

Research Article

A retrospective epidemiological study of delay for updated Thai red cross intradermal anti-rabies vaccination schedule amongst animal bite cases attending ARV clinic at a tertiary care centre

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ABSTRACT

Background: Rabies is an acute viral disease, which causes encephalomyelitis in virtually all the warm blooded animals, including man. Almost 20000 deaths occur in India. The present study conducted with objective to analyze the delays and compliance for anti-rabies vaccination as per schedule and its some factors among the animal bite cases.

Methods: Retrospective cross sectional record based study of cases attended Anti-Rabies Vaccination (ARV) clinic during the period of April 2012 to March 2013. The data extracted from records included socio-demographic variables, animal bite history treatment received and completion of ARV schedule. Data entered and analyzed using SPSS 21.

Results: Total of 3548 animal bite cases attended the ARV clinic. Out of these cases, 18.2 %, 20.3% and 14.2% of cases not reported on scheduled date for 2nd, 3rd & 4th dose of ARV respectively. Only 34.3% of cases completed the schedule. Delay for receiving ARV among women, cases from rural area & class II animal bite was statistically significant.

Conclusions: Counselling regarding follow up of ARV schedule at the time of first visit to the anti-rabies vaccine clinic must be strengthened to avoid poor compliance and delaying of schedule.

Keywords: Animal bite, Intradermal, Anti-rabies vaccine, Delay

INTRODUCTION

Rabies is an acute viral disease, which causes encephalomyelitis in virtually all the warm blooded animals, including man. It is invariably fatal but can be easily prevented. Dog is the principal reservoir of rabies in India. Worldwide, More than 55000 people die of rabies every year, the vast majority of these deaths occurring in Asia and Africa. Almost 20000 deaths occur in India alone.¹ Wound cleansing and immunization after animal bite can prevent the onset of rabies and death. Every year, more than 15 million people worldwide receive a post exposure preventive regimen to avert the

disease. This is estimated to prevent 327000 rabies deaths annually. In India, Almost 1.8 million people annually receive post exposure - prophylaxis against rabies.²

As per Drug Controller General of India (DGCI), the schedule recommended for intradermal rabies vaccination (IDRV) is updated Thai red cross schedule. This is four dose schedule, given on day 0, 3, 7 & 28 where day 0 is first day of vaccine. In spite of affordable price of the vaccine, the compliance to intradermal rabies vaccine was low.³ The first 3 doses of IDRV are very crucial and should be given as close to original dates and preferably

completed by day 7. About 1 to 2 days of variation for fourth dose i.e. 28 day is acceptable.⁴

Lack of Post Exposure Prophylaxis (PEP) and non-compliance to vaccination schedule are common factors in people dying due to rabies.^{5,6}

Study related to delays and completion of vaccination as per schedule is very few. Hence this study was conducted with the objective of analyzing the factors associated with delays and compliance for anti-rabies vaccination schedule.

METHODS

The present study was conducted at Anti-Rabies Vaccination (ARV) clinic, general hospital, under government medical college. ARV clinic provides services for all animal bite cases which includes vaccination of the cases as per category.

All cases as per classification are vaccinated with updated Thai red cross intradermal regimen which includes four doses on day 0, 3, 7, & 28. Day 0 is the first day of vaccination. This was retrospective cross sectional record based study. Records of all cases attended ARV clinic during the period of April 2012 to March 2013 were collected from the registered maintained at ARV clinic. Institutional approval was obtained from institution for utilizing the hospital records.

For study purpose, data extracted from records included variables such as age, gender, region, type of animal bite, category of bite, dates of received vaccine on subsequent visit. Those cases not received 2nd and 3rd dose of vaccine on scheduled date & more than one day delay for 4th dose on scheduled date was considered as a delay for anti-rabies vaccination.⁴ Those who have received all four intradermal doses irrespective of time schedule at the study place considered as completed the course of vaccination. Incomplete records were excluded from the study.

The data were entered, cleaned in MicrosoftTM Excel[®] 2010. Frequency analysis were generated for each identified outcome variables and chi square test used for showing association between study variables & delay for receiving ARV by using IBM SPSS 21.

RESULTS

During study period 3548 animal bite cases attended the ARV clinic. Out of these, 1515(42.7%) were between age group of 12-40 years while 1054 (29.7%) were below 12 years of age group. 75.5% of men having animal bite. 1989 (66.1%) were from urban area. 44.8% were having BPL card. Maximum cases i.e. 76.8% observed having class III animal bite. Dog was the commonest animal for exposure i.e. 3268 (92.0%) cases followed by cat (2.8%) and wild animals (2.6%). During study, it was observed

that after taking 1st dose for animal bite cases, 73.5% attended for 2nd dose, followed by 60.4% & 39.8% attended for the 3rd and 4th dose respectively. Out of total patients attended the ARV clinic, only 34.3% of cases completed the schedule at our clinic while 21% not reported to health facility after first dose (Table 1).

Table 1: Socio-demographic profile & treatment received at ARV clinic.

Variables	Numbers=3548	Percentage
Age group (years)		
0-12	1054	29.7
12-40	1515	42.7
41-60	0679	19.1
>60	0300	08.5
Sex		
Male	2679	75.5
Female	0869	24.5
Area		
Urban	1989	56.1
Rural	1559	43.9
BPL status		
Yes	1588	44.8
No	1960	55.2
Class		
I	0113	03.2
II	0710	20.0
III	2725	76.8
Animals		
Dog	3268	92.1
Cat	0101	02.8
Pig	0065	01.8
Wild	0094	02.6
Others	0020	00.6
ARV vaccine received		
1 st dose	3548	100.0
2 nd dose	2609	073.5
3 rd dose	2144	060.4
4 th dose	1412	039.8
No. of doses completed		
1 st & 2 nd dose	2609	73.5
1, 2 nd & 3 rd dose	1992	55.7
1 st , 2 nd , 3 rd & 4 th dose	1217	34.3
Not reported to health facility after 1 st dose	0743	21.0

Table 2 shows that for 2nd dose of ARV, 18.2 percentages of cases not reported on schedule date with average delay of 1.2 days (range 1-9 days).

For 3rd dose 20.3% cases not reported on schedule date with average delay of 1.9 days (range 1-14 days).

For 4th dose, 14.2 percentage of cases not reported on scheduled date with average delay of 3.7 days (range 1-18 days).

Table 2: Distribution of the animal bite cases not followed schedule for receiving the subsequent ARV vaccine during the study period.

Number of dose	Received vaccine	Cases delay for ARV numbers (%)	Average days (Range)
2 nd dose	2609	475 (18.2)	1.4 (1-9 days)
3 rd dose	2144	437 (20.3)	1.9 (1-14 days)
4 th dose	1412	201 (14.2)	3.7 (2-18 days)

Table 3 shows association of factors with delays for receiving ARV. Children (<12 years) has less delay (50%) as compared to cases more than 12 years (P = 0.41). Women has more delayed (50%) as compared to men (P = 0.15).

Cases from rural area (58.8%) has more delay for receiving ARV as compared to urban areas (P = 0.008).

BPL status of cases has not statistical significant association.

Class II (58.5%) has more delay as compared to class III. It was statistically significant. Biting animal and delayed vaccination was not statistically significant (P = 0.742).

Table 4 shows association of factors and completion of ARV. Children completing on schedule (45.5%) than adults (P = 0.00001).

Animal bite cases from urban area (42.5%) as compared to rural area (23.9%) completing the schedule was statistically significant (P = 0.0001).

Class III cases completing the vaccination (35.8%) schedule more than class II (P = 0.002). Cases with dog as a exposure for bite completing vaccination more (35.1%) as compared to other animals like cat (24.7%), wild animals (29.8%), (P = 0.05).

Table 3: Association of socio-demographic & animal bite factors with delayed vaccination among study participants during the study period.

Variables	Delayed N (%)	Not delayed N (%)	Total	Chi square value	P value*
Age (years)					
<12	244 (50.3)	241 (49.7)	485	2.84	0.41
>12-40	389 (54.8)	321 (45.2)	710		
>40-60	179 (55.0)	147 (45.0)	326		
>60	73 (51.8)	068 (48.2)	141		
Sex					
Women	198 (50.1)	197 (49.9)	395	2.02	0.155
Men	687 (44.2)	580 (45.8)	1267		
Area					
Urban	542 (50.2)	537 (49.8)	1079	11.24	0.0008
Rural	343 (58.8)	240 (41.2)	583		
BPL status					
No	475 (54.4)	398 (45.6)	873	0.99	0.319
Yes	410 (52.0)	379 (48.0)	789		
Class of bite					
I	031 (67.4)	015 (32.6)	046	9.009	0.011
II	189 (58.5)	134 (41.5)	323		
III	665 (51.4)	628 (48.6)	1293		
Animal					
Dog	828 (53.0)	736 (47.0)	1564	2.05	0.742
Cat	017 (50.0)	017 (50.0)	034		
Pig	008 (42.1)	007 (57.9)	019		
Wild	014 (60.0)	016 (40.0)	040		
Others	004 (80.0)	001 (20.0)	005		

*P <0.05 = statistically significant

Table 4: Association of socio-demographic & animal bite factors with completed vaccination among study participants during the study period.

Variables	Completed N (%)	Not completed N (%)	Total	Chi square value	P value*
Age (years)					
<12	690 (45.5)	364 (34.5)	1054	295.96	0.00001
>12-40	505 (33.3)	1010 (66.7)	1515		
>40-60	244 (35.9)	435 (64.1)	0679		
>60	104 (34.7)	196 (65.3)	0300		
Sex					
Women	296 (34.0)	573 (66.0)	869	0.029	0.86
Men	921 (34.4)	1758 (65.6)	2679		
Area					
Urban	845 (42.5)	1144 (57.5)	1989	134.49	0.0001
Rural	372 (23.9)	1187 (76.1)	1559		
BPL status					
No	621 (31.7)	1339 (68.3)	1960	5.55	0.01
Yes	566 (36.3)	992 (63.7)	1558		
Class of bite					
I	27 (23.9)	86 (76.1)	113	12.12	0.002
II	218 (30.7)	492 (69.3)	710		
III	975 (35.8)	1750 (64.2)	2725		
Animal					
Dog	899 (35.1)	2119 (64.9)	3268	9.13	0.05
Cat	025 (24.7)	076 (75.3)	101		
Pig	014 (21.5)	051 (78.5)	065		
Wild	028 (29.8)	066 (70.2)	094		
Others	001 (5.0)	019 (95.0)	020		

*P <0.05 = statistically significant

DISCUSSION

The present study was carried out at anti-rabies vaccination clinic of a tertiary care centre during the period of April 2012 to March 2013. Total of 3548 animal bite cases registered at ARV clinic for animal bite.

During the study, it was observed that maximum cases were from the age group of 12-40 years followed by less than 12 years age group. This shows that young adults are more prone for getting animal bite cases due to more exposure to outdoor activities. Behera et al. also noted that 46.4% of the victims of animal bite were from economically productive age group of 15 to 45 years.⁷ Children's are also more prone due to involvement of playful activities with dogs and other pet animals. Many children's lack of judgement about how to deal with a dog, and their inability to fend off an attack, may put them at additional risk.⁸ Men are almost 75 percent more exposed than women again because involved in outdoor activities. Other studies^{8,9} also reported more number of male cases than female. Almost 75 percent cases were of class III type suggests new diagnostic criteria have

increases the number of cases into class III. Gadekar Rambhau & Khokhar et al. observed that majority of the animal bite exposure were of category III.^{8,9}

Dog was the commonest among all animals for causing bite to human beings. In India 96% of the rabies is due to bite from dogs.¹⁰ Our study findings also shows 92% bite because of dog and this finding similar with the Sudarshan MK et al.¹¹ found dog as the main biting animal (91.5%).

After receiving first dose, 73.5 percent cases attended for 2nd dose, followed by 60.4 % and 39.8% attend the 3rd and fourth dose respectively. Mahendra BJ et al. observed only 38.5% received four doses with high dropout rate.¹² These show that as the number of dose as well as duration increases percentage of cases attending for ARV clinic for vaccination decreases. Satapathy DM et al. studied that dropout rate increases with progress of time. Dropout rate for last dose of vaccine i.e. on 28th day is more than on day 3 and day 7. The gap of three week between 3rd dose and last dose could be a reason for drop outs.³

However, following discontinuation of sheep brain vaccine in December 2004 by government of India, it is hoped that coverage of modern cell culture vaccine will improve in country.¹¹ Overall 34.3% of dog bite cases have received the complete vaccine at OPD during the study period. This is probably due to the fact of dog causing the exposure remaining healthy and normal for more than 10 days after exposure in the majority of cases³ and these cases were not excluded from study due to non-availability of record. If ARV compliance could be indirectly assessed by considering the three doses completion, still the study shows only 60% completed the ARV. The compliance to completion of full course of vaccine to both sheep culture vaccine and cell culture vaccine was low (40%).¹¹ Majority of the victims depend upon the government hospitals and not completing the vaccine schedule. When the vaccine is administered through intradermal route, the antigenic load is reduced. Hence it is crucial for bite victims to complete the prescribed course of vaccine & dropouts are a matter of grave concern.¹²

21 % not reported to health facility after first dose. This finding is less than observed (34.3%) by Mahendra BJ et al.¹² This could be after receiving the first dose; cases may continue the subsequent doses to the nearest health centre.

It has been seen that receiving anti rabies vaccine as per schedule produces good antibody response. Also first three doses must be received within 7 days from the first dose as well as on the schedule date. During the study, it was observed that 18.2% not reported on schedule for 2nd dose while 20.3% and 14.2% cases delayed for 3rd and 4th dose. The average range of delay is from 1-18 days. Here also as the dose number increases average days of delay also increases. This shows that most of the cases not following schedule. Counselling of the patients at the time of first dose as well subsequent doses is very much needed. More research on shorter course regimen (mostly within week) is also strongly needed for reducing delays as well avoidance of cost spending on the restart of the schedule.

After studying the factors association with the delays for receiving the vaccination, children (<12 years) had less delay could be because of special care for children's by the parents. Cases from rural area have more delay than urban area could be due to accessibility to health care facility. Class II cases had more delay as class III cases were present with bleeding or more number of wounds so cases became more conscious for completing the vaccination as per schedule.

Among the characteristics that were tested for association for not completing schedule, cases (<12 years), cases from rural areas, class II cases, biting animal other than dog statistically significant. Hence to improve compliance among these cases must be counsel the importance of completion of schedule. Mahendra BJ et al.

and Vinay M et al. also found these factors for non-compliance of ARV schedule.^{12,13} Also Hampson K et al.¹⁴ found that incomplete ARV vaccination is less effective and almost 10% of human rabies cases reported from study in India had received incomplete PEP vaccination with cell culture vaccines. In the present study other factors like death of an animal, death of rabies case, education status of cases, knowledge about rabies were not studied due to non-availability of records. In conclusion present study shows that health education about transmission of Rabies and counselling regarding follow up of ARV schedule at the time of first visit to the anti-rabies vaccine clinic must be strengthened to avoid poor compliance and delaying of schedule. Telephone reminders or SMS reminder may be effective to improve the compliance for schedule. Accessibility as well as availability of vaccine to nearby health facility specially for rural population is needed.

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