ORIGINAL RESEARCH ARTICLE

Seasonal Trend of Animal Bite Victims Attending Anti Rabies Clinic of A Tertiary Care Hospital, Berhampur, Odisha.

Prof. Durga Madhab Satapathy[1], Dr. Nivedita Karmeee[2], Dr. P. Narmada Reddy[3], Dr. Debasish Pandit[4]

ABSTRACT

NEED OF THE STUDY

Rabies is a fatal viral zoonosis and a serious public health problem. It is 100% fatal yet preventable disease. It is a disease of the central nervous system caused by the bites of warm-blooded animals and transmitted to humans through animal bites, most commonly by dogs. The cases for post~exposure prophylaxis are reported throughout the year in the ARC but cases of unprovoked bites or animals with a high suspicion of Rabies infection or more number of cases are reported in certain periods of the year. The knowledge on specific seasonal trend of animal bite cases will help the policy makers to formulate appropriate plans especially IEC activities and provision of logistic support for management of animal bite cases. The following study was therefore conducted in the ARC of MKCG Medical College Hospital, Berhampur with the following objectives.

OBJECTIVE

1. To study the month and season wise trend of animal bite victims over last 5 years.

2. To assess the seasonal distribution, if any, of bite victims with regards to type and behaviour of animal

METHODOLOGY

This was a record based cross sectional study carried out at ARC OPD in Department of Community Medicine, M.K.C.G. Medical college, Berhampur, Odisha. The duration of study was of 3 months from January-2019 to March-2019. The retrospective data of number of animal bite cases was collected form ARC OPD Register for the period from January 2014 to December 2018. Analysis was done in "R" software version 3.6.1. The "dplyr", "ggplot2", "forecast" and "stats" packages were used for data munging and trend analysis.

RESULTS

The total number of animal bite cases from January 2014 to December 2018 was 50484. An average of 10097 cases of animal bite were reported per year for the last 5 years with SD = 717.17. Dogbite was most common (83.33%), followed by cat bite (9.52%), monkey bite (5.65%) and others (1.2%). About 64.87% animal bite cases were males. Timse series analysis showed a trend of minimal decline of cases of animal bite since 2014 to 2018. Seasonality was noticed with maximum cases were reported in the month of October followed by November and December in each year. With respect to seasonality, highest number of animal bite cases was more during winter season followed by spring season and summer season.

CONCLUSION

There was a decrease in the burden of animal bite cases. Necessary intervention strategies based on epidemiological triad has to be designed and implemented for prevention & control of rabies.

Corresponding Author : Dr. Nivedita Karmee, niveditakarmee@yahoo. com

[1]H. O. D & Professor, [2]Assos. Professor, [3,4] Post Graduate student, Department of Community Medicine, M.K.C.G. Medical College, Berhampur, Odisha.

KEY WORDS

Rabies, Seasonal trend, Epidemiological triad, Intervention strategy.

INTRODUCTION

Rabies is a viral zoonotic disease of central nervous system. It is caused by Lyssavirus type -1 which belongs to the family Rhabdoviridae. The virus is excreted in the saliva of the affected animal. A number of carnivorous like dogs, cats, jackels, wolves and bat species serve as a natural reservoir. Rabies in dogs is a source of 99% human infections and a potential threat to more than 3.3 billion people. All the warm blooded animals including man are susceptible to rabies. It is transmitted to man by contact, bites and licks of rabid animals. It is the only communicable disease of man which is fatal but vaccine preventable [1].

Rabies is responsible for about 59, 000 human deaths annually in over 150 countries with 95% of cases occuring in Africa and Asia [2]. More than 99% of all human deaths from rabies occur in the developing world. India is endemic for rabies accounting for 36% of the world's deaths. It causes 18,000-20,000 deaths every year. Most 91.5% animal bites in India are by dogs, out of which about 60% are stray and 40% pets. A person is bitten in every 2 seconds and someone dies from rabies in every 30 minutes. The annual number of person-days lost because of animal bites is 38 million [3].

Citing the burden of rabies on a global scale, the global partners announced a plan "Zero by 30", in the year of 2017. So the present study was conducted in Anti Rabies Clinic of M. K. C. G. Medical College, Berhampur, Odisha to find out the trend of animal bite victims over a period of last 5 years and to assess the seasonality of animal bite victims.

METHODOLOGY

It was a record based cross-sectional study carried out at the Anti-Rabies-Clinic (ARC) OPD of M. K. C. G. Medical college, Berhampur, Odisha. The study was conducted over the period of 3 months from January 2019 to March 2019. The nature of the data used in the analysis was secondary data gathered from the OPD register of Anti-Rabies Clinic. Information about the socio-demographic profile and the types of animal bite were collected for the period of 5 years from January 2014 to December 2018. The total number of reported cases were calculated monthwise irrespective of new and re-exposure status. All the three categories of the animal bite cases were included in this study.

All the cases of animal bite reported to ARC OPD for the last 5 years were plotted as time-series plot. It is a line graph which represent the measurements taken over regular time interval. Time series decompostion is a statistical method that decomposes a signal into several components i. e. a trend, a periodic and a random component. The time-series plot was decomposed to analyse the trend and seasonality about the victims of animal bite reported to ARC OPD, MKCG Medical College. Data was entered in excel and analysed in "R" software version 3.6.1. The "dplyr", "ggplot2", "forecast" and "stats" packages were used for data munging and trend analysis.

RESULTS

A total of 50484 cases of animal bite were repoerted to ARC OPD during the period from January 2014 to December 2018. An average of 10097 cases of animal bite were reported per year for the last 5 years with SD=717.17. Highest number of animal bite cases were reported in the year of 2014 i. e. 10903 while the lowest number of cases in the year of 2018 were 9077. It was found that there was slight decrease in trend in the number of animal bite cases from 2014 to 2018. (Table1)

Table 1: Year-wise Distribution of the cases

Time Period	No of Animal Bite Cases				Total	Mean =10096.8 SD =717.17
	Male(n, %)	Female(n, %)	Rural(n, %)	Urban(n, %)		
Jan 2014-Dec 2014	6809(62.45%)	4094(37.54)	7828(71.79%)	3075(28.20%)	10903	
Jan 2015-Dec 2015	6242(59.61%)	4229(40.38%)	7894(75.38%)	2577(24.61%)	10471	
Jan 2016-Dec 2016	7138(69.0%)	3206(40%)	6875(66.46%)	3469(66.46%)	10344	
Jan 2017-Dec-2017	6429(66.35%)	3260(33.64%)	7132(73.60%)	2557(26.395)	9689	
Jan 2018-Dec 2018	6129(67.52%)	2948(32.47%)	7225(79.59%)	1852(20.40%)	9077	
Total	**32747(64.87%)**	**17737(35.13%)**	**36954(73.20%)**	**13530(26.80%)**	**50484(N)**	

Among the cases, 64.87% animal bite victims were males and 35.13% were females. Based on locality, 73.20% belonged to rural areas and rest (26.80%) were from urban and semi-urban areas. (Table-1). Majority of the cases were of dog bite (88.30%) followed by cat (7.52%) and monkey bite (4.11%). Only 1.7% of the cases were bitten by other animals. (Figure-1)
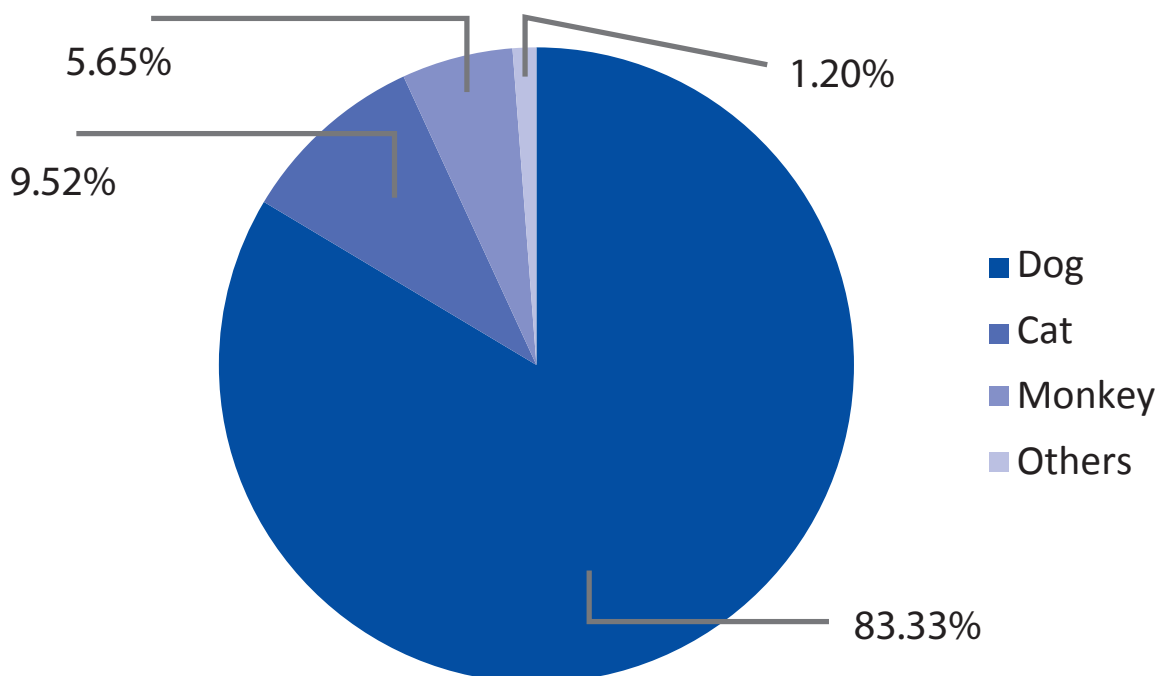

Figure 1: Types of Animal

The average number of animal bite cases per month were highest in the year of 2014. (mean=908, SD=272.17) and was lowest in the year of 2018. (mean =756, SD=139.83). (Table-2)

Table 2: Month-wise description of Animal Bite Cases from 2014-2018. (N=50484)

Year	No. of Months	Mean	Standard Deviation	Minimum	Maximum	Total
2014	12	908	272.17	607	1448	10903
2015	12	872.6	356.68	585	1730	10471
2016	12	862	318.06	543	1744	10344
2017	12	807.4	213.79	543	1396	9689
2018	12	756	139.83	543	1019	9077
2014-2018	**60**	**841.4**	**267.33**	**2821**	**7337**	**50484**

The time series plot indicate that the months of October, November and December show rise in the cases above the monthly average value for each year. For the year of 2014,2015,2016 and 2017, the maximum number of cases were reported in the month of October followed by November and December. In the year of 2018, maximum animal bite cases were reported in the month of January. Though there was a decline of cases after January 2018, again rise of cases were seen in the month of October. A sudden rise of the number of cases was also seen in the month of August 2014. (Figure-2)
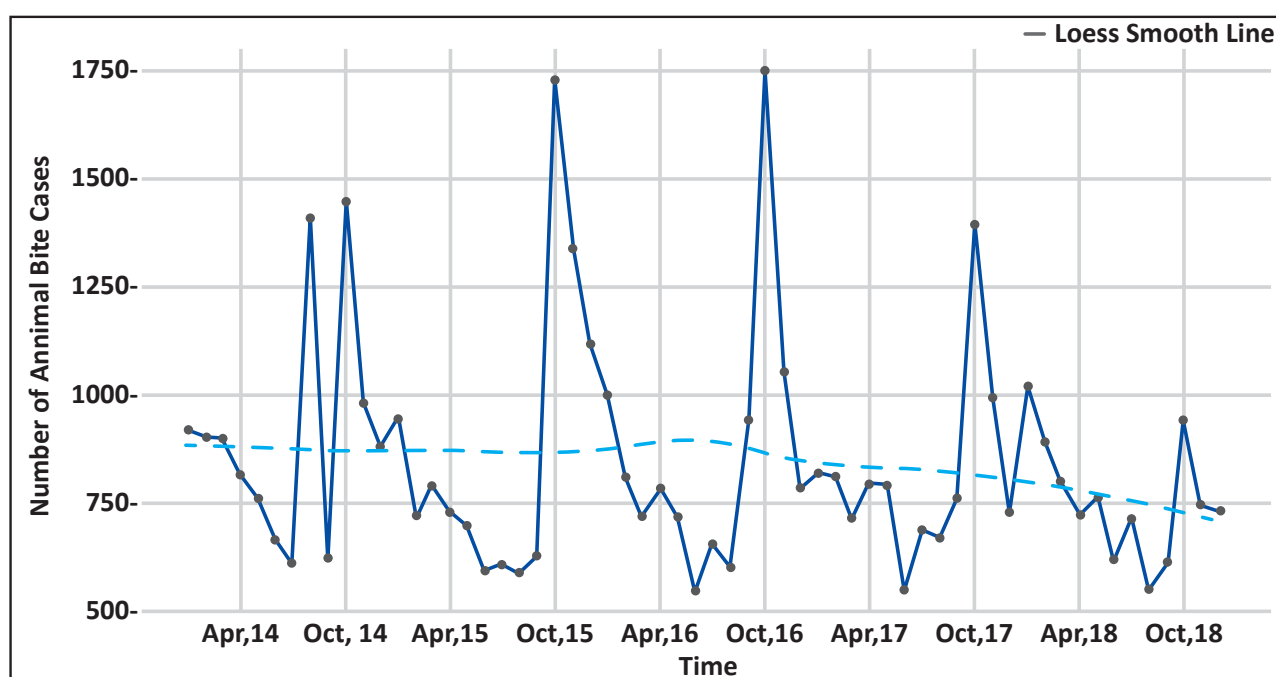

Figure 2: Time series plot of the Animal Bite Cases Attending to ARC-OPD.

To analyse the trend and sesonality, the monthly variation time series data was decomposed into trend and seasonality components by "loess smoothing method". The time-series data was decomosed into trend, seasonality and irregularity. A downward trend of the counts of the animal bite cases which first manifest itself from February 2018 is depicted in the figure. However with increase number of cases in October 2018, the annual number of cases remained high and the corresponding burden cannot be simply ignored. The additive model was considered since the random fluctuations in the data are roughly constant in size over time. The seasonal plot displayed the sub-series by year. It shows that the seasonal component constrained to remain the same across the year for the last 5 years. This implies that there is a seasonality among in the number of animal bite cases attending Anti-Rabies Clinic in each year. (Figure-3)
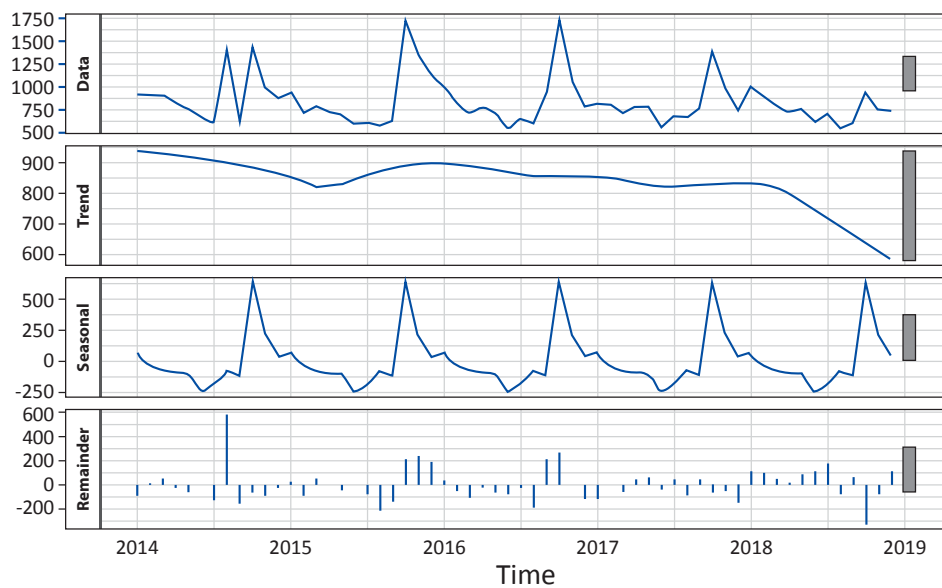
Figure 3: Seasonal Decomposition of Time series data into Trend, Seasonal and Irregular Component.

Table 3: Seasonality Index of the time series data

	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Seasonality Index	0.094	0.082	0.078	0.076	0.074	0.059	0.065	0.074	0.071	0.143	0.101	0.084

The average number of animal bite cases reported for the last 5 years was 841.4 (SD=267.33). The seasonality index were calclulated and it was found that the month of October shows the highest seasonal index (0.143) and minimum for the month of June (0.059) (Table 3). This indicate that the month of October was the peak time where maximum number of cases were attended to OPD followed by November and December. This time represent the continuation of winter and beginning of spring season in India. However in 2018, the trend shows slight reverse order. More number of cases were reported at the beginning of the year and with a peak in October, a decline in trend was seen. (Fig-4)
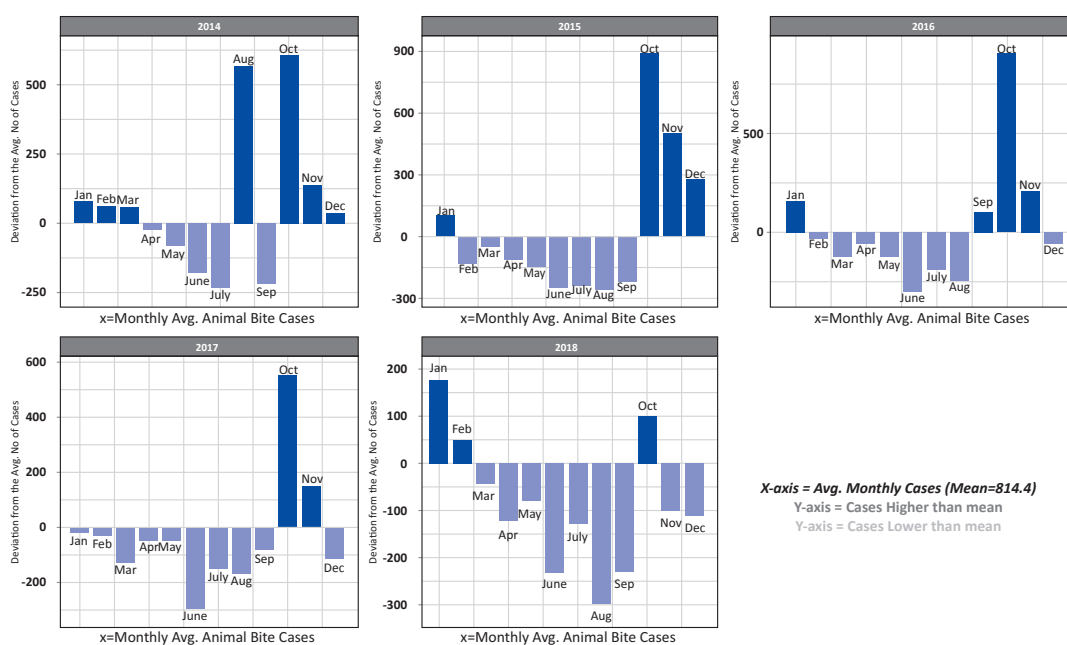

Figure 4: Month-wise variation of Number of Animal Bite Cases.

DISCUSSION:

Current cross sectional study is conducted to find out the trend of animal bite victims over a period of last 5 years and to assess the seasonal distribution of animal bite victims.

In our study, it was observed that average animal bite cases were more in the month of October, November and December and less in the months of April and May. It is similar to a study by Sinha et al (2015)[5] where more cases were found in the months of October, November and December and fewer cases found in the months of August, July and September respectively. In contrast to this study, a study conducted by Dr Kulkarni et al[6] found maximum number of cases in the month of March, April and February.

Maximum number of animal bite cases were by dogs followed by cats and monkeys which is similar to the findings of TR Behera et al[7], Singh et al[8], and Sudarshan et al [9] where dogs were the most common (95.8%) biting animal.

Males were more affected than females which could be because males are more involved in outdoor activities than females. Similar findings were reported by Mahd Junaid et al[10], Shelke et al[11], Jain et al [12]. However in a study by Gupta et al[13] more females were the victims.

Like wise majority of animal bite cases were from rural areas. This could be because in rural areas people mainly work outdoors and are largely farmers, daily labourers, etc. It was similar to the finding by Modi et al [14] and Behera TR et al [7]. However, studies by Sampath et al [15], Kirti V Kinge et al [16] reported that most of the animal bite victims were from urban areas.

The attendance of animal bite cases at ARC was high during winter season and spring season and less during rainy season and summer season. It could be because winter season is the breeding season for dogs. This is similar to the findings by Hanspal et al[17] and A. K. Pratap et al [18]. Contrary to this some studies conducted by Agrawal et al [19] and Vinay M et al [20] in which maximum animal bite cases were found in summer season.

CONCLUSION AND RECOMMENDATION:

As the burden of animal bite case is high, in every health facility there should be availability of vaccines and immunoglobulin. Most bites were by dogs and more in winter and spring season. It is necessary to vaccinate all the domestic dogs. Furthermore, most animal bite cases were from rural areas. So, there should be proper IEC activities to increase the awareness regarding the rabies prevention, treatment and adequate precautions to be taken especially during the winter season. The programs like ABC (Animal Birth Control) and mass vaccination campaign should function well to bring down the magnitude of animal bite cases.

Source of Support:

Nil

Conflict of Interest:

Nil

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