

Original Research Article

A prospective cross-sectional study on epidemiological determinants, vaccine hesitancy and adverse events following anti rabies vaccination in an animal bite

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Received: 01 September 2024

Revised: 11 November 2024

Accepted: 12 November 2024

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ABSTRACT

Background: Rabies is an infectious disease with hundred percent mortality that can be prevented by taking action pre or post exposure to the agent. The individuals' beliefs, customs and traditions play a major role in any health care practices. In this study we tried to assess the epidemiological determinants, vaccine hesitancy and adverse events following vaccination. Objectives were to study the epidemiological determinants of the individuals with animal bite and to study the vaccine hesitancy and adverse events following vaccination.

Methods: A prospective cross-sectional study was conducted among the 300 individuals who came with animal bite to the anti-rabies vaccination centre. The study participants were recruited through convenience sampling.

Results: Out of 300 participants 102 (34%) were of age group 15-35 years. Males 188 (62.7%) and females 112 (37.3%). The common animal that reported to bite was dog which was seen in 85.7% of study population. Vaccine hesitancy was observed in 16.7% (50). The 83% (249) participants took the ARV vaccination within 24 hours of the animal bite. The most common adverse events following vaccination reported is skin discoloration at the injection site by 53.3% (160).

Conclusions: The vaccine should be made available even in the rural, suburban areas. Newer vaccine with better preservatives should be made to prevent adverse events.

Keywords: Animal bite, ARV prophylaxis, Vaccine hesitancy, Adverse events following immunization

INTRODUCTION

Rabies virus belongs to the *Rhabdoviridae* family, genus *Lyssavirus*, which includes 15 virus species. All *Lyssavirus* species have the potential to cause rabies disease in people, but rabies virus is by far the most common cause.¹

Through implementation of the Global strategic plan to end human deaths from dog-mediated rabies by 2030, 5 affected countries will move a significant step closer to the sustainable development goal (SDG) 3 target of "ending the epidemics of AIDS, tuberculosis, malaria and

neglected tropical diseases (NTD)". They will also make critical progress towards SDG 3.8 on achieving universal health coverage.²

True burden of rabies in India is not fully known; although as per available information, it causes 18,000 to 20,000 deaths every year. About 30-60% of reported rabies cases and deaths in India occur in children under the age of 15 years as bites that occur in children often go unrecognized and unreported.³ Low awareness of the need to seek health care after a dog bite claims the lives of more than 55,000 people each year, mostly in Asia and

Africa. India is endemic for rabies, and accounts for 36% of the world's rabies deaths.⁴

According to the WHO, rabies exposure is divided into 3 categories as follows: category I: touching or feeding animals, as well as animal licks on intact skin, category II: nibbling of uncovered skin, minor scratches, or abrasions without bleeding, and category III: single or multiple transdermal bites or scratches, contamination of mucous membrane with the saliva of animals, injury in the head, face, neck, hands (fingertips to wrists), and genital area, type of bite by an animal with probable and confirmed rabies, exposure to bats, bitten or scratched by a bat, and people with weakness severe inherited and acquired immune system.⁶

Rabies is one of the non tropical disease that predominantly affects already marginalized, poor and vulnerable populations. The key towards implementing effective rabies elimination programs is to engage with local communities, start small, catalyse long-term investment through stimulus packages, ensure the ownership of governments, demonstrate success and cost-effectiveness, and scale up quickly. Rabies elimination is feasible and achievable if this goal is prioritized and adequately supported financially and politically.⁸

Post-exposure prophylaxis (PEP) is the emergency response to a rabies exposure. This prevents the virus from entering the central nervous system, which would invariably result in death.

PEP consists of: extensive washing with water and soap for at least 15 minutes and local treatment of the wound as soon as possible after a suspected exposure; a course of potent and effective rabies vaccine that meets WHO standards; and the administration of rabies immunoglobulin or monoclonal antibodies into the wound, if indicated.⁹

METHODS

Study design

It was a prospective cross-sectional study.

Study setting

Study carried out at anti rabies vaccination center of a tertiary care hospital in a Central India.

Duration of study

Study conducted for 3 months from January 2023 to March 2023.

Sampling technique

Convenience sampling method was used as sampling technique.

Study area

Patients who came with an animal bite to take the anti-rabies vaccine or anti rabies serum immunoglobins to the anti-rabies vaccination center.

Sample size

In the study we have included the average of the last three months of patient which was 300. The monthly footfall of the number of patients attending ARV OPD found to be ranging from 250 to 300. The interview was done during the history taking as per the convenience of the patient until the sample size was met. The ARV clinic is conducted from Monday to Saturday in a tertiary care center where we have planned to conduct the study.

Inclusion criteria

Patients who were above 5 years of age both gender, patients who were willing to give consent and assent for their children were included in the study.

Exclusion criteria

Patients who were taking the vaccine for the second time, patients who were critically ill or not able to give history were excluded.

Institutional ethics committee

IEC clearance was obtained.

Tools of assessment

Preformed, pretested questionnaire was used by interview technique.

Data collection

The data was collected using case record forms that included the socio demographic details, epidemiological details about the environmental exposure to the type of animal, time and place.

Clinical assessment

The wound site was clinically assessed based on the WHO categorization.

Wound management

History of post exposure management was asked like whether the wound is washed with soap, disinfectant or application of any traditional medicine, oil, turmeric etc.

Vaccine compliance

Vaccine compliance and hesitancy were assessed as per the modified Thai regime; where the vaccination was

advised on 0, 3, 7, 14 and 28 days. In our hospital we advise Intra dermal administration of ARV 0.1 ml over both Deltoid was given.

Adverse events following vaccination

The adverse events following immunization were assessed following up with the patient when they came for the subsequent doses of vaccination.

Privacy and confidentiality

Privacy and confidentiality of the study participants was strictly maintained.

Data analysis and statistical inferences

The data collected were analyzed using MS excel and IBM SPSS statistical software package version 23.0. The results were computed using the frequencies and percentages. Chi-square test for proportions was used.

RESULTS

In the study majority 34% (102) of study participants belong to age group 15-35; followed by 30% (90) were 35-60 years of age, 27% (81) were <15 years of age and 9% (27) were >60 years of age.

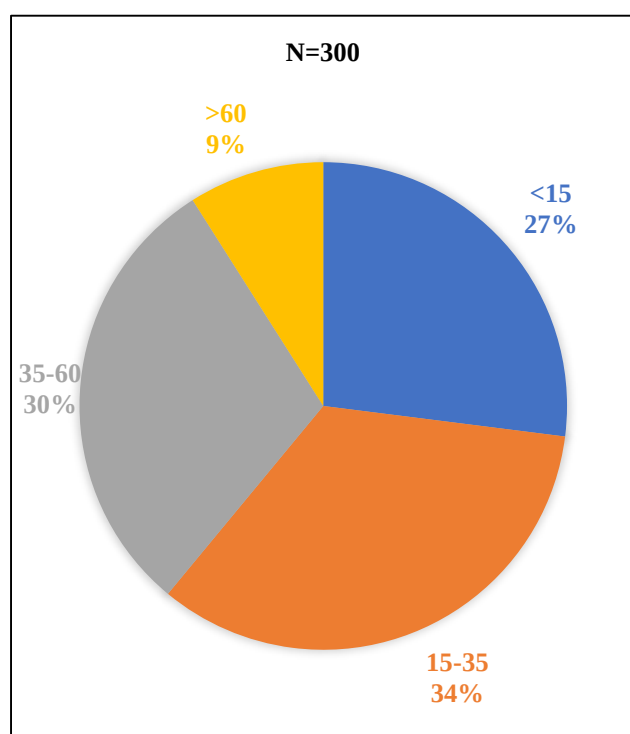


Figure 1: Distribution of study participants as per the age group.

In the study majority of study participants were Male 62.7% (188) and 37.3% (112) were females.

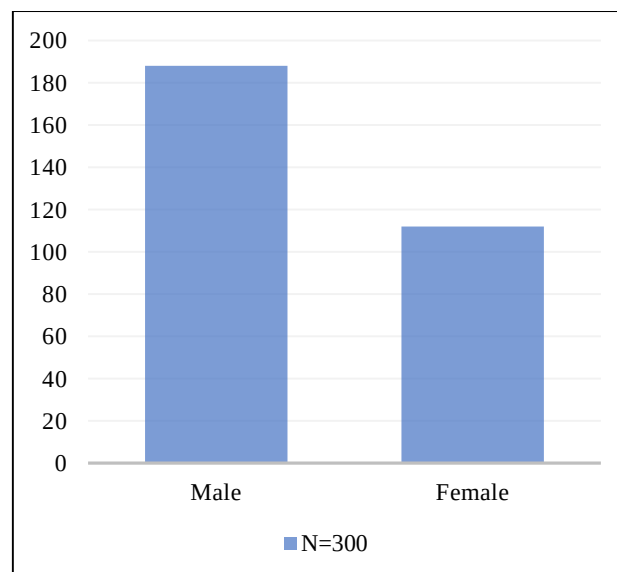


Figure 2: Distribution of study participants as per gender.

Table 1: The distribution of participants as per their residence (n=300).

Residence	N	Percentages (%)
Urban	234	78
Rural	66	22

Table 2: The distribution of study participants as per their socio-economic status (as per modified Kuppuswamy Sacale-2023).

Socio-economic status	Participants	%
Upper	3	1
Upper middle	45	15
Lower middle	147	49
Upper lower	105	35
Lower	0	0

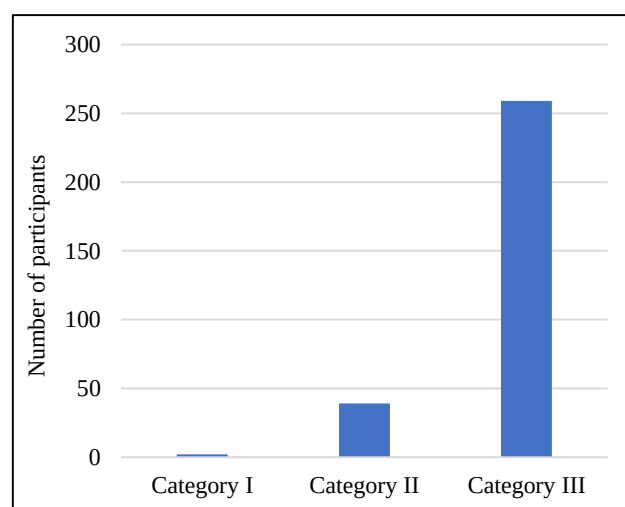


Figure 3: Distribution of study participants as per the category of the animal bite.

In the study majority of the study participants came for the vaccination reported were category III of the animal bite

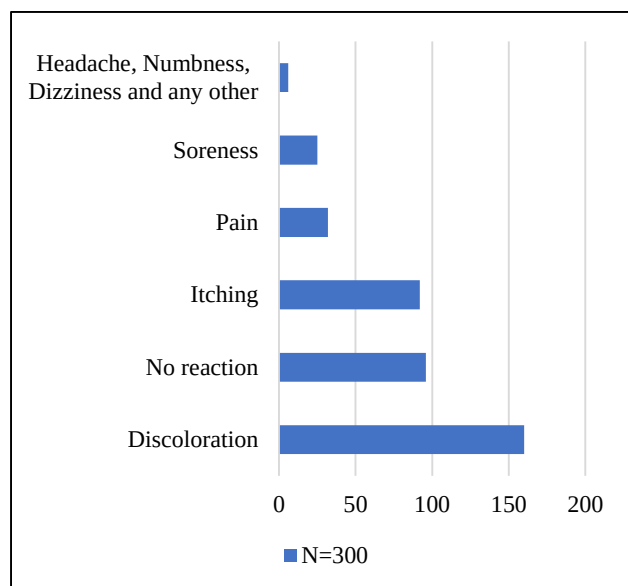


Figure 4: Adverse events following anti rabies vaccination.

DISCUSSION

In the present study the age group affected commonly is 15-35 (34%) years of age, probably due to outdoor activities, jobs, running errands. Which is similar to the study majority of the participants belong to age group 15-35; 102 (34%).¹⁰

Males were 62.7% (188) and females were 37.3% (112) similar to a study conducted by Sahu et al were 72.4% animal bite victims were males and 47.5% were children in age group of 2-18 years.¹³

Most common bite site was lower limb 55.7% (167) attributing to the animal attacked the person while walking.

Dog bite was more frequent and common 85.7% (257) among the study population similar to a study conducted by Ichhpujani et al were dog bites caused maximum morbidity (92%). Second most common biting animal was monkey (3.2%), followed by cat (1.8%), fox (0.4%).¹³ According to the study conducted by Lilare et al 52.6% of subjects were in anti-rabies category III followed by 46.6% and 0.8% in category II and I respectively the results were different from the study conducted by Ichhpujani et al where most bites (64.3%) were unprovoked bites by stray (64.7%) animals. 63% had category III exposure as per the WHO classification.^{13,14}

Compliance to the vaccine was found to be 83% and 17% of study conducted by Lilare et al population has shown

vaccine hesitancy which was similar to the study reveals that majority 56.4% of subjects had started the anti-rabies vaccination between 1-5 days whereas 39.9% had no delay.¹⁴ The 53.3% (160) has reported that the discoloration of skin as adverse event which is indifferent to the study conducted by Haradanhalli et al where they have observed 14.2% had minor adverse drug events, namely pain, numbness, itching, redness, rash, body ache, malaise, nausea, and fever, which subsided without any complication. Whereas we found in this study 2% (6) of study population having these minor symptoms.¹²

CONCLUSION

The vaccine should be made available even in the rural, suburban areas. Newer vaccine with better preservatives should be made to prevent adverse events. Stray dogs should be vaccinated and the policy makers are advised to focus on one health approach, by creating kennels for the stray dogs. Increase the veterinary clinics and screening among the stray dogs and wild animals.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Kaware A, Pothipogu T, Ingle P, Deshmukh J. A prospective cross-sectional study on epidemiological determinants, vaccine hesitancy and adverse events following anti rabies vaccination in an animal bite. *Int J Community Med Public Health* 2024;11:4770-4.