Deanship of Graduate Studies

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Management and Prevention of Animal Bites in West Bank.

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Management and Prevention of Animal Bites in West Bank.

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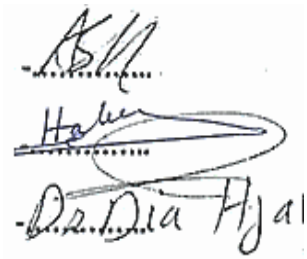

Jerusalem -- Palestine

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Dedication

I dedicate this first and not the last study to that child, a victim of rabies disease from Jericho Governorate, who died after being infected with a dog bite at the end of 2023.

I also dedicate it to humanity that is absent in this time in the shadow of conflicts and wars; I say that we must focus on the Third Army, that is the causes of diseases, especially infectious ones, I also dedicate it to my family and comrades.

اهدي هذه الدراسة الاولى وليست الأخيرة لذلك الطفل ضحية مرض السعار من محافظة اريحا والذي توفي بعد اصابته بعضة كلب بنهاية عام 2023 واهديها ايضا للإنسانية الغائبة بهذا الزمن في ضل النزاعات والحروب واقول يجب التركيز على الجيش الثالث اي مسببات الامراض خاصة المعدية وايضا اهديها لأهلي ورفاقي.

Yaser Ahmad AL-Nawaja

Declaration

I certify unless otherwise stated, that the thesis, I submitted for the Master's degree in Prevention and Control of Infectious disease at Al-Quds University is the product of my research, and that this work has not previously been submitted to another university for a higher degree.

Signature: 

Date: 25/2/2025

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Abstract

Background: Animal bites are direct injuries sustained by a person exposed to an animal attack, causing injury to the body that is primarily characterized by skin lacerations or severe injuries, the animal bites are ordinary injuries, considered one of the frequent reasons for receiving primary care and referring to emergency centers. Annually, 330,000 emergency visits are associated with bites in the United States(Darvishi et al., 2023).

Methodology: A quantitative, retrospective cohort study was conducted in the West Bank Governmental Preventive Medicine Department (PMD) in Palestine from 2020 to 2023 to estimate the prevalence rate of animal bites and their prevention and management.

Result: The majority of the population wears males totalling 2522 individuals (82.34%), while 541 individuals (17.66%) wear females, with the age average of the population being 21.37 years. The distribution of bite incidents by place reveals that the majority occurred in rural areas, with 53.09%. The data showed that dogs were responsible for most bites, accounting for 87.33%. Also, related to the number of bites, 71.43% experienced a single bite, while 28.57% were exposed to multiple bites. The nature of the wound showed that most wounds were classified as mild at 64.68%, and the distribution of bite locations on the body showed that the upper limbs were the most commonly affected area at 50.73%. In 2020, there were 636 cases, this number rose to 645 cases in 2021 and increased to 857 cases in 2022. The highest number of cases was recorded in 2023, with 925 cases. Only 5.06% of patients received rabies immunoglobulin (RIG), 50.05% received the rabies vaccine, 37.84% received the Tetanus-toxoid vaccine, and 69.54% of patients received antibiotic treatment.

Conclusion: The animal bite prevalence rate has been significantly increasing over the years.

Keywords: Animal bites, World health organizations, Preexposure prophylaxis, Rabies Virus, Postexposure prophylaxis, Rabies Vaccine, Ministry of Health.

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Initials of the term	Term in English
CDC	Center for Disease Control and Prevention
CNS	Central Nervous System
IRB	Institutional review board
MOA	Ministry of Agricultural
MOH	Ministry of Health
OIE	Office International des Epizooties
PEP	Post-Exposure Prophylaxis
PMD	Preventive Medicine Department
PrEP	Pre-Exposure Prophylaxis
PTSD	Post-traumatic stress disorder
RIG	Rabies immunoglobulin
RV	Rabies Virus
WHO	World Health Organization

Chapter 1: Introduction

1.1 Background of the study

Animal bites are direct injuries sustained by a person exposed to animal attack, causing injury to the body that is primarily characterized by skin lacerations or severe injuries. The animal bites are ordinary injuries, considered as one of the frequent reasons for receiving primary care and referring to emergency centers, annually, 330,000 emergency visits are associated with bites in the United States(Darvishi et al., 2023).

Also, animal bites have long been seen as a major social, economic, and health concern for civilizations with inadequate population control and animal biting policies. These dangers have increased as a result of the growing number of animal bite cases in some countries and the increasing trend of dog population as one of the most significant factors of human bites(Bay et al., 2023).

Infection is the most common bite-associated complication; the relative risk is determined by the species of the inflicting animal, bite location, host factors, and local wound care. The estimated healthcare cost associated with managing cat and dog bites in the United States is >$ 850 million annually and does not account for the costs to the patient in terms of time off work, rehabilitation, and permanent impairment(Darvishi et al., 2023).

Animal saliva can spread various infectious diseases, including rabies, are one of the leading causes of death globally. Around 4.5 million people worldwide are bitten by animals every year,

according to the Centers for Disease Control. Scratching, rubbing, inhaling, and contact with contaminated objects can all spread rabies. At the time rabies signs appear, the infected person will undoubtedly die from the disease. Due to its high death rate and expensive treatment and prevention expenses, this disease is significant, on every continent, there is rabies. Asia accounts for 31,000 of the 59 000 deaths caused by it globally each year. Asia and Africa's developing nations account for the majority of the estimated yearly human rabies deaths(Shariat et al., 2023).

Polymicrobial flora commonly seen in bite wounds reflect both aerobic and anaerobic microbiology of the biter's oral flora, the victim's skin, and the surrounding environment. Pricks, cuts, abrasions, and evulsions are examples of bite injuries. These wounds often have a benign appearance at first, but they can quickly become seriously infected and cause complications. The organisms that can be collected from bite wounds typically come from the biting animal's mouth cavity as well as the skin flora of the victim. Polymicrobial and synergistic infections predominate. More over two thirds of animal bite wound infections were found to have anaerobes in investigations that employed suitable techniques for recovering aerobic and anaerobic bacteria(Brook, 2009).

Additionally, there has been an increase in these risks due to the increasing number of dog bite cases in some countries and the dog population's rising tendency as one of the most significant variables in animal bites. An important measure of societal safety is dog bites. The consequences on dangers to livestock and wildlife, including bites and aggressive behavior toward people and other animals, are described in this important index along with the risks to public health. Even in situations where there is no risk of rabies, dog bite injuries rank among the most common causes of complications, particularly in children. These injuries result in a high hospitalization rate and serious psychological effects(Bay et al., 2023).

Roughly 85–90% of animal bite injuries to people are caused by dogs, 1–10% by cats, and 2–3% by rodents and others. Numerous studies conducted in low-income nations have shown that dogs account for 76–94% of animal bite injuries. This has led to a high incidence of rabies and increased death rates because of limited access to anti-rabies post-exposure treatment, The Centers for Disease Control (CDC) estimates that every year, around 4.5 million individuals worldwide are bitten by animals; these bites frequently necessitate post-exposure prophylaxis (PEP). Because rabies affects the central nervous system, it can cause encephalitis, which has a 100% fatality rate and causes over 60,000 fatalities worldwide each year. In order to prevent this disease, the World Health Organization (WHO) estimates that over 15 million people take prophylaxis each year. The Global Union of Rabies Control, the Food and Drug Administration, and the World Health Organization have joined forces to propose "Zero human rabies death by 2030" as a goal to end rabies by that year. An animal bite can cause infections, Post-traumatic stress disorder (PTSD), deformities that need reconstructive surgery, and in extreme cases, even death(Gaffari-fam et al., 2021).

However, 16 distinct genotypes of the Lyssavirus from the Rabdoviridae family, which includes the rabies virus, exist, the genotypes that have been detected V1, V3, V4, V5, and V8. Genotype V1 is found in dogs and subsequently in humans, skunks, and horses, while genotype V3 is found in bats, dogs, and cats. Humans typically become infected by touching dog or cat saliva, although a variety of other species, including cattle and non-human primates, have also been linked to contagions, the interaction between infected saliva and neuromuscular synapses is the primary route of infection. The incubation time might be anything from five days to six or twelve months, with an average of one to three months. The low rate of virus multiplication accounts for this extended latency period. The quantity of the inoculum and tissue tropism are key factors in propagation (Soler-Rangel et al., 2020).

Human vaccination against the rabies virus (RV) is an effective preventive intervention after exposure to the virus, either prior to or after the onset of clinical symptoms. Rabies is an infectious zoonotic virus disease that is almost always fatal after it manifests. It continues to be a major cause of mortality in many endemic countries, particularly in marginalized populations. Rabies vaccines are safe, effective, and well-tolerated, also, WHO recommends two main immunization strategies for the prevention of human rabies:

1- PEP, which entails administering rabies immunoglobulins if necessary, administering a course of multiple doses of the rabies vaccine, and thoroughly cleaning wounds at the RV exposure site.
2- Pre-exposure prophylaxis (PrEP) refers to the vaccination against rabies administered in multiple doses prior to exposure to RV.

In addition, WHO continues to advise against the development and administration of nerve-tissue vaccines, recommending instead that vaccinations based on RV produced in cell culture or embryonated eggs be used in their place. Also, WHO advises using embryonated eggs or cell culture with a potency of at least 2.5 IU per vial. (World, 2018).

1.2 Problem Statement

WHO has shown that the incidence of animal bites was about 306 cases per 100,000 people and the trend of animal bites was increasing and more than 2.5 billion people are at risk of rabies(Shariat et al., 2023).
Also, according to data collected from the Ministry of Health Department of Preventive Medicine (2023), there is an increase in the occurrence of animal bites among the Palestinian community, and in 2023 the Palestine Ministry of Health (MOH) reported the first human rabies case since more than 30 years for a younger child after a dog bite and he has died few days later. This indicates that the disease remerging after a long period of time without recording any case, and it is an elevated risk of rabies infection when compared to an increase in the prevalence of dog bites, which requires studying the prevention policies and control methods. It has also been noted in recent years that the phenomenon of stray dogs has increased and has become a societal problem without clear solutions to control dogs, which are the reservoir for rabies disease. The purpose of this study is to evaluate the management policies through prevention and control of

persons exposed to animal bites that cause the disease and to reduce its occurrence through recommendations that will be provided at the end of the study.

1.3 Significant of Study

The significance of the study is to examine the prevalence rate and management of persons exposed to animal bites retrospectively, given the dramatic increase in the number of stray animals in Palestine, especially dogs, and given the increase in emergency intervention as a result of bites, including (rat bites, dog bites, etc.). This study will give clear answers to the type of bites and methods of treatment and prevention policies to limit the disease transmission between animals and humans, rabies is the most important one, and national protocol for rabies prevention is implemented by MOH and MOA to reduce diseases burden through preventive and medical intervention in case of human bite by animal's, and animal's control by MOA.

1.4 Study Aim

The study aims to highlight the management and prevention of animal bits in the West Bank in the period 2020 -2023.
Although, the study aims to evaluate the prevalence rate of animal bites in the West Bank for the years 2020 to 2023, and show if the current policies were effective in preventing and controlling rabies disease.

1.5 Research Objectives

1- Identification of high-risk areas and high-risk groups affected by animal bits.
2- Highlighting age and gender distribution of people affected with animal bites.
3- Evaluation of different animal kinds and human bites including bits characteristic.
4- Evaluation of policy taken by both MOH and MOA for rabies and other zoonosis prevention.
5- Understand the treatment of animal bites in hospitals and patient outcomes.

1.6 Research Questions

1- What is the prevalence rate of animal bites in the West Bank for the years 2020 to 2023?
2- Has the prevalence rate of animal bites increased in the last few years?
3- Which age is at more risk for animal bites according to data reported?
4- Are current policies effective in preventing and controlling rabies disease?
5- What is the management of animal bits in West Bank for the years 2020 to 2023?

1.7 Conceptual definition

Animal bite: a direct injury sustained by a person when an animal attack
him, causing injury to the body that is primarily characterized by skin lacerations or severe injuries, the animal bites are ordinary injuries, considered one of the frequent reasons for receiving primary care and referring to emergency centers(Darvishi et al., 2023).

Infectious diseases: are illnesses brought on by pathogens, which are dangerous substances that enter the body. The most frequent culprits include parasites, bacteria, fungi, and viruses. Infectious diseases typically spread from person to person through bites from insects or animals, contaminated food, or contaminated water(Hanson et al., 2020).

Rabies: One of the most significant zoonotic diseases caused by a Lyssavirus of the Rhabdoviridae family that affects both humans and animals, rabies kills over 59,000 people worldwide each year. Infection can be eradicated at the source by mass-vaccinating dogs in a manner that covers more than 70% of the dog population. Human rabies can be avoided by promptly administering PEP to victims of rabid animal bites. However, in the majority of low-income nations where rabies is common, these precautions are either insufficient or nonexistent(Ain, 2018).

Anti-rabies vaccine: Immunization against the RV in humans is a successful prophylactic measure following virus exposure, either before or after the manifestation of clinical signs. In addition to the safe, efficient, and well-tolerated nature of rabies vaccines, the WHO advises two primary immunization approaches to prevent human rabies, PEP, which comprises giving a course of several doses of the rabies vaccination and, if necessary, rabies immunoglobulins and PrEP, describes the rabies immunization given in several doses before being exposed to RV(World, 2018).

1.8 Feasibility of the study

Ethical approval was obtained from Al-Quds University, also approval from MOH was obtained to have data from the Preventive Medicine Department (PMD)-Ramallah and all data that was obtained from Preventive Medicine in Ramallah was strictly confidential for research purposes.

Chapter 2: Literature Review

2.1 Introduction

This chapter presents a summary of the available research on the management and prevention of animal bites. and the researcher chose to expand the scope of the literary study to include other nations to enable the researcher to collect the latest data on this topic, moreover, literary research revealed that the management and prevention of animal bites is an important and developmental issue in the mentioned countries.

During the review, the review presents the results of previous studies on the extent to which policies were managed and prevented animal bites, and the goal of the review is to the current view of preventing transmitted diseases is occurring related to animal bits such as rabies and other disorders or complications.

The evaluation of the literature examined the prevalence rate of animal bites, management and prevention, and the effect of negative and positive attitudes towards the occurrence of rabies and its relationship to the percentage of adherence to policies to prevent its occurrence.

2.2 Literature review

The topic was studying and evaluating animal bite prevalence rate, management and prevention of it, and prevention of transmitted diseases such as rabies.

In order to conduct a literature study, the research identified the prevalence rate of animal bites as well as key terminology and variables related to the management and prevention of animal bites and transmitted rabies. A literature review was conducted using electronic databases like PubMed and Google Scholar to find pertinent publications and journals.

2.3 Pathophysiology of animal bites and rabies

The saliva or brain/nervous system tissue of an infected animal can directly spread the rabies virus (for instance, through cuts on the skin or mucous membranes in the mouth, nose, or eyes). The most typical method of rabies transmission is animal bites. Non-bite exposure to rabies can occur from scratches, abrasions, or open wounds exposed to saliva or other potentially infectious material from a rabid animal. Other interactions that are not considered to be rabies exposure include caressing a rabid animal or coming into contact with its blood, urine, or feces. These interactions do not raise the risk of getting the disease(Fatima et al., 2023).

The RV is a neurotropic virus prototype that may infect humans and animals and be lethal. This virus targets the host's peripheral body parts, penetrates motor nerves or sensory neurons, and then uses axonal transference to get to the central nervous system (CNS). Later, centrifugal supper occurs at important emigration points, such as the salivary glands. Transmission to subsequent hosts is made possible by the aberrations in behavior caused by the CNS disease. Numerous viral actions as well as particular virus proteins are necessary for the viral infectious cycle to successfully finish. The rabies virus seems to be extremely important for entering the host covertly and preserving itself without eliciting noticeable host reactions. With the development of reverse genetic technology, it is now possible to produce designed recombinant RV and examine viral activities that are related to normal RV pathogenesis in greater detail. For example, tracking live fluorescent RV increases the potential to identify factors associated with RV pathogenicity. Pathogenesis is influenced by a number of aspects of RV molecular biology, including the careful control of RV transcription, gene expression, and replication (Miranda and Miranda 2020).

As soon as the virus enters the body, it begins to replicate in the muscle cells and peripheral tissues nearby. From there, it moves through the peripheral neurons to the central nervous system. The length of time between the beginning of the infection and the appearance of symptoms is known as the virus's incubation period, and it can range from a few days to several years in different people(Lembo et al., 2008).

Via the peripheral nerves, the virus enters the CNS. It can penetrate nerve endings and proliferate throughout the brain, including the spinal cord and brainstem. Also, the virus can enter the CNS directly through open wounds or mucosal membranes. Once within the CNS, the virus begins to multiply quickly, mostly in the brain's gray matter, which includes the brainstem, limbic system, and hypothalamus. As a result, there is inflammation and brain tissue destruction. As a result, there is inflammation and brain tissue destruction. Since the virus is present in the CNC, inflammation results from an immunological reaction. The clinical signs and symptoms of rabies, such as neurological problems, are partly caused by this inflammatory reaction. The CNS neurons are the main organs that the rabies virus attacks and destroys. Encephalitis develops as a result of the disruption of regular neural function. Numerous neurological symptoms are brought on by the damaged neurons' degeneration and death (Fatima et al., 2023; Hayes et al., 2022).

2.4 Literature related to animal bites and rabies

A cross-sectional descriptive study was undertaken to analyze the trend of animal bites in Neyshabur, Iran, from 2015 to 2021, with data obtained from the vice-chancellery of Neyshabur University of Medical Sciences. The data consisted of person variables, location and time variables, and animal variables. And the results showed that there were 13190 cases of animal bites, with the trend growing from 2015 to 2020. Dogs caused the most injuries (86%), males were the most likely to be bitten (76.6%), and farmers accounted for 28.1% of all incidents. The lower limbs were the most commonly bitten (64.8%), with 83.4% reporting a scratch. The majority of the biting animals (67.9%) were not stray, and 83.3% had bitten their owners, there were no rabies deaths recorded during the research period. That's mean the number of animal bites is increasing and is greater than the national average in Neyshabur, Iran(Shariat et al., 2023).

In the other hand, a study was conducted in Iran, the purpose of this study was to look into the epidemiological characteristics of animal bite cases reported to rabies prevention facilities in Kerman City. The study was cross-sectional. Throughout 2021, all documented cases of animal bites at Kerman's rabies prevention centers were investigated. The study's data was examined using descriptive and inferential statistics methods in accordance with demographic and epidemiological information. The study found 3460 incidences of animal bites, with young persons and males having a higher prevalence. Dogs were the most prevalent animal biters. Given the high incidence of animal bites in Kerman, it is advised that educational and care actions be planned to reduce them(Ayatollahi et al., 2022).

Another cross-sectional survey from September 1 to November 30, 2011. Participants in the study were animal bite injury victims who presented to the accident and emergency unit at Mulago Hospital in Uganda, and they were included consecutively. A standardized questionnaire was used to measure sociodemographics, the degree and patterns of injury, health-seeking, and dog-handling habits. Descriptive statistics were utilized to sum up participant characteristics and animal bite injuries. The incident rate ratios (IRR) of a Poisson regression model were used to investigate the link between the number of days it took to receive treatment at Mulago Hospital and: a) prior first aid, b) animal bite injury experienced during the day, c) unknown dog, and d) victim resident in Kampala. Among the 25,420 patients who visited the emergency unit throughout the study period, 207 (0.8%) suffered animal bite injuries. The average age was 22.7 years (SD 14.3), 64.7% were male, and 40.1% were under the age of 18. The majority of 199 (96.1%) were bitten by a single unrestrained and unsingable dog that had previously bitten someone else in 22.2% of cases, and eight victims (0.4%) were attacked in canine gangs of 2-5 dogs. Rabies vaccination was proven in only 23 canines (11.1%), since 109 (52.7%) were unknown to the victims or communities. One hundred and eighteen victims (57.0%) were bitten by dogs in the Kampala district, while the remainder were bitten close or far away, and the victims were specially referred to an anti-rabies vaccine. Among 207 victims, 189 (91.3%) appeared within 2.6 days (SD ± 4.3). Two hundred patients (96.6%) suffered extremities injuries, while the rest got injuries to other body parts. All injuries were mild and treated on an outpatient basis with wound dressing, painkillers, prophylactic antibiotics, and an

anti-rabies vaccine. Victims who got prior first aid were more likely to seek treatment at Mulago hospital (IRR 1.7, 95% CI 1.4-2.1) than those who did not get prior first aid. Participants who received animal bite injuries during the day were more likely to seek treatment at Mulago hospital (IRR 1.6, 95% CI 1.3-2.1) than those who sustained injuries at other times. Participants who were bitten by an unknown dog and lived in Kampala had an IRR of 0.7, 95% CI 0.5-0.9, and IRR of 0.6, 95% CI 0.5-0.8, respectively, of seeking treatment at Mulago Hospital compared to those who were bitten by a known dog and did not live in Kampala (Wangoda et al., 2019).

However, a study conducted at An Najah National University in Palestine attempted to examine the existence of anti-rabies antibodies in stray dogs to predict their immunological state for risk management purposes. The current study is the first to find specific antibodies to RV in the serum of stray dogs in Palestine. Serum samples were randomly taken from 92 stray dogs in seven different Palestinian regions and analyzed for anti-rabies antibodies using ELISA. Only 11.95% of stray dogs (n=11) showed protective immunological status against rabies, with anti-rabies antibody titers (>0.5 IU) according to World Health Organization guidelines. This finding shows a substantial risk of reintroducing dog rabies into stray dogs, which could lead to human rabies transmission. To lower the risk of transmitting rabies to humans, a new strategy to enable broader vaccine coverage in stray dogs, in conjunction with control breeding, must be started (Fayyad et al., 2019).

However, in 2010 a cross-sectional study was conducted using exit interviews from 100 cases of animal bites from each of the three hospitals managed by the Ahmedabad Municipal Corporation. The study focused on attitudes and pre-treatment practices among 300 cases of animal bites; the most common biting animal was a dog, as 97.33% of the cases had a history of dog bites; the male-to-female ratio was 3:1; the majority of the cases (59%) had category III bites; and the majority of the cases (98.73%) belonged to the age group less than 20 years old. The most common biting site was the right lower limb, with the most common (45.7%), Just 5.7% of patients had immediately cleaned their wounds with soap and water, compared to 72% of instances who had prompt pre-treatment of their wounds before hospital visits. Tobacco snuff, red chili, turmeric, and various items like garlic, jaggery, kerosene, lime, bandages, soframycine, ghee, and wheat flour were among the local remedies used at the bite site in 66% of instances. The average amount of time between getting bit and going to the hospital was 32 hours. The study's conclusion also stated that there are safe and effective tissue culture vaccines available, that rabies prevention is almost guaranteed by prompt and appropriate post-exposure treatment, and that the medical community and the general public need to be made aware of the importance of wound care, the prudent use of anti-rabies serum, and the use of contemporary tissue culture vaccines following animal bites(Pawar AB, Bansal RK, Bharodiya Paresh, Panchal Shaishav, Patel HB, Padariya PK, 2010).

In order to target prevention programs and policies for those who are at higher risk, Irit Cohen-Manheima, Maya Siman-Tova, and Irina Radomislensk conducted a study in which they examined the national level, demographic, and injury characteristics of dog bite injuries requiring hospitalization. Data were extracted from the Israeli National Trauma Registry between 2009-2016. Between 2009 and 2016, a total of 986 people were admitted to hospitals due to dog bite injuries. Children aged 0 to 14 showed a rising significant trend ($p = 0.01$) over the course of the 8-year period in the percentage of hospitalized dog-bite injuries among all

trauma hospitalizations. The risk of dog bite injuries was also roughly twice as high for children as for adults between the ages of 15 and 94 (relative risk [RR]=1.89, 95% confidence interval [CI]=1.35-2.66, p<0.0001). In terms of the rate per 100,000, boys had a significantly higher rate than girls in 2016 (RR=2.85, 95%CI=1.57-5.19, p<0.0001), while no gender differences were found in corresponding age groups. The most common age group for face/head/neck injuries was children 0–14 years old (49.7%), with a 4-fold higher risk compared to those between 15 and 94 years old (RR=3.78, 95%CI, 3.01–4.75) among the younger age groups (<1, 1-3 and 4-5 years old) compared with the 6–11 and 12–14 age groups (p<0.0001). The yearly incidence rates per 100,000 population did not show any overall significant temporal trend, falling from 1.84 (95%CI=1.54-2.15) in 2009 to 1.54 (95%CI=1.28-1.81) in 2016 (Cohen-Manheim et al., 2018).

However, in 2021, (Carmen Luz Barrios et al., 2021) a study in Chile with the goal of epidemiologically examining the incidence of bites and the patterns of human-dog interactions involved. The records examined in this report are from bitten patients who visited Chile's primary public health facilities between September 17, 2017, and September 17, 2018: 17,299 animal bites were reported during the study period; however, only 7220 (41.74%) of those cases had an analysis where the offending species could be identified. Of the bites examined, dogs were responsible for 6533 (90.48%). Of them, medium-sized dogs were responsible for 41.05%. Dogs of mixed breeds accounted for 55.99% of bites, with German Shepherds accounting for 8.50% of cases. The majority of attacks were performed indoors (57.48%), and the majority of the dogs who bit the victim were known to them (99.95%). While Chile's dog bite records have improved, background information about the incident's circumstances should also be included. This will help create programs that effectively reduce dog bites.

On the other hand, a study describes trends and geographical distribution of animal bite injuries (a proxy of potential exposure to rabies) and deaths due to suspected human rabies in Uganda from 2001 to 2015. An analysis of surveillance data on suspected animal bite injuries gathered from Ugandan health facilities revealed that 208,720 cases of reported animal bite injuries were distributed across four regions: Central, Eastern, Northern, and Western. Of the 48,720 animal bites that occurred between 2013 and 2015, 59% were reported to have occurred in males, and 81% involved individuals older than five years old. In Uganda, there were 58 bites per 100,000 people between 2001 and 2015; in the Northern, 76 in the Central, 58 in the Western, 53 in the Eastern, and 50 in the Northern area. In the Central region, it climbed from 21 to 47 (P = 0.02), in the Eastern region from 27 to 34 (P = 0.04), in the Northern region from 23 to 70 (P = 0.01), and in the Western region from 16 to 46 (P = 0.001) between 2001 and 2015. There were reports of 486 probable human rabies deaths in all, with 29% coming from the Eastern, 28% from the Central, 27% from the Northern, and 17% from the Western regions. According to the study's findings, rabies infection mortality, possible exposure to the disease, and animal bite injuries are public health issues that impact every region of Uganda. In order to eradicate rabies, rabies prevention and control measures must be strengthened across the board in the health sector. The "One Health" concept should be used in these tactics, with a strategic focus on enhancing rabies surveillance, managing canine rabies, and guaranteeing post-exposure prophylaxis availability at lower health institutions(Masiira et al., 2018).

However, if animal attacks are treated properly and promptly, rabies can be mostly avoided from developing. In this context, the post-exposure treatment of animal bite patients is crucial. The world's highest rate of rabies cases and animal bites occurs in India. The nation's healthcare delivery systems are heavily burdened by this. a cross-sectional study carried out from January to December 2018 in the immunization clinic of a tertiary care hospital in Haryana. An interview schedule that was pre-planned, pre-tested, and semi-structured was used to interview 614 instances in total. Approximately 80.5% of the bites were caused by stray animals, with stray dogs accounting for 70% of occurrences. Specifically, 96.6% of cases received a tetanus toxoid and 97.7% of cases received an anti-rabies vaccine. Only 46% of the 204 (33.2%) victims who required local immunoglobulin infiltration received treatment. These victims were classified as category III instances. It was shown that there was a statistically significant correlation between the socioeconomic position, place of residence, and level of education and the time lag between the bite and reporting to the first health facility. In conclusion, it was found that the residents of the research region lacked appropriate wound care practices. It is also necessary to improve the availability of free life-saving immunoglobulin at the health facility as part of the rabies control program(Chowdhury & Chakraborty, 2017).

2.5 Summary

Literature review indicate an increase in the number of people infected with animal bites, which increases their rate of complications, the most important of which is the risk of contracting rabies resulting from dog and cat bites. Literature review have emphasized the importance of following established policies to combat rabies, whether at the level of the animal or the infected patient. Bites, therefore, this leads to reducing the costs involved in treatment resulting from animal bites, reducing the length of stay in the hospital, and reducing infection and death rates resulting from bite injuries.

2.6 Conclusion

According to the literature review, there is a lack of prevention and management of animal bites in many countries and it was showed increase prevalence and incidence rate of animal bites such as dogs, there is mean increased risk of infectious disease and see more bites complication and fatal disease such as rabies infection.

Chapter 3: Research Methodology

3.1 Introduction

An outline of the research methods used in this study is provided in this chapter. It includes the following: research sample, the context of the study, length of the research, data source, criterion for inclusion and exclusion Process of sampling, sample size, and sample, Pilot study, Validity, Reliability, Data collection, Variables (Study measures), Ethical consideration, Analysis plan and Limitation of the study.

3.2 Research design

A quantitative, retrospective cohort study was obtained from West Bank Governmental Preventive Medicine Department (PMD) in Palestine during 2020 to 2023 aiming evaluate the prevalence rate, prevention and management of animal bites. The researcher was able to synthesize prevention the data collected thanks to the study's design. In order to learn more about animal bites preventive and management during that times, the researcher employed the research design to submit. From here the recommendations for future practice.

3.3 Population

The study was included all cases of animal bites documented by MOH PMD as inclusion criteria during 2020 to 2023.

3.4 Site and Siting

The data was collected from all patient's health files from MOH PMD related to animal bites between 2020 to 2023, in Westbank.

The West Bank consists of 11 governorates: Hebron, Ramallah and Al-Bireh, Bethlehem, Nablus, Jericho, Jenin, Tubas, Jerusalem, Tulkarm, Salfit, and Qalqilya. Each governorate has a health directorate, and any person who is bitten by an animal usually is referred to PMD in each directional. will be evaluated and decision for treatment and prophylactic treatment will be taken, PMD are using special investigation form for surveillance purposes including treatment, follow up and coordination with veterinary services.

3.5 Sample and Sample Size

All cases of animal bites in West Bank were included in the study between 2020 to 2023 retrospectively with all that management intervention stored in PMD at MOH such as dog bite, cat bite and other animals and it was obtained as inclusion and exclusion criteria.

3.6 Inclusion and exclusion criteria

inclusion criteria:

- all cases of animal bites reported by PMD of Palestinian M.O.H in West bank at the period between 2020 to 2023.
- Dog bites
- Donkey bites
- Cat bites
- Monkey bites
- Hyena bites
- Swine bites
- Sheep bites
- Fox bites
- Cow bites
- Horse bites
- Camel bites
- Rat bites
- Badger

Exclusion criteria:

- All cases out of the study period
- All cases not documented by MOH PMD
- Human bites
- Snake bites
- Insect bites

- Scorpion bites

3.7 Duration of the study

On May 20, 2024, ethical approval was obtained. Protocol approval period: 20th May 2024 to 10th Jun 2024. Data was collected in the month of Jun to Oct 2024 as indicated in the proposal and facilitate the task of the researcher.

Data was analyzed in (Nov 2024). The final thesis was submitted for examination in (Dec 2024).

3.8 Instrumentation

The investigation form of the Palestinian M.O.H related to animal bites and rabies prevention through all different aspect's demographic, diagnosis, intervention, vaccination, coordination et…., was analyzed and new data form was conducted to cover all study variable related to study questions and aim and it was included (You can form attached in the chapter of appendix):

- Sociodemographic data
- Site of bite on body
- Number of bites
- Nature of wound
- Patient vaccination of rabies before bites
- Animal type
- Outcome of biting animal

3.9 Validity

After constructing the data collection form related to research variables, it was reviewed by three experts, an infectious disease specialist and two Academic Learning doctors, their comments were taken into consideration and modified before data collection, and the data collection form was approved by the experts.

3.10 Reliability

Data were collected from private files of the PMD of the MOH through a data collection form that was evaluated by experts, A pilot study was conducted to evaluate and to test the questionnaire reliability and validity and it is carried out for 5 participants that are chosen from different places outside the study sample, and Cronbach's Alpha was 0.82.

3.11 Data Collection

Identification of patients in recording is done by serial number, no names or contact info collected. the data was collected from files computerized by health system in PMD of MOH, some demographic data in addition to other essential information needed to reach the goals of our study. (You can find file attached in the chapter of appendix).

3.12 Variables (Study measures)

Table (1): Study variables

Dependent variable	Independent variable
Animal bites	Sociodemographic data
Prevalence rate of animal bites	Site of bite on body
	Number of bites
	Nature of wound
	Patient vaccination of rabies before bites
	Animal type
	Outcome of biting animal

3.13 Ethical consideration

The institutional review board (IRB) committee of Al-Quds University approved the study proposal. The Palestinian MOH granted permission and consent for the study to obtained on PMD. With the MOH legal consent, the data was gathered from medical records of PMD. In this study, no names or personal information was taken. Although the data were taken from the patients' medical records, there is no direct interaction with the participants.

3.14 Data analysis

Descriptive analysis included mean, median, standard deviation, maximum, minimum, percentage and frequency were used by SPSS version 22 to describe the results in the study and chi square test was selected to measure the relation between variables, considered significant is ($p < 0.05$).

Chapter 4: Result

Part (1): frequencies and percentage.

Table (2-A): Number and percentage of sociodemographic variables

Variable	**n (%)**
Gender	
Male	2522 (82.34%)
Female	541 (17.66%)
Age	
Mean ± Std-Dev	21.37 ± 16.65
Median (Q1-Q3)	15 (10-29)
Min, Max	0, 87

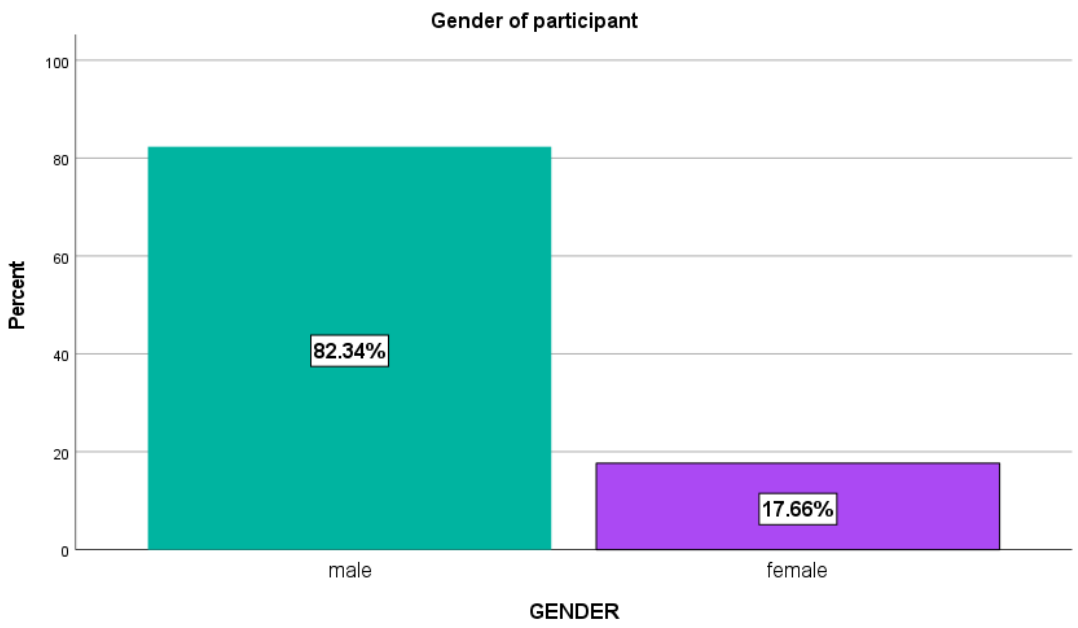
Table (2-B)

Occupation	
Barber	1 (0.03%)
Children	165 (5.39%)
Driver	2 (0.07%)
Employee	230 (7.51%)
Farmer	52 (1.7%)
Housewife	141 (4.6%)
Infant	16 (0.52%)
Merchant	2 (0.07%)
Musician	1 (0.03%)
Not Working	131 (4.28%)
Nurse	1 (0.03%)
Plumber	1 (0.03%)
Shepherds	1 (0.03%)
Smith	1 (0.03%)
Student	1604 (52.37%)
Veterinarian	1 (0.03%)
Worker	713 (23.28%)

From Table (2), the majority of the population is male 2522 individuals (82.34%), while 541 individuals (17.66%) are females.

The average age of the population is 21.37 years, with a high standard deviation of 16.65, indicating a wide range in ages. The median age is 15 years, suggesting that half of the population is younger than 15. The interquartile range (IQR) is 10-29, meaning that 50% of the population falls within this age range.

The majority of participants are students 1604 (52.37%), followed by 713 (23.28%) workers and 230 (7.51%) employees.



Figure(1) : Gender of Particepants

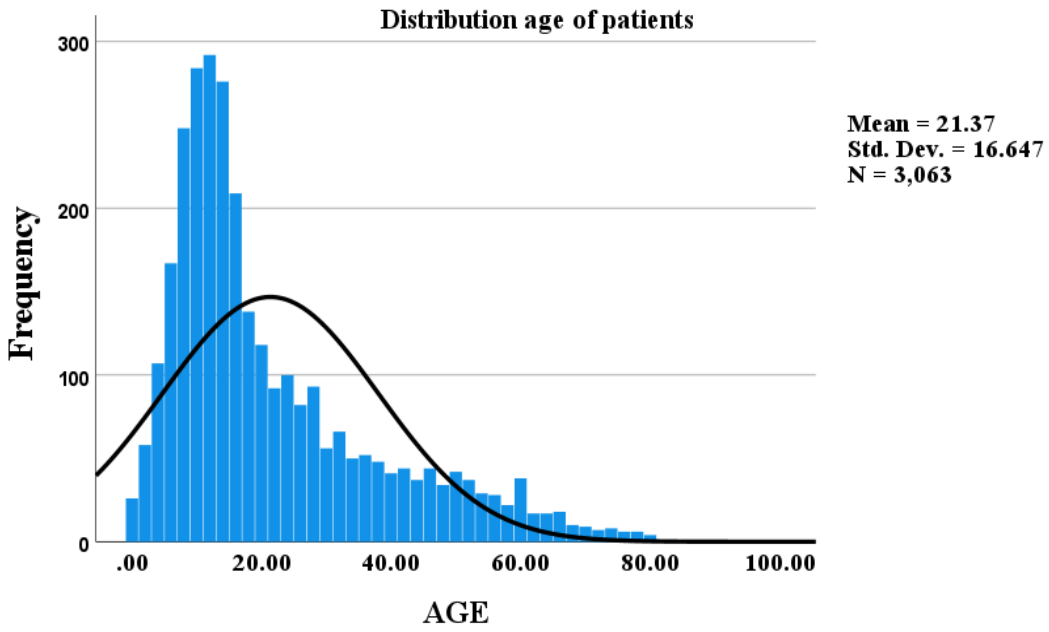


Figure (2): Age of patients

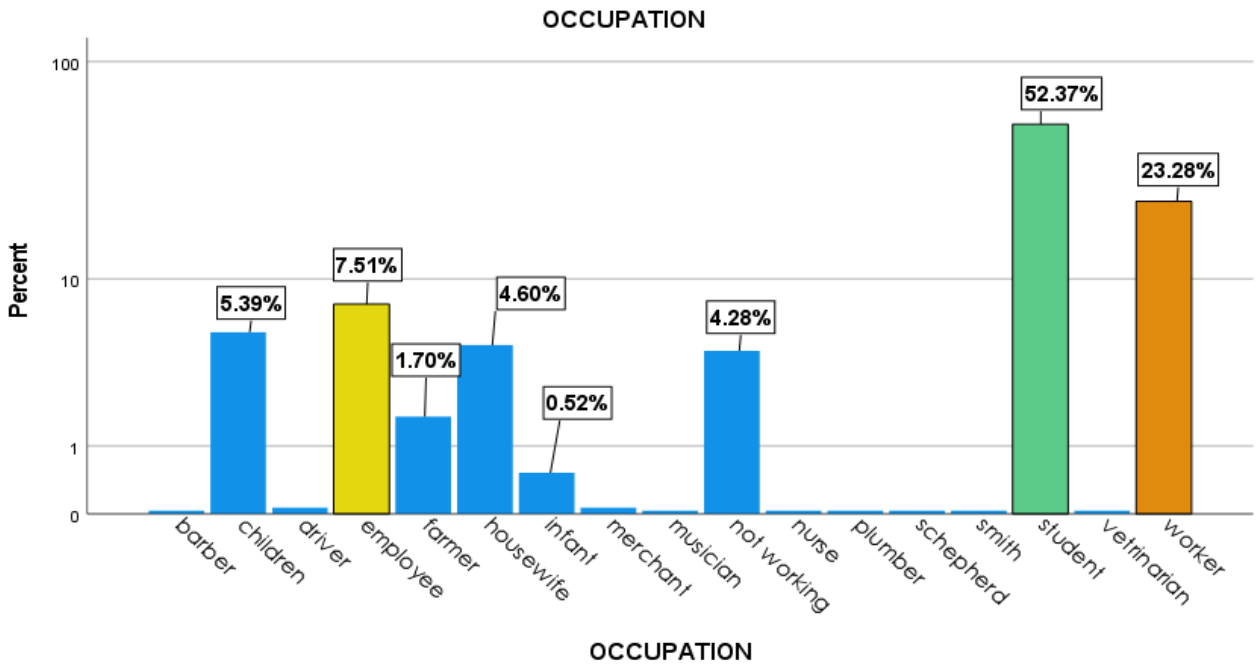


Figure (3): Occupation of patients

Table (3): Distributions of the Participants by Percentage and Frequency

Different Time Between Animal Bite Time and Investigation Time by Day	
Mean ± Std-Dev	1.31 ± 3.52
Median (Q1-Q3)	1 (0-1)
Min, Max	0, 103
Person District, address	
Bethlehem	218 (7.12%)
Hebron	359 (11.72%)
Jenin	156 (5.09%)
Jerico	192 (6.27%)
Jerusalem	137 (4.47%)
Nablus	340 (11.1%)
North Hebron	228 (7.44%)
Qalqilya	132 (4.31%)
Ramallah And Albereh	410 (13.39%)
Salfit	151 (4.93%)
South Hebron	207 (6.76%)
Tubas	77 (2.51%)
Tulkarm	248 (8.1%)
Yatta	208 (6.79%)

From Table (3), the variable (different time between animal bite time and investigation time by day) reflects the time delay between when an animal bite occurs and when it is investigated. On average, the delay is 1.31 days with a standard deviation of 3.52, indicating that while most investigations occur quickly, there is some variability in response time. The median delay is 1 day, and the interquartile range (Q1-Q3) is 0-1 days, meaning that in 50% of cases, the investigation occurs within the same day or the following day of the bite. However, the data shows a wide range, with a minimum delay of 0 days (immediate investigation) and a maximum delay of 103 days, suggesting that while most investigations happen promptly, there are outliers with significant delays. Most of the sample 410 (13.39%) from Ramallah and Albereh, while only 359 (11.72%) from Hebron.

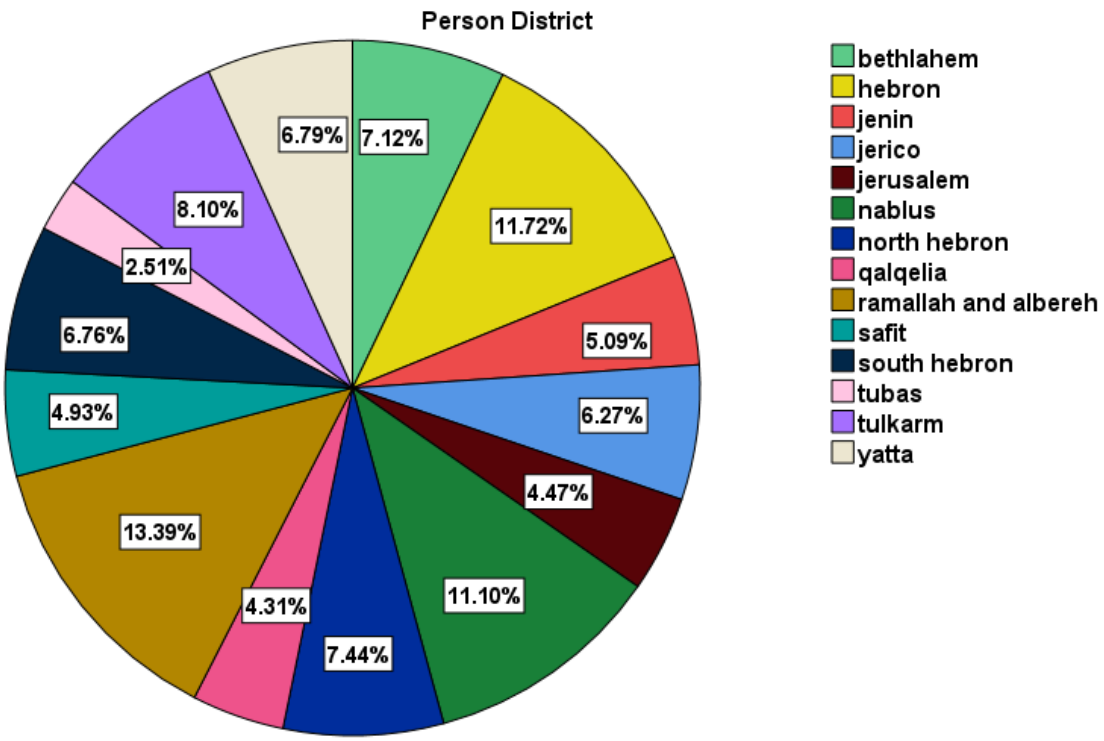


Figure (4): Person district

Table (4): Distribution of the bite.

Variable	Yes	No
Bite On the Body Face	66 (2.15%)	2997 (97.85%)
Bite On the Body Head &Neck	105 (3.43%)	2958 (96.57%)
Bite On the Body Lower Limbs	1358 (44.34%)	1705 (55.66%)
Bite On the Body Trunk	145 (4.73%)	2918 (95.27%)
Bite On the Body Upper Limbs	1554 (50.73%)	1509 (49.27%)
Bite On the Body Others	92 (3%)	2971 (97%)

From the Table (4), the distribution of bite locations on the body shows that the upper limbs were the most commonly affected area, with 50.73% (1554 cases) of bites occurring there, followed by the lower limbs with 44.34% (1358 cases). Bites on the trunk were less frequent, accounting for 4.73% (145 cases), and bites on the head and neck represented 3.43% (105 cases). Bites on the face were relatively rare, occurring in only 2.15% (66 cases), while 3% (92 cases) were categorized as other body parts. The majority of the population did not experience bites on these specific body parts, with proportions exceeding 90% for face, head and neck, trunk, and other areas.

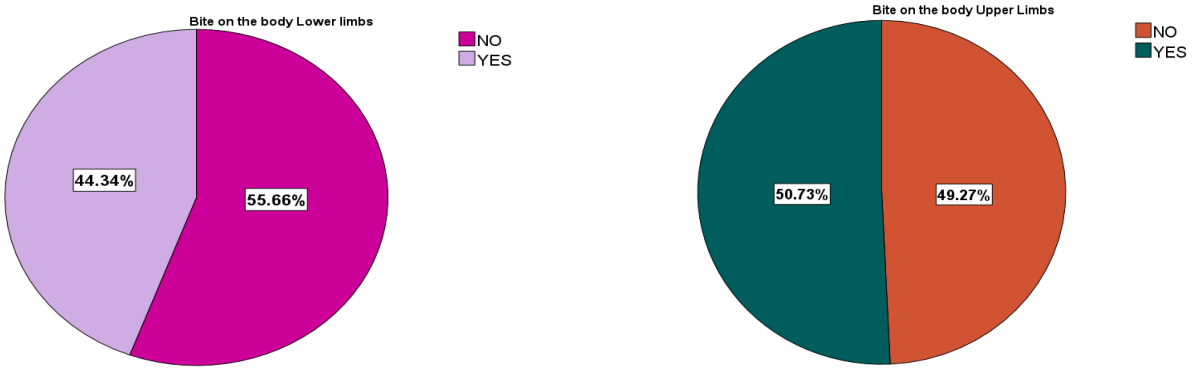


Figure (5): Bite on the body in lower and upper limbs

Table (5-A): other specific bite site and distribution.

Bite On the Body Specify Other Rare Sites	
Most Common Previous	2983 (97.39%)
Abdomen	10 (0.33%)
Abdomen And Chest	1 (0.03%)
Abdomen And Trunk	1 (0.03%)
Left Side Abdomen	1 (0.03%)
Right Side Of Abdomen	1 (0.03%)
Axillary	1 (0.03%)
Back	15 (0.49%)
Back and Buttocks	1 (0.03%)
Buttocks	27 (0.88%)
Chest	7 (0.23%)
Ear	1 (0.03%)
Left Ear	1 (0.03%)
Left Gluteus Muscles	1 (0.03%)
Left Shoulder	1 (0.03%)
Lower Back	1 (0.03%)
Left Flank	1 (0.03%)
Left Ilic Crest	1 (0.03%)
Pelvic	1 (0.03%)
Penes	1 (0.03%)
Right Axillary	1 (0.03%)
Right Ear	1 (0.03%)
Right Flank	1 (0.03%)
Scrotal	2 (0.07%)
Tests	1 (0.03%)

Table (5-B)

Number of bites on the body	
Single	2188 (71.43%)
Multiple	875 (28.57%)

From the above Table (5), The variable (bite on the body specify others rare sites) shows that the majority of individuals, 97.39% (2983 cases), did not report bites on other unspecified body parts. However, 2.61% (80 cases) specifically reported bites on the specified body, indicating that bites are quite rare compared to other body parts. Although, the variable (number of bites on the body) indicates that the majority of individuals, 71.43% (2188 cases), experienced a single bite, while 28.57% (875 cases) suffered from multiple bites. This suggests that single bite incidents are more common, but a significant proportion of individuals experienced multiple bites.

Table (6): Bite type.

Nature of wound	
Mild	1981 (64.68%)
Moderate	964 (31.47%)
Sever	118 (3.85%)

The variable in table (6) : (Nature of wound) shows that the majority of wounds were classified as mild, accounting for 64.68% (1981 cases). Moderate wounds made up 31.47% (964 cases), while severe wounds were relatively rare, occurring in only 3.85% (118 cases). This distribution indicates that most wounds from bites were not severe, with only a small fraction requiring significant medical attention.

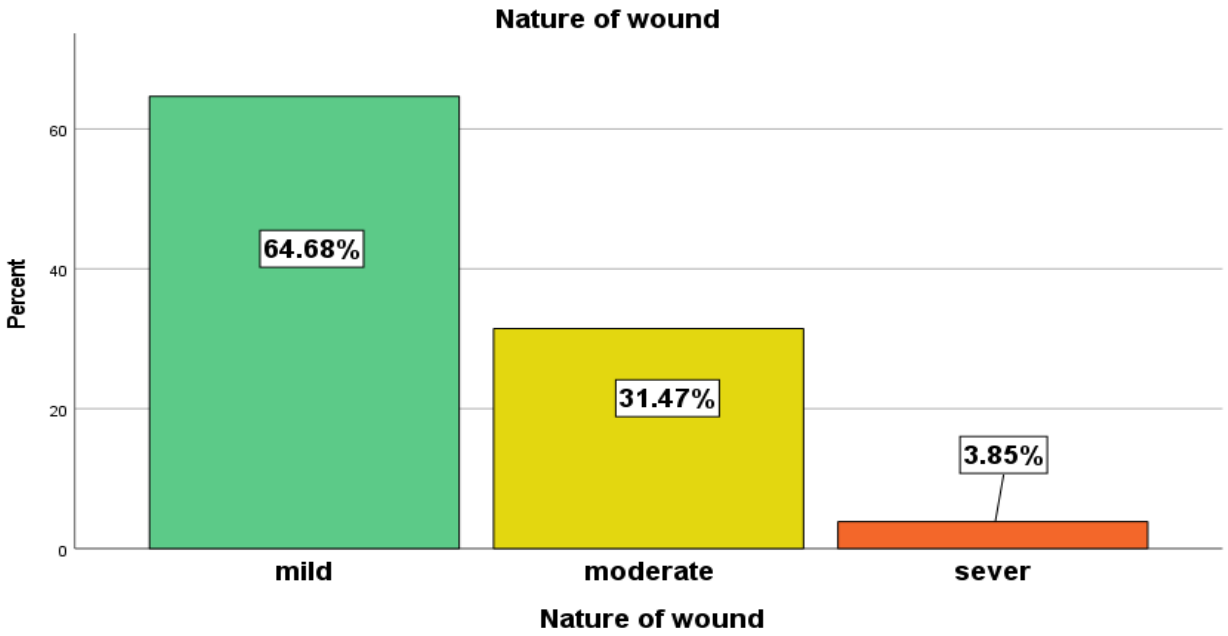


Figure (6): Nature of wound

Table (7): Animal vaccination and patient prevention prophylaxis.

	Yes	No
Biting by vaccinated animals	506 (16.52%)	2557 (83.48%)
Patient treated with RIG	155 (5.06%)	2908 (94.94%)

In the table (7) The data on animal vaccination and patient treatment shows that only 16.52% (506 cases) of the biting animals were vaccinated against rabies, while a large majority, 83.48% (2557 cases), were not vaccinated, indicating a significant public health risk. Regarding treatment, only 5.06% (155 cases) of patients received RIG, while the vast majority, 94.94% (2908 cases), did not receive this treatment. This suggests that most patients did not undergo RIG treatment, possibly due to the nature of the bite or the availability of the treatment.

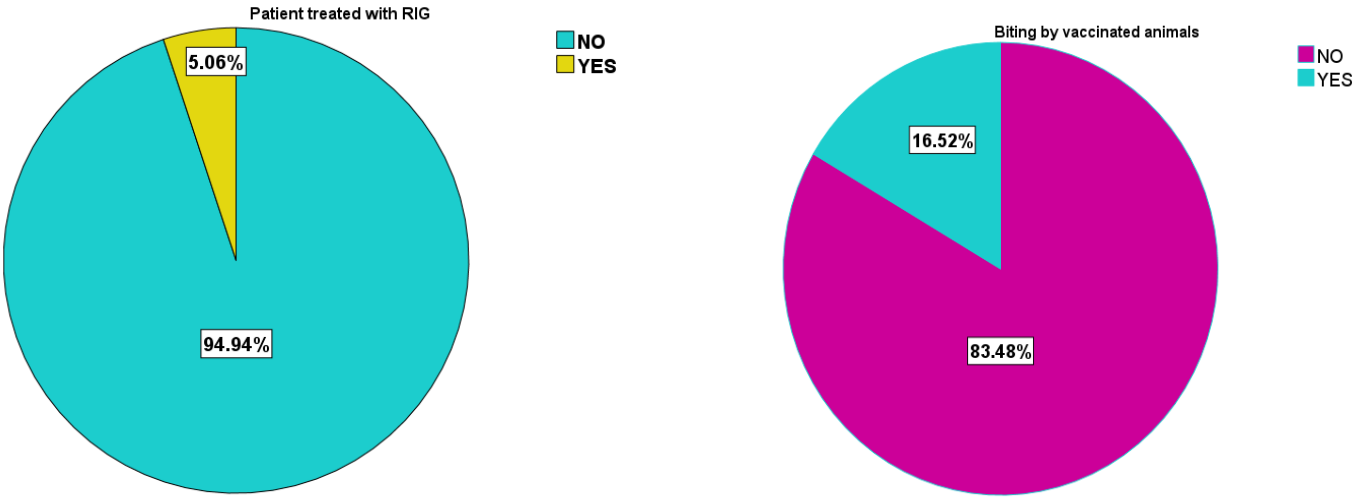


Figure (7): Patient treated with RIG and Biting by vaccinated animals

Table (8): Biting Animal Kind

Table 8: Biting Animal Kind	N (%)
Dog	2675 (87.33%)
Badger	1 (0.03%)
Camel	1 (0.03%)
Cat	199 (6.5%)
Cow	1 (0.03%)
Donkey	35 (1.14%)
Fox	4 (0.13%)
Horse	19 (0.62%)
Hyena	1 (0.03%)
Monkey	1 (0.03%)
Pig	22 (0.72%)
Rabbit	1 (0.03%)
Rat	32 (1.04%)
Sheep	1 (0.03%)
Unkown	70 (2.29%)

In the table (8) The variable (Biting Animal Kind) shows that dogs were responsible for the vast majority of bites, accounting for 87.33% (2675 cases). This highlights the significant role dogs play in animal bite incidents within this population, making them the primary focus for potential rabies control and prevention efforts.

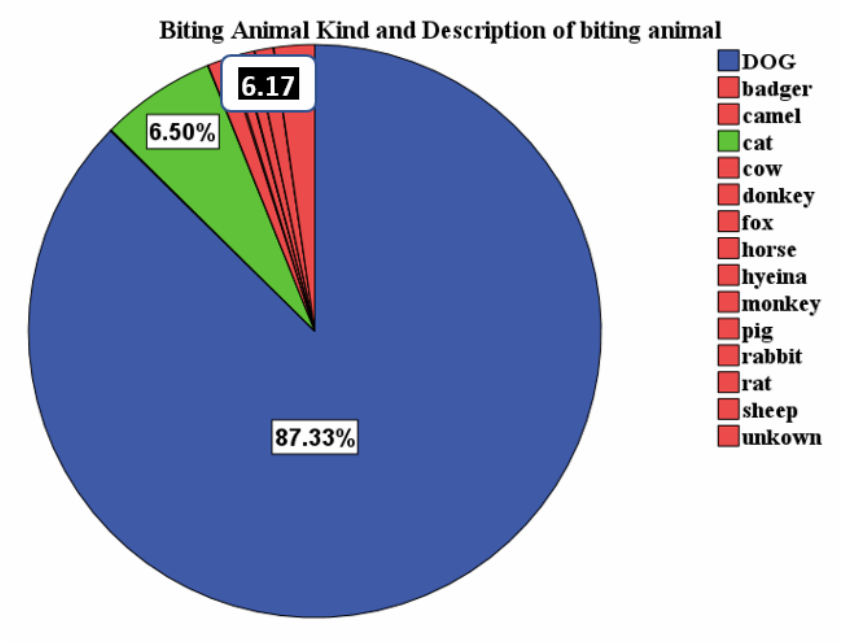


Figure (8): Biting animal kind

Table (9): Animal bite intervention.

Tetanus Toxoid Vaccine	
NO	1904 (62.16%)
YES	1159 (37.84%)
Treatment Medication antibiotic	
NO	933 (30.46%)
YES	2130 (69.54%)
Rabies Vaccine	
NO	1530 (49.95%)
YES	1533 (50.05%)

In the table (9) Animal bite intervention, Tetanus Toxoid Vaccine: 62.16% (1904 cases) of patients did not receive the tetanus toxoid vaccine, while 37.84% (1159 cases) did.

Treatment Medication: 69.54% (2130 cases) of patients received antibiotic treatment, whereas 30.46% (933 cases) did not. This shows that a significant portion of patients were treated with antibiotics, likely for infection prevention or management.

Rabies Vaccine: The distribution is almost even, with 50.05% (1533 cases) receiving the rabies vaccine and 49.95% (1530 cases) not receiving it. This indicates a balanced split between those who received the vaccine and those who did not, reflecting a substantial proportion of patients who potentially missed out on crucial rabies prevention.

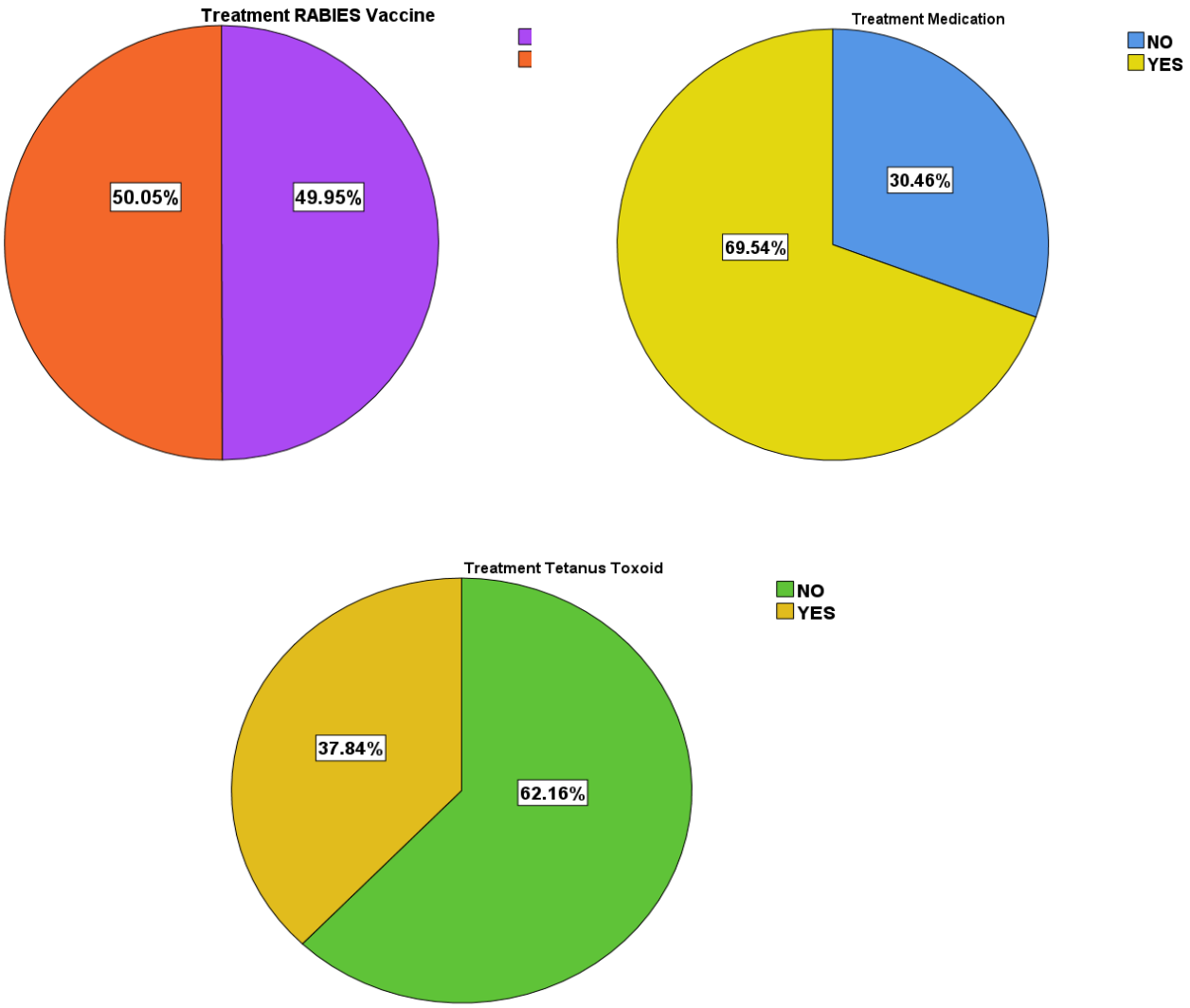


Figure (9): Treatment rabies vaccine, medication and tetanus toxoid

Table (10): Anti rabies vaccine doses.

Rabies Vaccine Administration For 1st Dose	
Not Vaccinated	1530 (49.95%)
Vaccinated Known Date	1500 (48.97%)
Vaccinated Unknown Vaccine Date	33 (1.08%)
Rabies Vaccine Administration For 2nd Dose	
Unvaccinated	2285 (74.6%)
Vaccinated Known Date of Vaccine	778 (25.4%)
Rabies Vaccine Administration For 3rd Dose	
Unvaccinated	2539 (82.89%)
Vaccinated Known Vaccine Date	524 (17.11%)
Rabies Vaccine Administration For 4th Dose	
Unvaccinated	2998 (97.88%)
Vaccinated Known Vaccine Date	65 (2.12%)
Rabies Vaccine of Administration For 5th Dose	
Unvaccinated	3060 (99.9%)
Vaccinated Known Vaccine Date	3 (0.1%)

In the table (10) Anti rabies vaccine doses showed:

- 1**st Dose:** 49.95% (1530 cases) of individuals were **not vaccinated**. Among those who were vaccinated, 48.97% (1500 cases) had a known vaccination date, while 1.08% (33

cases) had an unknown vaccination date. This indicates that a substantial proportion of individuals either missed the first dose or had unclear records of their vaccination.

- 2**nd Dose:** 74.6% (2285 cases) of individuals were **unvaccinated** for the second dose. Of those who received the second dose, 25.4% (778 cases) had a known vaccination date. This suggests a significant gap in the completion of the full vaccination series.

- **3rd Dose:** 82.89% (2539 cases) were **unvaccinated** for the third dose, and 17.11% (524 cases) had a known vaccination date. This indicates a continuing trend of low coverage for subsequent doses.
- **4th Dose:** 97.88% (2998 cases) were **unvaccinated** for the fourth dose, with only 2.12% (65 cases) having a known vaccination date. The coverage for this dose is very low.

- **5th Dose:** 99.9% (3060 cases) were **unvaccinated** for the fifth dose, with only 0.1% (3 cases) receiving the vaccine and having a known date. This highlights an extremely low uptake for the final dose in the vaccination series.

Figure (10): Anti rabies vaccine doses

Table (11): Outcome of biting animals

Outcome of the animal	
Under Observation	2129 (69.51%)
Escaped	740 (24.16%)
Killed	67 (2.19%)
Unknown	127 (4.15%)

In the table (11) outcome of biting animals, the 69.51% (2129 cases) of the animals were placed under observation. This is the most common outcome, suggesting a focus on monitoring animals that have bitten individuals for signs of rabies. 24.16% (740 cases) of the animals escaped. This indicates a notable proportion of animals were not contained, which could pose ongoing risks for rabies transmission. 2.19% (67 cases) of the animals were killed. This is a relatively small fraction, suggesting that killing of the animals was not a common practice or occurred in specific circumstances. 4.15% (127 cases) had an unknown outcome. This could reflect incomplete records or uncertainty about the fate of some animals.

Overall, the majority of animals were observed, but a significant number either escaped or had unknown outcomes, highlighting potential gaps in control and follow-up measures.

Table (12): Variables related to biting animals and geographic bite area.

Animal If Under observation (10-14 days)	
Healthy	715 (23.34%)
Sign of Rabies	8 (0.26%)
Died	10 (0.33%)
Unknown	2330 (76.07%)
Type of lab Test If the animal killed or died	
NO	3063 (100%)
YES	0 (0%)
Animal biting identification (animal characteristic)	
Unknown	2333 (76.17%)
Known	730 (23.83%)
Biting patient by residency	
Camp	163 (5.32%)
Urban	1274 (41.59%)
Rural	1626 (53.09%)

In the table (12) Variables related to biting animals and geographic bite area. The 23.34% (715 cases) of the animals were observed to be healthy at the end of the observation period, indicating no signs of rabies. 0.26% (8 cases) of the animals showed signs of rabies, which suggests a very low incidence of rabies among observed animals. 0.33% (10 cases) of the animals died during the observation period, which could be due to various causes, not necessarily rabies. 76.07% (2330 cases) had an unknown outcome, reflecting a significant portion of animals with unclear results after the observation period.

The variable pertains to the type of laboratory test conducted when an animal has been killed or has died. Out of the total, 3063 tests were performed (100%), and 2333 instances (76.17%) involved the identification of the animal that bit.

The distribution of bite incidents by biting patient by residency reveals that the majority occurred in rural areas, with 53.09% (1626 cases) of bites reported in these settings. Urban areas followed with 41.59% (1274 cases) of incidents, indicating a significant number of bites also occurred in more densely populated regions. In contrast, camp settings had the fewest incidents, accounting for 5.32% (163 cases). This data highlights that rural environment are the most common locations for bite incidents, with urban areas also contributing substantially, while camps are less frequently associated with such incidents.

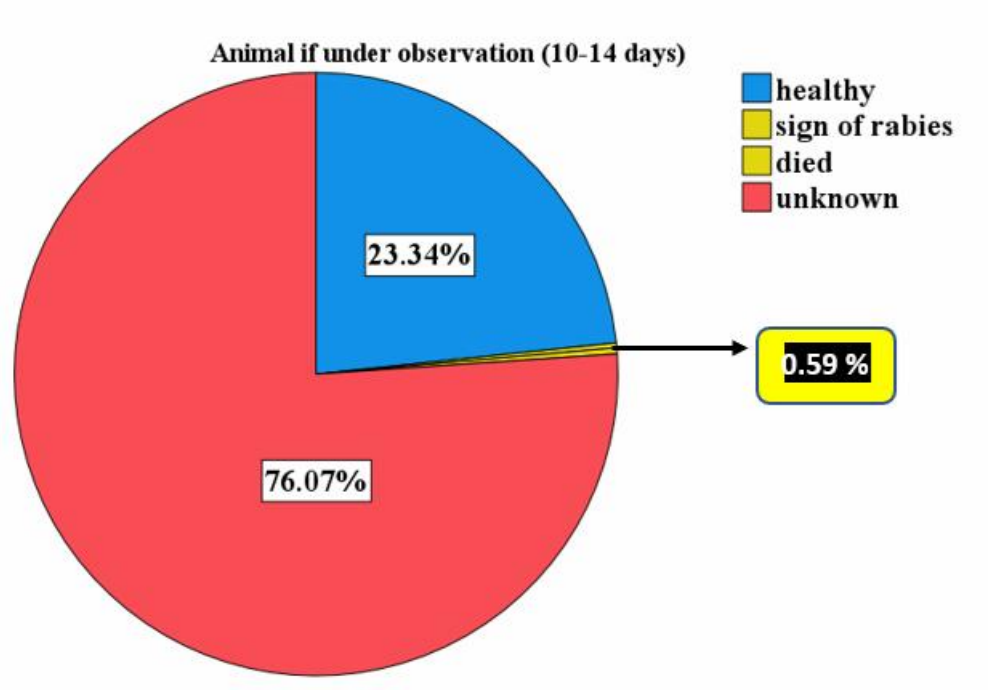


Figure (11): animals under observation

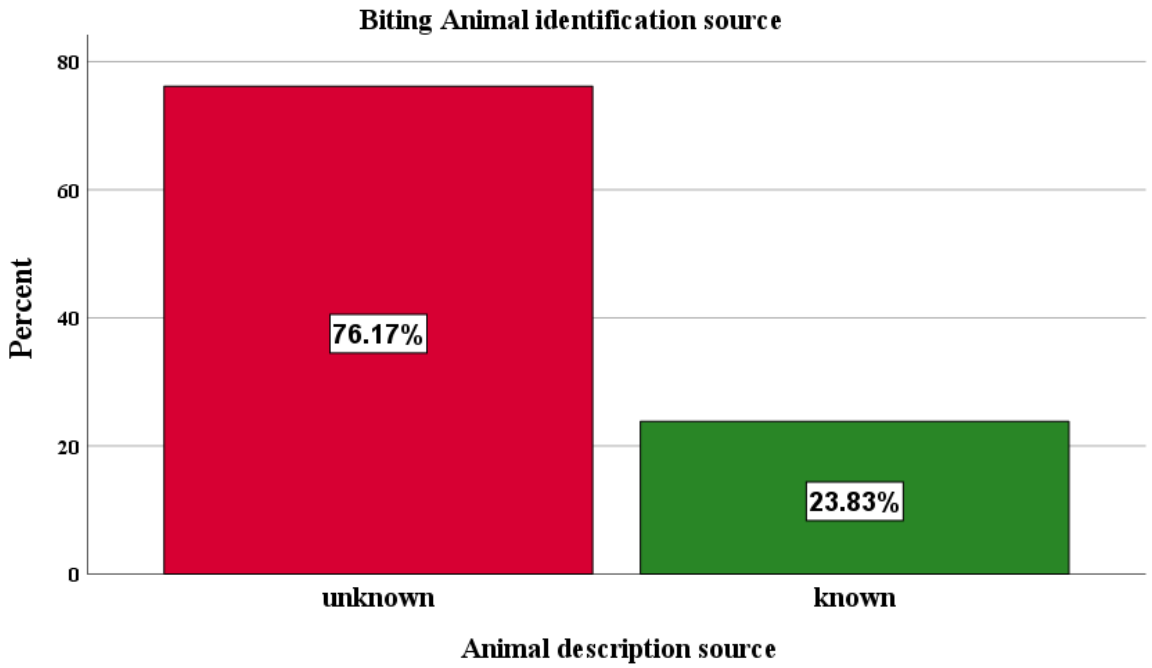


Figure (12): biting animal identification source

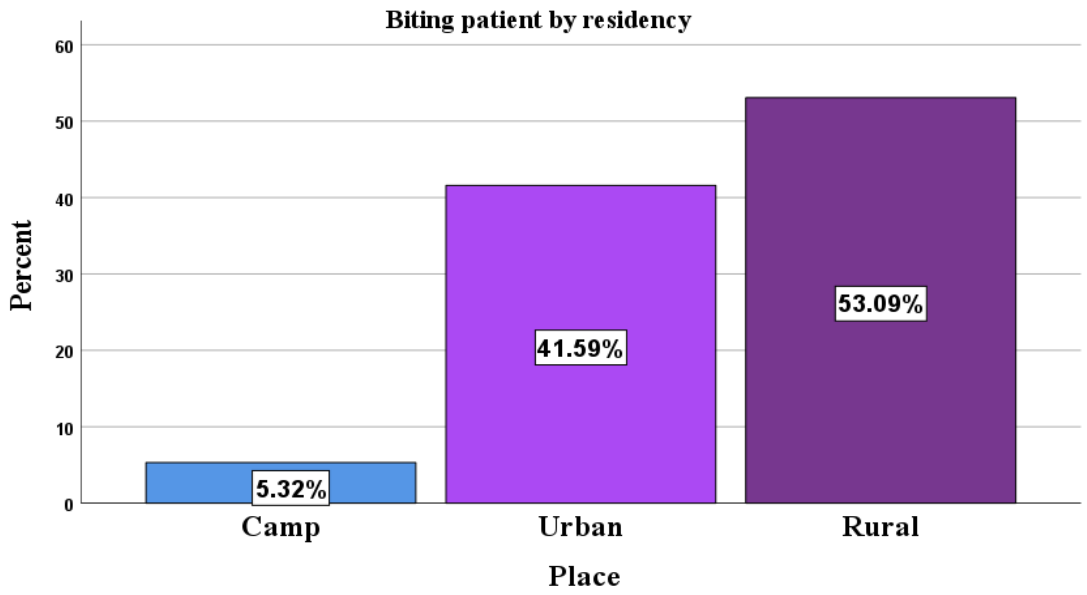


Figure (13): Biting patient by residency

Table (13): Anti rabies vaccination before bite for patient.

Patient Was Vaccinate For Rabies Before Bite	
NO	3025 (98.76%)
YES	38 (1.24%)

As shown 1n table (13) the data on whether patients were vaccinated for rabies before the bite shows that a vast majority, 98.76% (3025 cases), were not vaccinated for rabies before the bite. Only 1.24% (38 cases) of patients had been vaccinated prior to the incident. This indicates that very few patients had received pre-bite rabies vaccination, which could have implications for the effectiveness of post-bite rabies prevention and treatment strategies.

Table (14): Distribution of bite by West Bank city and cases percentage by year of study.

Distribution of bite as west bank city	
Bethlehem	218 (7.12%)
Hebron	1002 (32.71%)
Jenin	156 (5.09%)
Jericho	192 (6.27%)
Jerusalem	137 (4.47%)
Nablus	340 (11.1%)
Qalqilya	132 (4.31%)
Ramallah and bereh	410 (13.39%)
Salfit	151 (4.93%)
Tubas	77 (2.51%)
Tulkurem	248 (8.1%)
Cases by year of study	
2020	636 (20.76%)
2021	645 (21.06%)
2022	857 (27.98%)
2023	925 (30.2%)

As shown in table (14) the data on the year of study reveals a progressive increase in the number of cases over the years. In 2020, there were 636 cases, representing 20.76% of the total. This number rose to 645 cases (21.06%) in 2021, and further increased to 857 cases (27.98%) in 2022. The highest number of cases was recorded in 2023, with 925 cases, accounting for 30.2% of the total. This upward trend indicates a growing prevalence of the study's focus or a greater number of reported incidents in recent years.

In addition, and according of table (14) above, Hebron city was showing a majority of animal bite with percentage 32.71%, and the lowest percentage was show in Tubas city with percentage 2.51%.

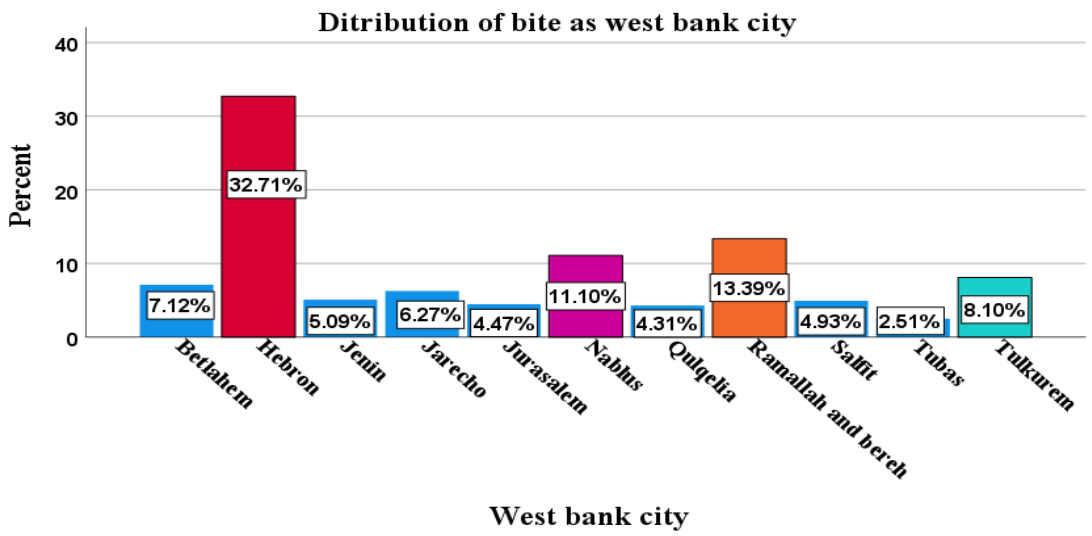


Figure (14): distribution of bites as west bank city

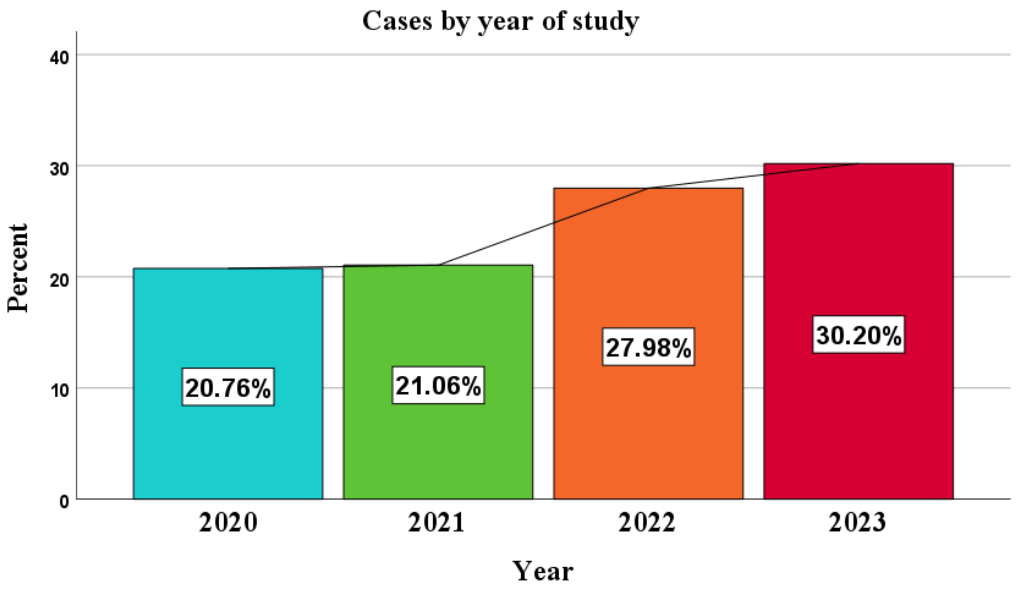


Figure (15): Cases by year of study

Part (2): Cross-tabulation.

Table (15): cross tab of biting animals grouped by gender.

Variable	Female	Male	P.value
Age			
n (miss)	541 (0)	2522 (0)	0.10
Mean ± Std-Dev	24.74 ± 20.5	20.65 ± 15.6	
Median (Q1-Q3)	17 (8-39)	15 (10-28)	
Min, Max	0, 83	0, 87	

In the table (15) The age distribution by gender shows that the average age for females is 24.74 years with a standard deviation of 20.5, while for males, the average age is 20.65 years with a standard deviation of 15.6. The median age for females is 17 years (with a quartile range of 8 to 39), compared to a median age of 15 years (with a quartile range of 10 to 28) for males. The minimum and maximum ages are 0 to 83 years for females and 0 to 87 years for males. The p-value of 0.10 indicates that there is no statistically significant difference in age between the two genders, suggesting that the observed differences in age are likely due to chance rather than a meaningful gender-related disparity.

Table (16): Cross tab of different time between animal bite time and investigation time by day grouped by gender.

Variable	Female	Male	P-Value
Different time between animal bite time and investigation time by day			
n (miss)	541 (0)	2522 (0)	0.65 c
Mean ± Std-Dev	1.66 ± 5.9	1.24 ± 2.8	
Median (Q1-Q3)	1 (0-1)	1 (0-1)	
Min, Max	0, 103	0, 50	

In the table (16) The data on the different time between animal bite and investigation by gender shows that the average delay for females is 1.66 days with a standard deviation of 5.9, while for males, the average delay is 1.24 days with a standard deviation of 2.8. Both genders have a similar range of investigation times, with no missing data reported. The p-value of 0.65 indicates that there is no statistically significant difference in the time between the bite and investigation between females and males. This suggests that any observed differences in delays are likely due to random variation rather than a meaningful gender-related factor.

Table (17): cross tab of distribution of bite site grouped by gender.

Variable	Female	Male	P. value
Bite on the body Face			
NO	530 (98.0%)	2467 (97.8%)	0.959
YES	11 (2.0%)	55 (2.2%)	
Total	541 (100.0%)	2522 (100.0%)	
Bite on the body Head &Neck			
NO	524 (96.9%)	2434 (96.5%)	0.785
YES	17 (3.1%)	88 (3.5%)	
Total	541 (100.0%)	2522 (100.0%)	
Bite on the body Lower limbs			
NO	313 (57.9%)	1392 (55.2%)	0.279
YES	228 (42.1%)	1130 (44.8%)	
Total	541 (100.0%)	2522 (100.0%)	
Bite on the body Trunk			
NO	515 (95.2%)	2403 (95.3%)	1
YES	26 (4.8%)	119 (4.7%)	
Total	541 (100.0%)	2522 (100.0%)	
Bite on the body Upper Limbs			
NO	259 (47.9%)	1250 (49.6%)	0.505
YES	282 (52.1%)	1272 (50.4%)	
Total	541 (100.0%)	2522 (100.0%)	
Bite on the body others			
NO	521 (96.3%)	2450 (97.1%)	0.367
YES	20 (3.7%)	72 (2.9%)	
Total	541 (100.0%)	2522 (100.0%)	

From the above table (17), the distribution of bites on the body face by gender reveals that 2.0% (11 cases) of females and 2.2% (55 cases) of males experienced bites on the face. The vast majority of both genders did not have face bites, with 98.0% (530 cases) of females and 97.8% (2467 cases) of males reporting no such incidents. The p-value of 0.959 indicates that there is no statistically significant difference between genders regarding face bites. This suggests that the likelihood of having a face bite is similar for both females and males.

The P-value of all variables larger than 0.05 indicates that there is no statistically significant difference between genders regarding those variables.

Table (18): Cross tab of type of bite grouped by gender.

Variable	Female	Male	P. value
Number of bites on the body			
Single	390 (72.1%)	1798 (71.3%)	0.749
Multiple	151 (27.9%)	724 (28.7%)	
Total	541 (100.0%)	2522 (100.0%)	
Nature of wound			
Mild	357 (66.0%)	1624 (64.4%)	0.589
Moderate	161 (29.8%)	803 (31.8%)	
Sever	23 (4.3%)	95 (3.8%)	
Total	541 (100.0%)	2522 (100.0%)	
Biting Animal Was the animal Vaccinated against rabies			
NO	459 (84.8%)	2098 (83.2%)	0.381
YES	82 (15.2%)	424 (16.8%)	
Total	541 (100.0%)	2522 (100.0%)	
Patient Treatment RIG			
NO	512 (94.6%)	2396 (95.0%)	0.808
YES	29 (5.4%)	126 (5.0%)	
Total	541 (100.0%)	2522 (100.0%)	

The above table (18), shows that the P-value of all variables larger than 0.05 indicates that there is no statistically significant difference between genders regarding those variables.

Table (19): cross tab of biting animal kind grouped by gender.

variable	female	male	P. value
Biting Animal Kind and Description of biting animal			
Dog	410	2265	<0.001
Badger	0 (0.0%)	1 (0.0%)	
Camel	0 (0.0%)	1 (0.0%)	
Cat	94 (17.4%)	105 (4.2%)	
Cow	0 (0.0%)	1 (0.0%)	
Donkey	6 (1.1%)	29 (1.1%)	
Fox	0 (0.0%)	4 (0.2%)	
Horse	3 (0.6%)	16 (0.6%)	
Hyena	0 (0.0%)	1 (0.0%)	
Monkey	0 (0.0%)	1 (0.0%)	
Pig	3 (0.6%)	19 (0.8%)	
Rabbit	1 (0.2%)	0 (0.0%)	
Rat	11 (2.0%)	21 (0.8%)	
Sheep	0 (0.0%)	1 (0.0%)	
Unknown	13 (2.4%)	57 (2.3%)	
Total	541	2522	

In table (19), the data on the kind and description of the biting animal shows a significant difference between genders in the distribution of animal types. Among females, 75.8% (410 cases) were bitten by dogs, whereas a much higher 89.8% (2265 cases) of males were bitten by

dogs. In contrast, there was only one male bite incident involving a badger, with no such incidents

reported for females. The p-value of <0.001 indicates a statistically significant difference between genders regarding the type of biting animal, suggesting that males are more likely to be bitten by dogs compared to females.

Table (20-A): Cross tab of multiple variables for rabies prevention grouped by gender.

Variable	Female	Male	P. value
Tetanus Toxoid Vaccine			
NO	318 (58.8%)	1586 (62.9%)	0.082
YES	223 (41.2%)	936 (37.1%)	
Total	541 (100.0%)	2522 (100.0%)	
Treatment Medication antibiotic			
NO	165 (30.5%)	768 (30.5%)	1
YES	376 (69.5%)	1754 (69.5%)	
Total	541 (100.0%)	2522 (100.0%)	
Rabies Vaccine			
NO	275 (50.8%)	1255 (49.8%)	0.686
YES	266 (49.2%)	1267 (50.2%)	
Total	541 (100.0%)	2522 (100.0%)	
Rabies vaccine Administration for 1st dose			
Not vaccinated	275 (50.8%)	1255 (49.8%)	0.521
Vaccinated known date	258 (47.7%)	1242 (49.2%)	
Vaccinated unknown date	8 (1.5%)	25 (1.0%)	
Total	541 (100.0%)	2522 (100.0%)	
Rabis Vaccine Administration for 2st dose			
Unvaccinated	394 (72.8%)	1891 (75.0%)	0.323
Vaccinated known Date of	147 (27.2%)	631 (25.0%)	
Total	541 (100.0%)	2522 (100.0%)	

Table (20-B)

Rabies Vaccine Administration for 3st dose			
Unvaccinated	443 (81.9%)	2096 (83.1%)	0.533
Vaccinated Known Vaccine Date	98 (18.1%)	426 (16.9%)	
Total	541 (100.0%)	2522 (100.0%)	
Rabies Vaccine Administration for 4st dose			
Unvaccinated	530 (98.0%)	2468 (97.9%)	1
Vaccinated Known Vaccine Date	11 (2.0%)	54 (2.1%)	
Total	541 (100.0%)	2522 (100.0%)	
Rabies Vaccine Administration for 5st dose			
Unvaccinated	541 (100.0%)	2519 (99.9%)	0.964
Vaccinated Known Vaccine Date	0 (0.0%)	3 (0.1%)	
Total	541 (100.0%)	2522 (100.0%)	
Outcome of animal biting			
Under Observation	364 (67.3%)	1765 (70.0%)	0.197
Escaped	135 (25.0%)	605 (24.0%)	
Killed	18 (3.3%)	49 (1.9%)	
Unknown	24 (4.4%)	103 (4.1%)	
Total	541 (100.0%)	2522 (100.0%)	
Patient was Vaccinate for rabies before bite			
NO	538 (99.4%)	2487 (98.6%)	0.169
YES	3 (0.6%)	35 (1.4%)	
Total	541 (100.0%)	2522 (100.0%)	

In table (20), the data on Tetanus Toxoid Vaccination by gender indicates that 58.8% (318 cases) of females and 62.9% (1586 cases) of males did not receive the tetanus toxoid vaccine.

Conversely, 41.2% (223 cases) of females and 37.1% (936 cases) of males did receive the vaccine. The p-value of 0.082 suggests that there is no statistically significant difference between genders in the likelihood of receiving the tetanus toxoid vaccine. This implies that the rates of vaccination are relatively similar for both females and males, with any observed differences likely due to random variation.

The data on rabies vaccination for the doses (1-5 DOSE) by gender. The p-value of larger than 0.05 indicates that there is no statistically significant difference between genders in the administration of the 1-5 doses of the rabies vaccine. This suggests that the rates of vaccination, as well as the clarity of vaccination records, are similar for both females and males.

Table (21): Animal if under observation (10-14 days) grouped by gender.

Variable	Female	Male	P. Value
Animal If Under observation (10-14 days)			
Healthy	102 (18.9%)	613 (24.3%)	0.004
Sign Of Rabies	4 (0.7%)	4 (0.2%)	
Died	1 (0.2%)	9 (0.4%)	
Unknown	434 (80.2%)	1896 (75.2%)	
Total	541 (100.0%)	2522 (100.0%)	

In table (21), the data on the observation outcomes for animals under surveillance shows that a higher percentage of males (24.3%, 613 cases) compared to females (18.9%, 102 cases) had animals classified as healthy during the observation period, with p-value of 0.004 indicating a statistically significant difference. For signs of rabies, both genders had low incidence rates, with 0.7% (4 cases) of females and 0.2% (4 cases) of males showing signs. The percentage of animals that died was also low, with 0.2% (1 case) of females and 0.4% (9 cases) of males. The majority of cases for both genders were classified as unknown, with 80.2% (434 cases) of females and 75.2% (1896 cases) of males having indeterminate outcomes. This suggests that while there is a significant difference in the proportion of healthy animals, the overall high rate of unknown outcomes reflects potential gaps in follow-up or record-keeping.

Table (22): Animal biting identification and biting are grouped by age.

Variable	Female	Male	P. Value
Animal biting identification			
Unknown	408	1925	0.692
Known	133	597	
Total	541	2522	
Biting patient by residency			
Camp	29 (5.4%)	134 (5.3%)	0.883
Urban	230	1044	
Rural	282	1344	
Total	541	2522	

In table (22) the data on animal biting identification indicates that a similar proportion of both genders had unknown biting animals, with 75.4% (408 cases) of females and 76.3% (1925 cases) of males reporting an unknown identification of the animal. Conversely, 24.6% (133 cases) of females and 23.7% (597 cases) of males had known identifications of the biting animal. The p-value of 0.692 suggests that there is no statistically significant difference between genders in the identification status of the biting animal. This indicates that both females and males are equally likely to have unknown or known information about the biting animal.

The data on the place of biting by gender shows the following distribution. The 5.4% (29 cases) of females and 5.3% (134 cases) of males experienced bites in a camp setting. 42.5% (230 cases) of females and 41.4% (1044 cases) of males were bitten in urban areas. 52.1% (282 cases) of females and 53.3% (1344 cases) of males experienced bites in rural areas.

The p-value of 0.883 indicates that there is no statistically significant difference between genders regarding the place where the bite occurred. This suggests that the distribution of bite incidents across camp, urban, and rural settings is similar for both females and males.

Table (23): distribution of bite by west Bank city grouped by gender.

Variable	Female	Male	P. Value
Governate: distribution of bite as west bank city			
Bethlehem	46 (8.5%)	172 (6.8%)	<0.001
Hebron	165 (30.5%)	837 (33.2%)	
Jenin	20 (3.7%)	136 (5.4%)	
Jericho	45 (8.3%)	147 (5.8%)	
Jerusalem	29 (5.4%)	108 (4.3%)	
Nablus	64 (11.8%)	276 (10.9%)	
Qalqilya	8 (1.5%)	124 (4.9%)	
Ramallah And Bereh	91 (16.8%)	319 (12.6%)	
Salfit	20 (3.7%)	131 (5.2%)	
Tubas	9 (1.7%)	68 (2.7%)	
Tukaram	44 (8.1%)	204 (8.1%)	
Total	541 (100.0%)	2522 (100.0%)	

In table (23), for the data on the geographic distribution of bite incidents (geographic location) by gender, the p-value of <0.001 indicates a statistically significant difference between genders in the geographic distribution of bite incidents. Specifically, while the proportion of bites in Bethlehem is slightly higher among females compared to males, the percentage of bites in Hebron is slightly higher among males. This suggests that geographic patterns of bite incidents vary by gender, with significant differences in the distribution across these locations.

Table (24): Cases by year of study grouped by gender.

Variable	Female	Male	P. Value
Study: year of study			
2020	120 (22.2%)	516 (20.5%)	0.652
2021	105 (19.4%)	540 (21.4%)	
2022	155 (28.7%)	702 (27.8%)	
2023	161 (29.8%)	764 (30.3%)	
Total	541 (100.0%)	2522 (0%)	

In table (24), the data on the year of study by gender indicates the distribution of cases over different years: 22.2% (120 cases) of females and 20.5% (516 cases) of males were recorded, 19.4% (105 cases) of females and 21.4% (540 cases) of males were documented, 28.7% (155 cases) of females and 27.8% (702 cases) of males were noted and 29.8% (161 cases) of females and 30.3% (764 cases) of males were observed.

The p-value of 0.652 indicates that there is no statistically significant difference between genders in the distribution of cases across these years. This suggests that the proportion of cases each year is relatively consistent for both females and males.

Table (25-A): Distribution of variables grouped by year of study.

Variable	2020	2021	2022	2023	P. Value
Gender					
Male	516 (81.1%)	540 (83.7%)	702 (81.9%)	764 (82.6%)	0.652
Female	120 (18.9%)	105 (16.3%)	155 (18.1%)	161 (17.4%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	
Nature Of Wound					
Mild	414 (65.1%)	423 (65.6%)	513 (59.9%)	631 (68.2%)	0.006
Moderate	203 (31.9%)	198 (30.7%)	298 (34.8%)	265 (28.6%)	
Sever	19 (3.0%)	24 (3.7%)	46 (5.4%)	29 (3.1%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	
Tetanus Toxoid Vaccine					
No	350 (55.0%)	392 (60.8%)	579 (67.6%)	583 (63.0%)	<0.001
Yes	286 (45.0%)	253 (39.2%)	278 (32.4%)	342 (37.0%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	

Table (25-B)

R.V: Rabies Vaccine					
No	275 (43.2%)	240 (37.2%)	369 (43.1%)	646 (69.8%)	<0.001
Yes	361 (56.8%)	405 (62.8%)	488 (56.9%)	279 (30.2%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	
Patient Treatment RIG					
No	611 (96.1%)	604 (93.6%)	805 (93.9%)	888 (96.0%)	0.048
Yes	25 (3.9%)	41 (6.4%)	52 (6.1%)	37 (4.0%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	
Patient Was Vaccinate for Rabies Before Bite					
No	633 (99.5%)	627 (97.2%)	849 (99.1%)	916 (99.0%)	0.001
Yes	3 (0.5%)	18 (2.8%)	8 (0.9%)	9 (1.0%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	
Treatment Medication Antibiotic					
No	164 (25.8%)	205 (31.8%)	272 (31.7%)	292 (31.6%)	0.04
Yes	472 (74.2%)	440 (68.2%)	585 (68.3%)	633 (68.4%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	

Table (25-C)

Number Of Bites on The Body					
Single	427 (67.1%)	470 (72.9%)	600 (70.0%)	691 (74.7%)	0.007
Multiple	209 (32.9%)	175 (27.1%)	257 (30.0%)	234 (25.3%)	
Total	636 (100.0%)	645 (100.0%)	857 (100.0%)	925 (100.0%)	

The table (25) summarize categorical data from 2020 to 2023, broken down by variables such as gender, the nature of the wound vaccination status, and treatment details. The P-values suggest statistical significance testing for differences across the years for each variable. Here's an interpretation:

Gender: The male and female distribution across the years remains fairly consistent, with males consistently making up around 81–83%, and females around 16–19%. The P-value (0.652) indicates no significant difference across the years.

Nature of Wound: The proportion of mild, moderate, and severe wounds shows some variation, particularly for mild wounds which increase in 2023. The P-value (0.006) suggests a statistically significant change in the nature of wounds over time.

Tetanus Toxoid Vaccination: The proportion of patients not vaccinated for tetanus increased over time, peaking in 2022, before slightly decreasing in 2023. The P-value (<0.001) shows a highly significant trend over time.

Rabies Vaccination: A significant increase in those not receiving rabies vaccines is observed in 2023 (69.8%), as reflected by a P-value of <0.001.

Patient Treatment RIG: There was a slight decrease in the use of RIG from 2021 to 2023. The P-value (0.048) indicates statistical significance.

Patient Vaccinated for Rabies Before Bite: Very few patients had prior rabies vaccination, with a notable increase in 2021, though the percentages remained very low. The P-value (0.001) shows statistical significance.

Treatment Medication: There's a slight decrease in antibiotic use from 2020 to 2023, with a P-value of 0.04 indicating statistical significance.

Number of Bites on the Body: The proportion of patients with multiple bites decreased over time, with a P-value of 0.007 indicating a significant change.

The statistically significant P-values (typically $P < 0.05$) suggest there were meaningful changes in these variables over the years.

Table (26-A): Distribution of variables grouped by nature of wound.

Variable	Mild	Moderate	Sever	P. Value
Patient Treatment RIG				
NO	1941 (98.0%)	891 (92.4%)	76 (64.4%)	<0.001
YES	40 (2.0%)	73 (7.6%)	42 (35.6%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Tetanus Toxoid Vaccine				
NO	1272 (64.2%)	575 (59.6%)	57 (48.3%)	<0.001
YES	709 (35.8%)	389 (40.4%)	61 (51.7%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Rabies Vaccine				
NO	1210 (61.1%)	304 (31.5%)	16 (13.6%)	<0.001
YES	771 (38.9%)	660 (68.5%)	102 (86.4%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	

Table (26-B)

Treatment Medication antibiotic				
NO	614 (31.0%)	289 (30.0%)	30 (25.4%)	0.41
YES	1367 (69.0%)	675 (70.0%)	88 (74.6%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Rabies Vaccine Administration for 1st dose				
Not Vaccinated	1210 (61.1%)	304 (31.5%)	16 (13.6%)	<0.001
Vaccinated Known Date	750 (37.9%)	649 (67.3%)	101 (85.6%)	
Vaccinated Unknown Vaccine Date	21 (1.1%)	11 (1.1%)	1 (0.8%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Rabies Vaccine Administration for 2st dose				
Unvaccinated	1614 (81.5%)	618 (64.1%)	53 (44.9%)	<0.001
Vaccinated known Date of Vaccine	367 (18.5%)	346 (35.9%)	65 (55.1%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	

Table (26-C)

Rabies Vaccine Administration for 3st dose				
Unvaccinated	1735 (87.6%)	726 (75.3%)	78 (66.1%)	<0.001
Vaccinated Known Vaccine Date	246 (12.4%)	238 (24.7%)	40 (33.9%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Rabies Vaccine Administration for 4st dose				
Unvaccinated	1957 (98.8%)	931 (96.6%)	110 (93.2%)	<0.001
Vaccinated Known Vaccine Date	24 (1.2%)	33 (3.4%)	8 (6.8%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	
Rabies Vaccine Administration for 5st dose				
Unvaccinated	1979 (99.9%)	963 (99.9%)	118 (100.0%)	0.941
Vaccinated Known Vaccine Date	2 (0.1%)	1 (0.1%)	0 (0.0%)	
Total	1981 (100.0%)	964 (100.0%)	118 (100.0%)	

The table (26), describes the distribution of variables grouped by the Nature of Wound mild, moderate, or severe. The variables examined include the use of RIG, Tetanus Toxoid Vaccination, Rabies Vaccination at different doses, and antibiotic treatment. Here's a detailed interpretation:

Patient Treatment RIG:

A higher percentage of patients with severe wounds (35.6%) received RIG compared to those with mild (2.0%) and moderate (7.6%) wounds.

The P-value (<0.001) indicates a statistically significant association between wound severity and RIG administration.

Tetanus Toxoid Vaccination:

Patients with severe wounds had the highest proportion (51.7%) of Tetanus Toxoid vaccination, while mild wounds had the lowest (35.8%).

The P-value (<0.001) shows a significant difference in Tetanus Toxoid vaccination rates based on wound severity.

Rabies Vaccine:

A higher proportion of patients with severe wounds (86.4%) received the Rabies vaccine, compared to those with moderate (68.5%) and mild (38.9%) wounds.

The P-value (<0.001) indicates a significant difference in Rabies vaccination across wound severity.

Treatment Medication:

Antibiotic use was slightly higher for patients with severe wounds (74.6%) compared to those with mild (69.0%) and moderate (70.0%) wounds.

However, the P-value (0.41) suggests no statistically significant difference in antibiotic use across wound severities.

Rabies Vaccine Administration (1st Dose):

Severe wound cases had the highest proportion (85.6%) of patients receiving the 1st dose of the Rabies vaccine, while mild wounds had the lowest (37.9%).

The P-value (<0.001) indicates a significant difference in the administration of the 1st Rabies vaccine dose by wound severity.

Rabies Vaccine Administration (2nd Dose):

More patients with severe wounds (55.1%) received the 2nd dose compared to those with moderate (35.9%) and mild wounds (18.5%).

The P-value (<0.001) indicates a significant difference for the 2nd dose of the Rabies vaccine.

Rabies Vaccine Administration (3rd Dose):

Patients with severe wounds were more likely to receive the 3rd dose (33.9%) compared to moderate (24.7%) and mild wounds (12.4%).

The P-value (<0.001) highlights a statistically significant difference for the 3rd dose of the Rabies vaccine.

Rabies Vaccine Administration (4th Dose):

A larger percentage of patients with severe wounds (6.8%) received the 4th dose compared to those with mild (1.2%) and moderate (3.4%) wounds.

The P-value (<0.001) indicates a significant difference for the 4th dose of the Rabies vaccine.

Rabies Vaccine Administration (5th Dose):

Almost no patients across all wound severities received the 5th dose, with only 0.1% of patients with mild and moderate wounds receiving it, and none with severe wounds.

The P-value (0.941) shows no significant difference for the 5th dose.

In conclusion the data indicate a strong association between the severity of wounds and the administration of Rabies vaccine doses and RIG, as highlighted by the statistically significant P-values. In contrast, antibiotic treatment did not show a significant difference based on wound severity.

Table (27-A): Distribution of animal bites variables grouped by Patient Treatment RIG.

Variable	NO	YES	P. value
Bite on the body Head & Neck			
NO	2827 (97.2%)	131 (84.5%)	<0.001
YES	81 (2.8%)	24 (15.5%)	
Total	2908 (100.0%)	155 (100.0%)	
Bite on the body Face			
NO	2857 (98.2%)	140 (90.3%)	<0.001
YES	51 (1.8%)	15 (9.7%)	
Total	2908 (100.0%)	155 (100.0%)	

Table (27-B)

Bite on the body Trunk			
NO	2777 (95.5%)	141 (91.0%)	0.017
YES	131 (4.5%)	14 (9.0%)	
Total	2908 (100.0%)	155 (100.0%)	
Bite on the body Upper Limbs			
NO	1424 (49.0%)	85 (54.8%)	0.18
YES	1484 (51.0%)	70 (45.2%)	
Total	2908 (100.0%)	155 (100.0%)	
Bite on the body specify other rare sites			
NO	2832 (97.4%)	151 (97.4%)	0.188
Abdomen	9 (0.3%)	1 (0.6%)	
Abdomen and Chest	1 (0.0%)	0 (0.0%)	
Abdomen and Trunk	1 (0.0%)	0 (0.0%)	
Left Side Abdomen	1 (0.0%)	0 (0.0%)	
Right Side of Abdomen	1 (0.0%)	0 (0.0%)	
Axillary	1 (0.0%)	0 (0.0%)	
Back	15 (0.5%)	0 (0.0%)	
Back and Buttocks	1 (0.0%)	0 (0.0%)	
Buttocks	26 (0.9%)	1 (0.6%)	
Chest	7 (0.2%)	0 (0.0%)	
Ear	1 (0.0%)	0 (0.0%)	

Table (27-C)

Left Ear	1 (0.0%)	0 (0.0%)	
Left Gluteus Muscles	1 (0.0%)	0 (0.0%)	
Left Shoulder	1 (0.0%)	0 (0.0%)	
Lower Back	1 (0.0%)	0 (0.0%)	
Left Flank	1 (0.0%)	0 (0.0%)	
Left Ilic Crest	1 (0.0%)	0 (0.0%)	
Pelvic	1 (0.0%)	0 (0.0%)	
Penes	1 (0.0%)	0 (0.0%)	
Right Axillary	0 (0.0%)	1 (0.6%)	
Right Ear	1 (0.0%)	0 (0.0%)	
Right Flank	1 (0.0%)	0 (0.0%)	
Scrotal	1 (0.0%)	1 (0.6%)	
Tests	1 (0.0%)	0 (0.0%)	
Total	2908 (100.0%)	155 (100.0%)	

The above cross tab table (27), displays the distribution of various **bite locations** on the body, grouped by **(Patient Treatment RIG)** status, comparing those who **did not receive RIG (NO)** and those who **did receive it (YES)**. Below is an interpretation of the findings:

Bite on the Head & Neck:

- ✓ **No RIG (NO)**: 97.2% of patients had no bite on the head and neck, while 2.8% did.
- ✓ **Received RIG (YES)**: A much higher percentage (15.5%) had head and neck bites, while 84.5% did not.

The P-value (<0.001) indicates a statistically significant association, showing that bites on the head and neck were more likely to result in RIG administration.

Bite on the Face:

- ✓ **No RIG (NO)**: 98.2% of patients had no bite on the face, while 1.8% did.
- ✓ **Received RIG (YES)**: 9.7% had bites on the face, while 90.3% did not.

The P-value (<0.001) also shows a significant association, indicating that face bites were more likely to result in RIG administration.

Bite on the Trunk:

- ✓ **No RIG (NO)**: 95.5% of patients had no bite on the trunk, while 4.5% did.
- ✓ **Received RIG (YES)**: 9.0% had bites on the trunk, while 91.0% did not.

The P-value (0.017) suggests a statistically significant association, indicating that trunk bites were associated with RIG administration, though the association is weaker compared to head and face bites.

Bite on the Upper Limbs:

- ✓ **No RIG (NO)**: 49.0% of patients had no bite on the upper limbs, while 51.0% did.
- ✓ **Received RIG (YES)**: 54.8% had no bite on the upper limbs, while 45.2% did.

The P-value (0.18) indicates no statistically significant association between upper limb bites and RIG administration.

Bite on Other Body Parts:

- ✓ **No RIG (NO)**: 97.4% of patients had no bite on other body parts, while 0.3% had abdominal bites.
- ✓ **Received RIG (YES)**: 97.4% had no bite on other body parts, while 0.6% had abdominal bites.

The P-value (0.188) shows no statistically significant association between bites on other body parts and RIG administration.

The results demonstrate that bites on the **head, neck, face, and trunk** were significantly associated with the administration of RIG as indicated by the P-values (<0.001 and 0.017). However, bites on the **upper limbs** and **other body parts** (e.g., abdomen) did not show a statistically significant association with serum treatment.

Table (28-A): Distribution of variables grouped by Treatment Rabies Vaccine.

Variable	No	Yes	P. Value
Bite On the Body Head & Neck			
No	1495 (97.7%)	1463 (95.4%)	0.001
Yes	35 (2.3%)	70 (4.6%)	
Total	1530 (100.0%)	1533 (100.0%)	
Bite On the Body Face			
No	1509 (98.6%)	1488 (97.1%)	0.004
Yes	21 (1.4%)	45 (2.9%)	
Total	1530 (100.0%)	1533 (100.0%)	
Bite On the Body Trunk			
No	1467 (95.9%)	1451 (94.7%)	0.129
Yes	63 (4.1%)	82 (5.3%)	
Total	1530 (100.0%)	1533 (100.0%)	
Bite On the Body Upper Limbs			
No	741 (48.4%)	768 (50.1%)	0.375
Yes	789 (51.6%)	765 (49.9%)	
Total	1530 (100.0%)	1533 (100.0%)	

Table (28-B)

Bite On the Body Specify Other Rare Sites			
No	1500 (98.0%)	1483 (96.7%)	0.478
Abdomen	4 (0.3%)	6 (0.4%)	
Abdomen and Chest	0 (0.0%)	1 (0.1%)	
Abdomen and Trunk	0 (0.0%)	1 (0.1%)	
Left Side Abdomen	1 (0.1%)	0 (0.0%)	
Right Side of Abdomen	0 (0.0%)	1 (0.1%)	
Axillary	0 (0.0%)	1 (0.1%)	
Back	6 (0.4%)	9 (0.6%)	
Back And Buttocks	1 (0.1%)	0 (0.0%)	
Buttocks	12 (0.8%)	15 (1.0%)	
Chest	2 (0.1%)	5 (0.3%)	
Ear	1 (0.1%)	0 (0.0%)	
Left Ear	0 (0.0%)	1 (0.1%)	
Left Gluteus Muscles	0 (0.0%)	1 (0.1%)	
Left Shoulder	0 (0.0%)	1 (0.1%)	
Lower Back	0 (0.0%)	1 (0.1%)	
Left Flank	0 (0.0%)	1 (0.1%)	

Table (28-C)

Left Ilic Crest	0 (0.0%)	1 (0.1%)	
Pelvic	1 (0.1%)	0 (0.0%)	
Penes	0 (0.0%)	1 (0.1%)	
Right Axillary	0 (0.0%)	1 (0.1%)	
Right Ear	1 (0.1%)	0 (0.0%)	
Right Flank	1 (0.1%)	0 (0.0%)	
Scrotal	0 (0.0%)	2 (0.1%)	
Tests	0 (0.0%)	1 (0.1%)	
Total	1530 (100.0%)	1533 (100.0%)	

The above table (28), presents the distribution of variables grouped by **(Rabies Vaccine)** status, comparing those who **did not receive the Rabies Vaccine (NO)** and those who **did (YES)**. The variables refer to the location of the bite on the body (e.g., Head & Neck, Face, Trunk, Upper Limbs). Here's a detailed interpretation:

Bite on the Head & Neck:

A higher proportion of patients who received the Rabies Vaccine (4.6%) had bites on the head and neck compared to those who did not receive the vaccine (2.3%).

The P-value (0.001) indicates a statistically significant difference between the groups, showing that patients with bites on the head and neck were more likely to receive the Rabies Vaccine.

Bite on the Face:

Patients with bites on the face were more likely to have received the Rabies Vaccine (2.9%) compared to those who did not (1.4%).

The P-value (0.004) suggests a statistically significant difference, with face bites associated with higher Rabies Vaccine administration.

Bite on the Trunk:

A slightly higher percentage of patients with bites on the trunk received the Rabies Vaccine (5.3%) compared to those who did not (4.1%).

However, the P-value (0.129) shows no statistically significant difference, indicating that trunk bites were not strongly associated with vaccine administration.

Bite on the Upper Limbs:

There was a nearly even distribution between patients who received the vaccine (49.9%) and those who did not (51.6%) when it came to bites on the upper limbs.

The P-value (0.375) indicates no significant association between bites on the upper limbs and Rabies Vaccine administration.

Bite on Other Body Parts:

There was a small difference between patients with unspecified bite locations who received the vaccine (96.7%) and those who did not (98.0%).

The P-value (0.478) shows no statistically significant difference, suggesting that other bite locations were not associated with vaccine administration.

In conclusion the data show that bites on the head & neck and face were significantly more likely to lead to Rabies Vaccine administration, as indicated by the significant P-values. However, for bites on the trunk, upper limbs, and other body parts, no statistically significant differences were found between those who received and those who did not receive the vaccine.

Table (29-A): Variable distribution grouped by Tetanus Toxoid Vaccine.

Variable	NO	YES	P. Value
Bite on the body Head &Neck			
NO	1823 (95.7%)	1135 (97.9%)	0.002
YES	81 (4.3%)	24 (2.1%)	
Total	1904 (100.0%)	1159 (100.0%)	
Bite on the body Face			
NO	1859 (97.6%)	1138 (98.2%)	0.373
YES	45 (2.4%)	21 (1.8%)	
Total	1904 (100.0%)	1159 (100.0%)	

Table (29-B)

Bite on the body Trunk			
NO	1797 (94.4%)	1121 (96.7%)	0.004
YES	107 (5.6%)	38 (3.3%)	
Total	1904 (100.0%)	1159 (100.0%)	
Bite on the body Upper Limbs			
NO	971 (51.0%)	538 (46.4%)	0.015
YES	933 (49.0%)	621 (53.6%)	
Total	1904 (100.0%)	1159 (100.0%)	
Bite on the body specify other rare sites			
NO	1853 (97.3%)	1130 (97.5%)	0.365
Abdomen	8 (0.4%)	2 (0.2%)	
Abdomen And Chest	1 (0.1%)	0 (0.0%)	
Abdomen And Trunk	1 (0.1%)	0 (0.0%)	
Left Side Abdomen	0 (0.0%)	1 (0.1%)	
Right Side Of Abdomen	1 (0.1%)	0 (0.0%)	
Axillary	0 (0.0%)	1 (0.1%)	
Back	8 (0.4%)	7 (0.6%)	
Back And Buttocks	1 (0.1%)	0 (0.0%)	
Buttocks	20 (1.1%)	7 (0.6%)	
Chest	2 (0.1%)	5 (0.4%)	

Table (29-C)

Ear	0 (0.0%)	1 (0.1%)	
Left Ear	0 (0.0%)	1 (0.1%)	
Left Gluteus Muscles	1 (0.1%)	0 (0.0%)	
Left Shoulder	1 (0.1%)	0 (0.0%)	
Lower Back	1 (0.1%)	0 (0.0%)	
Left Flank	0 (0.0%)	1 (0.1%)	
Left Ilic Crest	1 (0.1%)	0 (0.0%)	
Pelvic	1 (0.1%)	0 (0.0%)	
Penes	1 (0.1%)	0 (0.0%)	
Right Axillary	1 (0.1%)	0 (0.0%)	
Right Ear	1 (0.1%)	0 (0.0%)	
Right Flank	0 (0.0%)	1 (0.1%)	
Scrotal	1 (0.1%)	1 (0.1%)	
Tests	0 (0.0%)	1 (0.1%)	
Total	1904 (100.0%)	1159 (100.0%)	

From the above table (29), the distribution of bite locations on the body, grouped by Tetanus Toxoid vaccination status, shows several notable differences. A significantly higher proportion of individuals with no Tetanus Toxoid vaccination experienced bites on the Head & Neck (4.3%) compared to those vaccinated (2.1%) with a p-value of 0.002. Similarly, bites on the Trunk were more common in the non-vaccinated group (5.6%) compared to the vaccinated group (3.3%), showing statistical significance (p = 0.004). However, there were no significant differences in the occurrence of bites on the Face (p = 0.373) or in the category "other body parts" (p = 0.365) between the two groups. Interestingly, bites on the Upper Limbs were more frequent in vaccinated individuals (53.6%) compared to the non-vaccinated (49.0%), with a significant p-value of 0.015.

Table (30-A): Distribution of variables grouped by Age class.

Variable	>=31	0-15	16-30	P. value
Bite on the body Head &Neck				
NO	710 (99.0%)	1483 (94.5%)	765 (98.5%)	<0.001
YES	7 (1.0%)	86 (5.5%)	12 (1.5%)	
Total	717 (100.0%)	1569 (100.0%)	777 (100.0%)	
Bite on the body Face				
NO	707 (98.6%)	1524 (97.1%)	766 (98.6%)	0.021
YES	10 (1.4%)	45 (2.9%)	11 (1.4%)	
Total	717 (100.0%)	1569 (100.0%)	777 (100.0%)	

Table (30-B)

Bite on the body Trunk				
NO	701 (97.8%)	1463 (93.2%)	754 (97.0%)	<0.001
YES	16 (2.2%)	106 (6.8%)	23 (3.0%)	
Total	717 (100.0%)	1569 (100.0%)	777 (100.0%)	
Bite on the body Upper Limbs				
NO	298 (41.6%)	862 (54.9%)	349 (44.9%)	<0.001
YES	419 (58.4%)	707 (45.1%)	428 (55.1%)	
Total	717 (100.0%)	1569 (100.0%)	777 (100.0%)	
Bite on the body specify other rare sites				
NO	706 (98.5%)	1512 (96.4%)	765 (98.5%)	0.751
Abdomen	2 (0.3%)	7 (0.4%)	1 (0.1%)	
Abdomen and Chest	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Abdomen and Trunk	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Left Side Abdomen	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Right Side of	0 (0.0%)	0 (0.0%)	1 (0.1%)	
Axillary	0 (0.0%)	0 (0.0%)	1 (0.1%)	
Back	3 (0.4%)	10 (0.6%)	2 (0.3%)	
Back And Buttocks	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Buttocks	3 (0.4%)	20 (1.3%)	4 (0.5%)	
Chest	2 (0.3%)	5 (0.3%)	0 (0.0%)	

Table (30-C)

Ear	0 (0.0%)	0 (0.0%)	1 (0.1%)	
Left Ear	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Left Gluteus Muscles	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Left Shoulder	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Lower Back	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Left Flank	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Left Ilic Crest	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Pelvic	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Penes	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Right Axillary	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Right Ear	0 (0.0%)	1 (0.1%)	0 (0.0%)	
Right Flank	1 (0.1%)	0 (0.0%)	0 (0.0%)	
Scrotal	0 (0.0%)	1 (0.1%)	1 (0.1%)	
Tests	0 (0.0%)	0 (0.0%)	1 (0.1%)	
Total	717 (100.0%)	1569 (100.0%)	777 (100.0%)	

In table (30), the distribution of bite locations by age class reveals significant variations across different age groups. Bites on the Head & Neck were most common among the 0-15 age group (5.5%), compared to 1.5% in the 16-30 group and 1.0% in those aged 31 and above, with a

highly significant p-value of <0.001. Similarly, the 0-15 age group showed the highest percentage of bites on the Trunk (6.8%), in contrast to 3.0% in the 16-30 group and 2.2% in the 31+ group ($p < 0.001$). Bites on the Upper Limbs were more frequent in older age groups, with 58.4% in those aged 31 and above and 55.1% in the 16-30 group, while the 0-15 group had a lower occurrence at 45.1% ($p < 0.001$). There were smaller but still significant differences in the occurrence of bites on the Face, where the 0-15 group had a higher frequency (2.9%) compared to the other age groups (both 1.4%, $p = 0.021$). The distribution of bites on "other body parts" showed no significant variation across age groups ($p = 0.751$).

Part (3): Regression

- Regression analysis with different time between animal bite time and investigation time by day on:

✓ Patient Treatment RIG
✓ Rabies Vaccine
✓ Tetanus Toxoid Vaccine
✓ Age Class: Age group

Table (31): The regression analysis examined the relationship between the time of an animal bite and investigation and various treatment variables

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	1.28	0.1162	11.02	1.052e-27
Patient treatment RIG (YES	-0.2469	0.296	-0.8341	0.4043
Rabies vaccine YES	-0.0986	0.13	-0.7585	0.4482
Tetanus Toxoid YES	0.2196	0.1407	1.56	0.1189
Age Class 16-30	0.097	0.1583	0.6128	0.54
Age Class >=31	-0.05245	0.1696	-0.3093	0.7571

In the table (31) The regression analysis examined the relationship between the time between an animal bite and investigation and various treatment variables, including the administration of anti-rabies serum, rabies vaccine, tetanus toxoid, and age group (Age Class). The intercept estimate was significant ($\beta = 1.28$, $p < 0.001$), indicating the baseline time between bite and investigation. However, none of the treatment variables showed a significant effect on different time between animal bite and investigation. For example, receiving anti-rabies serum (had an estimate of -0.2469 ($p = 0.4043$), and the rabies vaccine had an estimate of -0.0986 ($p = 0.4482$). Similarly, the administration of tetanus toxoid had a non-significant positive estimate of 0.2196 ($p = 0.1189$). Age group also did not have a significant impact on different time between animal bite and investigation, with the 16-30 age group ($\beta = 0.097$, $p = 0.54$) and those aged 31 and above ($\beta = -0.05245$, $p = 0.7571$) both showing non-significant results.

Chapter 5: Discussion

5.1 Discussion on high-risk area and high-risk group affected by animal bites.

In the current study, the distribution of bite incidents by place reveals that the majority occurred in rural areas, with 53.09% (1626 cases) of bites reported in these settings. Urban areas followed with 41.59% (1274 cases) of incidents, indicating a significant number of bites also occurred in more densely populated regions. In contrast, camp settings had the fewest incidents, accounting for 5.32% (163 cases).

In regard with animal bite distribution by city, the current study showed that Hebron city had the majority of animal bite with percentage 32.71%, and the lowest percentage was show in Tubas city with percentage 2.51%, Bethlehem 7.12%, Jenin 5.09%, Jericho 6.27%, Jerusalem 4.47%, Nablus 11.1%, Qalqilya 4.31%, Ramallah 13.39%, Salfit 9.93%, and Tulkarem 8.1%.

Animal bites are more common in rural areas than in other areas due to the presence of a number of animals concentrated on the outskirts of residential areas, away from overcrowding, which allows for an increase in the rate of bites and the lack of pedestrian traffic and the animal being alone with the victim.

A study was consistent with current study of the 1215 studies that were retrieved, 34 studies were chosen for the meta-analysis. There were 230,019 instances of animal attacks in the research conducted between 1993 and 2013. Iran's estimated total incidence rate of animal bites was higher in rural areas (17.45/1000) compared with urban areas (4.35/1000)(Abedi et al., 2019).

5.2 discussion age and gender distribution of people affected with animal bite.

In the current study, the majority of the population were male 2522 individuals (82.34%), while 541 individuals (17.66%) are females. The average age of the population is 21.37 years, with a high standard deviation of 16.65, indicating a wide range in ages. The median age is 15 years, suggesting that half of the population is younger than 15. The interquartile range (IQR) is 10-29, meaning that 50% of the population falls within this age range. The majority of participants are students 1604 (52.37%), followed by 713 (23.28%) workers and 230 (7.51%) employees.

Moreover, our study is in agreement with a recent study conducted in Iran to quantify the incidence of animal bites nationwide and produce reliable data on animal bite exposure, a meta-analysis was carried out and was showed males had a far higher incidence rate of animal bites (14.90/1000) than females (4.55/1000), the incident rate was highest among students compared with other reported occupations (Abedi et al., 2019).

Moreover, a study was conducted to evaluate dog bites throughout the United States, where dog bite injuries were retrieved and examined using the National Electronic Injury Surveillance System All Injury Program data for the years 2005 through 2013. The US Census Bureau's population data was used to obtain the incidence values. $P < 0.05$ was the threshold for significance. An average of 337,103 ED visits were made annually due to dog bites. At 28.9 years old, the gender distribution was 52.6% female and 47.4% male and according gender distribution this study not consistent with current study (Loder, 2019).

A study was conducted by Salman Khazaei1, amid to address the epidemiology of animal bites and associated factors with delay in PEP in Nahvand district, western Iran, the data analysis was showed majority of victims were males 1167(80.5%), and main age of victims younger age between 15-26 years , and the high group affected is student according to occupation data(Khazaei et al., 2018).

According to several studies, the main age group affected with animal bites was student age, and according many risk factors may be increase that such as difficult of defenses during animal bite, during going to school at morning and no someone in area or street at morning times, and according that overall of ancient studies was consistent with current study.

5.3 discussion of different animals' kind and animal biting including bits characteristic.

Kind and Description of biting animal shows that dogs were responsible for the vast majority of bites, accounting for 87.33% (2675 cases). This highlights the significant role dogs play in animal bite incidents within this population, making them the primary focus for potential rabies control and prevention efforts.

The 69.51% (2129 cases) of the animals were placed under observation. This is the most common outcome, suggesting a focus on monitoring animals that have bitten individuals to rule out rabies cases. 24.16% (740 cases) of the animals escaped. This indicates a notable proportion of animals were not contained, which could pose ongoing risks for rabies transmission. 2.19% (67 cases) of the animals were killed. This is a relatively small fraction, suggesting that killing of the animals was not a common practice or occurred in specific circumstances. 4.15% (127 cases) had an unknown outcome. The 23.34% (715 cases) of the animals were observed to be healthy at the end of the observation period, indicating no signs of rabies. 0.26% (8 cases) of the animals showed signs of rabies, which suggests a very low incidence of rabies among observed animals. 0.33% (10 cases) of the animals died during the observation period, which could be due to various causes, not necessarily rabies. 76.07% (2330 cases) had an unknown outcome. The data on animal vaccination and patient treatment shows that only 16.52% (506 cases) of the biting animals were vaccinated against rabies, while a large majority, 83.48% (2557 cases), were not vaccinated, indicating a significant public health risk.

The number of bites on the body indicates that the majority of individuals, 71.43% (2188 cases), experienced a single bite, while 28.57% (875 cases) suffered from multiple bites. This suggests that single bite incidents are more common. The distribution of bite locations on the body shows that the upper limbs were the most commonly affected area, with 50.73% (1554 cases) of bites occurring there, followed by the lower limbs with 44.34% (1358 cases). Bites on the trunk were less frequent, accounting for 4.73% (145 cases), and bites on the head and neck represented 3.43% (105 cases). Bites on the face were relatively rare, occurring in only 2.15% (66 cases), while 3% (92 cases) were categorized as other body parts. The majority of the population did not experience bites on these specific body parts, with proportions exceeding 90% for face, head and neck, trunk, and other areas. Nature of wound shows that the majority of wounds were classified as mild, accounting for 64.68% (1981 cases). Moderate wounds made up 31.47% (964 cases), while severe wounds were relatively rare, occurring in only 3.85% (118 cases).

A retrospective study was carried out in Germany in 2023 showed that high percentage of animal bite form dog with percentage 94.5% from all cases (Maurer et al., 2023), on the other hand , study was conducted in Italy amid to summarize the main protocols currently followed in pediatrics in cases involving the most common bites from different animal species, this study data analysis showed dog bite most prevalent bites (Septelici et al., 2024).

The most studies were showed a dog bite is the most frequent, more frequent globally due to a high number of dog animal compared with other animals, also the current confirmed\575 with all previous studies.

Data were gathered from the medical records of animal bite victims who were referred to the Hurand Rabies Center between 2014 and 2017 for this cross-sectional study. Using Poisson regression analysis, the epidemiological pattern of animal bites and factors influencing the delayed beginning of post-exposure prophylaxis were examined. Findings: Males and those between the ages of 5 and 15 made up the bulk of animal bite victims. Furthermore, dog bites were the main cause of injury. The lower limbs were the organs most frequently afflicted, which is not consistent with current study according to most part of injuries(Gaffari-fam et al., 2021).

A previous study that looked at the demographics and injury features of dog bites that required hospitalization was carried out in Israel in order to target prevention initiatives and policies for those who are more vulnerable. 986 people were admitted to hospitals overall between 2009 and 2016 due to dog bite injuries. Among children aged 0 to 14, there was a statistically significant increase over an 8-year period in the percentage of hospitalized dog-bite injuries among all trauma hospitalizations ($p = 0.01$). In addition, children were roughly twice as likely as adults between the ages of 15 and 94 to sustain a dog bite (relative risk [RR] = 1.89, 95% confidence interval [CI] = 1.35–2.66, $p < 0.0001$). In terms of the rate per 100,000, boys had a significantly higher rate than girls in 2016 (RR = 2.85, 95%CI = 1.57–5.19, $p < 0.0001$), but no gender differences were found in the other age groups. The most common age group for facial/head/neck injuries was children 0–14 years old (49.7%), with a 4-fold higher risk compared to those between 15 and 94 years old (RR = 3.78, 95%CI, 3.01–4.75) among the youngers (<1, 1–3 and 4–5-year old) compared with the 6–11 and 12–14 age groups ($p < 0.0001$), so this study was consistent with current study (Cohen-Manheim et al., 2018).

This consistent study regarding to site of injury, set out to do this kind of examination throughout the United States. Dog bite injuries were retrieved and examined using the National Electronic Injury Surveillance System All Injury Program data for the years 2005 through 2013. SUDAAN 11.0.01Ô software was used for statistical analysis in order to take into consideration the data's weighted and stratified nature. The US Census Bureau's population data was used to obtain the incidence values. $P < 0.05$ was the threshold for significance. An average of 337,103 emergency department visits were made annually due to dog bites. At 28.9 years old, the gender distribution was 52.6% female and 47.4% male. The upper extremities accounted for 47.3% of the bite locations, followed by the head/neck (268.8%), lower extremity (21.5%), and trunk (4.4%). More bites to the head and neck occurred in younger patients, more bites to the upper extremities in older patients(Loder, 2019).

On the other hand, a study was conducted in 2019 aimed to characterize epidemiologically all bite incidents in Chile that were recorded in 11 public emergency services and analyze the information provided in health care forms from 5195 bites recorded in six regions of Chile, the result was showed a single bite event accounted for 86.6% (2587/2988) of all animal bites. The bites affected various body parts of the victims and were distributed as follows: 32% (1640/5189) in the upper extremities and 33% (1717/5189) in the lower extremities, with no discernible difference: P is greater than 0.05. The second category consisted of the head and neck, which accounted for 14.9% (775/5189) of the bites. The thorax, belly, buttocks, and genitalia followed, all of which had lower frequency(C. L. Barrios et al., 2019).

5.4 discussion of policy taken by both MOH and MOA for rabies and other zoonosis prevention and treatment of animal bite in hospital.

In 2020, there were 636 cases, representing 20.76% of the total. This number increased to 645 cases (21.06%) in 2021, and further increased to 857 cases (27.98%) in 2022. The highest number of cases was recorded in 2023, with 925 cases, accounting for 30.2% of the total. This upward trend indicates a growing prevalence of the study's focus on a greater number of reported incidents in recent years.

The data of patients were vaccinated for rabies before the bite showed that a vast majority, 98.76% (3025 cases), were not vaccinated for rabies before the bite. Only 1.24% (38 cases) of patients had been vaccinated prior to the incident. This indicates that very few patients had received pre-bite rabies vaccination, which could have implications for the effectiveness of post-bite rabies prevention and treatment strategies.

62.16% (1904 cases) of patients did not receive the tetanus toxoid vaccine, while 37.84% (1159 cases) did, 69.54% (2130 cases) of patients received antibiotic treatment, whereas 30.46% (933 cases) did not. This showed that a significant portion of patients were treated with antibiotics, likely for infection prevention or management, the distribution is almost even, with 50.05% (1533 cases) receiving the rabies vaccine and 49.95% (1530 cases) not receiving it. This indicates a balanced split between those who received the vaccine and those who did not, reflecting a substantial proportion of patients who potentially missed out on crucial rabies prevention, 74.6% (2285 cases) of individuals were unvaccinated for the second dose. Of those who received the second dose, 25.4% (778 cases) had a known vaccination date. This suggests a significant gap in the completion of the full vaccination series, 82.89% (2539 cases) were unvaccinated for the third dose, 97.88% (2998 cases) were unvaccinated for the fourth dose, 99.9% (3060 cases) were unvaccinated for the fifth dose, this highlights an extremely low uptake for the final dose in the vaccination series.

According to study was conducted in Uganda, aimed to characterize animal bite injuries among patients presenting to Mulago National Referral Hospital in Kampala, Uganda, 25,420 patients that presented to the A&E unit during the study period, 207 (0.8%) had animal bite injuries. Out of 207, 189 victims (91.3%) showed up in 2.6 (SD ± 4.3) days. Of the casualties, two hundred (96.6%) experienced injuries to their extremities, and the remaining victims had injuries to other body parts. Since all of the injuries were mild, they were treated as outpatients using preventive antibiotics, analgesics, wound dressings, and anti-rabies vaccinations. In comparison to victims who had no prior first aid, those who had received first aid had a rate of seeking treatment at Mulago hospital that was 1.7 times higher (IRR 1.7, 95% CI 1.4-2.1). Individuals who experienced animal bite injuries during the daytime had a 1.6-fold higher likelihood of visiting Mulago hospital for treatment (IRR 1.6, 95% CI 1.3-2.1) in comparison to those who suffered injuries at other times(Wangoda et al., 2019).

However, a study was conducted in India was to evaluate epidemiological profile and management practices of animal bite cases in a tertiary care hospital of Haryana, cross section study showed Approximately 80.5% of the bites were caused by stray animals, with stray dogs accounting for 70% of occurrences. Specifically, 96.6% of cases received tetanus toxoid and 97.7% of cases received the anti-rabies vaccine. Only 46% of the 204 (33.2%) victims who required local immunoglobulin infiltration received treatment. These victims were classified as category III instances. It was discovered that there was a statistically significant relationship between the time gap between the bite and reporting to the first health facility and socioeconomic status, residence, and education(Chowdhury & Chakraborty, 2017).

Furthermore, a study carried out between 2001 and 2015 in Uganda to assess the long-term trends and spatial distribution of animal bite injuries and deaths from human rabies infection

revealed that 208,720 cases of animal bite injuries were documented. Of these, the Central, Eastern, Northern, and Western regions accounted for 27%, 22%, 27%, and 23% of the total. Among the 48,720 people who were bitten by animals between 2013 and 2015, 81% were older than five years old, and 59% of the victims were men. In Uganda, there were 58 bites per 100,000 people between 2001 and 2015; in the Northern, 76 in the Central, 58 in the Western, 53 in the Eastern, and 50 in the Northern area. In the Central region, it climbed from 21 to 47 (P=0.02), in the Eastern region from 27 to 34 (P=0.04), in the Northern region from 23 to 70 (P=0.01), and in the Western region from 16 to 46 (P=0.001) between 2001 and 2015. There were reports of 486 probable human rabies deaths in all, with 29% coming from the Eastern, 28% from the Central, 27% from the Northern, and 17% from the Western regions, also this result is high compared with current study(Masiira et al., 2018).

5.4.1 RV

Vaccines can be delivered intramuscularly or intradermally for both PrEP and PEP. One intramuscularly dose, or the whole contents of the vial, is 0.5 mL or 1.0 mL of vaccination, depending on the product. One intradermally dose is equivalent to 0.1 mL of vaccine. Manufacturers of vaccines are urged to apply for a license variation to national regulatory bodies in order to include WHO-recommended schedules and intradermally administration as permitted uses on the label. Although the intradermally schedules offer advantages through savings in costs, dosages, and time, the previous WHO-recommended schedules for rabies vaccination administration are still appropriate. The deltoid region of the arm in adults and children over the age of two, and the anterolateral region of the thigh in children under the age of two, are the suggested sites for intramuscular injection delivery. It is not recommended to give the rabies vaccine intramuscularly near the glutes. The administration of many shots during a single visit may be necessary for the rabies vaccination, contingent upon the schedule that is selected. When administering multiple doses of the rabies vaccine during a single visit, it is recommended to inject the shots into distinct locations or limbs. Use opened vials within 6 to 8 hours. It is best to resume vaccinations rather than restart them if any doses are missed. During a PEP or PrEP course, a change in the vaccination's formulation or delivery method is permissible if it cannot be avoided. It is not required to restart the series of injections; instead, the immunization regimen should be followed in accordance with the schedule for the new delivery method(World, 2018).

5.4.2 PEP

The nature of encounter with the suspected rabid animal and the patient's immunization status determine the indication and protocol for PEP. PEP is not necessary for category I exposures; it is advised to vaccinate immediately for category II exposures; it is also advised to vaccinate immediately for category III exposures and provide RIG if necessary. The selection of a PEP schedule should consider practicality (cost, dosage frequency, duration, and adherence), as well as clinical settings and patient preferences. For categories II and III, all bite wounds and scratches should be thoroughly cleaned and flushed as quickly as possible using soap or detergent and lots of water. Tetanus shots, analgesics, and antibiotics may be recommended depending on the wound's characteristics. It is recommended to provide the first dose of the rabies vaccine as soon as feasible following exposure. Whenever a category III exposure is

identified, even months or years after the interaction, vaccination should always be given. Nonetheless, the chance of contracting clinical rabies decreases gradually over the course of the first twelve months following the exposure, with clinical rabies only infrequently emerging beyond that time. In the event that vaccination supplies are limited, shots can be saved for suspected and likely cases of rabies exposure that happened recently or within the previous 12 months. It is advised to provide RIG to people who have not received a prior rabies vaccination following a category III exposure thorough wound cleaning combined with prompt vaccination administration and finishing the PEP course is a highly efficient way to prevent rabies, even in the absence of RIG. Whether or not RIG is available, rabies vaccinations should never be denied. RIG is not recommended for people of all ages who have received PEP vaccinations at least twice or who have verified proof of prior PrEP use. A repeat exposure that occurs less than three months after the initial exposure and for which the patient has already taken a full course of PEP is sufficient; neither vaccination nor RIG are needed. The PEP schedule for those who have already received vaccinations should be followed for repeat exposures that take place more than three months after the prior PEP; RIG is not recommended(World, 2018).

5.4.3 Administration of rabies immunoglobulins (RIG)

RIG need to be given just once, ideally concurrently with PEP commencement or as soon as feasible thereafter. After the seventh day after the initial dose of the rabies vaccination, RIG should not be administered since circulating vaccine-induced neutralizing antibody will have started to manifest. Prioritizing the distribution of RIG is necessary if the quantity provided is restricted. Patients with severe immunodeficiency, those with deep wounds or bites to highly innervated areas of the body, such as the head, neck, or hands, and cases where the biting animal is a confirmed or probable rabies case or where bites, scratches, or exposure of a mucous membrane are the cases with the highest priority to receive RIG. The maximum dose calculation for RIG is 20 IU/kg body weight for human-derived RIG (hRIG) and 40 IU/kg body weight for equine-derived RIG eRIG in order to achieve optimal effectiveness. Because skin testing is not a reliable way to predict adverse effects, it should not be done prior to eRIG administration. However, even though it is uncommon, anaphylaxis can happen at any point during the administration of a RIG, so the treating physician needs to be ready to handle it. RIG is injected into and surrounding the area for minor wounds, the highest amount anatomically possible should be used. The compartment syndrome, which happens when high amounts of RIG are injected into a tiny body location with little tissue, must be avoided. If necessary, physiological buffered saline can be used to dilute RIG for large and many wounds in order to guarantee that all wounds get infiltration. Because bat bites and scratches are not often obvious or observable, RIG should be injected as close to the exposure site as is anatomically possible in cases when there has been direct contact with animal. Consider further rinsing with diluted RIG for mucosal exposures without wounds. Serious adverse events or any hint that the quality of the RIG is changing ought to be monitored and reported. The World Health Organization advises maintaining a register to track the clinical application of mAb products(World, 2018).

5.4.4 PrEP

For people who are at a high risk of being exposed to RABV, the WHO advises PrEP. These include those at occupational risk, travelers who may be at risk of exposure, and subpopulations in highly endemic settings with limited access to timely and appropriate PEP. People who live in rabies endemic areas those where the annual frequency of dog bites is greater than 5% or where vampire bat rabies is known to exist should take PrEP into consideration. A population-based PrEP strategy should be implemented when the local context and rabies epidemiology have been assessed, along with the viability of managing the animal source of rabies. The following PrEP regimen is advised by WHO Two site intradermally shots given on days 0 and 7. When using intramuscularly administration, the WHO advises administering the vaccination at one site between days 0 and 7. A one visit PrEP may probably provide some protection in a time crunch, but it is not yet regarded as a full course. A second dosage of PrEP should be administered as soon as feasible and within a year to those who only received it on day 0. Should there be a possible rabies exposure before the second dosage, complete PEP (including RIG, if necessary) must be administered. After completing a primary series of PEP or PrEP, people who live in or are visiting high-risk areas do not need to take any additional PrEP booster doses(World, 2018).

Chapter 6: Conclusion, Recommendations, Limitations and Budget of the study.

6.1 Conclusion

The distribution of bite incidents by place reveals that the majority occurred in rural areas, with 53.09%. Urban areas followed with 41.59% of incidents, indicating a significant number of bites also occurred in more densely populated regions. In contrast, camp settings had the fewest incidents, accounting for 5.32%, and according animal bite distribution by city, the current study was showed Hebron city with percentage 32.71%, and the lowest percentage was show in Tubas city with percentage 2.51%.

The majority of the population is male with percentage 82.34%, while 17.66% are females. The average age of the population is 21.37 years, with a high standard deviation of 16.65, indicating a wide range in ages. The median age is 15 years, suggesting that half of the population is younger than 15. Also, the majority of participants are students 52.37%, followed by 23.28% workers and 230 (7.51%) employees.

According to kind of biting animal showed that dogs were responsible for the vast majority of bites, accounting for 87.33%. And animal vaccination were only 16.52%, while a large majority, 83.48%, were not vaccinated.

A single animal bites on the body indicates that the majority of individuals, 71.43%, while 28.57% as a multiple bite, the distribution of bite locations on the body showed that the upper

limbs were the most commonly affected area with 50.73% of bites, followed by the lower limbs with 44.34%.

In 2020, there were 636 cases of animal bites, representing 20.76% of the total. This number increased to 645 cases (21.06%) in 2021, and further increased to 857 cases (27.98%) in 2022. The highest number of cases was recorded in 2023, with 925 cases, accounting for 30.2% of the total, that was concluded the prevalence rate of animal bites was increasing by years.

98.76% were not vaccinated for rabies before the bite. Only 1.24% of patients had been vaccinated prior to the incident.

According to prevention and management after animal bites, 62.16% of patients did not received tetanus toxoid vaccine, while 37.84% did, 69.54% of patients received antibiotic treatment, whereas 30.46% did not, 50.05% was received the rabies vaccine and 49.95% not received it. Regarding RIG treatment and prophylaxis, only 5.06% (155 of patients were received (RIG), while the vast majority 94.94% did not received this treatment.

A higher percentage of patients with severe wounds 35.6% were received RIG compared to those with mild 2.0% and moderate 7.6% wounds, the P-value (<0.001) indicates a statistically significant association between wound severity and RIG administration, patients with severe wounds had the highest proportion 51.7% of Tetanus Toxoid vaccination, while mild wounds had the lowest 35.8%, a higher proportion of patients with severe wounds 86.4% received the Rabies vaccine, compared to those with moderate 68.5% and mild 38.9% wounds, the P-value (<0.001) these a significant difference in rabies vaccination across wound severity, antibiotic use was slightly higher for patients with severe wounds 74.6% compared to those with mild 69.0% and moderate 70.0% wounds, the P-value (<0.001) indicates a statistically significant association, that bites on the head and neck were more likely to result in RIG administration, The P-value (0.017) suggests a statistically significant association, indicating that trunk bites were associated with RIG administration.

6.2 Recommendation of this study

1- Strengthening Collaboration and Surveillance:

- Modify investigation forms for both MOH and MOA, aligning with WHO and OIE recommendations.
- Improve surveillance systems and ensure complete data collection.
- Strengthen collaboration between MOH and MOA, implementing the One Health approach.
- Assign veterinarians to health directorates for animal health monitoring and laboratory examinations.

2- Public Awareness and Education:

- Conduct medical awareness campaigns on rabies prevention and control.
- Involve media and schools in educational campaigns.

- Educate risk groups (students, workers, employees) on safe animal interactions and avoiding provocation.
- Inform pet breeders about the importance of rabies vaccination.
- Design an awareness brochure on animal care, handling, and recognizing aggressive behavior.
- Conduct school training on handling dog interactions and attacks.
- Educate mothers on child safety regarding animal contact.
- Encourage students to travel in groups to reduce individual dog attacks.
- Train school health staff, parents, and students on proper wound disinfection and management**.**

3- Rabies Vaccination Programs:

- Implement a widespread vaccination campaign for domestic animals, especially dogs and cats.
- Prepare an emergency strategy to vaccinate stray dogs, aiming for 70% coverage per WHO guidelines.
- Educate farmers and breeders, especially those with guard dogs, on the importance of rabies vaccination and responsible pet care.
- Increase storage of rabies vaccines by 30% to ensure emergency preparedness.

4- Wound Management and Treatment:

- Include wound disinfection and bacterial culture testing in patient forms for effective antibiotic administration.
- Follow WHO recommendations on RIG administration for Category III exposures.
- Ensure correct evaluation and vaccination of animal bite victims, especially in endemic areas.
- Follow up on bitten patients to complete rabies vaccination doses.
- Monitor and track the health of the biting animal, conducting laboratory tests if necessary.

5- Prevention and Community Engagement:

- Raise awareness in rural areas through municipalities and health services.
- Prevent uncontrolled dog population growth through collaborative efforts between MOH, MOA, and local government.
- Record all relevant data on patient surveillance forms.
- Use social media and other outreach methods to Conduct awareness campaigns in high-risk areas (Hebron, Ramallah, Al-Bireh, Nablus).

6.3 Recommendations for future research

- Clinical and epidemiologic features of persons accessing emergency departments for dog and cat bite injuries in west bank
- prevention and control of zoonosis disease from dog in west bank.

6.4 Limitation of the study

- lake of financial support for research,
- Transportation and traffic crises that make it difficult to move to ministry of health or preventive medicine department in Ramallah.
- There are some obstacles, such as the difficulty of movement between the Palestinian governorates, especially during the war on Gaza,
- The restrictions on the West Bank, and occasional power outages and the Internet.
- Financial limitation to conduct farther studies.
- Difficultly of movement. crisis area and political instability.
- Animals' movement with no borders between countries.
- Different policies of prevention and control for animals between different countries.

6.5 Budget of the study.

Total cost for study			
Expense description	**Number of units**	**Cost of each unit**	**Total cost**
Transportation	13	200	2600 ILS
Data analysis/Software/ printing			3000 ILS
Miscellaneous			2000 ILS
Total			7600 ILS

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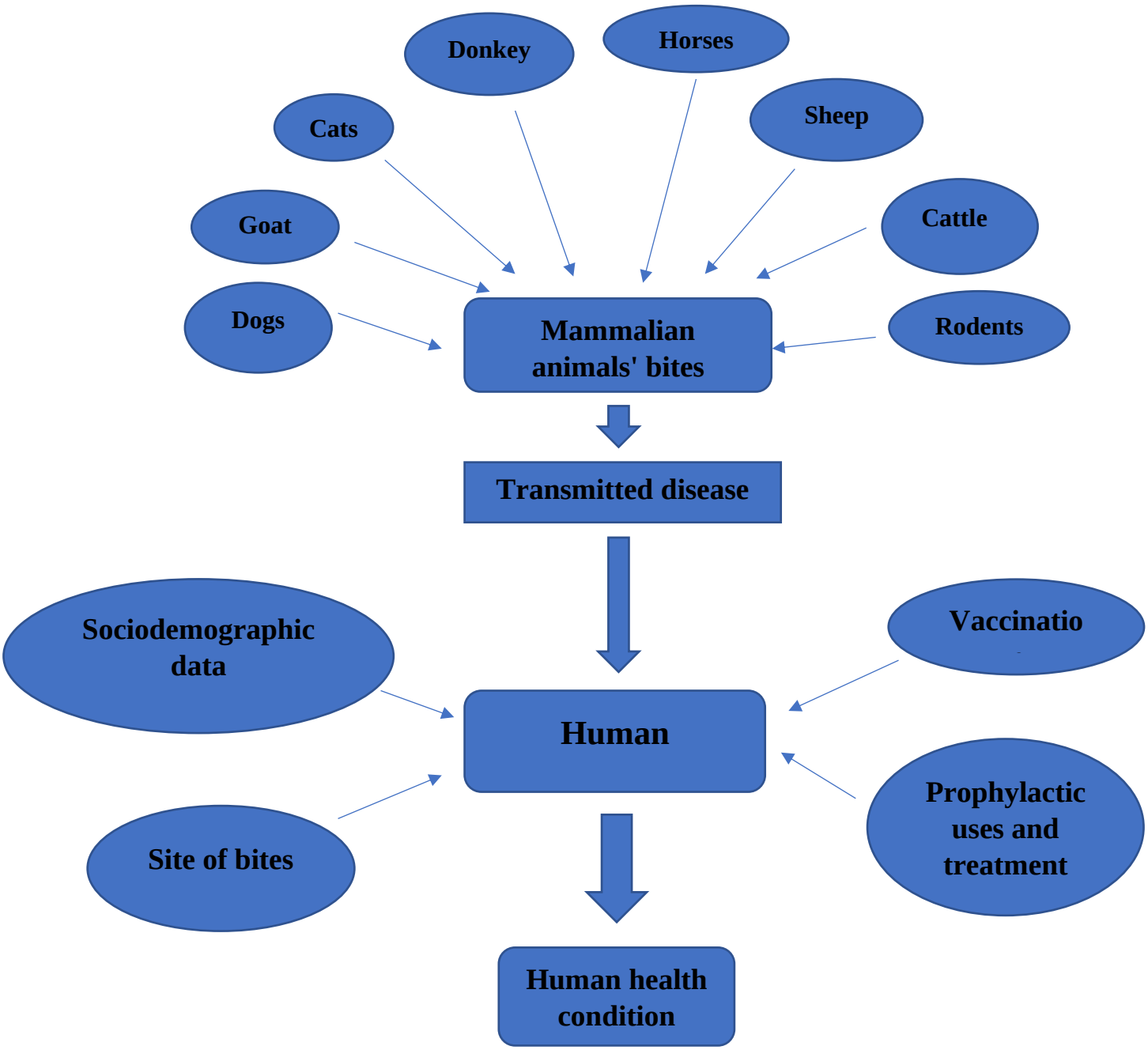
Appendix

Structural Framework



Annex (1): IRB Approval

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ: 2024/5/22
الرقم: REF.20/24

عزيزي الطالب ياسر النواجعة المحترم
برنامج ماجستير الوقاية وضبط الامراض المعدية

الموضوع: موافقة لجنة اخلاقيات البحث العلمي

قامت اللجنة الفرعية لأخلاقيات البحث التابعة لكلية الصحة العامة بمراجعة مشروع الرسالة بعنوان:

"Management and Prevention of Animal Bites in the West Bank "

المقدم من (مشرف البحث/د. اسعد رملاوي).

يعتبر مشروعك مستوفيًا لمتطلبات أخلاقيات البحث في جامعة القدس.

نتمنى لكم كل التوفيق في تسيير المشروع.

ملاحظة: في حالة الحاجة الى موافقة من اللجنة المركزية في الجامعة، تستطيع التقدم باستخدام هذه الموافقة على الرابط. https://research.alquds.edu/en/ethics/48-how-to-apply.html

رئيسة اللجنة الفرعية لاخلاقيات البحث
كلية الصحة العامة
د. نهى الشريف

نسخة/ أعضاء لجنة البحث
نسخة/ الملف

Annex (2): Facilitate the task

State of Palestine
Ministry of Health
Education in Health and Scientific Research Unit

دولة فلسطين
وزارة الصحة
وحدة التعليم الصحي والبحث العلمي

Ref: .....
Date: .....

عطوفة الوكيل المساعد لشؤون الصحة العامة وصحة الاسرة المحترم،،،

تحية واحترام،،

الموضوع: تسهيل مهمة بحث

يرجى تسهيل مهمة الطالب: ياسر نواجحة– ماجستير الوقاية وضبط الامراض المعدية/ جامعة القدس، وبالاشراف د. اسعد رملاوي، في عمل بحث بعنوان:

Management and prevention of animal's bites in West Bank

من خلال السماح للطالب بجمع المعلومات من دائرة الطبي الوقائي حول موضوع البحث.

على ان يتم الالتزام باساليب واخلاقيات البحث العلمي، والحفاظ على سرية المعلومات.

على ان يتم تزويد الوزارة بنسخة PDF من نتائج البحث، التعهد بعدم النشر لحين الحصول على موافقة الوزارة على نتائج البحث.

مع الاحترام،،

د. عبد الله القواسمي
رئيس وحدة التعليم الصحي والبحث العلمي

نسخة: عميد كلية الصحة العامة المحترم/ جامعة القدس

Telfax:09-2333901 scientificresearch

Annex (3): Collected data form

''Collected Data Tool''

Demographic data:

Age:

Gender:

Occupation:

Location of biting (area):

Date of bite:

Time of visit hospital after bite:

Related to bite:

Site of bite on the body

- **Face**
- **Head and neck**
- **Upper limb**
- **Lower limb**
- **Trunk**
- **Other ……**

Number of bites: ☐ **single** ☐ **multiple**

Nature of wound: ☐ **mild** ☐ **moderate** ☐ **sever**

Patient vaccination of rabies before bite: ☐ **yes** ☐ **no**

Related to treatment:

- **Vaccination** **number of doses ……**
- **Antirabic serum** **number of doses ……**
- **Tetanus vaccine** **number of doses ……**
- **Specified medication** **……...**

Related to biting animal:

☐ **Dog**

☐ **Cat**

☐ **Donkey**

☐ **Cattle**

☐ **Horse**

☐

Rodent

Home animal **non-Home animal**

Vaccinated animal against rabies **yes** **no**

Outcome of biting animal:

Under observation **killed** **escaped**

Result of laboratory examination for animal biting according rabies

Positive **negative** **no lab test**

If animal biting is under observation 10-14 days, what the sign of appeared about animal?

Healthy

Died

Sign of rabies

عنوان الرسالة:

إدارة عضات الحيوانات والوقاية منها في الضفة الغربية.

اعداد الباحث: ياسر أحمد خليل النواجعة

اشراف: الدكتور أسعد الرملاوي

الملخص

الخلفية: عضات الحيوانات هي إصابات مباشرة يتعرض لها الشخص الذي تعرض لهجوم حيوان، مما يسبب إصابة في الجسم تتميز في المقام الأول بتمزقات جلدية أو إصابات خطيرة، وعضات الحيوانات هي إصابات عادية، وتعتبر واحدة من الأسباب المتكررة لتلقي الرعاية الأولية والإحالة إلى مراكز الطوارئ، سنويًا، ترتبط 330.000 زيارة طوارئ بعضات في الولايات المتحدة. .(Darvishi et al., 2023)

المنهجية: تم الحصول على دراسة كمية بأثر رجعي في دائرة الطب الوقائي الحكومية في الضفة الغربية في فلسطين خلال الفترة من 2020 إلى 2023 لتقدير معدل انتشار عضات الحيوانات وكذلك الوقاية والإدارة.

النتيجة: أظهرت النتائج ان غالبية المصابين بالعضات من الذكور 2522 فردًا (82.34٪) بينما 541 فردًا (17.66٪) من الإناث ومتوسط عمر المصابين بالعضات 21.37 عامًا، ويكشف توزيع حوادث العض حسب المكان أن الأغلبية حدثت في المناطق الريفية بنسبة 53.09٪، وأظهرت البيانات أن الكلاب

كانت مسؤولة عن الغالبية العظمى من العضات بنسبة 87.33٪. أيضًا، فيما يتعلق بعدد العضات، تعرض 71.43٪ لعضة واحدة، بينما تعرض 28.57٪ لعضات متعددة. أظهرت طبيعة الجرح أن غالبية الجروح صنفت على أنها خفيفة بنسبة 64.68٪، وأظهر توزيع أماكن العض على الجسم أن الأطراف العلوية كانت المنطقة الأكثر تضررًا بنسبة 50.73٪، في عام 2020، كان هناك 636 حالة تمثل الإجمالي. وارتفع هذا العدد إلى 645 حالة في عام 2021، ثم ارتفع إلى 857 حالة في عام 2022. وسُجل أعلى عدد من الحالات في عام 2023، حيث بلغ 925 حالة. وتلقى 5.06% فقط من المرضى المضادات المناعية لداء الكلب RIG، وتلقى 50.05% لقاح داء الكلب، بينما تلقى 37.84% لقاح الكزاز، وتلقى 69.54% من المرضى العلاج بالمضادات الحيوية.

الاستنتاج: معدل انتشار عضات الحيوانات يتزايد بشكل ملحوظ مع مرور السنين.

الكلمات المفتاحية: عضات الحيوانات، منظمة الصحة العالمية، فيروس داء الكلب، الوقاية ما بعد التعرض، الوقاية ما قبل التعرض، وزارة الصحة