

Reprint

ISSN 1997-2571 (Web Version)

# Journal of Innovation & Development Strategy (JIDS)

(*J. Innov. Dev. Strategy*)

---

Volume: 6

Issue: 1

April 2012

---

*J. Innov. Dev. Strategy 6(1):103-111(April 2012)*

**RABIES INFECTION AND TREATMENTS IN BANGLADESH**

M. RAHMAN AND M.L. RAHMAN



**GGF**  
Nature is Power

An International Scientific Research Publisher

Green Global Foundation<sup>©</sup>

Publication and Bibliography Division

100 Leeward Glenway

Apartment # 1601

M3c2z1, Toronto, Canada

E-mails: [publication@ggfagro.com](mailto:publication@ggfagro.com), [editor@ggfagro.com](mailto:editor@ggfagro.com)

[http://ggfagro.com/ejournals/current issues](http://ggfagro.com/ejournals/current%20issues)



JIDS\*\* issn 1997-2571, HQ:19-10 central place, saskatoon, saskatchewan, s7n 2s2, Canada

## RABIES INFECTION AND TREATMENTS IN BANGLADESH

M. RAHMAN<sup>1</sup> AND M.L. RAHMAN<sup>2</sup>

<sup>1</sup>Senior Medical Technologist, Institute of Public Health Mohakhali Dhaka;

<sup>2</sup>Medical Technologist, Institute of Public Health Mohakhali Dhaka.

Corresponding author & address: Matur Rahman, E-mail: matiurmrahman@yahoo.com

Accepted for publication on 21 March 2012

### ABSTRACT

Rahman M, Rahman ML (2012) Rabies infection and treatments in Bangladesh. *J. Innov. Dev. Strategy*. 6(1), 103-111.

Studies were conducted on Rabies Infection and Treatments in Bangladesh with the objectives of knowing the level awareness and knowledge of persons with animal; anti-rabies vaccines available for animal bites; to identify socio-economic status of ARV users; and to obtain data on animal bites, anti rabies treatment. The research was conducted at the Institute of Public Health (IPH) and data were collected using a parameter and treatment guideline on the awareness regarding rabies medicals, socio-demographic information to access, knowledge about concerned animal bites. The results showed that the victims of vaccine needed come from more than 44% IPH as vaccine collector for their own needs. 33% parents came to collect vaccine for their children and 11% relatives of which 54% was of rural farming community. It was observed that 76% of the victims were poor. The vaccine collectors answered that about 59% animals attacked suddenly, 33% animals attacked after provocation and 8% during feeding. About 65% victims came with bite and scratch. After attacked 57% of the victims immediately washed the wound by soap water, 32% took primary treatment and 31% took indigenous treatment. Regarding indigenous treatment they took help of mouth air (jhar-fook), plate treatment (thala-pora), water treatment (pani-pora), molasses treatment (gur-pora), ayurved and others. In terms of other- two victims from Dhaka answered that they eat raw red meat to prevent rabies. Almost half (50%) of the animal bite victims were known about the imported vaccine. The main source of government supply vaccine was from IPH, 93% of the vaccine collectors had chosen the ARV produced in IPH. The knowledge and costs of vaccine collectors showed that more than 85% vaccine collector gave choice for IPH vaccine. It may be recommended from the study that the Rabies treatment in Bangladesh should be more wide specially in rural areas from government supplies of the vaccines. The school students and the agricultural workers including housewife should be oriented for animal bite prevention and understanding the symptoms of mad or infected animals. The results of the study indicate that there is great scope of herbal treatment of ARV in the sub-urban and rural areas implementing the experience of African countries. Primary medical treatment must be emphasized other than traditional and indigenous treatments which can decrease the rabies mortality by up to 31% and the cost of the treatment may be reduced 36%. Extensive orientation and promotion is required for the imported vaccines for the rural people.

**Key words:** anti-rabies, ethno-pharmaceutical, mice model, pv strain, salix subserrata, silene macrosele

### INTRODUCTION

Rabies is a zoonotic disease caused by RNA viruses occurs in worm blooded animals. The incidence of rabies in the developing world is believed to be severely underreported. Most rabies exposures are from bites by unvaccinated dogs. In recent time Bangladesh has made significant development in Health indicators. It is estimated that more than two thousand people die by rabies infected in Bangladesh every year; the second-highest toll in the world from animal bites. As per expert opinion, the actual figure of death from Rabies in Bangladesh may be five times higher than the documented figure. There have no organized systematic data on rabies death and thus a lack of reliable data. Bites from Rabies infected dogs, cats, monkeys and foxes are common in Bangladesh. Most cases occur during the month of August and September, the mating season of dogs. In 1998 an epidemic Rabies occurs in Hatia island of Noakhali district of Bangladesh. From a Hospital record it is estimated that 2000 person's die of Rabies disease in every year and more than 80,000 persons undergo anti-Rabies treatment whose are bitten by suspected rabid animals. Infection Disease Hospital's data shows that the diagnosed Rabid among the attending patients between year 1991-2000 average 100-150. Though the fatality is preventable through right remedies and this is only vaccination, but the records shows the fatal death rate by Rabies virus are remain high, this is because for lack of proper awareness on rabies infection and about needs of rabies vaccine. So far searched, there were found no related study on affected animal bite, management of those vaccine user's views towards the ARV and user's socio-economic status in Bangladesh. There are an estimated 55,000 human deaths annually from rabies worldwide (Abad *et al.* 2000 Appiah 1999), with about 31,000 in Asia (Bangladesh), and 24,000 in Africa (Gebrie *et al.* 2005). Most deaths occur in China, Bangladesh and Pakistan, where rabies is endemic and healthcare is poor. India has reported as having highest rate of human rabies in the world primarily because of stray dogs. In this contest it is essential to know why people prefer the local product rather than the other one. Some of the victims by animal bite or attack took local indigenous treatments.

When a person is affected by a healthy domestic dog, cat, the animal is usually confined for 10 days and observed for signs of rabies prior to initiating post-exposure prophylaxis. The rabies status of an animal also can be determined by testing for antibodies against rabies in its blood or by killing the animal and testing its brain tissue. It is reported that everyday 200-300 persons are arriving at the Institute of public health to collect the ARV without any delay. It is started to distribute the modern cell cultured vaccine freely to the dog bites from Infectious Disease Hospital under the Ministry of Health and Family Welfare of Bangladesh Government. The present research was designed to identify the treatment of animal attack, using pattern of ARV among the

animal affected, socio-economical status of the Anti Rabies Vaccine users and - user's views about the Anti Rabies Vaccine, IPH prepare nerve type vaccines. The specific objectives of this study were to: i. Study the level of awareness and knowledge of persons with animal; ii. Know about the anti-rabies vaccines available for animal bites; iii. Identify socio-economic status of ARV users; and iv. Obtain data on animal bites, anti rabies treatment.

**MATERIALS AND METHODS**

The methods and materials used in the study including the design, population sampling and questionnaire guideline for data collection and analysis are briefly mentioned here.

**Study Design, Population and Sampling:**

Cross-sectional study designed as per guidelines suggested by Debella 2002, and Shayan 2006 and other works done at PCVI section of Institute of Public Health (IPH). It has become eminent to follow Anti Rabies Vaccines (ARV) production and supply within very near future as per need of increasing demand of the concern countries. In all 493 samples collected with the information. There were no restrictions, all the persons who were present to collect the ARV from the IPH and form the out let. The questionnaire guideline used in the studies is mentioned here.

**Data Collection:**

A structured questionnaire as the research instrument was used in data collection. The questionnaire was developed to elicit socio-demographic information to access awareness regarding rabies, knowledge about dog/other animal bites.

**Questionnaire Questions**

1. Vaccine Collector-Patient self/Father/Mother/Brother/Sister/Relative
2. Name of the infected person: Male/Female: Age:
3. Address: -- Upazila----- District-----
4. Education level: Illiterate/ /Primary /SSC/ HSC/ Graduate/ Others
5. Profession of the infected person: Job/business/housewife
6. Family economic status: Solvent/Medium/Poor
7. Types of animal which attacked; Dog/Cat/Fox/Monkey/Rat/others
8. Types of injury /attack: Bite/Scratch/Both
9. Types of the animal; Pet/wild
10. Parts of the body attacked; Leg/Hand/Body/Face/Head/Multi places
11. Any Primary Treatments/ others: Yes/Not
12. Prior knowledge on ARV of IPH: Neighbor/Physician/Health worker/other
13. Idea on Imported Vaccine: Yes/No If yes How: Dr/Health worker/Neighbor)
14. Cause for avoiding of imported vaccine: Costly/Efficacy not known/
15. Ever seen any person with Rabies after vaccinated: Yes/Not
16. Ideas on Rabies Disease: (Fear/Head problem/Cannot drink water/Doglike)

**Data analysis:**

The collected data were analyzed using SPSS with cross interpretation among the variables.

**RESULTS AND DISCUSSION**

The results of the present research are sequentially mentioned here followed by interpretation and discussion the composition of the study sample as analyzed are given here in tabular and graphical forms.

**Patterns of the Vaccine Collectors:**

Victims of vaccine needed come from every corner of the country, as vaccine collector for their own needs, parents came to collect vaccine for their children and relative for there're nearer.

**Living Areas:** The persons who were victimized by the animal bite may be lived in villages, Upazila, District town or in Dhaka City Corporation (DCC).

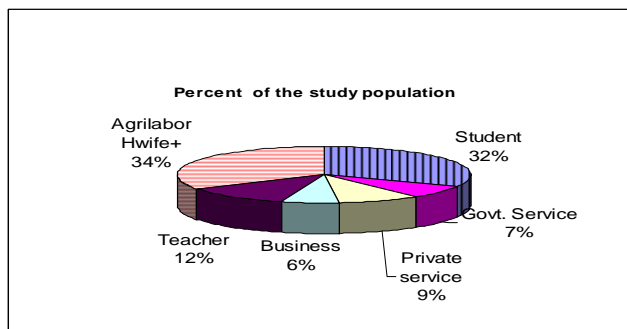


Fig. 1. Occupation of the study population

### Demographic Characteristics of the Respondents:

Out of total respondents (n=493) the majorities were found to be Table-1 male (349) and 144 were female. Male and female ratio was 1:41. Regarding the age structure majority (145) 29% were of 2-10, followed by 11-20 years (106) 22%. The age range of vaccine users varied from 2 years to 100 years with mean 24.89, Standard Deviation was  $\pm 18.249$  years and 51% users were within 20 years.

Table 1. Characteristic of the Respondents

Age group	Victims Gender		Total
	Male	Female	
Up To 5	28	10	38
6-10	79	28	107
11-20	81	25	106
21-30	58	24	82
31-40	43	21	64
41-50	35	18	53
More than 51	25	18	43
Total	349	144	493

By the study on Rabies Post exposure Prophylaxis, it was mentioned that among the patients seeking care for rabies PEP, most were male (Male female ratio 1:49) mean age was 31.5 (median 29, range 0-96) years, patients <15 years of age represented 26%. In the Rabies Survey 2003 by APCRI shows the age range under 14 years 35.1% and sex distribution were 71% were male rest were from female. Gochfeld (2007) reported difference of toxicological aspects as per gender character and with age groups. On client perception towards ARV by Anti-rabies.

### Vaccine Collectors:

Victims of vaccine needed come from every corner of the country and more than 44% (218) come to IPH as vaccine collector for their own needs. 33% (161) parents came to collect vaccine for their children and 11% relatives.

### Living Area of the Respondents:

The persons who were victimized by the animal bite among them majority 54% from rural area, 122 (25%) lived in Dhaka city. In a study by U.S. the respondent's distribution by occupation was more than 50% farmer, agri-labour being about 25%.

### Family Status of the Victims by Means of Economic Condition:

The obtained from the studies on family status of the victims by means of economic condition is given in the Table 2. It was observed that the majority of victims 76 % ( 375) belonging to poor and low income group.

Table 2. Distribution of the Victims by Family Status

Family status	Frequency	Percentage	Cumulative Percent
Solvent	234	47.5	47.5
Roughly solvent	141	28.6	76.1
Financially uneasy	118	23.9	100.0
Total	493	100.0	

Association for Prevention and Control of Rabies in India (APCRI) shows in their study "Assessing burden or rabies in India, May 2004" that majority of the bite victims belonging to poor and low income (75%) group, from middle income it was 16.4% and from the upper income it was 8.1%.

### Animal bite

Amongst 493 animal bite cases, 460 (93%) cases were from dog bite and cat bite was 3% (Fig. 4). About 90% (445) patients came to collect vaccine within 10 day of animal bite. Injury type varied from bite, scratch and both. 25% (121) of the animals were pet and rest was not. About 59% animals attacked the victim suddenly, 33% animals attacked after provocation and 8% during feeding.

### Types of the animal which attacked:

Results given in Fig. 2. Show that in amongst 493 animal bite cases, 93% cases were from dog bite, being only 3% for cat bite.

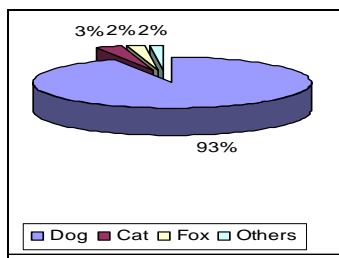


Fig. 2. Type of animal bite

Study on Rabies post exposure prophylaxis, that dogs accounted for 81.2% of all injuries which was found to be similar to the results and summarized findings of) though percentages slightly varied according to the types of biting animals. Another study on Assessing burden or rabies in India, May 2004 by APCRI shows the most common biting animal were dog (91.5%) and majority of them were (62.9%) strays.

**Pet or Wild Animals by their Location and Injuries**

When asked to the vaccine collectors and to the victims about what types the animals were? The major portion said that the animal had not pet 75% and only 25% (121) were pet. APCRI shows their study Assessing burden or rabies in India, May 2004 that a total 1458 pet dog were reported by the respondents from 8500 household with a population of 52,731. It is important to know the types of injury which is direct linked with needs of vaccine or not? Fig 3 show that 86% victims including vaccine collectors complain about Bite, followed by 13% had scratch and only 1% had face both experienced.

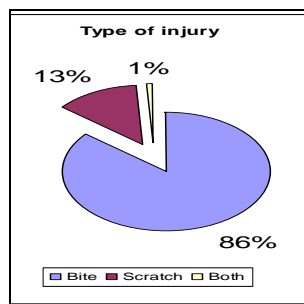


Fig. 3. Distribution of the Victims by their Injury Type

**Time of Vaccine Collection After Affected:**

When asked to the vaccine collectors about time duration when they attracted by the animals about 90% (445) patients (Table-3) came to IPH to collect vaccine within 10 days of animal bite which indicates the knowledge about the rabies infection among the respondents.

Table 3. Distributions of the victims by Time duration (attacking time)

Time	Frequency	Percentage
Within 10 days	445	90.3
More than 10 days	48	9.7
Total	493	100.0

According the study Assessing burden or rabies in India, May 2004 by APCRI shows that 79.1% victims had not taken ARV within 10 days of attacked and within 08 days it was only 4.2% of vaccine collector.

**Causes of Attacked by the Animals:**

The vaccine collectors answered that about 59% animals attacked suddenly, 33% animals attacked after provocation and 8% during feeding (Table-4).

Table 4. Victims as per Causes of Attacked

Attack	Number	Percent
Without provocation	290	58.8
After provocation	163	33.1
During feeding	40	8.1
Total	493	100

**Injury types & Level of Family Income of the Victims:**

Victims with bite & scratch mostly 320 (65%) from the poor and low income level(less than 5000 taka per month (Table-5).

Table 5. Injury Types and Income Group of the Respondents

Group of Income	Injury type			Total
	Bite	Scratch	Both	
Up to 5000	271	45	4	320
5001-10000	121	14	0	135
10001-15000	20	4	0	24
15001-20000	9	1	0	10
20001-25000	1	0	0	1
25001-30000	1	0	0	1
>30001	0	2	0	2
Total	423	66	4	493

In the study of APCRI on assessing rabies burden of Rabies in India shows that the economics status of bite victims 75% from poor and low income.16.4% from middle income and only 8.1% from upper income group.

**Post-bite Treatment**

According answered by the respondents they victimize by the animal in the part of body -Lower extremities of the body were affected by animal bite was 67%, upper extremities were 17%. Immediately after bite 57% patients washed the wound by soap water and 43% patients didn't do anything. 31% patients took primary treatment care and 31% patients took indigenous treatment. Regarding indigenous treatment the patients took help of jhar-fook, thala-pora, pani-pora, gur-pora, ayurved and others.

**Part of the Victim's Body where Animal Attacked:**

Among the total victims lower extremities of the body were affected by animal bite was 67% (Fig. 4), upper extremities were 17%.

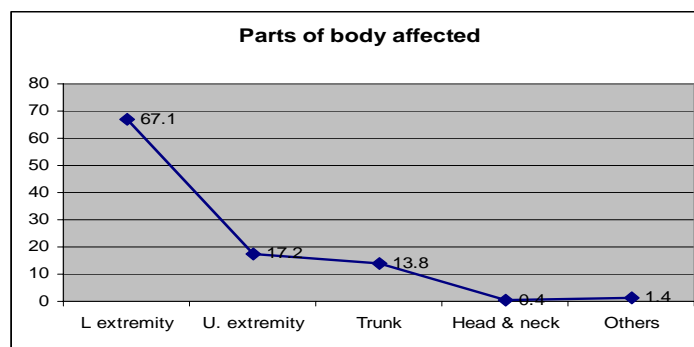


Fig. 4. Distribution of the victims (n-493) Part of Body which attacked

According the study of APCRI among the victims the site of bite was on lower limbs (56.2%) followed by upper limbs (20.9%), hands (17%) and then the head face (11.5%)

**Treatment After Attacked:**

After attacked 57% of the victims immediately washed the wound by soap water and 43% victims didn't do anything (Fig. 5). 32% took primary treatment care and 31% took indigenous treatment. Regarding indigenous treatment they took help of jhar-fook, thala-pora, pani-pora, gur-pora, ayurved and others.

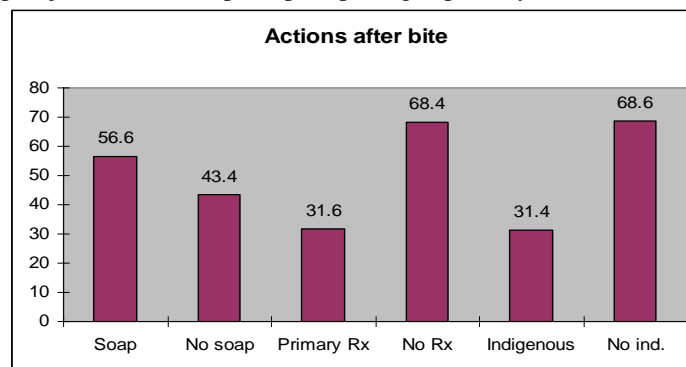


Fig. 5. Treatment after the Bite

According the study of APCRI among the victims only 39.5% of bite victims washed the wounds with soap and water. The use of local applications to wounds was common (36.8%). The indigenous treatment was also

popular (45.3%) and so in the rural areas (47.9%) and more in the rural area and magic-religious (faith healing, witchcraft etc) practice were the most common.

#### Types of Indigenous Treatment:

Regarding indigenous treatment the patients took help of jhar-fook (mouth air), thala-pora (plate treatment), pani-pora (water treatment), gur-pora (molasses) (14%), ayurved and others (Table-6). In terms of other- two victims from Dhaka answered that they eat row red meat to prevent Rabies for three alternate days; two victims from Noakhali District said that they took "MILAM" one type of local fruit to prevent the victim from Rabies.

Table 6. Distribution of the victims (n-493) as types of Traditional treatment

Parameters	Frequency	Percent
Not Taken	338	68.6
Jharfuk	22	4.5
Thala pora	12	2.4
Pani pora	16	3.2
Gur pora	68	13.8
Ayurved	20	4.1
Labon pora	10	2.0
Others	7	1.4
Total	493	100.0

Table 7. Information about ARV of IPH

Known from	Number	Percentage
Neighbors	275	55.8
Physician	113	22.9
Health worker	105	21.3
Total	493	100

According the study of APCRI among the victims only 47.9% took anti rabies vaccination. It was also good to see a predominance of TCV usage 50.1% over NTV usage (46.9%). A slightly higher usage of TCV (52.7%) in rural area may be due to non availability of NTV.

#### Opinion on IPH supplied ARV:

Maximum (84%) vaccine collectors said the IPH supplied vaccine are good only 55 collectors said they had no idea on vaccine (Table-12).

Table 8. Distribution of the vaccine collectors (n-493) Opinion on IPH ARV

Opinion	Frequency	Percentage
Good	414	84.0
No idea	55	11.2
Not applicable	24	4.9
Total	493	100.0

#### Previous knowledge on usurers and reaction from the ARV

About 90% vaccine collectors saw another ARV user near by and who have ever seen ARV reaction which is IPH supplied. Among them 2.6% saw reactions in previous ARV users. They complain about fever, headache, irritating on the injected site. Among the vaccine collectors only 2.0% had reactions in previous ARV users.

Table 9. Distribution of the vaccine collectors (n-493) by previously seen ARV users and any reaction

Ever seen ARV users	Ever seen ARV reaction			Total
	Yes	No	Not applicable	
Yes	12	430	0	442
No	1	3	47	51
Total	13	433	47	493

The case studies conducted and reported by Saxina (2005) Hemachudha et al. (2002). Report that a 56 year old male who developed bilateral neuro-retinitis following three injections of anti-rabies vaccine prepared from the chick embryo. Retroocular neuritis and papillitis following sheep brain anti-rabies vaccine have been reported. The Optic nerve is rarely involved after sheep brain anti-rabies vaccination. Neurological complications are usually seen with sheep brain vaccines but can be rarely seen after chick embryo cell vaccines. The main cause in such cases is presumed to be the antigenic cerebral tissue used in the preparation of sheep brain vaccine. Side

effects from the rabies vaccines currently used in USA are much less than the earlier used vaccine. Side effects are soreness, redness, swelling, itching, nausea, abdominal pain, muscle aches among the 5-40% of the recipients, fever about 6% of recipients.

**Information about Imported (Cell cultured) Vaccine:**

Almost half (50%) of the animal bite victims were known about the imported vaccine. With idea on the foreign vaccine among them 41% got information from neighbors, second highest group 33% got information from the Health workers.

Table 10. Distribution of the vaccine collectors (n-493) who have Knowledge about foreign vaccine

How get information on foreign vaccine	Knowledge about foreign vaccine		Total
	Yes	No	
Doctor	64	0	64
Health worker	80	0	80
Neighbors	101	0	101
Not applicable	0	248	248
Total	245	248	493

A cross sectional study in the Anti-rabies clinic, Department of Community Medicine, MKCG Medical College Hospital, Behramapur shows that all the individuals knew about some form of anti-rabies vaccines, 78.7% knew about NTV, 17.32% about PCEC.

**Choice of vaccine:**

As may seen in the Fig 6 that the main source of government supply vaccine from IPH, 93% of the vaccine collectors (457) had chosen the ARV produced in Institute of Public Health & 36(7%) choice the imported vaccine.

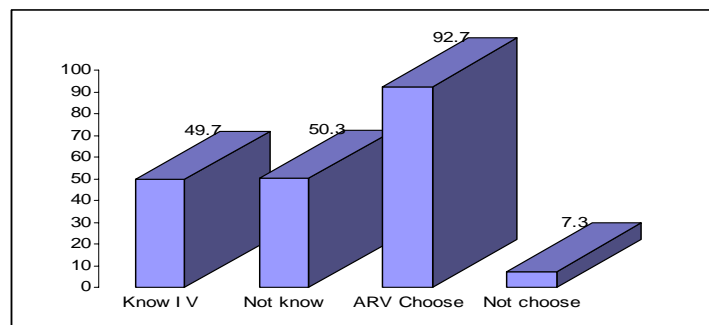


Fig. 6. Vaccine Collector's Choice of Vaccine

In the years 2010 Institute of Public Health supplied 32031 courses Human ARV & for animal 878 courses. According APCRI study in India source of vaccine from government supply for NTV were 87.4%, for TCV 64.5%. From private source for NTV were 8.7% and for TCV 64.5%. In china about 5 million people are estimated to be vaccinated annually. About 0.40 million people continue to receive the sheep brain vaccine despite the fact WHO has recommending for discontinuation. Similar recommendations were also made previously from different research findings (Abebe *et al.* 2003).

**Income Group and Knowledge on Imported Vaccine and Costs:**

The results obtained from the study on the knowledge and costs of vaccine collectors are given in the Tables 11-13. The results show that out of 493 vaccine collector 413 had choice to IPH vaccine whose income level up to or less than 10,000 taka.

Table 11. Vaccine collectors' income and knowledge on foreign vaccine

Income group	Choice of Vaccine		Total
	IPH ARV	Import	
up to 5000	298	22	320
5001-10000	125	10	135
10001-15000	22	2	24
15001-20000	9	1	10
20001-25000	1	0	1
25001-30000	1	0	1
>30001	1	1	2
Total	457	36	493



According to the study by APCRI the knowledge about different types of ARVs, was higher in literates, persons from higher socio-economic strata (SES) and in persons from urban areas. Knowledge about the foreign vaccine had no effect to collect the vaccine, respondents (245) had knowledge about the imported vaccine among them 210 persons collect the IPH vaccine. Similar results were also reported by Sudarshan *et al.* (2004) and Deressa *et al.* (2010) from different countries including Brazil and Ethiopia.

#### **Causes for Avoiding Foreign Vaccine:**

Among the respondents who had an idea on foreign vaccine on them about 219 (89%) of patients didn't choose imported vaccine due to its price.

Table 12. Vaccine collectors' view on causes on knowledge about foreign vaccine

Knowledge about foreign vaccine	Choice of Vaccine		Total
	IPH ARV	Import	
Yes	210	35	245
No	247	1	248
Total	457	36	493

Table 13. Vaccine collectors' view on causes for avoiding foreign vaccine

Causes of avoid	Frequency	Percent
Costly	219	89.39
Efficiency not known	26	10.61
Total	245	100.0

Study in the Anti-rabies clinic, Department of Community Medicine, MKCG Medical College Hospital, Berahmapur shows that all the individuals knew about some form of anti-rabies vaccines, 78.7% knew about NTV, 17.32% about PCEC.

According to the Vaccination Hoax-All vaccinations have side effects, some short term and some long term. A vaccinated person is more likely to get a disease than a non-vaccinated person. The whole theory of vaccination is flawed. It causes a weakening of the immune system thus making those who are inoculated more susceptible to disease. Dead and potentially dangerous anti-rabies vaccines are in circulation in most parts of Kenya despite several notifications to the government by the pharmaceutical industry. According to a source at Ranbaxy Laboratories Ltd., in Nairobi, they are not aware of the said Verorab rabies vaccine that is selling in the local market carrying their name. "Ranbaxy does not market any vaccines on behalf of Aventis and specifically Verorab as mentioned in Kenya.

#### **Cause of Biting and Time of Vaccine Collection after Biting:**

When any person attracted by the animals of them about 90% (445) came to IPH to collect vaccine within 10 days of animal bite which indicates the knowledge about the rabies infection among the respondents.

#### **Causes of Attacked by the Animals:**

About 59% animals attacked suddenly, 33% animals attacked after provocation and 8% during feeding.

#### **Injury Types and Level of Family Income:**

Victims with bite and scratch mostly 320 (65%) from the poor and low income level (less than 5000 taka per month). According to the respondents they were victimized by the animal in the part of the body -Lower extremities of the body were affected by animal bite was 67%, upper extremities were 17%. Immediately after bite 57% patients washed the wound by soap water and 43% patients didn't do anything. 31% patients took primary treatment care and 31% patients took indigenous treatment. Regarding indigenous treatment the patients took help of jhar-fook, thala-pora, pani-pora, gur-pora, ayurved and others.

#### **CONCLUSION**

It may be concluded from the study conducted on rabies infection and treatments in Bangladesh that an effective Anti-Rabies Vaccine (ARV) supply system should be established by IPH in order to reduce the suffering mortality of victims. Because, the victims of vaccine needed come from more than 44% to IPH as vaccine collector for their own needs of which 54% was of rural poor farming community. Awareness campaign should be conducted with the vulnerable on first-aid treatment followed by scientific care.

The vulnerable should be oriented for animal bite prevention and understand the initial symptoms of the disease. It may be concluded that there is great scope of herbal treatment of ARV in the country. Primary medical treatment must be emphasized other than traditional which can decrease the rabies problem significantly.

## REFERENCES

- Abad MJ, Guerra A, Bermejo P, Irurzun A, Carrasco L (2000) Search for Antiviral Activity in Higher Plant Extracts. *J. Phytother.*, 14, 604-607.
- Abebe D, Debella A, Urge K (2003) Medicinal plants and other useful plants of Ethiopia, 1st edition, Camerapix publishers International, Nairobi, Kenya, pp. 1-275.
- Appiah KA, Gates HL, Africana (1999) The Encyclopedia of the African and African American experience. New York: Basic Cirtasd Books P 24-53.
- .Shayan. AK. Duggal. Ulka, Kamble, A.K.Agarwal; JICM.2006:7(1), 39-46.
- Debella A (2002) Manual for Phytochemical Screening of Medicinal Plants. Ethiopian Health and Nutrition Research Institute, Addis Ababa, Ethiopia, pp. 1-84.
- Deressa A (2010) Ethiop, Zologic Basis of Drug Vet. J. 14(2), 1-16.
- Gazzaneo LRS, Lucena RFP, Albuquerque UP (2005) Knowledge and use of medicinal plants by local specialists in an region of Atlantic Forest in the state of Pernambuco (Northeastern Brazil). *Journal of Ethnobiology and Ethnomedicine* 2005, 1:9. The Merck Manual, 11th edition, p.183.
- Gebrie E, Mekonnen E, Debella A, Zerihun L (2005) Phytochemical Screening and Pharmacological Evaluations for the antifertility effect of the methanolic root extract of *Rumex steudelii*. *J. ethnopharmacol.*, 96, 139-143.
- Gochfeld M (2007) Framework for gender differences in human and animal toxicology. *Environ. Res.*104, 4–21.
- Hemachudha T, Loathamatas J, Rupprecht CE (2002) Human Rabies: a disease of complex neuropathogenetic mechanisms and diagnostic challenges. *Lan. Neurol.* 1, 101-109. *J. Ethnobiol. Ethnomedicine* 3, p 24.
- Saxina R (2005) AIIMS publication, India 18, The Vaccination Hoax//[www. whale.to/b/hoax1.html](http://www.whale.to/b/hoax1.html)
- Sudarshan MK (2004) Assessing the Burden of Rabies in India Report of the Association for Prevention, Control Rabies in India (APCRI) WHO multi-centric rabies survey, p19-31.