

Out of Pocket Expenditure among Animal Bite Patients Attending a Tertiary Care Hospital for Treatment in Rajasthan

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ABSTRACT

Introduction: Rabies is an infectious viral disease that is almost always fatal. It is present on all continents, except Antarctica, with over 95% of human deaths occurring in the Asia and Africa regions. Treating a rabies exposure, where the average cost of rabies post-exposure prophylaxis (PEP) is US\$ 40 in Africa, and US\$ 49 in Asia, can be a catastrophic financial burden on affected families whose average daily income is around US\$ 1–2 per person. Study was conducted with the objectives to analyse the direct and indirect out of pocket expenditure of the post exposure prophylaxis of animal bites in spite of free supply of anti-rabies vaccine and immunoglobulin.

Material and methods: A cross sectional observational study was carried out at Anti Rabies Clinic, SMS Hospital Jaipur, Rajasthan from October 2018 to March 2019 to know out of pocket expenditure of animal bite patients and its determinants. Prior approval from institutional ethics committee and informed consent were taken and a pre-designed, pre-tested proforma was filled from the persons attending anti rabies clinic on last visit of post-exposure prophylaxis (PEP). Apart from socio-demographic details, information about direct or indirect out of pocket expenditure due to animal bite was recorded and analysis was done using chi square test, ANOVA test, 't'-test and univariate and multivariate regression.

Results: Total out of pocket expenditure by 81 studied patients was Rs. 53201.00, out of which 91.69% i.e. Rs. 48780.00 were indirect expenses and 5.04% i.e. Rs. 2681.00 was expenditure on medical and surgical management including registration and consumables. Only 3.27% i.e. Rs. 1740.00 was on post exposure anti-rabies prophylaxis of 81 patients. Mean out of pocket expenditure was Rs. 656.80±1387.76 ranging from Rs. 0.00 to Rs. 8550.00 per patient with median of Rs. 290.00.

Conclusion: Despite free supply of anti-rabies vaccine and anti-rabies serum under Mukhyamantri Nishulk Dava Yojna (MNDY) the indirect out of pocket expenditure in animal bite treatment is still high, which should draw attention for policy makers.

Key words: Animal Bite, Out Of Pocket Expenditure, Tertiary Care Hospital.

source of human rabies deaths, contributing up to 99% of all rabies transmissions to humans.²

Rabies is one of the neglected tropical diseases. Due to poor knowledge of preventive measures it mainly affects the most vulnerable groups of society like, children and lower socio-economic classes who live in remote rural areas. It is extremely difficult to measure the psychological impact of fear and trauma after a suspected rabid dog bite into a monetary value but was estimated to account for about 32,000 disability-adjusted life year (DALYs) in Africa and 1,40,000 DALYs in Asia.³ Every year, more than 15 million people worldwide receive a post-bite vaccination. This is estimated to prevent hundreds of thousands of rabies deaths annually.⁴ Most deaths due to rabies occurs in rural areas where surveillance system is poor and also, rabies is not a notifiable disease in India so, actual figure may be much higher. In the past, a large proportion of rabies patients did not receive any vaccination, and many did not complete the full course. In the periphery, primary health centres (PHCs) and community health centres (CHCs), vaccine as well as immunoglobulin (IG) is at scarce or even not in supply. But now the government has supplied anti-rabies vaccine (ARV) to all PHCs and CHCs but immunoglobulin is available only at tertiary care hospitals. That is why majority dog bite cases are referred to the tertiary care centre. In Rajasthan, after implementation of Mukhyamantri Nishulk Dava Yojana (MNDY) from October 2011, the anti-rabies vaccines and immunoglobulins are being provided free of cost, but direct or indirect out of pocket expenditure on animal bite is still very for deprived segment of society. So, this study was conducted with the objectives to analyse the direct and indirect out of pocket expenditure of the post exposure

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INTRODUCTION

Animal bite in humans is a serious public health problem especially in developing countries contributing 17.4 million cases of animal bite per annum. Rabies is a vaccine-preventable viral disease which occurs in more than 150 countries with globally 59,000 deaths every year. The highest numbers of human deaths due to rabies are observed in India and Philippines.¹ India accounts for 36% of the Global and 65% of the Asian rabies related deaths. Dogs are the main

prophylaxis of animal bites in spite of free supply of anti-rabies vaccine and immunoglobulin.

MATERIAL AND METHODS

A cross sectional descriptive study which was carried out in anti-rabies clinic of SMS Medical College and Hospital, Jaipur (Rajasthan) from October 2018 to March 2019. Prior approval from institutional ethics committee was taken and informed written consent was taken from all animal bite patients or from legal guardian in case of minors. Total 81 animal bite patients attending anti rabies clinic on last visit (Day-28) of post-exposure prophylaxis (PEP) were interviewed. Sociodemographic data like, age, sex, religion, residence, total family income, education and occupation were noted in a pre-designed and pre-tested proforma. Detail history of animal bite like, date, site and grade of bite, type of animal, schedule of treatment, direct and indirect expenditure on animal bite treatment were recorded.

STATISTICAL ANALYSIS

The data collected were entered in Microsoft Excel 2010 spreadsheets and analyzed. Results were expressed as percentages and proportions for qualitative data while median, mean and standard deviation were calculated for quantitative data. Univariate analysis was done by chi square test, ANOVA test and unpaired 't'-test. Stepwise multivariate linear regression analysis was done to identify independent determining factors of out of pocket expenditure. 'P' value < 0.05 was taken as significant. Medcalc 16.4 version software was used for all statistical calculations.

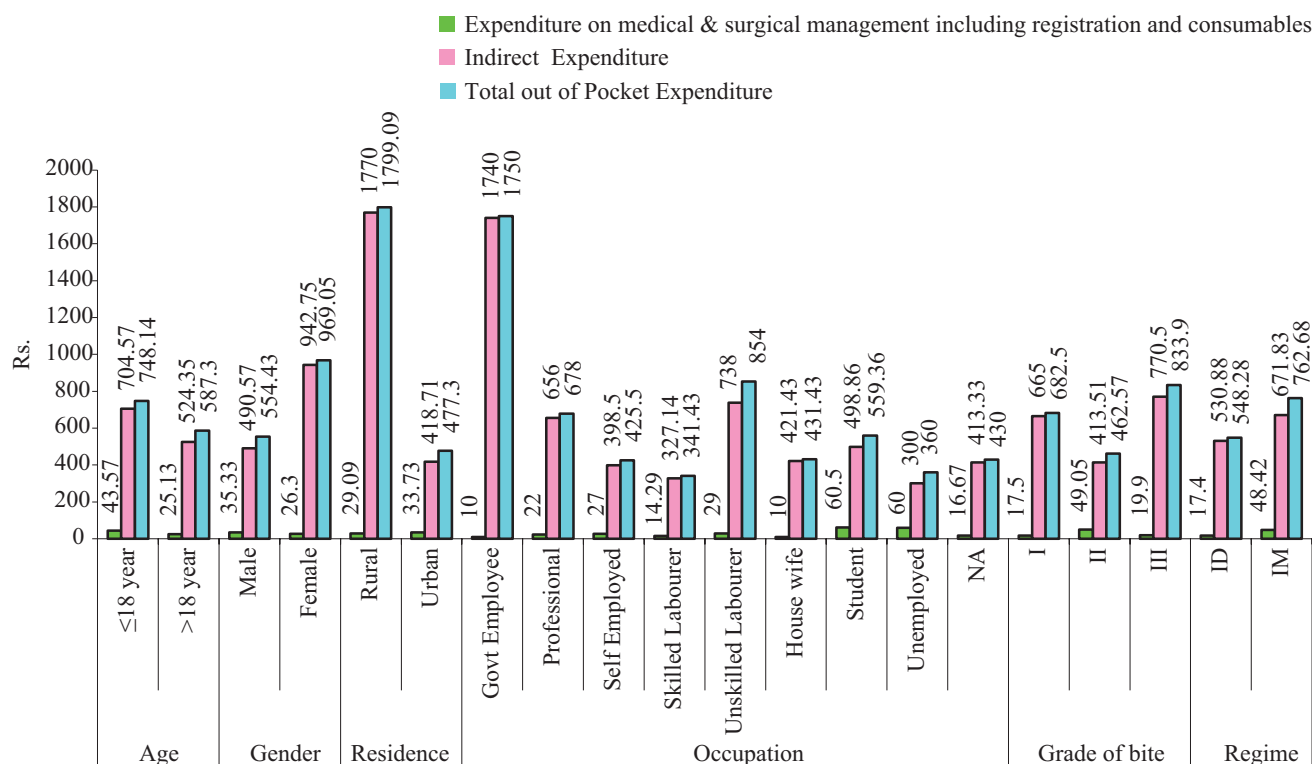
RESULTS

In the present study, total 81 subjects were included, most

of them 46 (56.79%) were above 18 year of age while 34 (43.21%) were below 18 years. 61 (75.31%) were males and 20 (24.69%) were females. Most of the subjects belonged

Parameter	Number (n)	Percentage (%)
Age:		
≤18 year	35	43.21
>18 year	46	56.79
Gender:		
Male	61	75.31
Female	20	24.69
Residence:		
Rural	11	13.58
Urban	70	86.42
Occupation:		
Govt. employee	5	6.17
Professional	5	6.17
Self employed	10	12.35
Skilled labourer	7	8.64
Unskilled labourer	20	24.69
House wife	7	8.64
Student	22	27.16
Unemployed	2	2.47
NA	3	3.70
Grade of bite:		
I	4	4.94
II	37	45.68
III	40	49.38
Regime:		
ID	40	49.38
IM	41	50.62

Table-1: Socio-demographic characteristics of studied population



Graph-1: Mean Expenditure according to socio-demographic characteristics

Out of Pocket Expenditure	Total sum (Rs.)	%
Expenditure on post exposure anti-rabies prophylaxis	1740	3.27%
Expenditure on medical & surgical management including registration and consumables	2681	5.04%
Indirect expenditure	48780	91.69%
Total	53201	100.00%
Mean	656.80	
Standard deviation	1387.76	
Median	290.00	
Minimum	0.00	
Maximum	8550.00	

Table-2: Break up of total expenditure on anti rabies treatment (N=81)

	N	Mean	SD	Median	Min.	Max.	't' value*	'p' value*
Age:								
≤18 year	35	43.57	102.92	20	0	610	1.172	0.245
>18 year	46	25.13	25.14	20	0	120		
Gender:								
Male	61	35.33	79.27	20	0	610	0.496	0.621
Female	20	26.30	30.05	15	0	120		
Residence:								
Rural	11	29.09	19.21	30	0	50	0.202	0.840
Urban	70	33.73	75.32	10	0	610		
Occupation:								
Govt. employee	5	10.00	22.36	0	0	50	0.71	0.680
Professional	5	22.00	16.43	20	10	50		
Self employed	10	27.00	35.61	20	0	120		
Skilled labourer	7	14.29	17.18	10	0	50		
Unskilled labourer	20	29.00	17.44	25	0	50		
House wife	7	10.00	5.77	10	0	20		
Student	22	60.50	127.93	20	10	610		
Unemployed	2	60.00	14.14	60	50	70		
NA	3	16.67	11.55	10	10	30		
Grade of bite:								
I	4	17.50	22.17	10	0	50	1.79	0.174
II	37	49.05	100.51	20	0	610		
III	40	19.90	18.16	15	0	86		
Regime:								
ID	40	17.40	15.18	10	0	86	2.023	0.046
IM	41	48.42	95.78	30	0	610		

Table-3: Expenditure on medical and surgical management including registration and consumables

to urban area (86.42%), only 11 (13.58%) were from rural area. Occupation wise most common sufferers were students (27.16%) followed by unskilled laborers (24.69%), self-employed persons (12.35%). Grade-III bite was most common (49.38%) followed by grade-II (45.68%) and grade-I (4.94). Both regimes intramuscular and intradermal were available and these are almost equally distributed (IM regimes- 50.62%, ID regimes 49.38%) (Table-1).

The mean out of pocket expenditure was Rs. 656.80±1387.76 ranging from Rs. 0.00 to Rs. 8550.00 per patient with median of Rs. 290.00. Total out of pocket expenditure by 81 studied patients was Rs 53201.00, out of which 91.69% (Rs. 48780.00) was on indirect expenses while 5.04% (Rs. 2681.00) was expenditure on medical and surgical management including registration and consumables. Only 3.27% i.e. Rs. 1740.00 was on post exposure anti-rabies prophylaxis of 81 patients (Table-2). Expenditure on post

exposure anti-rabies prophylaxis was very low (3.27% of total out of pocket expenditure) and was done only by one adult, male patient belonging to urban area and was unskilled labourer having grade-III bite by a wild animal and given IM regime.

It was observed in the present study that expenditure on medical and surgical management including registration and consumables was more in ≤18 years aged patients (Rs. 43.57±102.92), males (Rs. 35.33±79.27), urban residents (Rs. 33.73±75.32), students (Rs. 60.50±127.93) and for grade-II bitten patients (Rs. 49.05±100.51) but it was significantly higher when IM regime was given (Rs. 48.42±95.78, p value < 0.05) (Table-3) while indirect expenditure was more in ≤18 years aged patients (Rs. 704.57±1540.39), females (Rs. 942.75±1983.30), government employees (Rs. 1740.00±3779.29) and for grade-III bitten patients (Rs. 770.50±1896.54) and when IM regime was given

	N	Mean	SD	Median	Min.	Max.	't' value*	'p' value*
Age:								
≤18 year	35	704.57	1540.39	250	0	8500	0.581	0.563
>18 year	46	524.35	1250.20	200	0	8400		
Gender:								
Male	61	490.57	1109.36	250	0	8500	1.28	0.204
Female	20	942.75	1983.30	225	0	8400		
Residence:								
Rural	11	1770.00	3313.99	250	0	8500	3.195	0.002
Urban	70	418.71	595.55	250	0	4000		
Occupation:								
Govt. employee	5	1740.00	3779.29	100	0	8500	0.54	0.824
Professional	5	656.00	493.64	800	80	1200		
Self employed	10	398.50	619.40	225	0	2000		
Skilled labourer	7	327.14	280.64	250	80	880		
Unskilled labourer	20	738.00	1829.08	250	0	8400		
House wife	7	421.43	575.80	200	0	1700		
Student	22	498.86	848.20	235	0	4000		
Unemployed	2	300.00	282.84	300	100	500		
NA	3	413.33	404.64	200	160	880		
Grade of bite:								
I	4	665.00	565.07	640	100	1280	0.64	0.528
II	37	413.51	470.08	250	0	2000		
III	40	770.50	1896.54	200	0	8500		
Regime:								
ID	40	530.88	1320.63	200	0	8400	0.458	0.648
IM	41	671.83	1442.53	250	0	8500		

Table-4: Indirect Expenditure

	N	Mean	SD	Median	Min.	Max.	't' value*	'p' value*
Age:								
≤18 year	35	748.14	1550.28	300	10	8550	0.514	0.608
>18 year	46	587.30	1263.53	245	0	8430		
Gender:								
Male	61	554.43	1131.79	300	0	8550	1.162	0.249
Female	20	969.05	1981.83	235	10	8430		
Residence:								
Rural	11	1799.09	3319.75	300	0	8550	3.089	0.003
Urban	70	477.30	628.49	290	0	4020		
Occupation:								
Govt. employee	5	1750.00	3801.64	100	0	8550	0.55	0.814
Professional	5	678.00	495.65	810	100	1210		
Self employed	10	425.50	614.30	255	0	2020		
Skilled labourer	7	341.43	283.16	290	80	890		
Unskilled labourer	20	854.00	1838.05	300	20	8430		
House wife	7	431.43	576.41	210	10	1710		
Student	22	559.36	870.97	270	20	4020		
Unemployed	2	360.00	296.98	360	150	570		
NA	3	430.00	398.50	210	190	890		
Grade of bite:								
I	4	682.50	576.62	670	100	1290	0.68	0.508
II	37	462.57	495.68	300	0	2020		
III	40	833.90	1905.29	245	0	8550		
Regime:								
ID	40	548.28	1321.98	215	0	8430	0.693	0.490
IM	41	762.68	1457.59	300	0	8550		

Table-5: Total out of pocket expenditure

Independent variables	Coefficient	Std. Error	t	P
(Constant)	477.3000			
Residence	1321.7909	427.8348	3.089	0.0028

Table-6: Regression Equation

(Rs. 671.83±1442.53) but it was significantly higher for rural area patients (Rs. 1770.00±3313.99, p value < 0.05) (Table-4). Similar results were observed for total out of pocket expenditure, it was more in ≤18 years aged patients (Rs. 748.14±1550.28), females (Rs. 969.05±1981.83), government employees (Rs. 1750.00±3801.64) and for grade-III bitten patients (Rs. 833.90±1905.29) and when IM regime was given (Rs. 762.68±1457.59) but was significantly higher for rural area patients (Rs. 1799.09±3319.75, p value < 0.05) (Table-5, Graph-1).

Stepwise multivariate linear regression was done to identify independent determining factor for total out of pocket expenditure in post exposure prophylaxis. Age, gender, occupation, area of residence, grade of bite and regime of treatment were put in the model. Probability of retention was kept <0.05 while that of removal was kept >0.10. All variable except area of residence were excluded from the model. Residence was found independent determining factor for total out of pocket expenditure in post exposure prophylaxis at a tertiary care centre running under free drug scheme (Mukhyamantri Nishulk Dava Yojana) (Table-6).

DISCUSSION

World Health Organization (WHO) divided the animal bite exposures into three categories. The prophylaxis for each category is different. The prophylaxis can be pre-exposure prophylaxis (PrEP), post-exposure prophylaxis (PEP), and re-exposure prophylaxis (REP). Pre-exposure prophylaxis consists of vaccination on days 0 and 7 (1 injection by IM route or 2 injections by ID route). This is usually given to high-risk persons only. All category II and III animal exposures have to take post-exposure prophylaxis. Anti-rabies vaccines are required in both the exposures in category II and III but the rabies immunoglobulin is also required in category III exposure. There are two types of vaccination schedules viz, Intramuscular schedule (1 injection of 0.5ml on deltoid on days 0, 3, 7, 14 and 28) and Intra dermal schedule (2 injections of 0.1ml on two deltoids on days 0, 3, 7 and 28). There are two types of immunoglobulin available, i.e. equine rabies immunoglobulin (ERIG) and human rabies immunoglobulin (HRIG). The dose of ERIG is 40 IU/Kg body weight while that of HRIG is 20 IU/Kg body weight. Equine serum is associated with anaphylactic reactions due to equine origin. Human immunoglobulin is costly when compared with equine.

In the present study, most of the studied patients were adult above 18 year of age (56.79%), male (75.31%), belonging to urban area (86.42%), unskilled laborers and students (24.69% and 27.16% respectively), having grade-III bite (43.38%) and given IM regimes (50.62%). The finding were close to the previous studies by Salve et al.⁵ in Haryana (48.9% < 18 years of age, 70.4% males) and Sajna and Roshni⁶ in Kerala

(64.3% > 15 years of age, 63.4% males).

Total out of pocket expenditure by 81 studied patients was Rs 53201.00, out of which 91.69% i.e. Rs. 48780.00 were indirect expenses and 5.04% i.e. Rs. 2681.00 was expenditure on medical and surgical management including registration and consumables. Only 3.27% i.e. Rs. 1740.00 was on post exposure anti-rabies prophylaxis of 81 patients. Mean out of pocket expenditure was Rs. 656.80±1387.76 ranging from Rs. 0.00 to Rs. 8550.00 per patient with median of Rs. 290.00. Salve et al.⁵ in Haryana found the total average cost of PEP vaccination Rs. 315.00 while Sajna and Roshni⁶ in Kerala found the average cost per person for vaccination Rs. 391.50, for ERIG Rs. 400.00 and HRIG Rs. 6400.00. They did not include the other direct and indirect expenditures in their study.

Expenditure on post exposure anti-rabies prophylaxis was very low (3.27% of total out of pocket expenditure) and was done only by one adult, male patient belonging to urban area and was unskilled laborers, having grade-III bite by a wild animal and given IM regime. Expenditure on medical and surgical management including registration and consumables was more in ≤18 years aged patients, males, urban residents, students and for grade-II bitten patients but was significantly higher when IM regime was given. Indirect expenditure was more in ≤18 years aged patients, females, government employees and for grade-III bitten patients and when IM regime was given but was significantly higher for rural area patients. Similar to indirect expenditure, total out of pocket expenditure was also more in ≤18 years aged patients, females, government employees and for grade-III bitten patients and when IM regime was given but was significantly higher for rural area patients. Such bifurcation was not used by any author in previous studies.

Residence was found independent determining factor for total out of pocket expenditure in post exposure prophylaxis when stepwise multivariate linear regression was applied. All variable except area of residence were excluded from the model. No comparable data were available regarding direct (like, medicine, surgical management of wound, consumables) and indirect expenditure (like, travel, loss of wage) on animal bite management. Those few studies available considered expenditure on anti-rabies vaccines and immunoglobins only.

CONCLUSION

Although like any other medicines anti-rabies vaccine and immunoglobulin are also available free of cost to all patients at tertiary care centres in Rajasthan. Interrupted supply, non-availability of immunoglobulins at PHCs and CHCs and limited working hours of peripheral health institutes were the factors responsible for direct expenditure on animal bite management. Repeated travel for the completion of regime

and loss of wage due to distance and large waiting time were the factors responsible for indirect expenditure on animal bite management.

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