

## Research Article

# Compliance to anti rabies vaccine and animal bite management practices in a rural area of Davangere, Karnataka, India

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### ABSTRACT

**Background:** In India 20,000 deaths and 17.4 million animal bite cases occur annually. Rabies is not a notifiable disease in India and most deaths occur in rural areas where surveillance is poor. Objectives of the study were (i) to study the compliance of animal bite victims to anti rabies vaccination (ARV) and (ii) to study the wound management practices of animal bite victims.

**Methods:** A cross sectional study was conducted in April - May 2014 in areas catered by Anaji primary health centre (PHC), Davangere, Karnataka, India. Category 2 and 3 animal bite victims registered in the past 3 years at Anaji PHC were visited at their residence and data was collected using a semi structured questionnaire.

**Results:** About 23.4% reported 24 hours post bite to the health facility. Correct wound management was observed only in 12.5% of victims while 33.3% sorted to indigenous practices and 27.1% did not receive any wound care. 82.6% completed the ARV schedule while 17.4% did not complete the schedule. Lack of time (50%) was the most common reason for non-compliance.

**Conclusions:** Compliance to ARV was good yet declined after the third dose. Correct wound management practices were not done for majority of animal bite victims.

**Keywords:** Anti-rabies vaccine, Compliance, Animal bite, Primary health centre

### INTRODUCTION

Rabies is an acute, highly fatal viral zoonotic disease, caused by infection with the Lyssavirus type I.<sup>1</sup> It has been recognized for many millennia in India, long before Aristotle recognized the disease in the Greco-Roman era.<sup>2</sup> The ancient Vedic text “Sushruta Samhita” contains graphic descriptions of rabies in animals and in humans: “If the patient becomes exceedingly frightened at the sight or mention of the very name of water, he should be understood to have been afflicted with Jala-trsisa (hydrophobia) and be deemed to have been doomed”.<sup>3</sup>

According to WHO-APCRI National Multicentric Rabies Survey, there are an estimated 17.4 million animal bite cases annually in India.<sup>4</sup> The annual number of human rabies deaths globally is estimated in 2010 to be from 26,400 to 61,000 of which 16,450 occurred in India.<sup>5</sup> Hence, compliance to post exposure prophylaxis (PEP) needs emphasis as human rabies may occur due to poor wound care, incorrect administration of anti-rabies vaccine (ARV) and/or rabies immunoglobulin (RIG), incomplete regimens, delayed treatment or poor wound care.<sup>6</sup> The present study was conducted in rural areas catered by Anaji PHC, Davangere to study the compliance to anti rabies vaccination and the wound management practices among animal bite victims,

thereby further exploring the need for emphasis on compliance to animal bite management in rural India.

## METHODS

A cross sectional study was conducted in April - May 2014 in areas catered by Anaji PHC, Davangere. Institutional Ethical Committee approval was obtained prior to the study. Category 2 and 3 animal bite victims registered in the OPD register of the primary health centre from January 2011 to March 2014 (past 3 years) were included in the study. Among the animal bite victims who were enrolled at Anaji PHC, after excluding patients presently on ARV schedule, those not residing in the PHC area and those who cannot be traced despite two repeated attempts, 51 victims were shortlisted. Among the listed 51 victims, 48 traceable victims were visited at their residence and data pertaining to demographic details, details of the animal bite, wound care practices and compliance to ARV was collected using a semi structured questionnaire.

**Statistical analysis:** Data entry and analysis was done using Microsoft EXCEL 2010. Analysed data is presented as proportions and percentages. Chi Square for trends test was used to find any significant differences in association among sequential independent categorical variables.

## RESULTS

**Table 1: Socio-demographic characteristics of study participants (n = 48).**

Socio-demographic variable	Number (%)	
Age group (in years)	0 – 5	5 (10.4)
	6 – 14	24 (50)
	15 – 45	14 (29.2)
	46 – 60	4 (8.3)
	>60	1 (2.1)
Gender	Male	37 (77.1)
	Female	11 (22.9)
Socioeconomic status (as per Modified B.G. Prasad classification)	Class I	0 (0)
	Class II	4 (8.3)
	Class III	15 (31.3)
	Class IV	16 (33.3)
	Class V	13 (27.1)
Education	Graduate	4 (8.3)
	High school	8 (16.7)
	Middle school	10 (20.8)
	Primary school	13 (27.1)
	Illiterate	13 (27.1)
Occupation	Professional	0 (0)
	Semi professional	1 (2)
	Clerical	3 (6.3)
	Skilled	2 (4.2)
	Semi -skilled	9 (18.8)
	Unskilled	0 (0)
	Unemployed	33 (68.8)

Majority of the respondents were males (77.1%), aged less than 15 years (60.4%) and belonging to class IV socioeconomic status as per Modified B.G. Prasad Classification.<sup>7</sup> Most of them were unemployed (68.8%) and illiterates or studied up to primary school (27.1%) as shown in Table 1.

**Table 2: Wound management practices among animal bite victims (n = 48).**

Biting animal	Stray dog	29 (60.4)
	Pet dog	19 (39.6)
Vaccination of biting animal	Yes	8 (42.1)
	No	11 (57.9)
WHO classification of animal bite	Category II	11 (22.9)
	Category III	37 (77.1)
Site of injury*	Head & neck	6 (12.5)
	Upper limb	17 (35.4)
	Lower limb	29 (60.4)
	Abdomen	2 (4.2)
	Back	3 (6.3)
Status of animal	Alive	32 (66.7)
	Dead	0 (0)
	Killed	3 (6.3)
	Unknown	13 (27.1)
Time of reporting of victim to health facility post bite	< 6 hours	30 (63.9)
	6 – 24 hours	7 (12.7)
	> 24 hours	11 (23.4)
Wound care	Washed with water only	2 (4.2)
	Washed with soap & water	6 (12.5)
	Washed with soap, water & antiseptic	6 (12.5)
	Applied irritants	16 (33.3)
	All of the above	5 (10.4)
	None	13 (27.1)
Occlusive dressing done	Yes	4 (8.3)
	No	44 (91.7)
Received Tetanus Toxoid	Yes	43 (89.6)
	No	5 (10.4)
Compliance to antirabies vaccine	Yes	39 (82.6)
	No	9 (17.4)

Values in parentheses are percentages; \* Total may exceed 100 because of multiple site injuries.

Among the animal bite victims, 77.1% had Category III bites and all were bitten by dog. Around 39.6% of these dogs were pet dogs of which 42.1% were vaccinated. The most common site of injury was lower limb (60.4%) followed by upper limb (35.4%). Majority of the animal bite victims (63.9%) reported to the health facility within 6 hours of the event, while 23.4% of them reported late beyond 24 hours. The reasons for delayed reporting (> 24 hours) were closure of the health facility due to government holiday (55%), children not informing the parents immediately post animal bite (18%), reluctance of

the respondents to seek medical advice (18%) and referral to district hospital for vaccination (9%).

Correct wound management practices of washing the wound with soap, water & application of antiseptic was observed only in 12.5% of victims while 33.3% sorted to application of irritable substances like turmeric powder, lime juice, chili powder etc. and 27.1% did not receive any wound care. Purified tissue cultured antirabies vaccination by intramuscular route as per Essen regimen was administered to all category III bite victims and rabies immunoglobulin was either not advised or patient was not affordable.<sup>8</sup> 89.6% of them received tetanus toxoid vaccination [Table 2].

Around 82.6% of the animal bite victims completed the 5-dose antirabies vaccination schedule while 17.4% did not complete the schedule. The Day 0 to Day 3, Day 0 to Day 7, Day 0 to Day 14 & Day 0 to Day 28 drop-out rates were 2.2%, 6.5%, 15.2% & 17.4% respectively. The compliance to anti-rabies vaccination declined significantly after the third dose [ $p=0.002$ ]. Lack of time (50%) and healthy status of the animal (25%) were the common reasons cited for non-compliance [Table 3].

**Table 3: Distribution of animal bite victims by compliance to ARV (n = 48).**

Dose of ARV	Compliance to ARV	Non-compliance to ARV
1 <sup>st</sup> dose	48 (100)	0 (0)
2 <sup>nd</sup> dose	47 (97.8)	1 (2.2)
3 <sup>rd</sup> dose	45 (93.5)	3 (6.5)
4 <sup>th</sup> dose	41 (84.8)	7 (15.2)
5 <sup>th</sup> dose	39 (82.6)	9 (17.4)

Values in parentheses are percentages;

Chi square for trends:  $\chi^2$  value= 16.36,  $p=0.002$ .

## DISCUSSION

This study was done to identify compliance to PEP for animal bites and added a note on its status in a rural scenario unlike most other studies which were done in tertiary care settings. Although operational issues like availability of ARV at a PHC can influence successful PEP in a rural setting, the motivation to complete the prescribed regimen rests with the consumer. In our study we found that three – fourth of the respondents reported to the health facility within 24 hours post animal bite which was different from other studies.<sup>9,10</sup> The difference may be due to the closer proximity of the PHC to the residence and prompt guidance by the local health workers. But wound washing practices was poor among the study participants compared to the picture given in other studies including one by Mahendra BJ et al.<sup>4,9,10</sup> Mere washing of the wound and application of antiseptics will reduce the risk of rabies by 50%.<sup>11</sup> But although the awareness that animal bites require immediate attention was evident from the fact that majority reached the PHC within 24 hours, it was not the same when it came to

wound care. This is further supported by the usage of indigenous native applicants over the wound by 33% of the participants which was similar to results of the World Health Organization – APCRI multi-centric survey,<sup>4</sup> but higher when compared to the results of studies conducted elsewhere.<sup>9,10,12,13</sup>

Local infiltration of rabies immunoglobulin is indicated for all Category III bites.<sup>8</sup> But the national coverage rates of RIG is very low (2.3%).<sup>4</sup> In our study we found no evidence in any of the respondents to have received RIG. Even though cost constraints and operational issues may be reasons for non-provision of RIG at the PHC, there is also a lack of awareness for prompt referral of category 3 bites to a nearby referral unit for RIG. Further qualitative studies are required both at the provider and consumer levels to assess the factors influencing low awareness and practice regarding RIG administration.

A study done by Rasanian SK et al<sup>14</sup> in a primary health center of Delhi showed that compliance to ARV was 78.9% whereas our study reported a compliance of 82.6%. Further there is a significant decline in compliance after the third dose [ $p=0.002$ ] of ARV. This failure to complete the regimen may be attributed to the belief in rural areas that after the 10<sup>th</sup> day of bite, if the dog which bit the victim was healthy, then the risk of rabies is very low. Further insight into such beliefs is needed to challenge an already scientifically prescribed 5-dose regimen.

## CONCLUSION

The study showed that the compliance to ARV was good but declined after the third dose. Correct wound management practices were not done for majority of animal bite victims.

This study emphasised the need for completion of the prescribed ARV regimen and improving awareness on proper wound management. This can be done by prompt follow-up, involvement of ASHAs, regular training of health care providers, strengthening IEC activities and proper record maintenance for animal bites.

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