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# COMPLIANCE TO POST EXPOSURE RABIES VACCINATION AMONG PATIENTS ATTENDING ANTI - RABIES CLINIC IN A TERTIARY CARE HOSPITAL, BENGALURU

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## ABSTRACT

**Introduction:** In India, every 2 seconds a person is bitten and every 30 minutes someone dies from rabies. Complete post-exposure prophylaxis is necessary among the animal bite victims for complete protection. Hence this study aims to determine the patient's compliance for Intradermal Anti - Rabies Vaccination and also to determine the constraints for compliance.

**Methodology:** A Retrospective record based review was conducted in the Anti - Rabies Clinic of Victoria Hospital, Bengaluru from the month of January to December 2015. The number of study subjects were 2815 after excluding category I cases, rat bite, human bite, re-exposure and pre-exposure cases. The major constraints were found out by interviewing the patient/guardian through the telephone.

**Results:** The compliance rate for Intradermal Rabies Vaccination (IDRV) is 79.60%. The major constraints were distance from the hospital, forgotten the dates, went to their hometown.

**Conclusion:** The compliance rate for rabies vaccination is considerably low for this highly fatal disease. Considering these major constraint factors, the animal bite victims should be motivated effectively through health education at the time of initiation of vaccination course to attain the goal of Rabies free India.

**Key words:** Compliance, Anti-Rabies Vaccination, Animal bite, Constraints.

## INTRODUCTION

Rabies is an acute infectious viral zoonotic disease of central nervous system that is almost always fatal following the onset of clinical signs.[1] Rabies is the 10th biggest cause of death due to infectious diseases worldwide.[2] Globally 61,000 deaths occur annually due to rabies, of which 16,450 (27%) occur in India.[3] In India, every 2 seconds, a person is bitten and every 30 minutes, someone dies from rabies.[4] 99 % of human rabies cases are due to bites from rabid dogs.[1] India has the highest population of stray dogs in the world, an estimated 19 million.[5] In Bengaluru city alone, there are an estimated 200,000 stray dogs, an average of about 10 dogs for every kilometer of road length in Bengaluru.[5] There are over 25,000 dog bites a year in Bengaluru Municipal limits alone.[5] Annually, there are 50 reported and perhaps 500 unreported or undiagnosed cases of rabies in Bengaluru and surroundings.[5]

Rabies is a vaccine preventable disease.[6] Every year, more than 15 million people worldwide receive a post-exposure vaccination. This is estimated to prevent hundreds of thousands of rabies

deaths annually.[3] In India, Intradermal schedule (Updated Thai Red Cross regimen) of rabies vaccination was implemented in 2006.[2] The Indian government has adopted its 'National Guidelines for Intradermal Vaccination' from World Health Organization guidelines.[7] In Rabies endemic countries like India, preventive measures such as Anti-Rabies Vaccine (ARV) and rabies immunoglobulin (RIG) are available in the hospitals and health centre's. The Anti-Rabies Clinic in the Government Victoria Hospital attached to Bangalore Medical College and Research Institute [ARC-BMCRI] has been providing Post Exposure Prophylaxis (PEP) against rabies to animal bite victims since January 2015. Intradermal (ID) vaccination schedule has been followed here. On an average 8 – 10 patients are attending a tertiary care centre for prophylaxis of rabies. In spite of it, the reason for high death rate is due to lack of awareness among people regarding management of animal bites and also low compliance towards complete course of anti-rabies vaccination.[8]

Timely and complete PEP for the animal bite victims is necessary to prevent rabies because who do not complete the full course of vaccine are still at risk of contracting rabies. [2] Therefore, this study aims to determine the compliance rate to complete course of IDRV and also to determine the constraints for compliance among animal bite victims.

## METHODOLOGY

A Retrospective record based study was conducted in the ARC-BMCRI, Bengaluru where patients were provided Intradermal Rabies Vaccination (Updated Thai Red Cross regimen) for post – exposure prophylaxis. All patients were given health education regarding the importance of completing the recommended course of vaccination at their first visit. The records maintained at ARC-BMCRI under Department of Community Medicine from the month of January to December 2015 were analyzed. The total number of patients was 2862 from which 2815 subjects were recruited for the study after excluding category I cases, rat bite, human bite, re-exposure and pre-exposure cases. The Institutional ethics committee of BMCRI, Bengaluru had approved the study. On record basis, all relevant data such as socio-demographic profile of animal bite victims, details of exposure, status of the biting animal, time interval between the animal bite and patient reaching the hospital, categories of contact, number of ARV doses administered in the Victoria hospital and the number of ARV doses taken correctly at the stipulated dates were collected. In ARC - BMCRI, the anti-rabies vaccine was continuously available throughout the study period.

The patients/relatives/guardian phone number had been noted down from the records for those who had not completed the full course of ARV. Then through telephone survey they were interviewed and the compliance for complete course of ARV and the reasons for their non – compliance were found out. The animal bite victims who discontinued the vaccination at any point during the recommended course (except those who discontinued vaccination after 3 doses, where the dog/cat remains healthy and alive for at least 10 days after the exposure) were considered as non-compliant bite victims/dropouts.[9] The data collected was coded and entered in Microsoft Excel version 2007 and it was analyzed using SPSS version 17.0 software. Descriptive statistics was used for data analysis and the data was represented in the form of percentages. The results were presented in the form of charts, tables, figures, diagrams, where ever necessary.

## RESULTS

Out of the total 2815 patients studied, 828 (29.4%) of them belong to $\leq$ 15 years age group. 2168 (77%) were males constituting male: female ratio to 3.4:1 and 2457 (87.3%) animal bite victims were from urban areas, 2003 (78.3%) were literates and 548 (36%) were unskilled workers. (Table 1)

**Table 1: socio-demographic profile of animal bite victims**

| Socio-demographic Variables | Cases (n= 2815) (%) |
|---|---|
| **Age group (years)** | |
| < 15 | 828 (29.4) |
| 16 – 30 | 681 (24.2) |
| 31 – 45 | 619 (22) |
| 46 – 60 | 422 (15) |
| > 60 | 265 (9.4) |
| **Gender** | |
| Male | 2168 (77) |
| Female | 647 (23) |
| **Domicile** | |
| Urban | 2457 (87.3) |
| Rural | 358 (12.7) |
| **Education*(n) = 2559** | |
| Literate | 2003 (78.3) |
| Illiterate | 556 (21.7) |
| **Occupation**(n) = 1527** | |
| Profession | 70 (4.6) |
| Semi – profession | 168 (11) |
| Clerical, shop-owner, farmer | 164 (10.7) |
| Skilled worker | 190 (12.4) |
| Semi – skilled worker | 350 (22.9) |
| Unskilled worker | 548 (36) |
| Unemployed | 37 (2.4) |

*The number of children < 7 years was 256, they were excluded; ** 828 were children < 15 years and 460 were students, so 1288 were excluded.

**Table 2: Distribution as Per Biting Animal**

| Biting animal | Cases (n= 2815) (%) |
|---|---|
| Dog | 2722 (96.69) |
| Cat | 55 (1.95) |
| Monkey | 24 (0.85) |
| Cow | 5 (0.18) |
| Horse | 3 (0.11) |
| Bear | 3 (0.11) |
| Fox | 2 (0.07) |
| Goat | 1 (0.04) |

**Table 3: Nature of the Wound and Anti-Rabies Vaccination Coverage**

| Variables | Cases (n= 2815) (%) |
|---|---|
| **Time interval** | |
| < 24 Hours | 712 (25.3) |
| > 24 Hours | 2103 (74.7) |
| **Categories Of Contact With Suspect Rabid Animal** | |
| II | 1013 (36) |
| III | 1802 (64) |
| **No. of doses received** | |
| 1 | 2511 (89.2) |
| 2 | 2030 (72.1) |
| 3 | 1832 (65.1) |
| 4 | 1730 (61.5) |
| **Animal Bite Victims Receiving ARV On Scheduled Days (Day of Visits*)** | |
| 0 (1st dose) | 2511 (100) |
| 3 (2nd dose) | 1890 (93.1) |
| 7 (3rd dose) | 1792 (97.8) |
| 28 (4th dose) | 1662 (96.1) |

* Percentage calculated from total number of patients received the respective doses

**Table 4: Constraints for Compliance to Anti-Rabies Vaccination**

| Constraints for compliance | Cases (n=457)(%) |
|---|---|
| Distance from the hospital | 91 (20) |
| Forgotten the dates | 84 (18.4) |
| Went to hometown | 70 (15.3) |
| Dog was fine (from 2nd or 3rd dose not taken) | 62 (13.6) |
| Cannot afford the cost | 53 (11.6) |
| Timings not convenient | 35 (7.7) |
| Cost incurred (travel charges) | 28 (6) |
| Loss of wages | 21 (4.6) |
| Did not feel it's needed | 9 (2) |
| Herbal medicines | 4 (0.8) |

This study shows that 2722 (96.69%) of patients were bitten by Dog (Table 2). Among them 1769 (65%) were bitten by stray dogs, remaining by pet dogs. Among those pet dogs, only 171 (18%) were immunized.

Among those 2815 patients studied, only 712 (25.3%) of them reported for treatment within 24 hours of post-exposure. (Table 3)

After exposure to the animal, physician categorizes the animal bite wound for further management based on WHO classification. Among the patients studied, 1802 (64%) had category III exposure and rest of them were category II. (Table 3)

In this study we observed that only 2511 (89.2%) had taken the first dose and the remaining 304 (10.8%) had not taken the first dose itself. Only 1730 (61.5%) among those who had taken their first doses had completed the full course of IDRV schedule. (Table 3). Among those patients who had taken all 4 doses, 1662 (96.1%) had taken the fourth dose on the scheduled dates whereas the remaining patients were delayed. (Table 3)

Out of the total 2815 patients studied, 891 completed their full course of vaccination in the Victoria hospital. The remaining 1,924 were contacted through telephone. Among them 839 had completed their vaccination course in the outside hospital, 56 (2.50%) had received only 3 doses stating that the dog was fine. These all patients i.e. 1786 (79.60%) were considered to be compliant to the vaccination course. Among the remaining, 457 (20.40%) were non-compliant and 572 had not responded to the telephone even after 2 repetitive attempts whose compliance cannot be assessed, so those patients were excluded from the denominator of determining compliance.

Among those 457 (20.40%) non-compliant patients, further leading questions had been asked on the telephone and the constraints for their compliance had been found out. Majority of them i.e. 91 (20%) had replied distance from the hospital, 84 (18.4%) had forgotten the dates, 70 (15.3%) went to their hometown, and the remaining patients replied various other constraints. (Table 4)

## DISCUSSION

In our study, we found the compliance rate to complete course of IDRV to be 79.60%. Similarly the studies done by Shankaraiah et al[10] in Bangalore in 2012 and Bariya et al[11] in Gujarat in 2011 showed the compliance rate to IDRV to be 77% and 70%. Whereas the studies done by Seenivasan et al[4] in 2013 in Tamil Nadu and Nikhil et al[12] in 2011 in Puducherry observed the compliance rate to Intramuscular Rabies Vaccination (IMRV) to be 6% and 0%. This shows that compliance to IDRV was found to be greater than IMRV which may be due to the reduced number of visits which in turn reduces the travelling charges, loss of wages and the vaccine costs. In contrast to this, a study conducted by Anandaraj et al in Davangere in 2014 showed the compliance rate to be 82.6% for IMRV which was found to be higher but it was due to the low sample size (n = 48).[13]

From our study, we observed that 89.2%, 72.1%, 65.1% and 61.5% of patients had received 1st, 2nd,

3rd and 4th dose respectively. 10.8% had not taken the first dose itself which may be due to their non-affordability, did not bring the BPL card…etc and the difference between the 1st and 2nd dose is comparatively higher when compared to the difference between the other doses which could be due to the reason that the patient believes that only one injection is enough after seeing the dog status. Earlier studies done by Shankaraiah et al[10] and Malkar et al[8] showed that 100%, 91.9%, 88.1%, 77% and 100%, 82.9%, 70.1%, 46.2% of patients had received 1st , 2nd , 3rd and 4th dose. In these studies there was high drop out for 4th dose which may be attributed to comparatively longer interval (21 days) between 3rd and 4th dose as compared to the interval between 1st and 2nd dose (3 days) and 2nd and 3rd dose (4 days). Therefore, as the dose increases, the compliance rate decreases.

This study shows that only 25.3% of patients had come to the hospital within 24 hours of exposure to the animal. Among the patients who were supposed to take the vaccine doses on the scheduled days, 6.9%, 2.2% and 3.9% were delayed for the 2nd, 3rd and 4th dose where more delay was seen for the 2nd dose. In contrast, the study done by Malkar et al in Maharashtra in 2014 showed that 1.88%, 3.31% and 33.39% of the patients were delayed for the 2nd, 3rd and 4th dose where more delay was seen for the 4th dose.[8] In our study, the reason was once there is a delay for the 2nd dose, the patients were given counseling so that there is no delay for the further doses.

In the present study, the major constraints for compliance was found out to be distance from the hospital (20%), forgotten the dates (18.4%), went to their hometown (15.3%). Whereas in a study conducted by Anandaraj et al in Davangere in 2014 showed 50% constraint was due to the lack of time.[13] One more study done by Bariya et al in Gujarat in 2011 showed the constraint factor to be personal or official workload, patients had forgotten the scheduled dates of vaccination.[11]

## LIMITATIONS

Telephone survey was conducted to estimate the compliance rate to IDRV, in which 572 patients had not responded, whose vaccination status is unknown so those were excluded. If they would have responded, compliance rate may vary from 77.1%.

## CONCLUSION

The patient's compliance to IDRV was found to be 79.60% which is considered to be low for this highly fatal disease. The major constraints for compliance were distance from the hospital, forgotten the dates, went to their home town. Hence the animal bite victims should be motivated effectively through health education by interpersonal communication with the use of Information, Education and Communication materials at the time of initiation of vaccination course about timely and complete administration of anti - rabies vaccination to attain the goal of Rabies free India.

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## REFERENCES:

1. Park K. Park's textbook of preventive and social medicine. 23rd ed. Jabalpur: Banarasidas Bhanot Publishers; 2015. Chapter 5, Epidemiology of communicable diseases; p.276-81.
2. Sajna MV, Culas R. Cost Analysis of Post Exposure Prophylaxis of Rabies in **A** Tertiary Care Centre - A Cross Sectional Study. IOSR-JDMS. 2014; 13(12): 08-12.
3. World Health Organization. WHO expert consultation on rabies-second report [Internet]. 2013 [cited 2016 Feb 10]. Available from: http://apps.who.int/iris/bitstream/10665/85346/1/9789240690943_eng.pdf?ua=1
4. Seenivasan P, Priya CK, Vijayalakshmi M et al. Anti rabies vaccination coverage among patients attending outpatient department in a tertiary care hospital in Tamil Nadu. International journal of medical and applied sciences. 2014 [cited 2016 March 06]; 3(1): 253-60.
5. Patel AH. Stray Dogs and Rabies, India 2002 [Internet]. [cited 01 May 2016]. Available from: http://www.karmayog.com/dogs/straydogs_rabies.htm
6. World Health Organization. Rabies [Internet]. 2016 [cited 01 May 2016]. Available from: http://www.who.int/mediacentre/factsheets/fs099/en/
7. Vinay M, Mahendra BJ, Nagaraj GB et al. Socio-demographic characteristics affecting compliance to intra dermal rabies vaccination at anti rabies clinic in a government tertiary care hospital in Karnataka. Journal of Evolution of Medical and Dental Sciences. 2013 [cited 2016 March 06]; 2(37):7090-5.
8. Malkar VR, Joge US. 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 Health. 2015 [cited 2016 March 09]; 2(2): 156-61. Available from: doi:10.5455/2394-6040.ijcmph20150517

9. World Health Organization. Rabies vaccines: WHO position paper, Weekly Epidemiological Record, No. 32 [Internet]. 2010; 85: 309-20. Available from: http://www.who.int/wer/2010/wer8532.pdf

10. 10. Shankaraiah RH, Rajashekar RA, Veena V et al. Compliance to anti-rabies vaccination in post-exposure prophylaxis. Indian J public health. 2015 [cited 2016 March 09]; 59(1): 58-60.

11. Bariya BR, Patel SV, Shringarpure KS. Comparison of Compliance of Animal Bite Patients to Two Different Routes of Post-Exposure Prophylaxis against Rabies. Health line, Journal of Indian Association of Preventive and Social Medicine. 2015 [cited 2016 March 10]; 6(1): 30-5.

12. Nikhil SV, Rizwan SA, Chellaiyan VG et al. Profile of Patients Attending an Animal Bite Management Clinic in Rural Pondicherry, India. International Journal of Tropical Disease and Health. 2014 [cited 2016 March 10]; 4(3): 306-10.

13. Anandaraj R, Balu PS. Compliance to anti rabies vaccine and animal bite management practices in a rural area of Davangere, Karnataka, India. Int J Community Med Public Health. 2016 [cited 2016 March 12]; 3(1):170-3.