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# Investigation rabies epidemics by animal bites in northern Savadkuh County 2021-2022

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## Abstract

Rabies is one of the most important zoonotic diseases that is transmitted through animal bites. Suspected contact with animal saliva is defined as animal bite suspected of rabies. The present study was conducted in order to evaluate the incidence of animal bites in humans in the years 2021 to 2022 in the city referring to Northern Savadkuh Rabies Center.

In this descriptive-analytical study, the data has been collected by means of a checklist of cases that referred to the center and information registration in the rabies portal during the years 2021 to 2022 in the city. The data was statistically analyzed by SPSS ver.21 software. Chi-square and Student's t-tests were used with a significance level of  $p < 0.05$ .

During the study conducted, 509 cases of animal bites occurred in the North Savadkuh health area, of which 199 cases were urban and 310 were rural.

The results of this study show that the prevalence of animal bites is higher in men living in rural areas and the most complaints about animal bites are related to dog bites with an average of 63.024%. The highest growth in animal bite complaints was related to cat bites with an average annual growth of 4.5%. Through this study, it can be concluded that educational programs are necessary to increase the awareness of people at risk.

**Keywords:** Epidemiology, Vaccination, Animal Bite, Rabies, Northern Savadkuh



## Background

In his medical book, Celsus considered the saliva of infected dogs to be contagious and defined the word hydrophobia<sup>1</sup>, and described burning the bite site of a rabid dog in humans (Mahdhubana, 2005). Muhammad ibn Musa al-Khwarizmi says about a rabid dog: A rabid or crazy dog is called a rabid dog that bites and refuses to eat and runs away from water. Whenever this dog bites a person, that person will suffer from a dangerous disease and become afraid of water rather than dying of thirst (Ansari Shirazi, 1992).

In 1881, Louis Pasteur began his first experiment with the saliva of a child who had died of rabies and presented his first detailed report on rabies prevention to the French Academy of Sciences in 1885. On July 6, 1885, a 9-year-old boy named Joseph Meister from the city of Alsace in France was vaccinated by Louis Pasteur around the navel and was saved, and at a young age he accepted the janitor of the Institute Pasteur in Paris (Simani, 2003).

Being bitten by animals is an important problem and threat to people's health because today the subsequent infection can cause a fatal disease such as rabies. Placenta, contaminated equipment and organ transplants are transmissible (Simani et al, 2002).

Rabies is one of the important common diseases between humans and animals (zoonosis) and one of the oldest viral diseases (Mahdhubana, 2005). The causative agent of rabies is a neurophilic virus belonging to the rhabdovirus family and of the lyssavirus type. (Simani et al, 2002). Rabies virus is a significant pathogen that needs to be controlled in highly contaminated areas. Where national and international guidelines are effective (Wu et al, 2017).

In Eastern Mediterranean countries, rabies is a major health problem, and tourists visiting these countries are strongly advised to get vaccinated before exposure (WHO, 1996). In Asia, most human rabies cases are reported from India, Bangladesh and Pakistan. This issue is due to the large population and the lack of proper planning to control and prevent this infectious disease (Ghaffari-Fam et al, 2016).

In I.R.Iran, rabies is endemic and epidemiologically, there are two forms of wild and urban (Simani, 2004). In the north of the country, dogs and foxes, and in the west and northwest of the country, wolves are the most important vectors and reservoirs of the disease (Simani, 2003).



Dogs play the most important role in the transmission of diseases to humans (WHO, 2008). In addition to the importance of health in humans, disease outbreaks in livestock cause significant economic damage (Bahonar et al, 2007). The increase in the population of stray dogs, the growing statistics of animal bites and the spread of rabies in many provinces of the country, and the financial costs of treatment and prevention remind us of the need to pay more attention to disease control and research in its various aspects (Zeynali et al, 1999).

Northern Savadkuh County is located in Mazandaran province and has an urban and rural context centered on Shirgah city. The sanitary borders of this city are limited to Qaimshahr city from the north, Savadkuh city from the south, Babol city from the west and Sari city from the east.

This study was conducted with the aim of determining the epidemiology of animal bites in Northern Savadkuh County during 2021-2022, so that based on the results, appropriate strategies can be decided to design intervention programs to reduce animal bite cases.

## Material and methods

The present study is kind of a descriptive-analytical type based on data collected from the health centers of the health district of Northern Savadkuh County. In this study, all people bitten by animals were referred to the health centers of Northern Savadkuh city in 2021-2022. Data collection was done through census. The desired data were collected according to the variables of age, time of occurrence, type of animal, place of bite and type of treatment. The collected data were subjected to statistical analysis through chi-square test and t-test using SPSS version 21 software with  $p < 0.05$ .

## Results

1. According to table number (1), there were 509 cases of animal bites during the years 2021-2022 in the health area of Northern Savadkuh city. The lowest animal bite case was in April 2021 and the highest animal bite case was in January 2022.
2. According to table number (2), men have been bitten more than women. So that in 2019, out of 96 cases of bites, 67 were men and 29 were women, and in 1400, out of 175 cases of bites, 130 were men and 45 were women, and in 1401, out of 238 cases of bites, 161 were men and 77 were women.





3. According to table number (3), the most cases of animal bites are in the age group (30 to 40 years) and the least cases are recorded in the age group (1 to 10 years).
4. Table No. (4) Shows the geographical distribution of animal bite cases. The most bites occurred in rural areas with an average of 63.98% (in the rural and forest areas of Lefour) and the lowest amount of bites was in urban areas with an average of 36.01%.
5. Table number (5) shows the frequency of the number of bites. According to the obtained data, the most bites were related to the owner's dog with 308 cases. The number of animal bites is followed by cats with 68 cases, stray dogs with 62 cases, prevention of non-bite contact with 38 cases, other domestic animals 9 cases (sheep 2 cases, cattle 7 cases), other wild animals 24 cases (rats 17 cases, fox 3 cases, squirrel 3 cases, hamster 1 case).

## Discussion

Swadkoh Mazandaran city is limited to Qaimshahr from the north, Babol from the west, Dodangeh Sari from the east, and Tehran and Semnan provinces from the south through the ridge of the Alborz mountains. This city consists of the central and underwater parts and the cities of Pol Sefid, Zirab and Alasht. According to the population and housing census of 2015, the population of this city is 43,913 people and its area is 2078 square kilometers (Statistical Centre of Iran, 2016).

In terms of the occurrence of rabies in the world, Iran is one of the countries where the disease is seen in both wild and domestic animals, and it is still one of the health-economic problems. Almost all provinces of the country are more or less infected with this disease (Naghibi et al, 2014). According to the report of the Infectious Diseases Management Center of the Iranian Ministry of Health, the number of deaths caused by rabies in Iran in 2016 was 12, and the incidence of animal bites was estimated at 216 per 100,000 people. In 2016, the number of animal bites was about 150,000, which reached 207,000 in 2017. In 2018, more than 234,000 animal bites and 6 deaths occurred in the whole country. This trend has been continuously increasing during the last 10 years. According to reports, the most cases of animal bites are related to Tehran province, followed by the provinces of Khorasan Razavi, Fars, Isfahan and Mazandaran respectively (Zinsstag et al, 2009).

Some studies conducted in Asia show the direct cost of animal bite treatment including 5 doses of vaccination to be 35.65 USD alone, vaccine and



patient. The vaccine alone is \$45, the vaccine and immunoglobulin are estimated at \$64 to \$442 depending on the type of immunoglobulin (Wangdi & etal, 2012).

The cases of animal bites in Northern Swadkoh city have had an increasing trend during 2021-2022 and 509 animal bite cases have been recorded during these three years. The incidence rate of animal bites in Northern Swadkoh city was 195/16 per 100 thousand people, which according to the classification of Tabatabai et al. (2007) is one of the areas with low animal bites.

Also, Amiri et al. (2009) during a study in Shahrood city stated that the incidence of animal bites was 246 per hundred thousand people and Dadipour et al. (2009) announced this rate in Kalaleh as 773 per hundred thousand people.

The results of this study showed that cat bites are increasing every year, and every year it ranks second after dog bites. This increasing trend of cat bites can be attributed to the lack of control over the population of cats at the city level and the increase in keeping cats as pets by city residents.

Also, the findings show that the amount of animal bites in rural areas is higher than in urban areas, which can be attributed to the compatibility of villages with wildlife, in such areas, humans are very close to animals on a daily basis, but the trend of animal bites in Urban environments are growing and increasing, which is due to the growth of urban development and the entry of the city into the realm of wildlife, the lack of control over the population of stray animals such as dogs and cats in urban environments, and the increase in the desire to keep animals in urban environments as pets. And increasing the closeness of urban people with animals can be. The results of this study are consistent with the study of Alian and colleagues (Alian et al, 2021).

According to the results, the most animal bites caused by domestic animals were done by cows, which could be due to the susceptibility of cows to rabies. The results of this study are consistent with the study of Bahoona et al (2009).

Also, the findings show that there are more cases of animal bites in men than in women, which can be attributed to their more presence in activities outside the home and their more employment in jobs such as animal husbandry and agriculture, which leads to an increase in their relationship. It happens with animals. The results of this study are consistent with the study of Rahmanian et al (2020).

## Conclusion



The results of this study showed that most cases of animal bites by dogs happened in rural areas and for men. Considering the low number of animal bites in Savadkuh County, it seems that by increasing awareness and training people in dealing with animals, it is possible to reduce the number of animal bites and rabies. Also, due to the increasing trend of animal bites in urban areas, the need to increase the access of urban health centers to rabies vaccine is felt more than ever.

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