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Original Research Article

Assessment of compliance to anti-rabies vaccine post-exposure prophylaxis in a tertiary care centre in Jammu

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ABSTRACT

Background: Rabies remains a fatal global health threat, with India bearing a significant burden. Anti-rabies vaccine's (ARV) post-exposure prophylaxis is crucial, yet poor adherence hinders eradication efforts and for improving outcomes of post-exposure prophylaxis we need to know about reasons behind non-compliance and delayed compliance. This study investigated ARV PEP adherence and its contributing factors at GMC, Jammu.
Methods: This Study was conducted among 594 animal bite victims (Category 2 and 3) at GMC Jammu's Anti-Rabies Clinic and study subjects were selected via convenience sampling method from September 2022 to July 2023. Data on demographics, bite characteristics, and wound care were collected, and ARV adherence was monitored. Reasons for non-compliance or delayed compliance were ascertained via telephone.
Results: Of participants, 74.2% completed the ARV course. However, about 22.1% had delayed adherence, while 3.7% had non-compliant. Delayed compliance's most common reasons were residence far away from clinic, work location outside Jammu, forgotten dates, negligence and loss of wages. Non-compliance was primarily due to negligence and health issues. There was no statistically significant association found between full compliance and combined (delayed and non-compliance) with factors such as age, residence, education, gender, category of bite, number of wounds, type of animal bite, wound washing practices, method of wound washing, or duration of wound washing ($p>0.05$). Chi-square test was applied for testing significance.
Conclusions: The study highlights considerable delayed and non-compliance with ARV, largely driven by patient negligence and health problems. This necessitates enhanced awareness, comprehensive patient education, and practical solutions to improve ARV PEP adherence and reduce rabies mortality in India.

Keywords: Animal bite, Anti rabies, Compliance, Health issue

INTRODUCTION

Rabies is a viral zoonotic disease in which central nervous system and once clinical symptoms develop lead to fatal disease. The primary source of rabies transmission to humans is Domestic dogs, which lead to 99% of cases. Both domestic and wild animals get affected by this disease and it can get spread by saliva through bites, scratches, or mucosal surfaces contact. 5 to 14 years old children are affected mostly. Except Antarctica Rabies occurs on every continent, but in Asia and Africa about over 95% of human deaths occur. However, reported cases are scarce, and recorded numbers vary significantly from the actual burden. Rabies is defined as a neglected tropical disease (NTD) that mainly affects marginalized, impoverished, and vulnerable populations.[1]

India bears a significant burden of human rabies, with approximately 20,000 known deaths annually, accounting for nearly one-third of the estimated 59,000 rabies-related deaths worldwide each years.[2] There are 96% mortality and morbidity related to dog bites in India. Proper wound management and the administration of both rabies immune globulin (RIG) and the anti-rabies vaccine (ARV) are the essential components of rabies post-exposure prophylaxis (PEP).

As soon as possible, at the starting of rabies post-exposure prophylaxis, human rabies immune globulin (HRIG) is administered as a single dose, directly into and around the site of exposure in category 3 patients, to induce passive immunity. Beyond the seventh day after the first dose of rabies vaccine, human rabies immune globulin (HRIG) should not be given.[3]

Immediately initiate post-exposure prophylaxis where suspected or confirmed rabid animal bites the unvaccinated individuals.[4] The updated Thai Red Cross regimen of intra-dermal vaccination (2-2-2-0-2) accepted by India[5]. Improper wound care, bites near highly innervated areas, failure to adhere to the vaccination schedule, delayed recognition of wounds, and prolonged initiation of treatment along with factors like vaccine quality and storage can render the prophylaxis ineffective and may lead to death.[6]

India has launched the National Action Plan for Dog-Mediated Rabies Elimination, with the aim of zero human deaths due to dog-mediated rabies. Mass dog vaccination and appropriate post-exposure treatment are the main focus in this initiative.[7] Despite this, poor compliance with the rabies vaccination schedule remains a critical concern. Timely administration of all recommended vaccine doses is essential to prevent disease progression and save lives. Therefore, the current study aimed to assess the extent of non-compliance and delayed compliance with post-exposure prophylaxis (PEP) for the anti-rabies vaccine (ARV) among patients at GMC, Jammu, and to identify the associated factors and reasons. Also, to identify the factors and reasons associated with delayed and non-compliance towards post-exposure prophylaxis (PEP) for the anti-rabies vaccine (ARV) among patients at GMC, Jammu.

METHODS

Study design

A hospital based cross-sectional study conducted at Anti-Rabies Clinic (ARC) of Government Medical College, Jammu.

Study population

The study population consisted of victims of animal bites who visited the Anti-Rabies Clinic of Government Medical College, Jammu, for treatment.

Study duration

Data collection for this study took place from September 2022 to July 2023.

Sampling and sample size

Convenience sampling method was used for participant selection. On the basis of a 4% margin of error, an alpha error of 0.05, and a beta error of 0.2, the sample size was calculated to be 594. This calculation utilized a prevalence rate of 55.2%, as reported by a study conducted by Nishant et al at a tertiary care hospital's Anti-Rabies vaccination OPD in Mumbai.

Inclusion criteria

All age groups were eligible, new patients with Category 2 or 3 visited Anti-rabies clinic, and participants who provided informed consent were included.

Exclusion criteria

Those who did not provide consent, those who received ARV for re-exposure, and those who received ARV for pre-exposure prophylaxis were excluded.

Data collection method

After obtaining informed consent, animal bite victims who met the inclusion criteria and attended the Anti-Rabies Clinic OPD at GMC Jammu were enrolled. Information regarding socio-demographic profiles, type of animal bite, wound category, and wound washing practices was collected using a pre-designed and tested proforma. Subsequently, each patient was followed up to assess their adherence to ARV. For individuals who did not return for subsequent vaccine doses, information concerning their reasons for non-compliance or delayed compliance was gathered via telephone**.**

For this study, we used below definitions:

Compliant: Participants who completed the entire recommended course of Anti-Rabies Vaccine (ARV) according to the prescribed schedule and dates, with successful completion documented by GMC, Jammu

Delayed compliant: A subject who completed the full ARV regimen within a 60-day period but did not strictly adhere to the exact prescribed vaccination schedule.

Non-compliant/dropout: A study participant after animal bite who got at least one dose of ARV but not able to complete all scheduled doses.

RESULTS

The average age of study participants in the study was 30.20±16.3 years, and their ages varied from 2 to 84

years. About 594 animal bite victims with category II and III wounds were included in the study that visited the Anti-Rabies Clinic of Government Medical College (GMC), Jammu. The most of the study subjects were male (76.9%), while females comprised 23.1%.

Table 1: The compliance to ARV (anti-rabies vaccine) (n=594).

	Numbers	Percent (%)
Compliant	441	74.2
Delayed	131	22.1
Non-compliant	22	3.7
Total	594	100.0

Table 2: Socio-demographic profile of animal bite patients (n=594).

Variables		Frequency	Percentage
Gender	Female	137	23.1
	Male	457	76.9
Place	Rural	87	14.5
	Urban	507	85.5
Age(years)	0-30	336	57
	31-59	222	37
	>60	36	6
Occupation	Business	13	2.2
	Employed	161	27.1
	Housewife	63	10.6
	Others	325	54.7
	Retired	20	3.4
	Unemployed	12	2.0
Level of education	Educated	550	92.8
	Uneducated	44	7.2

In terms of employment status, 27.1% of participants were employed, 10.6% were housewives, 2.2% were business owners, 3.4% were retired, 54.5% were engaged in other occupations, and 2% were unemployed. A large majority (92.8%) of participants were educated, while a 7.2% were uneducated (Table 2).

With respect to the type of animal involved in the bites, 58.2% were from stray dogs, 32.5% from pet dogs, 2.7% from stray cats, 1.9% from pet cats, 3.9% from monkeys, and 0.8% from other animals. The majority of wounds were categorized as category III (93.8%), while 6.2% were category II. Regarding the type of wound, 7.7% were multiple wounds, and 92.3% were single wounds. 540 (90.9%) participants were involved in wound washing practices. Out of which, 58 (9.8%) used only water, while 483 (81.3%) used both soap and water for wound cleaning (Table 3 and 4).

About 441 (74.2%) of the study participants, completed the entire Anti-Rabies Vaccine (ARV) course as prescribed. However, 131 (22.1%) showed delayed compliance, meaning they finished the regimen but not on schedule, and 22 (3.7%) were non-compliant or dropped out entirely (Table 1).

Table 3: Characteristics of exposure of animal bite (n=594).

Variables		Numbers	Percentages (%)
Type of animal bite	Monkey	23	3.9
	Others	5	0.8
	Pet cat	11	1.9
	Pet dog	193	32.5
	Stray cat	16	2.7
	Stray dog	346	58.2
Category of wound	Category 2	37	6.2
	Category 3	557	93.8
Number of wounds	Multiple	46	7.7
	Single	548	92.3

Table 4: Wound washing practices in animal bite patients (n=594).

Variables		Frequency	Percentage
Wound washing practice	Wound washing done	540	90.9
	Wound washing not done	54	9.1
Method of wound washing	Not applicable	53	8.9
	Using only water	58	9.8
	Using soap and water	483	81.3
Duration of wound washing	0-5 minutes	65	10.9
	11-15 minutes	99	16.7
	6-10 minutes	372	62.6
	Na	58	9.76
	Total	594	100.0

Among the 131 participants with delayed compliance, a significant portion, 44 (33.6%), missed their scheduled second dose (Day 3). Another 57 (43.5%) were late for their third dose (Day 7), and 30 (22.9%) experienced delays with their fourth dose (Day 28). Within the 22 non-compliant individuals, 15 (68.2%) missed their second dose, while 7 (31.8%) failed to receive their third dose (Table 5).

Table 5: Number of delayed and dropout cases with respect to doses of ARV.

Cases	Doses	Numbers	Percentage (%)
No. of delayed compliant cases	Second dose	44	33.6
	Third dose	57	43.5
	Fourth dose	30	22.9
	Total	131	100.0
No. of dropout or non-compliant cases	Second dose	15	68.2
	Third dose	7	31.8
	Total	22	100.0

The delayed compliance's reasons were residence far from the clinic (22, 16.8%), loss of wages (15, 11.4%), forgotten dates (17, 12.9%), household responsibilities (7, 5.34%), negligence (17, 12.9%), health issues (4, 3.05%), exams (1, 0.76%), place of work outside Jammu (22, 16.8%), ill advice from family and friends (8, 6.1%), staying outside Jammu city (12, 9.16%), and transportation issues (6, 4.6%) (Table 6).

Table 6: The reasons for delayed compliance (n=131).

Reasons for delayed compliance	Number	Percentage (%)
Exam	1	0.76
Forgotten dates	17	12.9
Health issue	4	3.05
Household responsibilities	7	5.34
Ill advice from family and friends	8	6.10
Loss of wages	15	11.4
Negligence	17	12.9
Outside Jammu city	12	9.16
Place of residence is far away	22	16.8
Place of work outside Jammu	22	16.8
Transportation issue	6	4.58
Total	131	100.0

The reasons came out for non-compliance were loss of wages (1, 4.5%), forgotten dates (1, 4.5%), negligence (7, 31.8%), health issues (7, 31.8%), place of work outside Jammu (1, 4.5%), and ill advice from family and friends (5, 22.7%) (Table 7).

Table 7: The reasons for non-compliance to ARV(n=22).

Reasons for non-compliance	Number	Percentage (%)
Forgotten dates	1	4.5
Health issue	7	31.8
Ill advice from family and friends	5	22.7
Loss of wages	1	4.5
Negligence	7	31.8
Place of work outside Jammu	1	4.5
Total	22	100.0

No statistically significant association was found between full compliance and combined (delayed and non-compliance) with factors such as age, residence, education, gender, category of bite, number of wounds, type of animal bite, wound washing practices, method of wound washing, or duration of wound washing ($p>0.05$). Chi-square test was applied for testing significance.

DISCUSSION

Participants aged 2 to 84 years, with a mean age of 30.2±16.3 years, were included in the present study. About 76.9% were males, while females accounted for 23.1% of the sample.

Wound washing practices were followed by 90.9% (540) of the 594 participants. Among these, 9.8% (58) used only water, whereas 81.1% (482) used both soap and water. These findings indicate a higher level of wound hygiene compared to previous studies. For instance, Manasi Panda et al[6] reported wound cleaning in 66.9% of cases. Another study by Sastry et al found that 41.7% of patients used water, soap, and antiseptic for wound care.[8] Similarly, Venkatesan et al and Lilare et al reported wound washing practices among 64% and 72% of their study subjects, respectively.[9,10]

About 74.2% of the participants in this study adhered entirely to the recommended ARV schedule. This is comparable to findings by Domple et al and Shankaraiah et al, who reported compliance rates of 76.5% and 77%, respectively.[11,12] However, other studies have shown lower rates Sahu et al reported a 52.3% compliance rate, while Dhaduk et al found that 68% of participants completed the vaccine regimen.[13,14] Panda et al reported only 47.8% compliance among animal bite victims.[6]

In this study, negligence and health-related issues emerged as the leading causes of non-compliance with the ARV schedule. These findings are partially aligned with those of Panda et al, who identified distance from the Anti-Rabies Clinic (ARC) and fear of wage loss as significant barriers.[6] Anandaraj et al also highlighted time constraints and perceived health status of the biting animal as factors contributing to non-compliance.[15] Additionally, Shankaraiah et al cited reasons such as forgotten vaccination dates, long distance from healthcare facilities, treatment costs, wage loss, and conflicts with school timings.[12] However, Praveen et al reported that problems due to transport, loss of wages, non-availability of rabies immunoglobulins in peripheral centers, negligence and forgotten dates were reasons of non-compliance among animal bite victims.[16]

CONCLUSION

A total of 441 (74.2%) of the 594 individuals in this study fully complied with the complete ARV vaccination schedule. Additionally, 131 (22.1%) exhibited delayed compliance with the ARV regimen, while 22 (3.7%) were non-compliant. Negligence and health issues were most common reasons of non compliance towards ARV in this study. There is important need to enhance the awareness and council each and every animal bite victims regarding post exposure prophylaxis complete course towards ARV and early dose of Anti rabies Immunoglobulin injection around wound in category 3 animal bite victims so to

prevent from rabies disease. There is also need to increase awareness about pre-exposure prophylaxis of ARV.

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