliar to them. Most of the injuries were deep and the most frequent exposure regions were those of the lower extremities. In addition, a draft forensic medical assessment worksheet was developed to improve the process of examining patients who sustained dog bites. The information contained in proposed forensic medical assessment worksheets are a valuable source of data concerning epidemiology of canine bites, help to determine a proper course of action with respect to the dog, and may eventually reduce the number of dog bite incidents in Poland.

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Introduction

Dog bites are considered a serious health issue throughout the world. They may cause damage to physical health, such as disability, body deformations, and infections as well as damage to mental health (induction of post-traumatic stress syndrome; De Keuster et al., 2006; Peters et al., 2004). On rare occasions, they may even be fatal (Patronek et al., 2013). At the same time, dog bites to humans are an important social problem often overmuch publicized and condemned by the media.

Dog bite wounds represent approximately 60%–90% of all animal-related injuries, with the remainder being caused by cats (5%–20%), rodents (2%–3%), and others less common species

(Endom, 2010; Kilic et al., 2006; Ostanello et al., 2005; Paschos et al., 2014).

The United States appears to be the main source of detailed statistical analyses providing both the profile of the victim and the characteristics of the attacker dog (Matthias et al., 2015; Sacks et al., 1996; Weiss et al., 1998). According to American surveys published by the Centers for Disease Control, 885,000 dog bite incidents are reported in the US each year, with 1 in every 5 being serious enough to require medical attention (<http://www.dogbitelaw.com/dog-bite-statistics/all-dog-bite-statistics>). Another source claims that from 1992–1994, there were 333,687 dog bites in the US resulting in medical intervention (Weiss et al., 1998). In Europe, according to the Federal Veterinary Agency, in the year 2009, there were 2,843 dog bite incidents reported in Switzerland, alone. The Health Statistics of the Turkish Statistical Institute report that in 2008 there were 39,511 patients in Turkey seeking medical assistance after dog bites (Karbeyaz and Ayranci, 2014). In an overview of dog bite statistics, human fatalities caused by dog bites in the USA account for 0.655 of

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1,000,000 incidents, whereas in Turkey, this ratio appears to be half the value (0.364 deaths per 1,000,000 bites; [Yalcin et al., 2012](#)). In general, dog bite fatality rates are higher in low- and middle-income countries than in high-income countries (WHO Animal bites).

One of the serious consequences of dog bites is the risk of rabies infection. Rabies is an important concern, particularly in low-income countries. It is estimated that 55,000 people die annually from rabies, and canine bites cause most of these deaths ([Animal bites fact sheet, 2013](#); World Health Organization). It was reported that most of bite cases receiving antirabies vaccination in postexposure prophylaxis were people bitten by dogs. Rabies epizootic data (in the form of information concerning postexposure prophylaxis in humans) seem to be a valuable but still underestimated source of dog bites epidemiology data ([Garlicki et al., 1996](#); [Kilic et al., 2006](#)).

Data concerning dog bites to humans differ markedly not only between countries but often also within a given country depending mainly on the source of the gathered data. Different numbers of dog bites are reported through the health system (hospital emergency departments), local government authorities (dog attack incident reports), and from surveys or inquiries. Moreover, the actual number of dog bites seems to be underestimated because of the usually mild nature of most bite-related injuries, which often do not require medical help and therefore are not recorded in the statistics ([Nogalski et al., 2007](#); [Overall and Love, 2001](#); [Sacks et al., 1996](#)). According to the [Public Health Agency of Canada](#), injuries associated with dog bites were sustained most frequently by 5- to 9-year-old children (28.5%). Moreover, it should be underlined that, children are bitten 2 to 3 times more frequently than would be expected on the basis of their population proportion. Although most injuries to adults affect the extremities, in case of children, the body area most often affected was the face, head, and neck (>70%; [Overall and Love, 2001](#)).

With an estimated number of 8 million dogs (statistically, 1 dog per 3 households) living in Poland ([Fiszdon and Boruta, 2012](#)), no reliable dog bites statistics are compiled on a regular basis. There are no records showing the number of incidents, descriptions of the circumstances, or animal profile (e.g., breed, sex, age, and hormonal profile—spay/neuter or intact; [Rzepecka-Woźniak, 2006](#)). At present, the information concerning dog bite epidemiology in Poland comes only from isolated sources such as the Department of Forensic Medicine of the University of Medical Sciences in Poznań, Consulting Ward for Prophylactics of Rabies of Chair and Department of Infectious Diseases in Cracow and Department of Trauma and Emergency Medicine, Medical University of Lublin ([Garlicki et al., 1996](#); [Łabęcka et al., 2013](#); [Nogalski et al., 2007](#)).

Dog bites to humans are considered to be the most obvious manifestation of canine aggression. The phenomenon of canine aggression is not easy to define and, therefore, many different definitions of this behavior exist. Some describe canine aggression as several chains of behavior aimed at threatening or injuring other organisms ([McFarland, 1981](#)). Alexander gives a slightly different interpretation, defining it as a form of communication where the aggressor strives to increase the social distance from the attack target ([Alexander, 2003](#)). According to Overall, aggression is an appropriate or inappropriate threat or challenge that is finally resolved in an act of fight or disengagement ([Overall et al., 1997](#)). Another definition describes aggression as a behavior or model of threatening and confrontational behaviors used to resolve a conflict, which is finally settled through confrontation or backing/withdrawal ([Aloff, 2002](#)).

Many attempts have also been made to systematize aggression in dogs. The most frequently quoted types of aggression include: play-related aggression, territorial aggression, defensive

aggression, fear-related aggression, aggression resulting from satisfying of the predatory instinct (predatory aggression), redirected aggression, and interdog aggression ([Horwitz and Milles, 2009](#); [Maksymowicz et al., 2011](#); [Overall, 1997](#)). The ability to properly diagnose the type of aggression exhibited by a dog in a given situation may help to optimize further measures that should be taken with regards to this dog to avoid similar situations in future.

The objective of this study is to review and analyze the incidents of dog bites recorded by the outpatient unit of the Department of Forensic Medicine of the Medical University in Wrocław over a period of 6 consecutive years. The following parameters are used to assess the epidemiology of bites: circumstances of the incident, victims' injuries, and animal profile. An important goal of this study was to propose an improved standardized forensic medical assessment worksheet, inclusive of the incident characteristics relating to both the victim and the dog. The proposed modification focuses on improving the processes of patient interview and physical examination to ensure that all information obtained is quantitatively adequate and useful to understand the epidemiology of canine bites with an emphasis on the classification of dog behaviors. This approach will lead to a greater efficiency of preventive efforts which should eventually reduce the number of dog bite incidents. The results provided by the forensic medicine department are susceptible to bias because of their specific nature. When accessing the overall dog bite statistics, one should always remember that a substantial number of dog bite cases are not reported for medico-legal examination.

Materials and methods

The research material consisted of dog bite records spanning the period from 2005 to 2010, which were obtained from the Department of Forensic Medicine of the Medical University in Wrocław. During this period, 96 individuals sustained dog bites. Of this number, 63 cases ($n = 63$) were identified as sufficiently documented for the purpose of a full statistical analysis. The other cases ($n = 33$; 34%) did not provide all the details relating to the incident and its participants (the victim and the dog) to enable us to define the kind of dog behavior and perform all elements of statistical analysis. The analysis and assessment focused on forensic medical data pertaining to the patient, the circumstances of the incident, and the animal itself.

Patient profile

The following parameters were considered: sex and age, number of injuries (single, multiple), depth of skin injury (superficial, moderate, or deep), and affected anatomical areas (head/face, chest, upper extremities, lower extremities, or back).

Circumstances of bite incident

The following parameters were considered: season of the year, location (dog's own territory/territory unfamiliar to the dog), human aggressive behavior (reported/not reported), and number of animals involved.

Animal profile

Each dog is characterized by its phenotype (breed, body weight), the victim-dog relationship (owned/unknown), and the dog's behavior. All the information available from the history and the forensic examination report was used to classify each dog's behavior. For the purpose of this study, aggressive behaviors were

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