Case Report

www.ijrdh.com
ISSN: 2321 - 1431

Effectiveness of telephone reminders on increasing compliance to intradermal rabies vaccination

COMMUNITY MEDICINE

Vinay M [1], Mahendra BJ [2], Raghini Ranganathan[3]

ABSTRACT

Introduction: Rabies is virtually a 100% fatal disease. Annually 20,000 deaths occur in India. Deaths due to rabies can be prevented by appropriate post exposure prophylaxis (PEP) consisting of wound care, administration of immunoglobulin and administration of the complete schedule of rabies vaccine. Lack of PEP and non-compliance to vaccination schedule are common factors in people dying due to rabies. In a bid to increase compliance, a telephone call was made to the victims, when they did not come to ARC-MIMS on the scheduled date. **Objectives:** To determine the effectiveness of telephone reminders for increasing compliance to IDRV schedule, to determine the association between increase in compliance and the characteristics of the victims. **Methodology:** It is a before and after comparison study done in the Anti-Rabies clinic at Mandya Institute of Medical Sciences over 5 years (January 2008 to December 2012) Results: The total number of victims who took IDRV in ARC-MIMS in 2008 & 2009 were 7747.

Of them 4890 (63.1%) completed 3 doses and 2797 (36.1%) completed the 4 dose schedule. Telephone reminders were started in 2010. The total number of victims who took IDRV in ARC-MIMS in 2011 & 2012 were 8005. Of them 5807 (72.5%) completed 3 doses and 4353 (54.4%) completed the 4 dose schedule. The increase in compliance was statistically significant. Significant increase was observed in children (0-15 years age group), males, high school education, socioeconomic status III & IV, exposure to stray animals and category III victims. The increase in compliance was unvarying with respect to place of residence, occupation, type of animal, provocation of animal, duration since time of bite to PEP, location of bite and taking rabies immunoglobulin.

Key words: ***Compliance; Intradermal Rabies Vaccination; Telephone reminders***

Introduction

Rabies is virtually a 100% fatal disease. Annually 20,000 deaths occur in India. Approximately 17.4 million exposures occur in India annually, most of which are dog bites [1]. Deaths due to rabies can be prevented by appropriate post exposure prophylaxis (PEP) consisting of wound care, administration of immunoglobulin and administration of the complete schedule of rabies vaccine [2]. Intradermal Rabies vaccination is widely followed in

India which requires a much lesser quantity of vaccine and the change in the route of administration has made Rabies vaccine affordable to a majority of the dog-bite victims [3]. In spite of the affordable prices of the vaccine, the compliance to intradermal Rabies vaccine was low in various studies done in India [4]. Lack of PEP and non-compliance to vaccination schedule are common factors in people dying due to rabies [5, 6].

The Anti Rabies Clinic in Mandya Institute of Medical Sciences (ARC-MIMS), a government teaching hospital, has a dedicated anti-rabies clinic which has been providing pre-exposure and post-exposure prophylaxis since 2007. Intradermal vaccination is administered. Previous studies on compliance showed a high drop-out rate and the majority of drop outs did not receive the fourth dose of the vaccine [7]. In a bid to increase compliance, a telephone call was made to the victims, when they did not come to ARC-MIMS on the scheduled date. This study assesses the effectiveness of telephone reminders increasing compliance to intradermal rabies vaccination and the other factors which influence the compliance with regard to telephone reminders

Objective

- To determine the effectiveness of telephone reminders for increasing compliance to IDRV.
- To determine the association between increase in compliance and the socio-demographic characteristics of the victims.

Materials and Methods

This is a hospital based, before and after comparison study. The vaccine administered in the Anti-Rabies clinic is cell culture vaccine. The regimen that is followed is WHO recommended 'Updated Thai red cross regimen' which is 0.1ml on injected intradermally over the deltoid regions of both the arms on days 0, 3, 7 and 28 of the exposure. The compliance of the victims to the regimen during the years 2008 and 2009 was studied. The compliance was low. In a bid to increase, telephone reminders were started in the year 2010.

At the end of each working day the people who had missed their dose which was due on that working day would be called and reminded to receive their dose on the following day. We were not able to remind some of the victims who did not have a phone. The compliance of all the animal bite victims who reported to ARC-MIMS during the years 2011 & 2012 was studied and compared with the compliance of victims who had reported in 2008 & 2009. Some victims received the first dose of the vaccine and Rabies immunoglobulin at ARC-MIMS and intended to take the rest of the doses in other government facilities where IDRV was available. These victims were excluded from the analysis.

The association of socio demographic factors like as age, sex, residence, education and other factors such as the category of bite with the change in compliance was also analysed. Analysis was done using proportions and Z test was used to derive the statistical significance of the difference between proportions.

Results

The number of victims who had received post exposure prophylaxis during the years 2008 and 2009 was 7747 and the number of victims who received post exposure prophylaxis during the years 2011 and 2012 was 8005. The number of people who received all the four doses in the period before the introduction of

telephone reminders was 2797 (36.1%) and 4890 (63.1%) had received 3 doses. The number of people who received the four doses after the introduction of reminders increased to 4353 (54.4%) and 5807 (72.5%) had received 3 doses. The increase in compliance to both the third and the fourth dose was statistically significant (P<0.0002).

Among the characteristics that were tested for association increase in compliance was statistically significant among different age groups, education, residence, occupation, biting animal, nature of bite (provoked / unprovoked), time since bite and site of bite (P<0.05). With respect to the third dose, statistically significant increase was not seen in females, socioeconomic status (SES) I, II & V, non-pets & category 2 exposures. With respect to the forth dose, statistically significant increase was not seen among victims of SES I, victims exposed to animals other than dogs and victims having category 2 exposures.

Discussion

Telephone reminders, post card reminders and computer generated 'short messaging service' have been used to increase compliance to vaccination. Some of these have been shown to be effective in increasing compliance to vaccination [8-10]. Phone contact ensures that the message is understood and telephone reminders are hypothesized to be more effective in less literate victims. In our study statistically significant increase in compliance to the third and fourth dose were seen. The increase in compliance was not significant in the socioeconomic class I probably because the compliance had attained a plateau as evidenced by the fact that the compliance is highest in this group compared to the other groups. Similarly, the increase in compliance to third dose was not significant among class V because most of these people did not have phones and it was not possible to remind them. There was no significant increase in compliance among those who had category II exposure which underlines the need to educate those with category II exposures about the necessity to complete the vaccination schedule at the first contact with the victim.

This increase in compliance cannot be purely attributed to telephone reminders alone. Separate data of compliance among those who received telephone reminders was not available. Other factors which could have contributed to the increase in compliance include increase in awareness about the disease & vaccination and availability of improved transportation facilities (city buses have been started). The costs avoided due to the need to re-start the vaccination schedule and the deaths due rabies that have been potentially averted also adds to the scope of effectiveness of the telephone reminders.

Conclusion

Telephone reminders increase compliance to intradermal vaccination against rabies.

Acknowledgements

The authors sincerely thank all the faculty of the department, the Interns and the staff of the ARC for their cooperation and support in this study. The authors are grateful to the patients who attended ARC-MIMS and participated in this study.

Source of Funding: Nil

Source of Conflict: Nil

Table 1: Factors associated with increase in compliance to third dose after the introduction of telephone reminders

Factors influencing compliance		Before the introduction of telephone reminders			After the introduction of telephone reminders			Percent increase in compliance	Z value	P value
		No. completed	Total No.	Percent	No. completed	Total No.	Percent			
Total		4890	7747	63.1	5807	8005	72.5	9.4	12.662	<0.0002
Age	<15 years	1782	2688	66.3	2278	3058	74.5	8.2	6.81	<0.0002
	>15 years	3106	5059	61.4	3527	4947	71.3	9.9	10.47	<0.0002
Sex	Male	2733	4617	59.2	3735	5035	74.2	15.0	15.643	<0.0002
	Female	2157	3130	68.9	2073	2970	69.8	0.9	0.74	0.749
Residence	Urban	1071	1697	63.1	1472	2033	72.4	9.3	6.068	<0.0002
	Rural	3818	6050	63.1	4336	5972	72.6	9.5	11.146	<0.0002
Occupation	Agriculture	1116	1763	63.3	1232	1694	72.7	9.4	5.935	<0.0002
	Others	411	655	62.7	482	695	69.4	6.7	2.563	<0.0104
Animal causing exposure	Dog	4732	7499	63.1	5154	7613	67.7	4.6	5.942	<0.0002
	Others	180	248	72.7	259	329	78.6	6.4	1.712	0.0869
Nature of bite	Provoked	2603	4145	62.8	3154	4339	72.7	9.9	19.01	<0.0002
	Un provoked	2447	3860	63.4	2651	3666	72.3	8.9	8.273	<0.0002
Time since bite	<1 day	714	1116	64.0	1186	1641	72.3	8.3	4.619	<0.0002
	1 – 2 days	3628	5686	63.8	4073	5579	73.0	9.2	10.498	<0.0002
	> 2 days	546	945	57.8	546	785	69.5	11.7	5.054	<0.0002
Site of Bite	Lower limb	2963	4772	62.1	3428	4755	72.1	10.0	10.414	<0.0002
	Upper limb	1658	2611	63.5	2071	2842	72.9	9.4	7.434	<0.0002
	Others	240	364	65.9	306	408	75	9.1	5.535	<0.0002
Education	Illiterate	946	1611	58.7	962	1537	62.6	3.9	2.220	0.0264
	Primary	1612	2750	58.6	1473	2361	62.4	3.8	2.747	0.0060
	High school	1318	2115	62.3	2054	2594	79.2	16.9	12.767	<0.0002
	College	1014	1271	79.8	1321	1513	87.3	7.5	5.381	<0.0002
Socio-economic status	I	304	380	80.0	368	448	82.2	2.2	0.786	0.4319
	II	792	1185	66.8	959	1425	67.3	0.5	0.251	0.8018
	III	1488	2332	63.8	2127	2730	77.9	14.1	11.07	<0.0002
	IV	1855	2983	62.2	1926	2610	73.8	11.6	9.254	<0.0002
	V	452	867	52.1	429	792	54.2	2.1	0.821	0.4071
Pet/ Non-pet	Pet	1621	2649	61.2	2333	3074	75.9	14.7	12.000	<0.0002
	Non-pet	3411	5098	66.9	3294	4931	66.8	-0.1	- 0.114	0.9092
Category	II	787	1209	65.1	882	1341	65.8	0.7	0.359	0.7196
	III	4106	6538	62.8	4922	6660	73.9	11.1	13.717	<0.0002

Table 2: Factors associated with increase in compliance to fourth dose after the introduction of telephone reminders

Factors influencing compliance		Before the introduction of telephone reminders			After the introduction of telephone reminders			Percent increase in compliance	Z value	P value
		No. completed	Total No.	Percent	No. completed	Total No.	Percent			
Total		2797	7747	36.1	4353	8005	54.4	18.2	23.030	<0.0002
Age	<15 years	952	2688	35.4	1905	3058	62.3	26.9	20.333	<0.0002
	>15 years	1847	5059	36.5	2449	4947	49.5	13.0	13.13	<0.0002
Sex	Male	1441	4617	31.2	2870	5035	57.0	25.8	25.459	<0.0002
	Female	1355	3130	43.3	1482	2970	49.9	6.6	5.172	<0.0002
Residence	Urban	602	1697	35.5	1104	2033	54.3	18.8	11.495	<0.0002
	Rural	2196	6050	36.3	3249	5972	54.4	18.1	19.941	<0.0002
Occupation	Agriculture	633	1763	35.9	901	1694	53.2	17.3	10.225	<0.0002
	Others	240	655	36.6	381	695	54.8	18.2	6.698	<0.0002
Animal causing exposure	Dog	2700	7499	36.0	4111	7613	54.0	18.0	22.229	<0.0002
	Others	9	22	40.7	187	329	56.9	16.2	1.457	0.1451
Nature of bite	Provoked	1488	4145	35.9	2369	4339	54.6	18.7	17.290	<0.0002
	Unprovoked	1405	3860	36.4	1983	3666	54.1	17.7	15.421	<0.0002
Time since bite	<1 day	413	1116	37.0	903	1641	55.0	18.0	9.298	<0.0002
	1 – 2 days	2036	5686	35.8	3013	5579	54.0	18.2	19.419	<0.0002
	> 2 days	351	945	37.1	436	785	55.6	18.5	7.651	<0.0002
Site of Bite	Lower limb	1704	4772	35.7	2563	4755	53.9	18.2	17.855	<0.0002
	Upper limb	953	2611	36.5	1557	2842	54.8	18.3	13.534	<0.0002
	Others	141	364	38.7	232	408	56.9	18.2	5.031	<0.0002
Education	Illiterate	480	1611	29.8	558	1537	36.3	6.5	3.883	<0.0002
	Primary	888	2750	32.3	1178	2361	49.9	17.6	12.785	<0.0002
	High school	764	2115	36.1	1603	2594	61.8	25.7	17.527	<0.0002
	College	666	1271	52.4	1017	1513	67.2	14.8	7.965	<0.0002
Socio-economic status	I	251	380	66.1	309	448	68.9	2.8	0.895	0.3708
	II	547	1185	46.2	735	1425	51.6	5.4	2.757	0.0058
	III	812	2332	34.8	1550	2730	56.8	22.0	15.608	<0.0002
	IV	993	2983	33.3	1535	2610	58.8	25.5	19.134	<0.0002
	V	194	867	22.4	223	792	28.1	5.7	2.711	0.0067
Pet/ Non-pet	Pet	948	2649	35.8	1783	3074	58	22.2	16.777	<0.0002
	non-pet	1871	5098	36.7	2377	4931	48.2	11.5	11.657	<0.0002
Category	II	468	1209	38.7	552	1341	41.2	2.5	1.263	0.2066
	III	2328	6538	35.6	3796	6660	57.0	21.4	24.636	<0.0002

References

1. Sudarshan MK, Madhusudana SN, Mahendra BJ, Rao NS, Ashwath Narayana DH, Abdul Rahman S et al. Assessing the burden of human rabies in India: Results of a national multicenter epidemiological survey. International Journal of Infectious Diseases 2007; 11: 29-35.
2. World Health Organization. Expert consultation on Rabies. WHO Technical Report Series 982: Geneva: WHO 2013; 37.
3. World Health Organization. India's ongoing war against rabies. Bulletin of the World Health Organization Past issues 2009; 87: 885-964.
4. Satapathy DM, Reddy SSS, Pratap AK, Behera TR, Malini DS, Tripathy RM et al. "Drop out" cases in IDRV: A cause for concern. APCRI journal 2010; 12: 40-1.
5. Suraweera W, Morris SK, Kumar R, Warrell DA, Warrell MJ, Jha P. Deaths from symptomatically identifiable furious rabies in India: a nationally representative mortality survey. PLoS Neglected Tropical Disease 2012: 6 (10): e1847.
6. Kumar A, Pal D. Epidemiology of human rabies cases in Kolkata with its application to post prophylaxis. Indian Journal of Animal Research 2010; 44: 241-7.
7. Mahendra BJ, Harish BR, Vinay M. A Study of Factors influencing compliance to IDRV at Anti-Rabies Clinic of Mandya Institute of Medical Sciences, Mandya. APCRI Journal 2009; 11:18-20.
8. Rosser WW, Hutchison BG, McDowell I, Newell C. Use of reminders to increase compliance with tetanus booster vaccination. CMAJ 1992; 146: 911–917.
9. Sellors J, Pickard L, Mahony JB, Jackson K, Nelligan P, Zimic-Vincetic M et al. Understanding and enhancing compliance with the second dose of hepatitis B vaccine: a cohort analysis and a randomized controlled trial. CMAJ 1997; 157:143-148.
10. Larson B, Bergman J, Heidrich F, Alvin BL, Schneeweiss R. Do Postcard Reminders Improve Influenza Vaccination Compliance? MEDICAL CARE 1982; 20: 639-48.

AUTHOR(S):

1-Dr.Vinay M -Associate Professor, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya, Karnataka, India.

2-Dr.Mahendra BJ - Professor and Head, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya.

3-Dr.Raghini Ranganathan - Post Graduate, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya.

CORRESPONDING AUTHOR:

Dr. Raghini Ranganathan, Post Graduate, Department of Community Medicine, Mandya Institute of Medical Sciences, Mandya, Karnataka, India. Email id – raghinister@gmail.com