

## Original Research Article

# A study of treatment compliance of dog bite cases reporting to anti-rabies clinic of M.K.C.G Medical College, Odisha, India

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## ABSTRACT

**Background:** Rabies a dreadful disease can easily be prevented by immediate wound care, vaccination and immunoglobulin administration. Prognosis depends on the promptness of initiation, regularity and completion of treatment, determined by patient's compliance. It partly depends on the patience and devotion of doctor for counselling the patient. The objectives of the study were to assess the treatment compliance of dog bite cases attending tertiary care centre for post exposure prophylaxis (PEP) of Rabies.

**Methods:** It is a record based longitudinal study, conducted in Anti- Rabies Clinic of M.K.C.G Medical College from January 2016 to July 2016. Patients registered on first visit followed up to the 4<sup>th</sup> dose, the last cases registered on June 15<sup>th</sup> was followed up to July 31<sup>st</sup> to declare it as completed, delayed or defaulted as decided.

**Results:** Total 1658 cases were registered during the study period. Most of them were male (73.8%) and ≤20 yrs of age. 1222 cases (73.7%) completed treatment, out of which 793 cases completed on schedule and 429 cases delayed the doses. 436 (26.3%) cases had defaulted treatment i.e. missed one or more dose. Significant associations were found between treatment completion status and place of residence, education and age of the participants. Reporting within 1 day of the bite is associated with better compliance to PEP, showing their good health seeking behaviour. Completion rate was significantly higher in category III cases.

**Conclusions:** Intensive counselling needs to be done on day 1 and day 7th day of vaccination.

**Keywords:** Post exposure prophylaxis, Anti rabies vaccine, Dog bite, Compliance

## INTRODUCTION

Rabies is a highly fatal and completely preventable viral disease of the central nervous system occurring in more than 150 countries and territories. It is primarily a zoonotic disease transmitted by bites and licks of rabid animals. Although a number of wild animals serve as natural reservoir, rabies in dog is the source of infection in around 99% of the cases of human rabies.<sup>1</sup>

Every year tens of thousands of people die from rabies. 95% of rabies deaths occur in Asia and Africa region.<sup>2</sup>

South East Asia region accounts for 45% of all the rabies death. 36% of world rabies death occurs in India amounting for 18000 to 20000 rabies death per year.<sup>3</sup>

The reason behind such a large number of rabies death are general lack of awareness of preventive measures, insufficient dog vaccination, uninterrupted growth of canine population, lack of knowledge about importance of wound management, poor knowledge on post-exposure prophylaxis and also non compliance to the vaccination schedule.<sup>3,4</sup>

Though 100% fatal, rabies, following bite of suspected rabid animal can be easily prevented by proper post exposure treatment which includes three things- thorough washing of wound by soap and water, local administration of anti-rabies immunoglobulin and active immunisation by anti- rabies vaccine (ARV).<sup>5</sup>

Currently the Govt. of India approves the use of Cell culture vaccines (CCVs) for active immunisation free of cost. It can be administered both by intramuscular (IM) and intra-dermal (ID) routes. ID route being more safe, efficacious and economical than IM routes.<sup>6</sup>

As intra-dermal regimen involves multiple site injection and course comprise of 4 doses on 4 different occasions (Day 0, 3, 7, 28), patient compliance and strict adherence to the schedule is a determining factor for treatment success.

With this background the present study aims to assess compliance of dog bite cases to the 4 dose intra-dermal (ID) schedule of anti- rabies vaccine and the determinants associated with it.

## METHODS

The study was a prospective study conducted in the anti-rabies clinic (ARC) of M.K.C.G medical college, Odisha from 1st January 2016 to 31<sup>st</sup> July 2016. Clearance was obtained from the institutional ethical committee.

Dog bite cases reporting from 1<sup>st</sup> January to 30<sup>th</sup> June 2016 were included in the study and followed up to expected period of completion of vaccine schedule. Information regarding socio-demographic variables was recorded. In case of children, the social characters of the parents were recorded. Information regarding animal related factors was also collected from the records.

At the end of study period, compliance of the study participants to 4 dose anti- rabies vaccine schedule was noted from the records. The last cases reporting on 15<sup>th</sup> June were followed up for the last dose till end of July to justify it to be included in study population.

All category 2 and category 3 dog bite cases coming to ARC for 1<sup>st</sup> dose of I.D regimen of ARV were registered.

Cases going to other centres for subsequent doses and re-exposure cases were excluded from the study. Cases registered within study period 15<sup>th</sup> June who did not return by end of July were taken as defaulter.

In this manner total 1658 dog bite cases were included in the study by purposive sampling. They were advised, as routine, for post exposure prophylaxis to receive 4 doses of Anti- rabies vaccine through ID route on day 0, 3, 7, 28. First dose was given on registration. Rabies immunoglobulin was additionally given to category 3 bites.

Cases were categorised as:

*Completed treatment*- those who have taken all three remaining doses of ARV on prescribed dates.

*Completed but delayed treatment*- those who took all 3 remaining doses of ARV but not on schedule, delayed one or more dose.

*Defaulted treatment*- those who missed a dose of ARV. Once a case missed a dose it was classified in this category. No reclassification was done for the new schedule he or she was started after being classified as defaulter

Data analysis was done at the department of community medicine, MKCG medical college using appropriate software. Chi-squared test was used to determine difference in proportions. All tests were done at a significance level of 0.05.

## RESULTS

Total 1658 cases were collected during the study period fulfilling the inclusion and exclusion criteria.

Out of the 1658 dog bite cases collected, 1222 cases (73.7%) completed treatment, out of which 793 cases completed treatment on schedule, 429 cases completed treatment but not on schedule. Rest 436 (26.3%) cases had defaulted treatment i.e. missed one or more dose.

The most common dose delayed by cases was Day 28 (74.1%) followed by Day 7 (25.7%). Among defaulters also the majority of the study participants had missed the 4<sup>th</sup> dose (54.2%) followed by 3<sup>rd</sup> dose (Table 1).

**Table 1: Compliance to individual doses of ARV.**

Day	Delayed dose (N=429) No. (%)	Defaulted dose (N=436) No. (%)
3	61 (14.2)	65 (14.9)
7	110 (25.7)	135 (30.9)
28	318 (74.1)	236 (54.2)

Most of the study participants were male (73.8%) and ≤20 yrs of age. Significant associations were found between treatment completion status and place of residence, education status and age of the study participants. Significantly higher proportions of defaulters were rural and illiterate. It was observed that timely completion of post exposure prophylaxis associated with increased educational status (Table 2).

74.1% of the cases reported to the ARC after a gap of >24 hrs from dog bite. It was found that persons reporting to ARC within 1 day of the bite had significantly better compliance to PEP than those with delayed reporting (Table 3).

**Table 2: Association between treatment completion and socio-demographic characteristics.**

	Completed treatment (%)	Defaulted treatment (%)	
<b>Gender</b>			
Male (n=1215)	902 (74.2)	313 (25.7)	X <sup>2</sup> =0.6726 p=0.412
Female (n=443)	320 (72.3)	123 (27.7)	
<b>Residence</b>			
Rural (n=706)	454 (64.3)	252 (35.7)	X <sup>2</sup> = 56.02 p<0.05
Urban (n=952)	768 (80.6)	184 (19.4)	
<b>Education</b>			
Illiterate	165 (43.5)	214 (42.5)	X <sup>2</sup> =238.29 p<0.001
Primary	406 (78.5)	111 (21.4)	
Secondary	535 (85.3)	92 (14.7)	
Graduate	116 (86.6)	19 (13.4)	
<b>Age</b>			
≤20 yrs (n=788)	585 (74.2)	203 (25.3)	X <sup>2</sup> =19.91 p<0.05
21- 40 yrs (n=625)	483 (77.3)	142 (22.3)	
41- 60 yrs (n=227)	141 (62.1)	86 (37.9)	
>60 yrs (n=18 )	13 (72.3)	5 (27.7)	

**Table 3: Association between treatment compliance and time gap between bite and reporting to ARC.**

	Completed treatment on schedule (%)	Completed but delayed treatment (%)	Defaulters (%)	
<24 hrs	367 (85.5)	37 (8.6)	25 (5.9)	$X^2=330.92$ p<0.001
≥24 hrs	426 (34.6)	392 (31.9)	411(33.5)	

**Table 4: Association between treatment completion status and bite related factors.**

	Completed treatment (%)	Defaulted treatment (%)	Total	
Ownership of dog				
Pet	394(73.2)	144 (26.8)	538	X <sup>2</sup> =0.0904 p=0.763
Stray	828(73.9)	292 (26.1)	1120	
Nature of bite				
Provoked	620 (73.8)	220 (26.2)	840	X <sup>2</sup> = 0.009 p=0.920
Unprovoked	602 (73.6)	216 (26.4)	818	
Category of bite				
Category II	342 (68.1)	160 (31.9)	502	X <sup>2</sup> =11.54 p<0.05
Category III	880 (76.1)	276 (23.9)	1156	
Site of bite				
Head & Neck	79 (71.8)	31 (29.1)	110	X <sup>2</sup> =8.153 p=0.086
Upper limb	276 (71.5)	110 (28.5)	386	
Lower limb	836 (76.5)	256 (33.5)	1092	
Trunk	31 (83.7)	6 (16.3)	37	
Multiple sites	33 (100)	0	33	

Ownership of the dog, nature of the bite and site of the bite were not associated with treatment compliance. However, treatment completion rate was found to be significantly higher in category III cases than category II (Table 4).

Forgetfulness about the dose schedule (47%), personal or professional work (23%), not being present in town (15%) were the common reasons given for missing ARV doses by defaulters.

## DISCUSSION

In our study, we found the compliance rate for completion of course of IDRV(Intra dermal Rabies Vaccine) to be 73.7% similar to the findings of Shankariah et al and Dimple et al were it was found to be 77% and 76.5% respectively.<sup>7,8</sup> Another study conducted in Bengaluru, India found the compliance rate to be 79.6%.<sup>9</sup> However, a study done by Malkar et al recorded a lower compliance of 42.81%.<sup>10</sup>

Compliance to Intramuscular (I.M) route of ARV was found to be 62.6% and 60% by Bariya et al and Shankariah et al respectively, this was lower than that recorded for ID route.<sup>7,11</sup> Anandraj et al found a higher compliance of 82.6%.<sup>12</sup> This may be due to the small sample size of 48. The lower compliance to IM schedule is probably due to more number of visits which in turn increases the travelling charges, loss of wages etc.

Our study found that 4<sup>th</sup> dose was the most commonly missed and delayed dose. Similar finding was seen in the study done by Malkar et al were 46.71% case received and 33.9% cases delayed the 4<sup>th</sup> dose.<sup>10</sup> 4<sup>th</sup> dose was taken by only 61.5% of cases as found by Gudegowda et al.<sup>9</sup> The delay may be due to forgetfulness after a long gap.

The study revealed that improvement in education status was associated with better compliance to IDRV. Similarly, study done by Malkar et al found significantly higher completion rates among literates than illiterates.<sup>10</sup> Dimple et al and Vinay et al also found that improved literacy status of cases was significantly associated with better treatment compliance.<sup>8,13</sup>

Category III bite cases had higher treatment completion rate than category II. Malkar et al also found that significantly higher proportion of Category III cases completed treatment than Category II.<sup>10</sup> However, Dimple et al found better compliance in Category II cases.<sup>8</sup> This may be due to the fact that more number of Category III cases reporting than Category II

It was found that compliance was significantly better in those reporting within a day of bite. Indicating that better health seeking behaviour ensures better compliance for the future doses.

## CONCLUSION

Compliance to IDRV was 73.7% which is low considering that the disease is 100% fatal. Furthermore compliance to the 4<sup>th</sup> dose was worst. Educated study participants had better compliance than illiterates, with compliance improving as education level increases.

## Recommendations

Intensive counselling needs to be done starting from the 1<sup>st</sup> dose of the vaccine both for category 2 and 3 cases. Counselling to be done by giving emphasis that completion of the treatment on schedule is must to prevent rabies. Fatality of the disease should be highlighted. Patients coming for 3<sup>rd</sup> dose of the IDRV should be counselled thoroughly so that they don't miss the last dose which is as important as the other doses. Illiterate people should be counselled in local language using words which they understand.

## Limitations

Dog bite cases were taken only. Monkey bite cases which also constitute important portion of animal bite cases reporting to the ARC were excluded. Compliance was checked only in new dog bite cases. Cases who took 1<sup>st</sup> dose of ARV elsewhere and those who took remaining 3 doses outside were exempted from the study.

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## REFERENCES

1. Park K. Park's textbook of preventive and social medicine. 23rd edition. Bhanot publication; 2015: 276-278.
2. WHO | Rabies. WHO. World Health Organization; 2017. Available at: <http://www.who.int/media-centre/factsheets/fs099/en>. Accessed on 4 August, 2017.
3. WHO. India's ongoing war against rabies . WHO. World Health Organization; 2011. Available at: <http://www.who.int/bulletin/volumes/87/12/09-021209/en>. Accessed on 12 August, 2017.
4. Ichhpujani RL, Chhabra M, Mittal V, Bhattacharya D, Singh J, Lal S. Knowledge, attitude and practices about animal bites and rabies in general community-a multi-centric study. *J Commun Dis*. 2006;38(4):355-61.
5. National Institute of Communicable Diseases. National Guidelines for Rabies Prophylaxis and Intra-dermal Administration of Cell Culture Rabies Vaccines. 2007;27.
6. National Centre For Disease Control DGOHS. National Rabies Control Programme National Guidelines on Rabies Prophylaxis. 2015.
7. Shankariah RH, Rajashekar RA, Veena V, Hanumanthaiah AND. Compliance to anti-rabies vaccination in post-exposure prophylaxis. *Indian J Public Health*. 2015;59(1):58-60.
8. Dimple VK, Doibale MK, Sonkar VK, Aswar NR, Khadilkar HA, Jain SR. Treatment compliance of self-reported dog bite cases attending outpatient department of Tertiary Care Hospital, Maharashtra. *Int J Med Public Heal*. 2015;5(4):297-300.
9. Gudegowda KS, Shivalingamurthy RK, Vengatesan S., Sobagiah RT. AKK. Compliance to post exposure rabies vaccination among patients attending anti - rabies clinic in a tertiary care hospital. *Natl J Community Med*. 2016;7(10):1-5.
10. Malkar V, Joge U. A study of compliance of animal bite victims to 4 dose intradermal schedule of anti-rabies vaccine and factors affecting it. *Int J Community Med Public Heal*. 2015;2(2):156.
11. Bariya BR, Patel SV, Shringarpure KS. Comparison of compliance of animal bite patients to two different routes of post-exposure prophylaxis

against rabies. *Heal J Indian Assoc Prev Soc Med.* 2015;6(1):30–5.

12. Anandaraj R, Balu PS, Anandaraj R, Med JC, Health P. Compliance to anti rabies vaccine and animal bite management practices in a rural area of Davangere, Karnataka, India. *Int J Community Med Public Heal.* 2016;3(1):170–3.
13. Vinay M, Mahendra BJ, Nagaraj Goud B, Bullapp A, Ananthachari KR, Sheethal MP, et al. Socio-demographic characteristics affecting compliance to

intra dermal rabies vaccination at anti rabies clinic in a government tertiary care hospital in Karnataka. *J Evol Med Dent Sci.* 2013;2(37):7092–7.

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