



STUDY OF FACTORS ASSOCIATED WITH ANTI-RABIES POST EXPOSURE PROPHYLAXIS COMPLIANCE AMONG ANIMAL BITE CASES ATTENDING REFERRAL CENTRES OF VIDISHA, MADHYA PRADESH

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Abstract;

Introduction: Rabies is a viral infection of the neurological system that is spread by the bite of rabid animals such as dogs, rats, cats, bats, raccoons, and foxes. It is also one of the deadliest viruses, with a near 100% case-fatality rate once symptoms appear.

Aim: To assess the compliance of Anti Rabies Vaccine and Rabies immunoglobulin (RIG) among the animal bite patients.

Objectives: 1. To Determine the Socio-demographic characteristics of patients attending Rabies clinic 2. To identify the factors that influence compliance with Anti Rabies Vaccine and Rabies immunoglobulin among the animal bite patients 3. To identify the proportion of animal bite patients receiving the PEP of Rabies according to the Schedule.

Methodology: Patients on their first visit were interviewed and followed up until their last scheduled date of receiving ARV. During their interview, patients were asked how many days after the dog bite they came for vaccination. Patients who came for their scheduled dose were checked to see if they arrived on the scheduled day.

Results: Out Of the 386 study participants, 198 (51.29%) were found to be compliant to the full course of ARV, 158 (40.94%) were found to be noncompliant, and 30 (7.77%) cases were of delayed compliance. Key determinants of non-compliance identified in this study were distance from healthcare facilities (47.66%), fear of wage loss (28.03%), and forgetfulness (22.43%)

Conclusion: In the current study, it was observed that 51.29% were compliant to the full course of ARV. Key determinants of non-compliance identified in this study were modifiable barriers that can be addressed through targeted interventions. Wound management practices revealed significant gaps. This represents a critical missed opportunity for primary prevention of rabies infection.

Keywords: Compliance, Rabies, Anti Rabies Vaccine, Rabies Immunoglobulin, Post Exposure Prophylaxis

Introduction

Rabies is a viral infection of the neurological system that is spread by the bite of rabid animals such as dogs, rats, cats, bats, racoons, and foxes.[1,2] It is also one of the deadliest viruses, with a near 100% case-fatality rate once symptoms appear.[1]

Dogs are the most common cause of human rabies mortality (domestic or stray) in India.[3] According to the latest World Health Organization (WHO) statistics, India has between 18,000 and 20,000 cases of human rabies per year, making it a common occurrence in both rural and urban areas.[3,4]

It is estimated that more than 1.4 billion people are at risk of rabies infection in the South-East Asia region. Each year, 23,000-25,000 people die due to the extremely fatal disease in this region, which accounts for 45% of the rabies death worldwide. Around 36% of the world's rabies death occur in India each year. Rabies fatalities in India are the highest in Asia and the second highest in the world. It is endemic throughout the country with the exception of Andaman & Nicobar and Lakshadweep Islands[5]

To overcome the burden of disease and management, the World Health Organization (WHO) recommended wound categorization primarily for undelayed care. In addition to wound categorization and wound management, anti-rabies vaccine is required for incapacitating the virus. The intramuscular anti-rabies vaccine consists of 'Essen' regimen - one dose 0, 3, 7, 14 and 28 days and 'Zagreb' regimen 0, 7 and 21 days in which two doses are administered on the first day and one dose on other days. In India, since 2006, intradermal anti rabies vaccine has been implemented with updated Thai Red Cross regimen which consists of vaccine on 0, 3, 7 and 28 days.[6]

In India, rabies affects mainly poor and vulnerable populations from lower socioeconomic status and children between the ages of 5–15 years in remote rural communities, but only a few parents sought medical advice, usually with delay.[7]

Rationale:

According to the latest World Health Organization (WHO) statistics, India has between 18,000 and 20,000 cases of human rabies per year, making it a common occurrence in both rural and urban areas. This is due to poor compliance to Post-Exposure Prophylaxis of Rabies. Patients usually delay taking the 1st dose of vaccine or delay the subsequent doses of Scheduled ARV or delay taking the RIG, leading to failure of post-exposure prophylaxis of Rabies. So, understanding the factors that influence compliance can help public health authorities develop targeted interventions to improve vaccination rates and reduce the incidence of rabies

Methodology (Material & Methods)

It was a Prospective Cross-sectional Study. All the animal bite patients belonging to category II and category III who were attending the Rabies clinic during this period were included in this study. Patients on their first visit were interviewed and followed up until their last scheduled date of receiving ARV. During their interview, patients were asked how many days after the dog bite they came for vaccination. Patients who came for their scheduled dose were checked to see if they arrived on the scheduled day. Patients who did not come to take the scheduled dose of ARV were contacted telephonically for an interview, and they were motivated to come and take the scheduled dose of ARV as soon as possible.

All other data like demographic variables, the category of bite, site of the bite, nature of bite (pet/stray), type of animal exposed, the status of Anti Rabies Vaccine, immunoglobulin was asked during the first interview.

For the purpose of the present study, the following definitions were used:

Compliant- The study subjects who received the full course of ARV, that is, the scheduled doses of ARV on the recommended dates.

Delayed compliant- A subject who completed the scheduled doses of ARV within 60 days, but deviated from the scheduled regimen.

Dropout/noncompliant- If the study subject had taken at least one dose of ARV after animal bite, but not completed all the scheduled doses.

Category I bite patents, Animal bite victims who were in severe pain and needed emergency care and Minors below 18 years who were not accompanied by their parents or guardians for consent to the study were excluded from the study

Sample Size: Based on previous studies done in a similar urban setting, the compliance of ARV was found to be 76.5%.[8]. This compliance rate was used for sample size calculation and the total sample size was 301 using 95% confidence, absolute precision of 5%, and a dropout rate of 10%

Ethical clearance

Prior approval was taken from Institutional Ethics Committee and local authorities

Results

During the study period, a total of 386 patients fulfilled the inclusion criterion and they were followed up for compliance. Majority of cases 265(68.65%) belonged to age group 21-59 years. Paediatric patients formed (23.33%)90 of the study population. Male patients were 78.23% compared to 21.76% female (Table 1). With regard to religion, 311 (80.56) participants were Hindus, 49 (6.66%) were Muslims. 80 study participants (20.72%) were illiterates and 9(2.3) study participants were unemployed. Majority of cases were living in Joint Family 278(72.02%). Most 149 (38.6%) of the study participants were from Class II socioeconomic status followed by Class III 91(23.57%), based on the Modified BG Prasad Socioeconomic Classification.

Table 1: Sociodemographic profile of animal bite patients (N=386)

Variable	Number (Percentage)
Age	
0-20	110(28.4)
21-59	265(68.65)
≥60	11(3.1)
Gender	
Male	302(78.23)
Female	84 (21.76)
Religion	
Hindu	311(80.56)
Muslim	49 (12.69)
Others	26(6.7)
Educational Qualification	
Literate	306(79.27)
Illiterate	80(20.72)
Occupation	
Employed/working	232(60.1)
Student	105(27.2)
Housewife	33(8.54)
Unemployed	9(2.3)
Retired	7 (1.8)
Type of family	
Joint	278(72.02)
Nuclear	108(27.97)
Socio-economic status	
Class I	11(2.8)

Class II	149 (38.6)
Class III	91(23.57)
Class IV	60(16.66)
Class V	75(19.43)

Dog bites were most common 339 (87.82%) followed by cat bites (6.7%). The most common site for bites were lower limbs, left limb (40.94%) being slightly more prone than right limb (36%). Most of the bites were by stray animals 323(83.67%) and were unprovoked (80.5%). As per the WHO criteria most of the patients fell into Category II 289 (74.8%).

Table 2: Distribution of the study participants according to the characteristics of animal bite exposure (N=386)

Variable	Number (n)	Percentage (%)
Type of Animal		
Dog	339	87.82
Cat	26	6.7
Monkey	16	4.14
Others	5	1.2
Type of Animal Exposed		
Stray	323	83.67
Pet	63	16.32
Site of Bite		
Lower limb	297	76.94
Upper limb	54	13.98
Others	35	9.06
Category of wound		
Category II	289	74.8
Category III	97	25.2
Circumstance of bite		
Provoked bite	75	19.43
Unprovoked bite	311	80.56

Association was present between compliance of ARV and socio demographic factors like gender, education and socio-economic status. Association was also seen between compliance of ARV and type of animal, Category of wound and circumstance of bite.

Compliance to PEP:

A. Wound washing practices; Out of the 386 study participants, 270 (69.9%) reported to have washed their wounds before coming to the hospital and among those who washed their wounds, majority (211; 78.14%) reported to have washed the wounds within 30 min of the incident, 152 (56.29%) had washed the wound using soap and water, and 239 (88.5%) had washed the wound for less than 5 min.

Table 3: Distribution of study participants according to the wound washing practices following animal bite

Variable	Number (n)	Percentage (%)
Wound washing practice (N=386)		
Wound washing done	270	69.9
Wound washing not done	116	30.1

Method of wound washing (n=270)		
Wound washing using soap and water	152	56.29
Wound washing using water only	118	43.71
Duration of wound washing (n=270)		
0-5 min	239	88.5
6-10 min	23	8.6
11-15 min	08	2.9

B. Compliance to ARV

Out Of the 386 study participants, 198 (51.29%) were found to be compliant to the full course of ARV, 158 (40.94%) were found to be noncompliant, and 30 (7.77%) cases were of delayed compliance. Out of the 386 study participants who were administered Day 0 dose of ARV, 89(23.06%), 129(33.41%), and 158(40.94%) participants dropped out on the 3rd, 7th, and 28th day of ARV administration, respectively [Figure 1]. Among the 30 study participants who were delayed compliant, the minimum and maximum number of days of delay were 1 and 10 days, respectively, and the maximum cases of delay were reported for the 28th day dose.

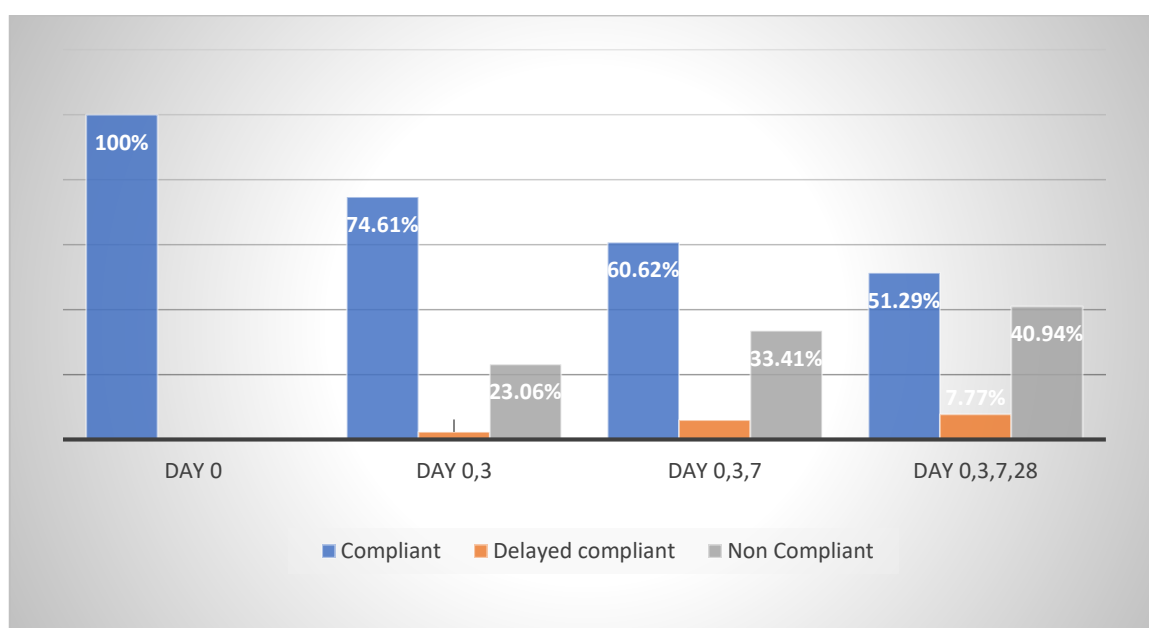


Fig. 1: Distribution of study participants according to the Delayed and non-compliant cases to full course of ARV (n=386)

C. Rabies immunoglobulin

Among the 97 category III bite cases, 77 (79.3%) were administered RIG. The reasons for non-administration of RIG were that some of the study participants did not give consent for local wound infiltration due to fear of pain and infection.

Further, all the 360 study participants were administered tetanus toxoid (TT) injection.

Non-compliance to ARV

Of the 386 study participants, 158(40.94%) were found to be noncompliant, among which the noncompliance was maximum for Day 3 dose of ARV

On telephonic interview, 29 study participants reported to have taken the full course of ARV at other health facilities (govt./ private)

22 study participants could not be contacted telephonically even after three attempts, and accordingly, were classified as loss to follow-up cases.

The remaining 107 study participants gave the following reasons for noncompliance to ARV administration. The most common reasons for non-compliance to ARV administration were found to be place of residence being far away from the centre (51; 47.66%) and fear of loss of wages (30; 28.03%) [Figure 2].

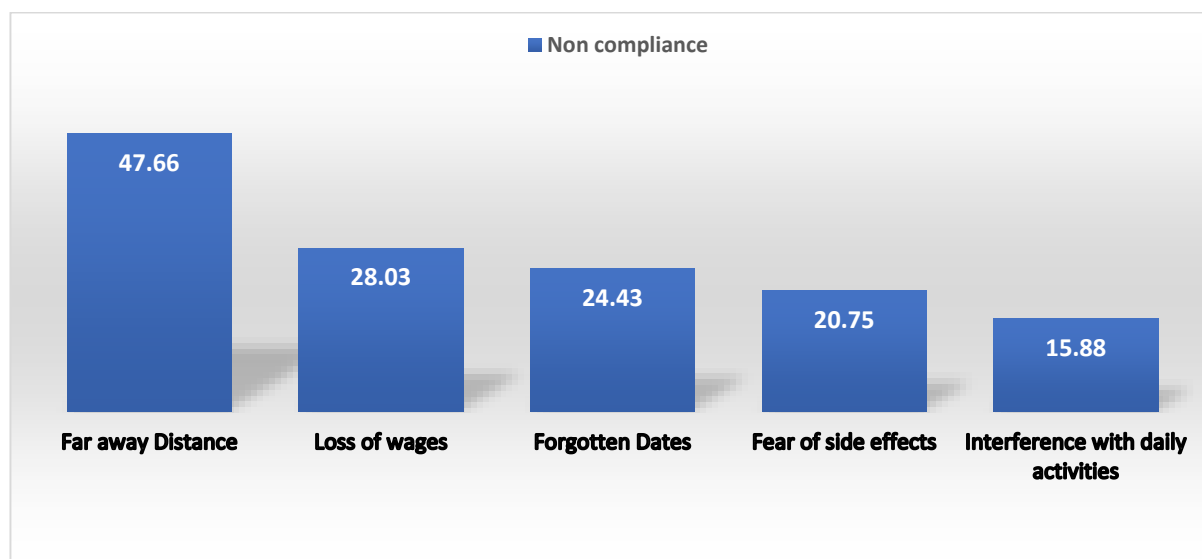


Fig. 2: Distribution of study participants according to the reasons for

Discussion

The sociodemographic characteristics observed in our study align closely with established patterns reported in the literature. The male predominance of 78.23% in our study is consistent with findings from multiple Indian studies. **Sundaram et al. 2024** reported similar male dominance in Tamil Nadu, while **Sahu et al. 2021** found 54.9% male representation in their Eastern India study. **Sharma et al. 2023** documented comparable gender patterns in their Central India investigation. This consistent pattern across diverse geographical settings reflects occupational and behavioral factors that increase male exposure to animal bites, particularly in rural and semi-urban environments [9][5][10].

The ARV compliance rate of 51.29% was observed in our study which falls below the median rate when compared with similar Indian studies. **Sundaram et al. 2024** reported higher compliance of 73.1% in Tamil Nadu, **Sharma et al. 2023** documented 78% compliance in Central India.[9][10]. Compliance rates similar to our findings were observed by **Sahu et al. 2021** who reported 52.3% compliance in Eastern India, and **Mahajan et al. 2019** who documented 50.3% compliance in Karnataka[5][11].

The progressive dropout pattern observed in our study, with 23.06%, 33.41%, and 40.94% dropouts on days 3, 7, and 28 respectively, is consistent with patterns reported by multiple researchers. **Sundaram et al. 2024** noted similar declining compliance over time, while **Sharma et al. 2023** documented comparable dropout patterns. This universal trend suggests that maintaining motivation for vaccination completion becomes increasingly challenging over time, regardless of geographical location[9][10].

The wound washing practices in our study revealed concerning gaps, with only 69.9% of participants washing wounds before hospital presentation. **Sharma et al. 2023** found that 41.7% washed wounds with soap and water. **Singh et al. 2016** documented similar deficiencies in wound care practices in Maharashtra. The finding that 88.5% of participants in our study washed wounds for less than 5 minutes is particularly concerning and represents a consistent pattern across Indian studies, highlighting a nationwide gap in public awareness about proper wound management protocols.[10][12]

Distance from healthcare facilities emerged as the primary barrier in 47.66% of non-compliant cases in our study. This aligns with **Sundaram et al. 2024** who identified distance as a major constraint in Tamil Nadu, **Sahu et al. 2021** who found distance from facility as primary barrier in Eastern India, and **Mahajan et al. 2019** who documented transportation problems as main issue in Karnataka [5][9][11].

Fear of loss of wages (28.03% in our study) represents the second most significant barrier. **Kumar et al. 2017** also identified loss of wages as primary reason for non-compliance (50%) in Maharashtra, while **Patil et al. 2017** documented lack of time as major barrier (50%) in Karnataka. **Sharma et al. 2023** noted economic constraints as significant factors in Central India [10][13][14]

The RIG compliance rate was 79.3% in our study. While 63.3% reported by **Sharma et al. 2023** in Central India, 49.4% documented by **Sahu et al. 2021** in Eastern India, and 80.4% reported by **Singh et al. 2016** in Maharashtra [5][10][12].

Conclusion and Recommendation

In the current study, it was observed that out of the 386 study participants, 198 (51.29%) were compliant to the full course of ARV. Key determinants of non-compliance identified in this study were distance from healthcare facilities (47.66%), fear of wage loss (28.03%), and forgetfulness (22.43%) - represent modifiable barriers that can be addressed through targeted interventions. Wound management practices revealed significant gaps, with only 69.9% of victims performing wound washing and most (88.5%) washing for inadequate durations. This represents a critical missed opportunity for primary prevention of rabies infection. To improve rabies prevention, decentralized ARV services, patient reminder systems, financial support for travel or wages, and intensified public education on proper wound care and the importance of completing PEP are essential.

Declaration of patient consent

All appropriate patient consent forms have been obtained and patients' consent were taken for use of their images and other clinical information to be reported in the journal.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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