

Determinants of Delay in Initiation of Post Exposure Prophylaxis for Rabies Prevention among Animal Bite Cases Attending a Rural Tertiary Care Hospital of Haryana

Babita¹, Shweta², Mahavir Singh³, SK Jha¹, Anita Punia¹, Sanjeet Singh⁴

¹Professor, ⁴Associate Professor cum Statistician, Department of Community Medicine,

²Under Graduate Student, BPS Government Medical College for Women, Khanpur Kalan, Sonapat,

³Professor, Department of General Surgery, Pt. B. D. S. PGIMS Rohtak.

Correspondence : Dr Sanjay Kumar Jha, E-mail: drsanjaykumarjha@gmail.com

Abstract:


Introduction : Rabies is a fatal but vaccine-preventable viral disease. Animal bite victims who report in primary and secondary level health care lack some measures which can help in protecting and preventing deaths due to rabies. The most important factor for prevention of death due to rabies is the timely administration of post-exposure prophylaxis (PEP) among animal bite victims. Therefore, in addition to an understanding of the epidemiological distribution of animal bites, it is necessary to explore the factors leading to delay in PEP initiation. **Objective:** To determine the determinants of delay in initiation of post exposure prophylaxis for rabies prevention among animal bite cases attending anti-rabies clinic of a rural tertiary care hospital in Sonapat, Haryana. **Method:** This cross-sectional study was conducted at an Immunization-cum-antirabies clinic of Bhagat Phool Singh Government Medical College for Women, Khanpur Kalan, Sonapat, Haryana. A pre tested, structured questionnaire was used to collect information among 410 participants after taking consent. The Institutional Ethics Committee of institute approved the study. The groups were compared with Chi-square test for categorical data. **Results:** Delay was present among 27.3% of participants. Significant factors of delay were no local wound treatment, any treatment taken prior to anti-rabies vaccine administration, rabies clinic closed on holidays, unawareness about PEP, non-availability of accompaniment, transportation issues and money problem for transportation. Knowledge also played significant role as delay was significantly more among the participants not having knowledge regarding source of infection, mode of transmission and incubation period of rabies. **Conclusions:** Delay in initiation of PEP was common and were significantly associated with lack of knowledge and unawareness, closure of rabies clinic on Sundays/holidays, non-availability of accompaniment and money problem during transportation.

Key-words : Delay, Post exposure prophylaxis, Rabies

Introduction:

Rabies is an acute viral disease that causes fatal encephalomyelitis in virtually all the warm-blooded animals. Globally, canine rabies causes around 60,000 human deaths, over 3.7 million Disability

Adjusted Life Years (DALYs) and 8.6 billion USD economic losses annually.^[1] South East Asian countries contribute to more than half of global burden of rabies with approximately 45% of worldwide rabies deaths occurring in Asia. An estimated 31,000 human deaths due to rabies occur

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annually in Asia.^[2-4] India is endemic for rabies accounting for 36% of the world's total deaths due to rabies. True burden of rabies in India is not fully known; although as per available information, eighteen to twenty thousand human deaths occur from rabies each year in India.^[5]

Despite the availability of cost-effective strategies, rabies continues to be a major public health challenge in resource poor countries. The primary and secondary level of healthcare is of utmost importance to focus with regard to rabies since animal bite victims who report in primary and secondary level health care lack some measures which can help in protecting and preventing deaths due to rabies. One important among them being the timely administration of post-exposure prophylaxis (PEP).^[6] Therefore, in addition to an understanding of the epidemiological distribution of animal bites, it is necessary to explore the factors leading to delay in PEP initiation. Present study was conducted with an objective to determine the determinants of delay in initiation of post exposure prophylaxis for rabies prevention among animal bite cases attending anti-rabies clinic of a rural tertiary care hospital in Sonapat, Haryana.

Method:

A Cross-sectional study was conducted from June 2021 to August 2021 at an Immunization-cum-antirabies clinic of Bhagat Phool Singh Government Medical College (BPSGMC) for Women, Khanpur Kalan, Sonapat, Haryana. The study population was the animal bite cases who visited the anti-rabies clinic of BPSGMC for Women for post exposure prophylaxis for rabies prevention.

Exclusion criteria : Severely ill patients who were not able to give interview and individuals who did not give informed consent for the interview.

Sample size : Sample size was calculated to be 372 at 5% alpha error and using the prevalence of delay in PEP as 41% from a previous study.^[7] Formula used to calculate was $(Z_{1-\alpha/2})^2 pq/d^2$, where p= prevalence,

$q=100-p$, d is permissible error which was taken as 5% (absolute precision), $Z_{1-\alpha/2}$ is standard normal deviate reflects the type I error and at 5% ($p<0.05$) it is 1.96.^[8] With 10% non-response rate, the final sample size was 410. Consecutive sampling was done till the desired sample size was reached.

A pre tested, structured questionnaire was used to collect data having information on socio demographic variables like age, gender, residence, education, socio-economic status, and information regarding injury location, side, type of animal, the extent of wound, time of bite, time of reporting, distance from anti-rabies clinic, knowledge regarding source of infection of rabies, its transmission, incubation period, etc.

Ethical Consideration: The Institutional Ethics Committee in BPSGMC for Women, Khanpur Kalan, Sonapat, Haryana, approved the study (Registration number- BPSGMCW/RC575/IEC/2020). The methods used in the present study were implemented in accordance with the approved protocols. Informed consent was taken before starting the interview, in case of subjects less than 18 years of age consent was taken from the parents/guardian. Confidentiality of the data was ensured.

Operational definition of delay in PEP: For the purpose of the study, a delay in initiation of anti-rabies PEP was defined as initiation of PEP more than or equal to 48 hours after animal bite.^[7]

Data analysis: Data were entered in a Microsoft Excel spread sheet and analyzed. Chi-square test was applied to find out association between delay in PEP and risk factors associated with it. P value less than 0.05 was considered statistically significant.

Results:

A total of 410 study subjects were interviewed from the anti-rabies clinic of BPSGMC for Women, Khanpur Kalan, Sonapat. The maximum animal bite cases were in children under 10 years age group and

then gradually decreasing as the age was increasing. Delay was present in about one third of study subjects but delay was less in older age group aged more than 50 years. (Figure 1)

Figure 2 shows gender wise delay in initiation of PEP in which most of the participants were males but delay was more among females.

Figure 1: Distribution of Age-wise delay in initiation of PEP for rabies prevention

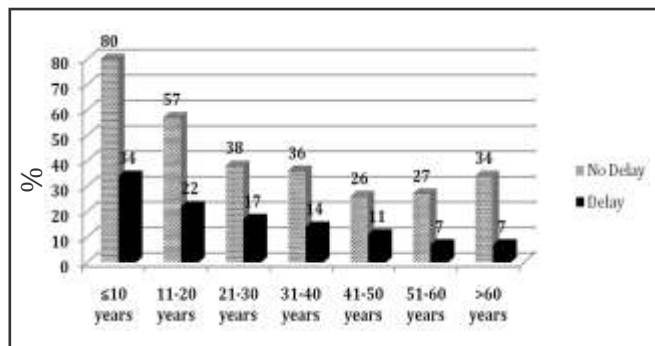


Figure 2: initiation of PEP Gender wise delay in initiation of PEP for rabies prevention

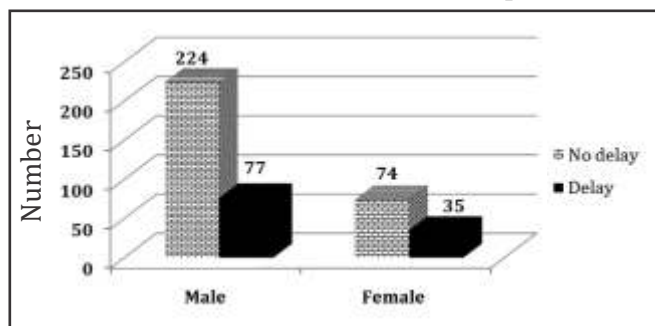


Table 1 shows that maximum cases reported were due to dog bite. The prevalence of delay was seen highest among cases of animal bite cases other than dog, monkey, bat, rat, buffalo etc. Delay was minimum in monkey bite cases. Although, the difference was statistically insignificant. Prevalence of delay was significantly higher among those study subjects who had not washed the local wound (42.9%) as compared to those who had washed the local wound with soap and water (24.1%). The delay was more among the study subjects who had applied local irritants over the wound as compared to participants who had not applied any irritants. Also, delay was more common among category 2 animal bite cases (30.6%) as compared to category 3 in

initiation of PEP. No participant belonged to category 1. Although the difference is not statistically significant. The delay was significantly more among the participants who had taken prior treatment as compared to the participants who had not taken any prior treatment (p value <0.013).

Table 2 shows the association between the delay in initiation of PEP against rabies and the knowledge of study subjects about rabies. The prevalence of delay was maximum in those study subjects who had no knowledge regarding source of infection (31.7%), its transmission (30.1%) and its incubation period (30.3%) than those who had knowledge regarding these aspects of rabies. The association between delay in initiation of PEP and lack of knowledge of the study participants regarding source of infection in rabies, its transmission and incubation period, was statistically significant. But the association of delay with knowledge regarding case fatality did not show significant difference.

Table 3 shows the reasons of delay in initiation of PEP of rabies. Delay was more due to the closure of rabies clinic on holidays, unawareness about PEP, non-availability of accompaniment, transportation issues, money problem and these factors showed significant association. Although the delay is more among the participants reporting from a distance of ≥ 20 km and referred cases but the difference was insignificant.

Discussion:

In the present study the maximum delay was seen in children and young adults, and the trend went on decreasing with age. It is believed that children spend more time outside their homes (in school, in playgrounds, etc.), play with animals and are unaware of their biting habits. All these make them more prone to animal bites and also their history of animal bite often goes unnoticed by the family members. The same findings are also supported by another study.^[9] In the current study, the delay was more common among females as compared to males.

Table 1: Distribution of delay in initiation of PEP as per characteristics of the animal bite and their management practices

Characteristics	No Delay (%)	Delay (%)	p value
Biting animal			
Stray dog	219 (72.5 %)	83 (27.5 %)	0.922
Domestic dog	58 (72.5 %)	22 (27.5 %)	
Monkey	12 (80.0 %)	3 (20.0 %)	
Others	9 (69.2 %)	4 (30.8 %)	
Local wound treatment			
Not washed	56 (57.1 %)	42 (42.9 %)	<0.001*
Washed with water	34 (89.5 %)	4 (10.5 %)	
Washed with soap & water	208 (75.9 %)	66 (24.1 %)	
Application of local irritants on wound			
No local application	208 (73.8 %)	74 (26.2 %)	0.468
Local application (e.g., red chili, turmeric, ash etc.)	90 (70.3 %)	38 (29.7 %)	
Any prior treatment before vaccination			
No	199 (76.8 %)	60 (23.2 %)	<0.013*
Yes	99 (65.6 %)	52 (34.4 %)	
Category of animal bite			
Category 2	154 (69.4 %)	68 (30.6 %)	0.102
Category 3	144 (76.6 %)	44 (23.4 %)	

This may be due to the fact that females often are unable to access to the hospital without the company of males. The same results were found in a study conducted in Iran by Khazaei et al. to evaluate delayed bite cases.^[10]

In present study, most animal bite cases were due to dogs and among them, majority of the numbers are contributed by stray dogs followed by domestic dogs. The findings were consistent with other studies.^[11-13] But the delay is usually same in both these cases (27.5%). In a study done in Tabbas by Riahi et al., the delay time was longer and correlated with domestic animal bites.^[14]

In developing countries like India, it is very common to see or hear certain practices like not to wash the local wound site after animal bite or

application of certain irritants over the local wound site with the belief that it will lead to the containment of the virus and would stop its transmission even when the wound is severe belonging to category 2 and 3. Studies done by Jain et al. and Salve et al. also showed high prevalence of such methods in Muradnagar and at a Primary Health Center (PHC) in Haryana respectively, along with the same reporting from certain other national and international studies and with this belief in their minds, they did not seek any proper medical advice.^[15-17] But they did not know about its disadvantage of causing infection and being soft tissue irritants these applicants might cause local tissue necrosis. This again signifies the lack of education as an important influencing factor of delay in PEP. According to WHO, immediate wound

Table 2: Distribution of delay in initiation of PEP as per knowledge about rabies

Knowledge about rabies	No delay (%)	Delay (%)	p value
knowledge regarding source of infection of rabies			
Yes	119 (80.4 %)	29 (19.6 %)	0.008*
No	179 (68.3 %)	83 (31.7 %)	
Knowledge regarding transmission of rabies			
Yes	91 (79.8 %)	23 (20.2 %)	0.044*
No	207 (69.9 %)	89 (30.1 %)	
Knowledge regarding incubation period of rabies			
Yes	56 (88.9 %)	7 (11.1 %)	0.002*
No	242 (69.7 %)	105 (30.3 %)	
Knowledge regarding case fatality of rabies			
Always fatal	164 (71.3 %)	66 (28.7 %)	0.721
Sometimes fatal	69 (71.9 %)	27 (28.1 %)	
Not fatal	24 (75.0 %)	8 (25.0 %)	
Don't know	41 (78.8 %)	11 (21.1 %)	

*Significant difference

Table 3: Reasons of delay in initiation of PEP

Reasons	No delay n (%)	Delay n (%)	p value
Rabies clinic closed on holidays	Yes 11 (31.4 %)	24 (68.6 %)	<0.001*
	No 287 (76.5 %)	88 (23.5 %)	
Unawareness about PEP	Yes 8 (25.0 %)	24 (75.0 %)	<0.001*
	No 290 (76.7 %)	88 (23.3 %)	
Non availability of accompaniment	Yes 29 (47.5 %)	32 (52.5 %)	<0.001*
	No 269 (77.1 %)	80 (22.9 %)	
Transportation issues	Yes 29 (59.2 %)	20 (40.8 %)	0.024*
	No 269 (74.5 %)	92 (25.5 %)	
Money problem	Yes 1 (16.7 %)	5 (83.3 %)	0.002*
	No 297 (73.5 %)	107 (26.5 %)	
Distance from rabies clinic (km)	<20 230 (73.7 %)	82 (26.3 %)	0.301
	≥20 67 (68.4 %)	31 (31.6 %)	
Delay due to referral	Yes 2 (50.0 %)	2 (50.0 %)	0.306
	No 296 (72.9 %)	110 (27.3 %)	

*Significant difference

washing and flushing of wound for at least 15 minutes with soap and water or with water alone and disinfection with substances having anti-viral activity is essential after exposure to rabies virus.^[18]

In the present study knowledge regarding source of infection of rabies, its transmission and incubation period played a significant role in timely initiation of PEP against rabies, same findings were reported by Liu Q et.al.^[19] Our study showed that 60% of the population correctly knew about case fatality of rabies. A community-based study done by Krishnamoorthy et al. in Puducherry found it to be 75% while it was almost 90% in other studies done in rural parts of Puducherry, Pune, Gujrat and New Delhi.^[20-23]

No doubt Education is a major factor but certain other significant factors were also found in our study like closure of rabies clinic on holidays, non-availability of accompaniment, transportation issues and money problem. Although the distance from rabies clinic played an important role and more delay was found if distance was more but difference was insignificant in our study and the results were similar to a study done by Khazaei et. al.^[10] In a study done in Kashmir, distance from anti-rabies clinic showed a very strong association with the delay in initiation of PEP i.e. more the distance of anti-rabies clinic, more was the prevalence of delay.^[24]

Conclusion:

The study has provided important information about various factors associated with delay in initiation of PEP. Most common biting animal was found to be dog. Among all the study participants, delay was predominantly seen in females, with distance more than 20 kms. But these factors were statistically insignificant. While certain other factors chosen for the study have played a significant role in the delay in initiation of PEP against rabies. Lack of knowledge and unawareness being the major factors, closure of rabies clinic on Sundays/holidays, non-availability of accompaniment, money problem during transportation, etc. too had a significant association. The study provides an insight into the facts of animal

bites and PEP, which can be further explored to manage animal bites and control rabies in humans.

Recommendation:

Awareness camps should be organized time to time for imparting knowledge regarding source of infection, mode of transmission, washing of wound with soap and avoidance of local irritants over wound which may delay initiation of treatment. Increasing the number of anti-rabies clinic in the peripheries, making ARV available at PHC and sub-center levels will be helpful in minimizing many factors associated with delay like non-availability of accompaniment, transportation issues and money required during transportation. The finding of dog being the common biting animal, needs a multi-pronged strategy to decrease human dog interaction either by decreasing dog population and doing mass vaccination of stray dogs; thus, helping in control of rabies.

Limitation of the study:

Since it was a hospital based study, the results cannot be generalized to the community. Those who suffered from animal bite, but unable to come for vaccination at the hospital could not be studied at all, so the reasons for being unvaccinated could not be determined. But reasons for delay in getting vaccinated may act as indirect indicator for those unvaccinated. Despite its limitations, the study revealed some potential information to help policymakers to improve the national rabies PEP.

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Declaration:

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Conflict of Interest: Nil

References:

1. World Health Organization. WHO expert consultation on rabies: third report. World Health Organization; 2018.
2. Kakkar M, Venkataramanan V, Krishnan S, Chauhan RS, Abbas SS. Roadmap to Combat Zoonoses in India (RCZI) initiative. Moving from rabies research to rabies control: lessons from India. *PLoS Negl Trop Dis*. 2012;6(8):e1748.

3. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda ME, Shaw A, Zinsstag J, Meslin FX. Re-evaluating the burden of rabies in Africa and Asia. *Bulletin of the World Health Organization*. 2005;83:360-8.
4. Gongal G, Wright AE. Human rabies in the WHO Southeast Asia region: forward steps for elimination. *Adv Prev Med* 2011;2011:1-5.
5. World Health Organization. Rabies vaccines: WHO position paper, April 2018-Recommendations. *Vaccine* 2018;36:5500-3.
6. Hampson K, Dobson A, Kaare M, Dushoff J, Magoto M, Sindoya E, Cleaveland S. Rabies exposures, post-exposure prophylaxis and deaths in a region of endemic canine rabies. *PLoS neglected tropical diseases*. 2008 Nov 25;2(11):e339.
7. Joseph J, Sangeetha N, Khan AM, Rajoura OP. Determinants of delay in initiating post-exposure prophylaxis for rabies prevention among animal bite cases: hospital based study. *Vaccine*. 2013 Dec 17;32(1):74-7.
8. Lemeshow S, Hosmer DW, Klar J, Lwanga SK. *Adequacy of Sample Size in Health Studies*. Chichester: John Wiley and Sons; 1990.
9. Krishnamoorthy Y, Vijayageetha M, Sarkar S. Awareness about rabies among general population and treatment seeking behaviour following dog-bite in rural Puducherry: A community based cross-sectional study. *Int. J. Community Med. Public Health*. 2018 Jun;5:2557-63.
10. Khazaei S, Rezaeian S, Salehiniya H, Rezaei R, Sabzavari JTN, et al. Delay in Post-Exposure Prophylaxis and Associated Factors Among People Bitten by Animals in the Northeast of Iran, 2015. *Archives of Clinical Infectious Diseases*. 2016;11(2).
11. SabouriGhannad M, Roshanaei G, RostampourF, Fallahi A. An epidemiologic study of animalbites in Ilam Province, Iran. *Arch Iran Med*.2012;15(6):356-60.
12. Sheikholeslami NZ, Rezaeian M, Salem Z.Epidemiology of animal bites in Rafsanjan,southeast of Islamic Republic of Iran, 2003-05.*East Mediterr Health J*. 2009;15(2):455-7.
13. Bijari B, Sharifzade GR, Abbasi A, Salehi S.Epidemiological survey of animal bites in east of Iran. *Iran J Clin Infect Dis*. 2011;6(2):90-2.
14. Riahi M, Latifi A, Bakhtiyari M, Yavari P, Khezeli M, Hatami H, et al. Epidemiologic survey of animal bites and causes of delay in getting Preventivev Treatment in Tabbbas during 2005-2010. *TB*.2012;27(22):132-43.
15. Li GW, Chen QG, Qu ZY, Xia Y, Lam A, et al. Epidemiological characteristics of human rabies in Henan province in China from 2005 to 2013. *J Venom Anim Toxins Incl Trop Dis*. 2015;21:34.
16. Ren J, Gong Z, Chen E, Lin J, Lv H, et al. Human rabies in Zhejiang Province, China. *Int J Infect Dis*.2015;38:77-82.
17. Salve H, Rizwan SA, Kant S, Rai SK, Kharya P, et al. Kumar S. Pre-treatment practices among patients attending an Animal Bite Management clinic at a primary health centre in Haryana, North India. *Trop Doct*.2015;45:123-5.
18. World Health Organization. WHO expert consultation on rabies. Second Report Geneva, 2013. WHO Technical Report Series, No. (982). Geneva, Switzerland: WHO; 2013.
19. Liu Q, Wang X, Liu B, Gong Y, Mkandawire N, Li W, Fu W, Li L, Gan Y, Shi J, Shi B. Improper wound treatment and delay of rabies post-exposure prophylaxis of animal bite victims in China: Prevalence and determinants. *PLoS neglected tropical diseases*. 2017 Jul 10;11(7):e0005663.
20. Naik B, Sahu S, Ganesh Kumar S. Wound management and vaccination following animal bite; a study on knowledge and practice among people in an urban area of Pondicherry, India. *Int J Community Med Public Health*.2015;2:501-5.
21. Singh US, Choudhary SK. Knowledge, attitude, behaviour and practice study on dog bites and its management in the context of prevention of rabies in a rural community of Gujrat. *Indian J Community Med*.2005;30(3):81.
22. Aggarwal N, Reddaiah VP. Knowledge, attitude and practice following dog bite: a community based epidemiological study. *Health Pop Perspect*, 2003;26(4):154-61.
23. Kakrani VA, Jethani S, Bhawalkar J, Dhone A, Ratwani K. Awareness about dog bite management in rural population. *Indian Journal of Community Health*.2013;25(3):304-8.
24. Ain SN, Khan SM, Azhar M, Haq S, Bashir K. Epidemiological profile of animal bite victims attending an anti-rabies clinic in district Srinagar, Kashmir. *Journal of Medical Sciences and Clinical Research*. 2018;6:599-603.