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ORIGINAL ARTICLE

Dog Bite Wounds and Their Management Prospective View from Lady Reading Hospital MTI Peshawar KP, Pakistan

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ABSTRACT

Background: Dog bite and dog bitten wound are serious health care problem. The stray dog, non-vaccinated domestic dog, free-roaming known dogs has worsened the problem here, lack of awareness, poor finances is major hindrance for receiving post-exposure prophylaxis as well as timely wound management for rabies.
Aim: To highlight the most common victim, wounding pattern, most common anatomical region wounded and wound management from our setup.
Methods This is a single center-based analytical cross-sectional study. Conducted from December 2021 till March 2022 spanning a duration of three months at academic tertiary care hospital situated in Peshawar city of Khyber Pakhtunkhwa province of Pakistan. N=277 victims of dog bitten victims with different wound patterns and from different central and peripheral areas reported to us. Chi-square test used for categorical data relationships. A P-value less than 0.05 was considered significant. SPSS version 22 was deployed to analyze the results. Mean standard deviation was used to illustrate numerical data.
Results The majority of dog bite victims reported to us were from sub-urban areas of Peshawar, the majority were male 207(74.7%), and female 64(23.1%). The most common victims were under 15 years of age majority had 37.2% 272(98.2%) arrived with an intact primary survey. 93.5% had an unprovoked bite and 6.5% reached with the obviously contaminated wound. 96% had washed their wound at home soap and water and other antiseptic solution 5% of them needed fluid resuscitation and intravenous analgesia. 242(81.4%) were category III wounds.
Conclusion: Controlling free-roaming and stray dog's population is a cornerstone for preventing these disfiguring wounds. Adequate lavage and selective debridement can minimize the scar. For Wounds larger than 3 cm combined efforts with general surgery and plastic surgery/maxillofacial surgery can give a better outcome.
Keywords: Stray dog, laceration puncture, soft tissue, soft tissue loss, healing by secondary intension, primary closure

INTRODUCTION

Dogs bitten victims are around 4.5 million people annually, dog attack revealed by US reveal. The Center for Disease Control (CDC) regularly studies dog bites and attacks in America. They reveal that only 800,000 of all dog bites need medical attention. When a human is bitten or scratched by an infected animal, they become infected with the virus. Rabies has been found on every continent except Antarctica, with Asia and Africa accounting for roughly 90% of deaths (WHO, 2018). The relationship between dogs and humans is very old, dating back over 12,000 years. Dog bites cause serious health problems relating to morbidity[1]. 1-2% of the population visiting emergency departments are the animal bite which is striking global health problem. With colossal variety being bitten by dogs (80-90%) and cats (5-15%). Dog bites wounds have diverse injury patterns and complications, when bitten on the head and face specifically in school-aged kids[2] People suffer more dog bites with an increasing number of being bitten by domestic dogs. According to the centers for diseases control and prevention (CDC) in Beijing, 100,000 people were attacked by dogs in 2007, exceeded to 180,000 in 2011. 10% of them have facial wounds. It is a special type of wound and has its own characteristics wounding pattern with high infection rates and grave complications from local wound sepsis to intracranial infection, facial wounds are inevitable and unmanageable with potential morbidity and mortality[3]. Preschool-aged children are more likely to be injured by dog bites, and dog bites can result in major injury to the head and neck region due smaller size of victim and dog being bigger and head and neck being most reachable part[4]. Dog bites frequency occurring in the United States of America is somewhere around 500,000 to 4.5 million annually[5]. Attacks by pet dogs commonly involve head and neck regions, while stray dog attacks involve hands and legs. This variation may be attributed to the difference of attitudes and behaviors towards a pet and a stray animal[6]. Dog bites account for more than 80% of mammalian bites[7]. Unlike the bites of cats, rats and humans. Dog bites wound causes crush injuries, avulsion, puncture and variable loss of soft tissue[1,8]. These injuries can appear less severe at first sight because of intact superficial tissue. While the dermis may not be severed, there is a possibility of tissue may still be devitalized by crushing, tearing, and/or avulsing the supporting blood supply[1]. The force applied by a dog's jaw is often estimated to be between 300-450 pounds per square inch (PSI)[9,10]. The force generated from some dog bites can fracture a bone, dependent on the patient, dog breed, and site of the bite[1,11]. Pakistan is a developing country with a population of almost 200 million people, making it one of the world's most populated countries. The majority of the population lives in rural regions or densely populated metropolitan areas with inadequate sanitation. Pakistan also has one of the highest rates of human rabies in the world, with an estimated 2000–5000 cases each year[12]. Due to significant morbidity associated with a dog bite wound, this study was initiated to identify a patient most common victim, wound pattern, most common anatomical area bitten, dogs involved, and management from our prospect. we also sought hypothesis that when the wound is less than 3 cm with minimum or no tissue loss can be jet lavage can be left to heal with second intention, however wounds larger than 3 with obvious contamination and minimum tissue loss can be selectively debrided and can be primarily closed to prevent disfiguring scar.

Our study has not only highlighted the different pattern of dog bite wounds but has also focused how these free roaming non vaccinated and unknown population of stray dogs prevailing here has put our population at risk of dog bite and rabies transmission.

Study goals

-The main objective of our study was to analyze the most common victim, the wound pattern, most common dog involved, and bite category.

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- evaluate the feasibility of selective debridement and immediate closure of dog bite wound
- find out the significance of oral and topical antibiotic for the prevention of wound sepsis.

METHODOLOGY

This is single center based analytical cross-sectional study carried out on data collected from immunity clinic and minor OT section in a public sector tertiary care hospital using consecutive sampling technique from duration spanned from December 2021 to March 31, 2022 in Peshawar. Ethical exemption was taken from the Ethical Review Committee of lady Reading hospital MTI (ref: No.264/LRH/MTI). All the dog bite victims were managed using ATLS protocol. After stabilization of the patient the research and its aim were explained to victims followed by informed and written consent. Data was collected by the principal investigators on a predesigned questionnaire that includes name age, sex, Medical registration Number (MR) demography contact no., time of bite, category of bite along with anatomical regions, wound management, post exposure prophylaxis (PEP) and discharge medication along with 3 weeks follow up. For all those who were unable to reach hospital after three weeks for completion of PEP (post exposure prophylaxis) from the same center due to distances and financial handicap completion of PEP schedule was done from other centers and confirmed by calling on their mobiles and texts as well as by video calls. According to age the victims were divided into four categories, Children (1 to 15 years of age), Adolescents (15 to 64 years of age), elderly (65years and onwards). Time of the bite was also divided into four categories as bitten in morning, afternoon evening and night. The categorization of the wounds was done according to WHO criteria with category I, category II and category III. We divided the dog bite wounds into cranial wounds which included wounds on scalp face and neck (proximal chest and back) distal wounds that lower chest, abdomen, buttocks and limbs. Cranial wounds and wounds more than 4 cm or deep wound with soft tissues exposed and lost were the wounds that need intervention as well as culprits for rapid rabies transmission and carries high mortality. All the victims with complex wounds (cranial wound or wound more than 4cm or victims with doubtful history or history suggestive of dubious dog behavior were given immunoglobulins had intravenous line established with 16g cannula intravenous fluid when needed followed by intra venous analgesia, they were given test dose of 10 units of immunoglobulins intradermal prior to giving intra-lesional immunoglobulins and were 20 minutes observed for any hypersensitivity/anaphylaxis reaction followed by intra-lesional immunoglobulins after wound lavage.

All the victims after dealing wounds were discharge on topical and oral antibiotic and daily dressing with follow up every week for wound healing till 3 weeks.

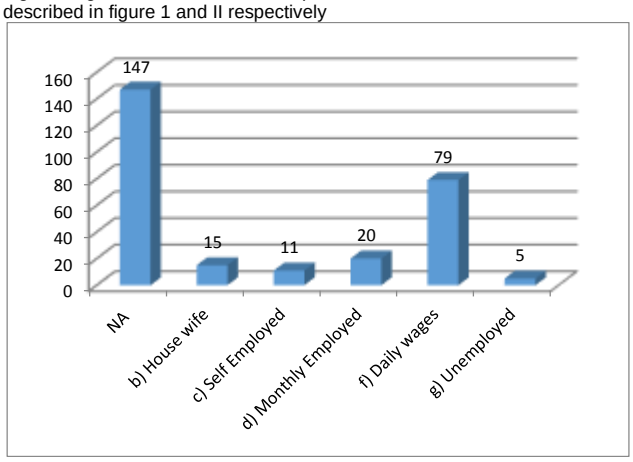
All questionnaire with incomplete information were excluded from the research. SPSS version 22 was used to analyze the results. The mean and standard deviation were used to illustrate numerical data. The chi-square was used to capture categorical data relationships. A P-value of less than 0.05 was considered significant.

RESULTS

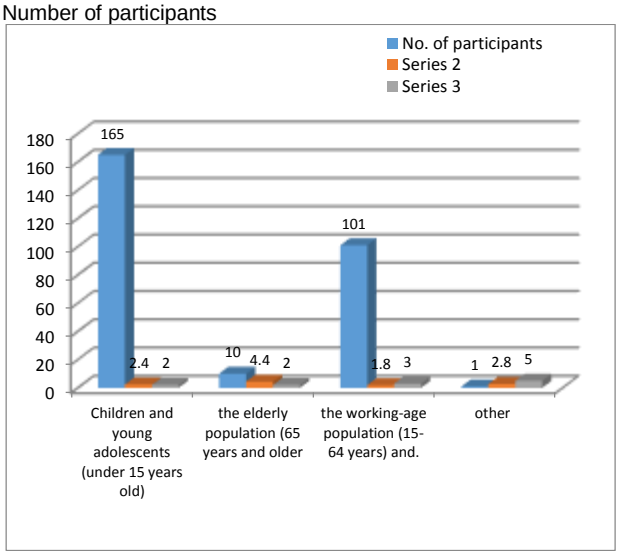
Social demographic Information of the patients/Victims: Of 300 questionnaires on hard copy, 277 were found completed. All bite wound caused by other animals were excluded from study. The general dog bite victims trended towards males 77% and rest were female about 23% of victims. The range of age for participants was from 1 to 65 years. Out of them 60% were under 15 years, 36% were above 15 years 36.4 makes population between 15-64 years. Only 14% were 65 years above. Majority of them lived in urban or suburban areas of Peshawar. All The participants were Pushto speaking belonging to urban and suburban area of Peshawar. The education level of participants 42% ever had no any education, however 42% victims did their primary class, 8% were in high class and rest 5% were intermediate and above. Regarding socioeconomic status, 55.6% were classified as lower socioeconomic class monthly family income less than 15000PKR and 38.6% to upper lower class family income above 15000-30000 PKR, only 4.4% were middle class above 30000 - 50000 and 1.1% were included in upper class more than 50000PKR however about 50% of the participants were perceived to be unable to afford the dog bite treatment despite they visited public hospital for wound follow up.

Dog details and time frame of bite: Timing of biting 139(50%) were bitten in afternoon, evening 95(34%) and morning 41(15%). The most of the event happened out side 250(90%) however 27(10%) victims bitten by dog inside their own home premises.

Fig. 1: Age distribution and occupation information about victims were described in figure 1 and II respectively



Number of participants



Awareness of about rabies and its prevention:

Detail about dogs	Type of dogs
Observable 120(43%)	Pet dogs 87(31%)
Dead 9(3%+	Unknown dogs 199(42%)
Alive 31(11%)	Stray dogs 71(25%)
Disappeared 45(16%)	
Don't know 72(25.9%)	

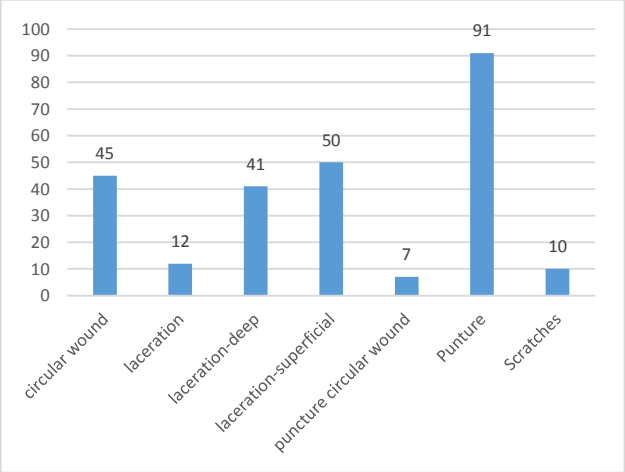
Most of the Victims and their caregivers were not aware of wound severity and rabies transmission through wound. 166(66%) only heard a name of rabies, only 97(35%) used word it can cause

psychological issues or death and 12(4.3%) were confused. Most of them were not previously vaccinated about 219(79%).

WHO categorization of dog bite wounds: There were cranial 199(72%) and caudal 78(28%). Moreover, the average number of 2.5, ranged between depths 1-3cm. Most victims wound were fell in Category III about 87% and the rest were Category II 13%. All category III cranial wound more than 4cm in size with suspicious dog behavior and non-vaccinated known dog, dubious history were given intra-lesional immunoglobulins along with PEP. Out 106(38%) needed immunoglobulins.

Remedies at home Out of 277 victims 11(15.2%) did not have any remedy at home 266(96%) came after having washes with either running tap water or with soap and tap water

Primary survey and actions and adjuncts: Out of 277 victims 265(95.7%) arrived with intact primary survey and were stable on arrival.3.6% wound needed bleeding control in the form packing. 2.9% needed intravenous line for fluid resuscitation and IV analgesia.



DISCUSSIONS

This is a single center based presentation and management of dog bite wound presented to Accident Emergency Department of Lady Reading Hospital MTI Peshawar. Amongst all the animal bites dog bite remain on top slot and main culprit for rabies transmission[11, 13]. In third world countries like Pakistan, magnitude of problem is more severe because of costly vaccine as well as reaching out to center where tertiary care facility are provided is challenging[14]. When compared to this[15, 16]. our study victims are mostly fell in age group under 15 years of age. N=19 were cranial wounds and where mostly affected were children under 10 years when compared to this[17]. When bite wound category stratified we have no CAT I wounds n=0, 75(27%) CAT II wounds, 209(75.4%) CAT III wounds, when compared to (5) we have much higher number . Only 25% of victims in our study were wounded by stray dogs, we have alarming higher number of victims bitten by unknown dogs with unknown vaccination status 199(42%) and non- vaccinated known and domestic dog 87(31%) when compared to others[18, 19,20]. Out of 277 victims 11(15,2%) did not opted for any remedy for wound at home, 265(96%) had a wound under running tap water or soap and water and other antiseptic solution. 5(1.8%) infection was reported in wounds which was closed after selective debridement predominantly involve lower limbs, however no infection was reported in head and neck wound which were closed primarily. When compared to this we have much less rate of infection[20]

During our study it is observed that dog bitten victims reports throughout the year mostly reports to LRH MTI. All seven doses of vaccines cannot be provided by all government hospital or charity based medical facility. Victims who were unable to buy vaccine to complete PREP are to referred to other centers to complete the PREP schedule.

It was observed during our study wounds which were left to heal by secondary intension after jet lavage, with daily dressings and oral and topical antibiotic prevented wounds sepsis. However, complex wounds, wounds sustained on head and neck needed closure by primary intension to prevent disfiguring scars caused by secondary intention healing. As reaching out for follow up at LRH beyond 3 weeks was difficult as they completed their remaining vaccination from other set up from where vaccine was given free of cost. We confirmed the completion of vaccination schedule on phone. The study provides evidence that dog bites are common in the study region, regardless of gender or age. The bites are both provoked and unprovoked, and are mostly caused by roaming dogs outside of people's homes. Compliance with suggested pre-clinical recommendations is limited, owing mostly to a lack of information about the risks of alternative therapies and the availability of therapy. As a result, there is a need for holistic focused health education initiatives as well as the control of herbalist activities. Furthermore, efforts that limit human-dog encounters in public settings, such as reducing stray dog numbers, must be emphasized.

Limitation: It's a single center based presentation of all dog bitten victims reported to LRH MTI. It need a qualitative analysis based on all centers located in KP province.

It's a regional analysis and these findings cannot be extrapolated outside the where these dog bite happens occur with no record available. The actual number of victims may be underestimated.

CONCLUSION

Stray and non- vaccinated known and unknown dogs are the major culprits for dog bite and rabies transmission as well as cause of these disfiguring wounds. Adequate lavage and selective debridement for wounds less than 4cm can be left to heal by secondary intension. For complex larger wounds more than 4 cm wound sustained on head and neck need combined efforts with general surgery and plastic surgery/maxillofacial surgery can give a better treatment outcome**.**

Recommendation

1. Controlling stray dog population is one of the solution to problem
2. To maximize public awareness more animal bite clinic should be set up, so that timely these victims and are managed.
3. Dog bite wound less than 4 cm should be jet lavage and left to heal by second intension with topical and oral antibiotic prevents wound sepsis when sustained on limbs and others areas.
4. Wounds larger than 4 cm, cranial wound should be selectively debrided and primarily closed.
5. Utilizing of social media to maximize public awareness about rabies and disfiguring wounds caused by dog bite will reduce dog bite victims and rabies transmission

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