WEEKLY EPIDEMIOLOGICAL REPORT

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Ministry of Health

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Rabies (Part I)

This is the first in a series of two articles on Rabies.

Introduction

Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. The disease affects domestic and wild animals and is spread to people through close contact with infectious material, usually saliva, via bites or scratches. Once symptoms of the disease develop, rabies is fatal to both animals and humans. [1]

Epidemiology of Rabies

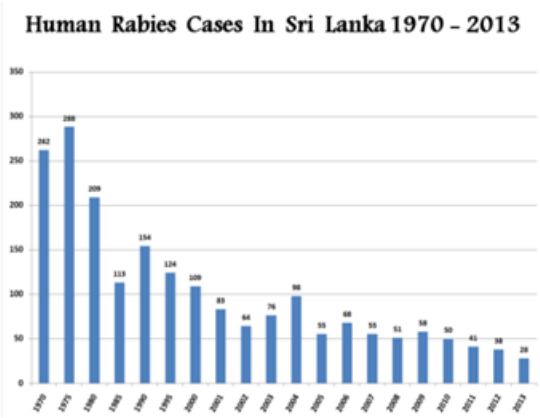
Rabies is present in almost all continents but more than 95% of human deaths occur in Asia and Africa. It was found that more than 60,000 people die of rabies every year in these two continents and epidemiological data suggest that 40% of people who are bitten by suspect rabid animals are children under 15 years of age. [1]

More than 100 countries report cases of rabies in dogs putting people at risk. Vaccinating at least 70% of the dog population is expected to breaks the cycle of transmission among dogs and to humans. Safe, efficacious and affordable dog rabies vaccines are available and countries embarking on rabies elimination need quality-assured dog vaccines and properly planned vaccination campaigns. [1]

Situation in Sri Lanka

Sri Lanka has reported an incidence of 1.4 per 100,000 cases of rabies in 2013. Animal bites requiring anti-rabies post-exposure treatment (PET) is very high in Sri Lanka and Medical supplies division reported that 317,772 Human Rabies Vaccine Vials (1ml) were issued in the year 2013 (1551 per 100,000 population) and the requirement ranged from 745 vials per 100,000 population in Polonnaruwa to 8549 vials per 100,000 population in Kilinochchi showing a marked inter district variation.

According to the data from the Medical Research Institute (MRI), dogs are the main reservoir and transmitter of rabies in Sri Lanka. The positivity among the dog heads tested for rabies at the MRI in year 2013 was 68% (664 dog heads were positive out of 973 tested) while the positivity among cat heads were 21% (77 out of 370 tested). Out of 11 cow heads tested, 9 became positive for rabies resulting in positivity rate of 82%. Bat rabies has not been reported in the country.



The incidence of human rabies deaths in Sri Lanka has decreased with the establishment of the rabies control program in the year 1975. The main possible factors which could be responsible for this reduction are the availability of modern Post Exposure Treatment (PET), successful public awareness programmes which lead to behavioural change in people leading to attend medical care following animal bites, improved health care facilities, better disease surveillance system and improved laboratory based diagnosis of the disease. The dog rabies control measures implemented by the Public Health Veterinary Service (PHVS) have also contributed to this reduction in human rabies deaths. These measures include mass dog vaccination and dog population control. [2]

However, the reduction in human rabies deaths has masked the simultaneous and increasingly

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high economic burden due to the direct and indirect costs of PEP. The annual cost to the Ministry of Health to provide rabies PEP is significantly high, thus human rabies still remains a significant public health problem in Sri Lanka. [2]

Rabies Virus

The rabies virus is the type species of the Lyssavirusgenus, in the family Rhabdoviridae. It is enveloped and has a single-stranded RNA genome with negative sense. Once within a muscle or nerve cell, the virus undergoes replication. From the point of entry, the virus is neurotropic (preferentially infect nerve cells), traveling quickly along the neural pathways into the Central Nervous System (CNS).

The virus usually first infects muscle cells close to the site of infection, where they are able to replicate without being 'noticed' by the hosts immune system. It then travels through the nerve cell axon towards the CNS, replicating in motor neurons and eventually reaching the brain. After the brain is infected, the virus travels centrifugally to the peripheral and autonomic nervous systems, eventually migrating to the salivary glands, where it is ready to be transmitted to the next host. [1]

Symptoms and Signs of the Disease

The period between infection and the first flu-like symptoms is typically 2 to 12 weeks in humans. Incubation periods as short as four days and longer as six years have been documented, depending on the location and severity of the inoculating wound and the amount of virus introduced. The initial symptoms of rabies are fever and often pain or an unusual or unexplained tingling, pricking or burning sensation (paraesthesia) at the wound site. Death almost always occurs 2 to 10 days after first symptoms. Survival is rare once symptoms have presented, even with the administration of proper and intensive care. [1]

Two forms of the disease can follow.

- **Furious Rabies**

People with furious rabies exhibit signs of hyperactivity, excited behaviour, hydrophobia and sometimes aerophobia. After a few days, death occurs by cardio-respiratory arrest. Furious rabies usually affects majority (70% - 80%) of the infected people. [1]

Hydrophobia : Hydrophobia ("fear of water") refers to a set of symptoms in the later stages of an infection in which the person has difficulty in swallowing, shows panic when presented with liquids to drink, and can't quench his or her thirst. All mammals infected with the virus who develop furious rabies may demonstrate hydrophobia. Saliva production is greatly increased, and attempts to drink, or even the intention or suggestion of drinking may cause excruciatingly painful spasms of the muscles in the throat and larynx. This can be attributed to the fact that the virus multiplies and assimilates in the salivary glands of the infected animal for the purpose of further transmission through biting and the infected animal's ability to transmit the virus will reduce significantly if he can swallow his saliva with/without external source of water. [1]

- **Paralytic Rabies**

Paralytic rabies accounts for about 30% of the total number of human cases. This form of rabies runs a less dramatic and usually longer course than the furious form. The muscles gradually become paralyzed, starting at the site of the bite or scratch. A coma slowly develops, and eventually death occurs. The paralytic form of rabies is often misdiagnosed, contributing to the under-reporting of the disease. [1]

Rabies in Animals

Three stages of rabies are recognized in dogs. The first stage is a one- to three-day period characterized by behavioral changes and is known as the prodromal stage.

The second stage is the excitative stage, which lasts for three to four days. It is this stage that is often known as furious rabies due to the tendency of the affected dog to be hyper-reactive to external stimuli and bite at anything near.

The third stage is the paralytic stage and is caused by damage to motor neurons. Inco-ordination is seen due to rear limb paralysis and drooling can be seen. Death is usually caused by respiratory arrest. [4]

Diagnosis

No test is available to diagnose rabies infection in humans before the onset of clinical disease and unless the rabies-specific signs of hydrophobia or aerophobia are present, the clinical diagnosis may be difficult. The reference method for diagnosing rabies is the Fluorescent Antibody Test (FAT), which is recommended by the World Health Organization (WHO). The FAT relies on visualization of rabies antigen by fluorescent microscopy techniques. The diagnosis can be made by detecting the whole virus, viral antigens, viral-specific antibodies in the cerebrospinal fluid, or nucleic acids in infected tissues (brain, skin, urine or saliva). Rabies can be reliably diagnosed from brain samples taken after death. Cerebral inclusion bodies (called Negri bodies) are 100% diagnostic for rabies infection but are found in only about 80% of cases. [1]

Transmission of the Disease

People are usually infected following a deep bite or scratch by an infected animal. Dogs are the main host and transmitter of rabies. They are the source of infection in most of the human rabies deaths reported in Asia and Africa. Bats are the source of most human rabies deaths in the Americas and bat rabies has also emerged as a public health threat in Australia and Western Europe recently. Human deaths following exposure to foxes, raccoons, skunks, jackals, mongooses and other wild carnivore host species are very rare.

Transmission can also occur when infectious material – usually saliva – comes into direct contact with human mucosa or fresh skin wounds. Human-to-human transmission by bite is theoretically possible but has never been confirmed. Changes in the environment and close human contact with wildlife can lead to increased human exposure to rabies-infected wildlife species. Rarely, rabies may be contracted by inhalation of virus-containing aerosol or via transplantation of an infected organ. Ingestion of raw meat or other tissues from animals infected with rabies is not a source of human infection. [1]

Compiled by Dr. H. A. Shanika Rasanjalee and Dr. A. Liyanapathirana of the Epidemiology Unit

to be continued

Table 1: Selected notifiable diseases reported by Medical Officers of Healt 06th – 12th Sep 2014 (37th Week)

RDHS Division	Dengue Fever		Dysentery		Encephalitis		Enteric Fever		Food Poisoning		Leptospirosis		Typhus Fever		Viral Hepatitis		Human Rabies		Chickenpox		Meningitis		Leishmaniasis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	147	10205	4	110	0	10	5	78	0	169	3	105	0	2	1	34	0	0	3	328	1	48	0	3	**88**	**13**
Gampaha	78	5136	1	108	0	9	0	32	0	22	18	164	2	14	7	183	0	5	2	232	0	50	0	2	**60**	**40**
Kalutara	30	2016	0	127	0	6	2	41	0	59	7	195	0	2	2	13	0	1	3	191	0	60	0	0	**92**	**8**
Kandy	46	1164	0	75	0	4	1	19	0	16	0	33	1	68	5	121	0	1	1	154	0	20	0	4	**91**	**9**
Matale	4	341	1	51	0	2	0	15	0	17	1	31	0	2	0	114	0	1	1	43	0	41	0	26	**69**	**31**
NuwaraEliya	3	220	3	200	0	3	1	16	1	69	2	20	0	53	0	27	0	0	0	93	0	23	0	0	**92**	**8**
Galle	10	742	2	85	0	4	1	6	1	33	2	126	0	70	0	5	0	0	2	327	2	36	0	3	**30**	**70**
Hambantota	6	502	0	38	0	4	0	10	0	13	1	70	4	59	0	15	0	0	4	118	0	39	4	261	**92**	**8**
Matara	19	424	2	80	0	4	0	21	0	18	1	59	4	41	1	29	0	0	0	141	1	26	0	65	**100**	**0**
Jaffna	27	845	16	357	0	7	2	168	2	54	0	7	1	266	0	8	0	0	1	116	6	38	0	1	**100**	**0**
Kilinochchi	0	43	0	71	0	1	0	21	0	0	0	1	0	18	0	0	0	0	0	14	0	6	0	10	**25**	**75**
Mannar	0	55	0	29	0	10	0	34	0	9	0	4	0	24	0	1	0	0	0	10	0	6	0	3	**60**	**40**
Vavuniya	1	103	4	35	0	1	0	25	1	21	0	9	0	5	0	5	0	0	1	11	0	13	0	2	**100**	**0**
Mullaitivu	1	81	0	46	0	0	1	10	0	17	0	8	0	11	0	0	0	1	0	5	0	5	0	7	**100**	**0**
Batticaloa	2	653	10	218	0	3	3	27	0	30	0	14	0	2	0	7	0	1	2	46	0	6	0	0	**86**	**14**
Ampara	0	123	2	55	0	1	0	2	2	10	0	15	0	12	0	4	0	1	0	80	0	8	0	9	**100**	**0**
Trincomalee	5	493	0	36	0	1	0	2	0	5	0	16	0	18	0	2	0	0	0	82	0	12	0	5	**92**	**8**
Kurunegala	32	1461	1	102	1	25	0	16	1	23	1	71	1	40	1	39	0	1	5	331	1	63	2	107	**85**	**15**
Puttalam	9	503	1	56	0	2	0	11	0	10	0	58	0	20	0	3	0	3	1	71	0	20	0	6	**62**	**38**
Anuradhapura	7	406	4	111	1	4	0	3	0	33	0	80	0	27	0	10	0	0	5	182	0	41	3	303	**79**	**21**
Polonnaruwa	8	408	2	34	0	4	0	6	1	1	0	57	0	6	0	6	0	0	2	128	2	23	0	98	**86**	**14**
Badulla	18	481	4	117	0	9	0	10	0	6	0	43	3	80	4	115	0	0	2	58	5	98	0	0	**82**	**18**
Monaragala	3	211	0	43	0	4	0	6	0	33	0	62	3	139	2	99	0	2	1	66	0	17	0	26	**82**	**18**
Ratnapura	14	2322	0	181	0	20	0	22	0	26	2	263	2	81	5	332	0	1	0	161	2	37	1	26	**67**	**33**
Kegalle	16	1257	1	89	0	9	0	31	0	34	1	129	0	47	8	179	0	0	2	208	2	61	0	2	**73**	**27**
Kalmune	0	125	4	96	0	1	1	6	1	69	0	1	0	0	0	0	0	0	0	86	0	7	0	0	**62**	**38**
SRILANKA	**486**	**30325**	**62**	**2550**	**2**	**148**	**17**	**638**	**10**	**797**	**39**	**1641**	**21**	**1107**	**36**	**1351**	**0**	**18**	**38**	**3282**	**22**	**804**	**10**	**969**	**79**	**21**

Source: Weekly Returns of Communicable Diseases (WRCD).

*T=Timeliness refers to returns received on or before 12th September , 2014 Total number of reporting units 337 Number of reporting units data provided for the current week: 269 C**-Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

06th – 12th Sep 2014 (37th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2014	Number of cases during same week in 2013	Total number of cases to date in 2014	Total number of cases to date in 2013	Difference between the number of cases to date in 2013& 2014
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	01	00	00	00	00	00	00	01	06	61	66	-7.6%
Diphtheria	00	00	00	00	00	00	00	00	00	00	-	00	-	%
Mumps	01	00	01	01	00	00	01	00	00	04	25	524	1158	-54.8%
Measles	25	03	07	00	01	01	01	00	02	40	104	2628	2605	+0.9%
Rubella	00	00	00	00	00	00	00	00	00	00	01	15	23	-34.8%
CRS**	00	00	00	00	00	00	00	00	00	00	00	04	06	-33.3%
Tetanus	00	00	00	00	00	00	00	00	00	00	00	11	16	-31.2%
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	%
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	00	22	66	-66.6%
Whooping Cough	01	00	01	00	01	00	01	00	00	04	02	44	64	-31.2%
Tuberculosis	55	15	16	12	01	01	07	20	15	142	103	6910	5895	+17.2%

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS** =Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them

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Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

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