



Status of Animal bites in Gwalior Chambal Region, In North Madhya, Pradesh (India)

Sajad Ahmad Bhat* and R J Rao

School of Studies in Zoology, Jiwaji University, Gwalior, (India)

Email: Sajadbio6@gmail.com

ABSTRACT

The study was carried out to access the prevalence of animal bites and rabies in Gwalior Chambal region. Rabies a zoonotic and dreadful disease is a concern, as its cases in India subcontinent are rising at a very rapid rate. The annual deaths due to rabies is estimated around 20,000 and is an economic burden for the nation. A study was carried out in Gwalior Chambal region to access the prevalence of animal bites and the deaths caused by rabies in the region. A field survey was conducted and compared with the available data in different hospitals of the selected area for the present study. The study reveals that 75% of males and 25% females in the study area were bitten by dogs and most of them were at the age group of 21-30 years. Most of the victims were bitten by stray dogs at their lower body extremes. Different barriers that are cause of death due to rabies needed to be removed in order to decrease the burden of deaths in the study area.

Key Words: Animal bite, deaths due to rabies, Rabies, Rural areas, Urban.

Received 21.11.2017

Revised 18.12.2017

Accepted 11.02.2018

INTRODUCTION

Rabies is of serious concern for the authorities as it is besieged with serious health consequences with serious financial burden on different states [1]. The dog bites has enhanced over the years and government are forced to purchase and stock more vaccines and medicines for averting and treating the dog bites that puts an additional burden on respective government [2]. Dog bite is natural, innate behaviour, as dogs feel susceptible to humans or in need of food. It is reported that around 10 million wounded obtain treatment yearly due to animal bites [3] and most of them are dog bites [4] and mostly children are soft victims. The dog bites with a pressure of more than 450 psi, and thus the injuries triggered by these canines are more severe.

A recent study projected that at least 421,000 animal bites and 20,000 animal bite-associated mortalities occur yearly [5]. Dog bites have induced serious health consequences in the urban areas of India and are linked with diseases that are considered to be one of the serious health and economic obstacles. A majority of these victims were bitten by dogs. Vaccination is a positive option to stop the spread of diseases for dog bites, particularly rabies, that the victim may suffer, only modern cell culture vaccines are used for rabies prophylaxis as the manufacturing of nerve tissue vaccine was stopped in India from 2005. Cell culture vaccines have caused a decrease in the occurrence of human rabies deaths in India during the past decade. This has definitely reduced the frequency of rabies patients admitted to the infectious diseases hospitals located in urban areas. However, apparent decrease may not actually reflect the country situation as a whole as the majority of rabies cases occur in rural areas, The WHO has shown serious concern for India during the negotiations of the meeting over the continuing large numbers of rabies deaths. An inter-regional conference was organized by the WHO in July 2002 to develop policies to decrease rabies deaths in these countries.

Rabies is considered as one of the most dread full viral zoonotic disease that is responsible to kill almost 60 000 people worldwide every year [6] and is a major threat for two third of world's population [7,8]. It is not specific in a particular geographical area but is cosmopolitanism in its distribution moving fast around the globe causing death to ten thousand children's annually [9,10]. Transmission is mostly through saliva of rabid dogs with highest level of incidences among human and veterinary and with high

mortality rate that causes high economic burden annually in various countries [11,12]. India is considered as the most victimised country in Asia with highest number of deaths due to rabies, there are 2 per 100,000 population incidences which leads to an average death of 20,000 individuals annually [13]. Rabies is considered a disease of low public health priority and no national wide epidemiological survey has been undertaken. WHO estimated that about 90% of total bites are by dogs in Asia [14] that transmit rabies to humans [15]. Individuals once bitten are applicable to WHO category II and III which are considered at high-risk regions and should immediately receive personal protective equipment's, while as animals should be observed for clinical signs or be examined for rabies diagnosis [16] It is estimated that more than 10 million victims receive treatment annually due to animal bites [14] in countries where rabies frequently affect the economically backward sections of the rural community and children below the age of 15 years [17,18,19] Less financial resources, negligence, unawareness, a weak health care infrastructure and inadequate reporting systems all facilitates to the disease transmission. Human-dog contacts are due to social and environmental conditions that brings people in contact with dogs. The Gwalior Chambal region is prone to such conflicts and hence the rabies victims are increasing Hence, an attempt has been made to study the current status of Animal bites in Gwalior Chambal Region, and its implications on its victims.

MATERIALS AND METHODS

Cross-sectional study was carried out in order to examine the patterns of dog bites for the period of two years inn Gwalior Chambal region North Madya Pradesh province, India. All district health centres in the study area which had separate, rabies sections and which provided health care and treatment services for victims of animal bites. Data on the bitten subjects were obtained from rabies records provided by the concerned authority. And extensive survey was carried out by the researcher to identify the causes and implications of dog bites.

Study site

| Area | Population | Male: Female | Literacy | Occupation |
|---------|------------|--------------|----------|-----------------------|
| Gwalior | 2,030,543 | 864 | 77.93% | Trade and agriculture |
| Morena | 1,965,137 | 840 | 72.1% | Trade and agriculture |
| Bhind | 1,703,562 | 837 | 76.59% | Trade and agriculture |

Source: Census, 2011

Target Population

Both male and female, elderly and children who were bitten by dogs were taken into account. The data was matched with the medical records and every attempt was made to include all the case of rabies in all hospitals.

Animal bitten subjects

It includes all those individuals referred to rabies centres because of suspension of rabies or any other disease from animal bites. And also those who could not enrolled in rabies centres or health centre, All the cases of animal bites were included in the study (census).

Studied variables

Preferred variables includes Age, gender, occupation, residential information urban or rural, body part effected by biting animal and year patterns of health services provided for the victims.

Data collection

Data was collected personally by visiting different villages and the same was matched with medical records of following hospitals with due permission from the CMO concerned. Face to face interviews with the victims were also conducted at the study site to know the effects and behaviour of rabies victims.

RESULTS

During the study it was observed that total number of bitten cases was (3250) out of which 75% were male and 25% was female victims (Fig 1). 1305 victims were from Urban areas contributes about total of 40.15 % while as that from rural area were 59.84 %. In present study, 21.13% (687) cases were in the age group of 0-10, while as 25.72% (836) cases were in the age group of 11-20, 21.04 % (684) are in the age group of 21-30, 11.72%(381) are in the ag group of 31-40, 8.83 % (287) are at the age of 41-50, 5.38% (175) are at the age of 51-60, 4.27% (139) are in the age group of 61-70, 1.29 (42) are in the age group of 71-80, 0.46% (15) are in the age group of 81-90 and 0.12 % (04) are of in the age of 91-100 (Table 1). In our study, 17.47% (568) were bitten by pet dogs, 1.87% (61) were bitten by monkey, 0.83 %

(27) were bitten by cat bite, 0.67% (22) were bitten by wild animals, 0.06% (02) were bitten by wild fox, 0.09% (03) were bitten by lizards, 0.06 (02) were bitten by human bite, 0.03% (01) were bitten by goat bite, 0.03 (01) were bitten by horse bite, 0.03 (01) were bitten by pig bite, 78.70% (2558) were bitten by street dogs, 0.12% (04) were bitten by unknown animals (Table 2). The study reveals that 10.86% (353) individuals were bitten on their upper body part including head, neck, shoulders, while as, 37.2% (1209) victims were bitten on their trunk, and 51.93% have bite on the lower extremes. (Table 3). Multiple deaths occurred due to rabies in Gwalior Chambal region from last three years, the maximum deaths occurred during 2016 with seven human deaths while as no death occurred during 2014 and two deaths were reported during 2015 (Fig 3).

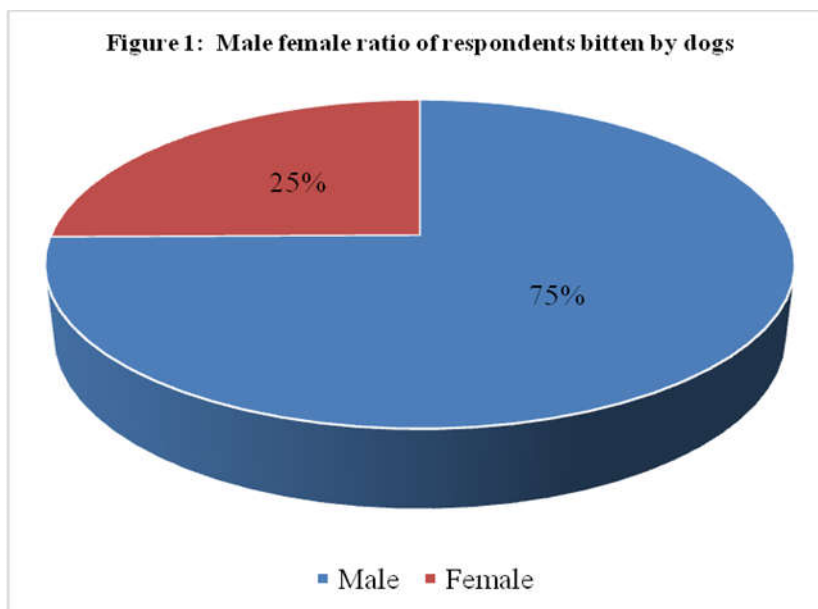


Table 1: Percentage of males and females bitten by dogs

| Age group | Male | Female | Total | % |
|--------------------|------|--------|-------------|-------|
| 0-10 | 529 | 158 | 687 | 21.13 |
| 11-20 | 646 | 190 | 836 | 25.72 |
| 21-30 | 522 | 162 | 684 | 21.04 |
| 31-40 | 298 | 83 | 381 | 11.72 |
| 41-50 | 217 | 70 | 287 | 8.83 |
| 51-60 | 132 | 43 | 175 | 5.38 |
| 61-70 | 115 | 24 | 139 | 4.27 |
| 71-80 | 32 | 10 | 42 | 1.29 |
| 81-90 | 14 | 01 | 15 | 0.46 |
| 91-100 | 03 | 01 | 04 | 0.12 |
| Grand Total | | | 3250 | |

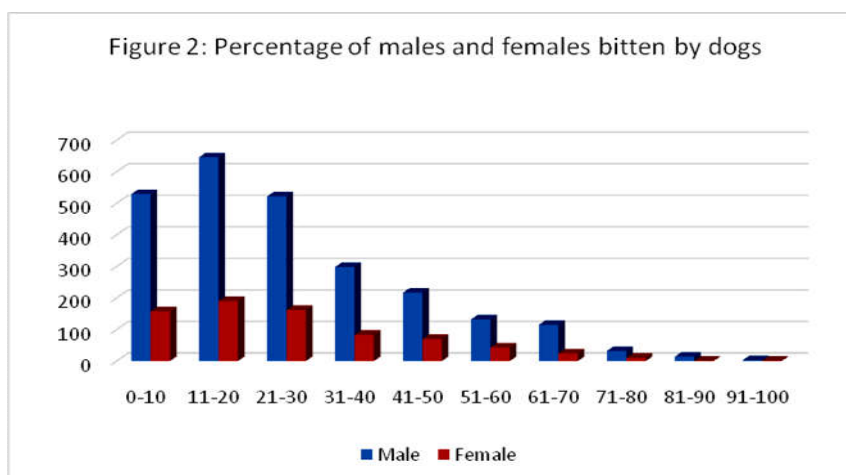
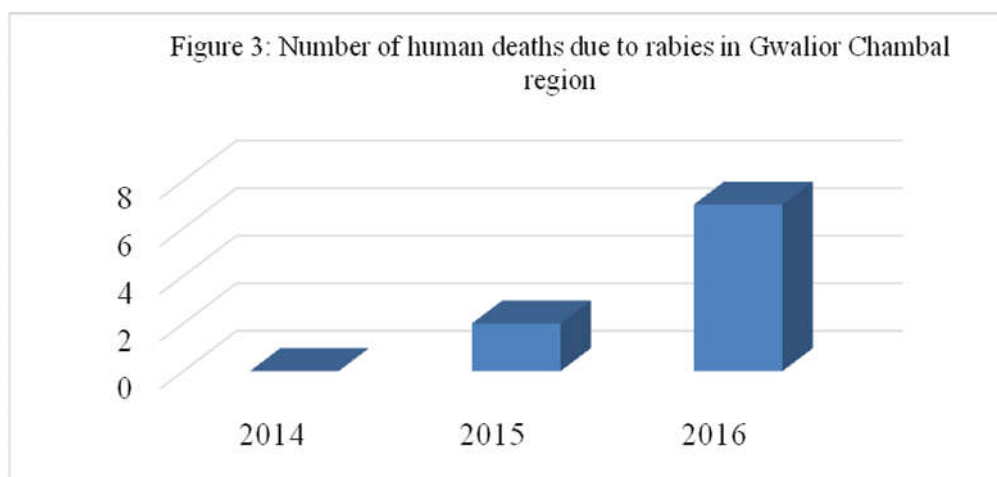


Table 2 : Human -Animal incidences in Rural and Urban Areas

| Details | Urban | Rural | Total | % |
|------------|-------|-------|-------|-------|
| Pet dog | 402 | 166 | 568 | 17.47 |
| Monkey | 19 | 42 | 61 | 1.87 |
| Cat | 11 | 16 | 27 | 0.83 |
| Wild | - | 22 | 22 | 0.67 |
| Wild Fox | - | 02 | 02 | 0.06 |
| Lizard | 01 | 02 | 03 | 0.09 |
| Human | 02 | - | 02 | 0.06 |
| Goat | - | 01 | 01 | 0.03 |
| Horse | 01 | - | 01 | 0.03 |
| Pig | - | 01 | 01 | 0.03 |
| Street dog | 869 | 1689 | 2558 | 78.70 |
| Unknown | - | 04 | 04 | 0.12 |
| Total | 1305 | 1945 | 3250 | |

Table 3: Percentage of body parts affected by dog bites

| Site of bite | No. of individuals | % |
|---|--------------------|-------|
| Upper part: Head, shoulder, Neck, Face | 353 | 10.86 |
| Trunk: Upper arms, abdomen, back | 1209 | 37.2 |
| Lower part: Thigs, buttocks, legs, Foot | 1688 | 51.93 |
| Total | 3250 | |



DISCUSSION

Rabies is an endemic disease in India and its prevalence appears to be constant with noticeable trend in gross rise or decrease in numbers. It is a distressing to note that many patients left hospital against medical advice, apparently after learning that there is no cure for the disease. The urban and rural survey revealed that the majority of human rabies victims were people who remain mainly outside and from poor sections of the community. Most of the population lives in rural areas, nearly two third of the rabies cases were reported from the rural population. A slightly higher proportion of children from rural areas and adults from urban areas had died of rabies. Dog bites were mainly accountable for these deaths and the majority of these were by stray dogs. Correspondingly, few other studies have recognized dogs as the main animal responsible for human rabies deaths in India. Consequently, the key to human rabies anticipation and control in India lies in the successful control of canine rabies and the stray dog population.

The male and female ratio indicated that males are more victims than females and the same study was reported by [20]. This can be attributed to the reason that men go out to carry out different types of jobs while as females mostly remain indoor because of their domestication, similar findings and explanation was reported by findings was being found by [20]. In this study individuals between 10-20 followed by 0-10 years old are mostly victims of dog bites as children in the age group of 10-20 remain out door to visit schools or go for playing as has also been reported by [21].

Seven deaths were reported during 2016 in Gwalior Chambal region due to dog bites, mostly stray dogs. Similarly, other studies have identified dogs as being the main animal responsible for human rabies deaths in India. The incidence of dog bites were more on lower limbs (51.93%) followed by bites to trunk region, hands and head. Similar observations were reported by [23-25].

Our results suggest that the density of human population is directly associated with human- animal interface which may in turn leads to rise in bitten cases and rabies, also the availability of food provides a good habitat for stray dogs, In order to address the issue it needs public awareness, proper disposal of waste food, and control on dog ownership. Cumulative effect of dog population, and low vaccination can lead to the persistence of rabies virus in a human population [26]. resulting in frequent disease outbreaks. Similar situations have been reported in many other canine rabies endemic countries [27, 28]. Monitoring and prevention of rabies is crucial to avert the disease in humans [29]. Barriers viz lack of awareness and education among victims Absence of diagnostic facilities in the affected areas inadequate surveillance and reporting system at access to raises vaccines and stray dogs are responsible for increased incidences of raises deaths in Gwalior Chambal areas similar observations were reported by [30, 8, 31]. The different barriers in Gwalior Chambal region is often attributed to low prioritization, epidemiological and operational constraints ,insufficient financial resources. Hence local diagnostic capacity is very important to cover all raises victims in Gwalior Chambal region ³² Further to reduce to deaths by raises victims the availability of simple and affordable diagnostics at all the hospitals must be available and for that establishment of diagnostic laboratory infrastructures [33].

In small settings like Gwalior Chambal region, vaccination, registration, routine supervision and population planning is one of the cost-effective elements that may reduce the burden of rabies victims. Accuracy to monitor the burden of raises disease in small populations. The data generated by this type of small research will be very helpful to influence the policies and strategies to ensure allocation of rabies vaccine in small areas which are mostly neglected. The epidemiological assessment of the prevalence of the rabies in Gwalior Chambal region revealed that victims of dog bites are not treated equally in the society as well as in their homes, rabies is a communicable disease but poor knowledge among the general public is a vulnerable to certain physiological disorders and feel a sense of isolation in the society. Further people in these villages had to resort different indigenous treatment that may cause mental trauma among these victims. In Gwalior Chambal region a little effect from the concerned authorities will make all the dogs accessible for vaccination and can educate the owner of dogs about the harmful effect of rabies. Apart from that general public can be made aware about the identification of rabid dogs and information concerned authority may be accessible at ease.

SOURCE OF FUNDING

I am thankful to Jiwaji University Gwalior for financial support (F/DEV/2017/304).

CONFLICT OF INTEREST

None

REFERENCES

1. Rezaeinasab M, Rad I, Bahonar A, (2007). The prevalence of rabies and animal bites during 1994 to 2003 in Kerman province, southeast of Iran. *Iran J Vet Res*:8(4):343e50doi.org/10.1016/j.phrp.2016.06.004
2. Sharifeian J, Simani S, Shirzadi M, (2003). Guideline state rabies disease. Tehran (Iran): Seda Publication; In Persiandoi: 10.1016/j.phrp.2016.06.004
3. World Health Organization (WHO). (2013).WHO Expert consultation on rabies. Second report (WHO technical report series; no. 982). Geneva (Switzerland): WHO.
4. Talan DA, Citron DM, Abrahamian FM, (1999). Bacteriologic analysis of infected dog and cat bites. *Emergency Medicine Animal Bite Infection Study Group. N Engl J Med*; 340(2):85e92 doi.org/10.1016/j.phrp.2016.06.004
5. Kasturiratne A, Wickremasinghe AR, de Silva N, (2008). The global burden of snakebite: a literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med*: Nov 4;5 (11):e218doi: 10.1371/journal.pmed.0050218
6. Martinez L, (2000).Global infectious disease surveillance. *Int. J. Infect. Dis.* 4, 222–228
7. Fook AR, (2005). Rabies remains a 'neglected disease'. *Euro. Surveill.*: 10 (11), 211– 212 doi.org/10.1016/j.antiviral.2013.04.004
8. Hampson K, Dobson A, Kaare, M, Dushoff J, Magoto M, Sindoya E, Cleavel and S. (2008). Rabies exposures post-exposure prophylaxis and deaths in a region of endemic canine rabies. *PLoS Negl. Trop. Dis.*: 2 (11), e339doi.org/10.1371/journal.pntd.0000339
9. Rupprecht CE, Barrett J, Briggs D, Cliquet F, Fooks AR, Lumlerdacha B, Meslin FX, Muller T, Nel L, Schneider C, Tordo N, Wandeler AJ, (2008). Can rabies be eradicated? *Dev. Biol. (Basel)*; 131, 95–121
10. WHO, (2013).Expert Consultation on rabies WHO Technical Report Series,: 931, 1–88 Accessed on February 4th.

11. Hicks DJ, Fooks AR, Johnson N. (2012). Developments in rabies vaccines. *Clin Exp Immunol*: 169(3): 199-204doi: 10.1111/j.1365-2249.2012.04592.x
12. Susilawathi NM, Darwinata AE, Dwija IB, Budayanti NS, Wirasandhi GA, Subrata K, (2012). Epidemiological and clinical features of human rabies cases in Bali 2008–2010. *BMC Infect Dis* : 12:. doi: 10.1186/1471-2334-12-81
13. Burki T, The global fight against rabies. *Lancet* 2008: 372 (9644), 1135–1136doi:10.1186/1471-2334-12-81
14. World Health Organization (WHO). (2013).WHO Expert consultation on rabies. Second report (WHO technical report series; no. 982). Geneva (Switzerland): WHO.
15. Barzkar H, Ghaffari-Fam S, Shamshirgaran SM, Ghasem-Zadeh P, Bayat-Maku Z. (2016). Epidemiological patterns of animal bite patients under 10 year old, in Maku county, [West Azerbaijan]. *Med J Tabriz Univ Med Sci Health Serv*: 37(6): 6-11. Persian.doi.org/10.1016/j.joad.2016.08.019
16. World Health Organization. (1996). WHO recommendations on rabies post-exposure treatment and the correct technique of intradermal immunization against rabies. WHO.
17. Pancharoen C, Thisyakorn, Lawtongkum W, Wilde H. (2010a). Rabies exposures in Thai children. *Wilderness Environ. Med.* 12, 239–243 Tenzin, Dhand, N.K., Dorjee, J., Ward, M.P., 2010a. Re-emergence of rabies in dogs and other domestic animal in eastern Bhutan, 2005–2007: 2001:Epidemiol. Infect. 139, 220–225.doi: 10.1371/journal.pntd.0001391
18. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda ME, Shaw A, Zinsstag J, Meslin F-X. (2005). Re-evaluating the burden of rabies in Africa and Asia. *Bull. World Health Organ.*: 83, 360–368. doi: S0042-96862005000500012
19. Cleaveland S, Kaare M, Knobel D, Laurenson MK. (2006). Canine vaccination– providing broader benefits for disease control. *Vet. Microbiol*; 117, 43–50.doi: 10.1016/j.vetmic.2006.04.009
20. Sudarshan MK, Mahendra BJ, Madhusudana SN, Ashwoath Narayana DH, Rahman A, Rao NS, An epidemiological study of animal bites in India; results of a WHO sponsored national multi-centric rabies survey. *J Commun Dis.* 2005: 38: 32-9doi:10.1016/j.ijid.2005.10.007
21. Gadekar, Rambhau D1, and Dhekale, Dilip N. (2011). Profile of Animal Bite Cases in Nanded District of Maharashtra State, India. *Indian Journal of Fundamental and Applied Life Sciences*: 1 (3): 188-193DOI: doi.org/10.18203/2394-6040.ijcmph20161603
22. Vinay M, Mahendra BJ, (2011). Compliance to intra dermal rabies vaccination schedule at the anti-rabies clinic, Mandya institute of medical sciences hospital, Mandya, Karnataka State. *APCRI journal.* 13: 35-7.
23. Sudarshan MK, Nagaraj S, Savitha B, Veena SG. (1995). An epidemiological study of rabies in Bangalore city. *J Indian Med Assoc* ;93:14—6
24. Singh J, Jain DC, Bhatia R, Ichhpujani RL, Harit AK, Panda RC, Epidemiological characteristics of rabies in Delhi and surrounding areas 1998. *Indian Paediatr* 2001;38:1354—60. 9doi:10.4103/0974-777X.150888
25. Gohil HK, Dhillion R, Tiwari KN. Human rabies situation in and around Delhi. *J Assoc Prev Control Rabies India* 2003;V(182):11— 5.
26. Lembo T, Hampson, K, Haydon, DT, Craft, M, Dobson, A, Dushoff J, Ernest E, Hoare R, Kaare M, Mlengeya T, Mentzel C, Cleaveland S, Exploring reservoir dynamics: a case study of rabies in the Serengeti ecosystem. *J. Appl. Ecol* 2008: 45, 1246–1257doi: 10.1111/j.1365-2664.2008.01468.x
27. Cleaveland S, Dye, C., Maintenance of a micro parasite infecting several host species: rabies in the Serengeti. *Parasitology* 1995:111, S33–S47
28. Wilde H, Hemachudhaa T, Khawplod B, Tepsumethanon V, Wacharapluesadeeb S, Lumlerdachab B, (2007). Rabies perspective from Asia. *Asian Biomed*: 1, 345–357.
29. Coleman PG, Dye C. (1996). Immunization coverage required to prevent outbreaks of dog rabies. *Vaccine* :14 (3), 185–186.doi.org/10.1016/0264-410X(95)00197-9
30. Sudarshan MK, (2007). The changing scenario of rabies in India: are we moving towards its prevention and control? *Indian J. Public Health*:51 (3), 145–147
31. Zhang J, Jin Z, Sun GQ, Zhou T, Ruan S, (2011). Analysis of rabies in China: transmission dynamics and control. *PLoS ONE*: 6 (7), e20891.doi.org/10.1371/journal.pone.0020891
32. Lembo T, Hampson K, Kaare MT, Ernest E, Knobel D, Kazwala RR, Haydon DT, Cleaveland S, (2010). The feasibility of canine rabies elimination in Africa: dispelling doubts with data. *PLoS Negl. Trop. Dis.*:4 (2), e626.doi.org/10.1371/journal.pntd.0000626
33. Hossain M, Bulbul T, Ahmed K, Ahmed Z, Salimuzzaman M, Haque MS, Ali A, Hossain S, Yamada K, Moji K, Nishizono A,(2010). Five-year (January 2004–December 2008) surveillance on animal bite and rabies vaccine utilization in the infectious disease hospital, Dhaka, Bangladesh. *Vaccine* 2011: 29 (5), 1036–1040doi: 10.1016/j.vaccine.11.052.

CITATION OF THE ARTICLE

Sajad Ahmad Bhat and R J Rao. Status of Animal bites in Gwalior Chambal Region, In North Madhya, Pradesh (India). *Bull. Env. Pharmacol. Life Sci.*, Vol 7 [4] March 2018 : 19-24