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Research Article

Perception about Rabies and its Pre-exposure Prophylaxis among the Staff of Government Veterinary Hospital of Berhampur - A Qualitative Study

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I N F O

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A B S T R A C T

Background: Rabies is a vaccine-preventable, zoonotic disease. Animal-related injuries, especially dog and cat bites, have been identified by researchers as important hazards in the veterinary profession.

Objectives: To explore the knowledge and perception of rabies and its pre-exposure prophylaxis among the staff of the Government Veterinary Hospital, Berhampur.

Methodology: It is a qualitative study conducted on the staff of the Government Veterinary Hospital of Berhampur who were interviewed using a pre-designed pre-tested interview schedule till data saturation. The in-depth interviews were recorded using voice recorders, transcribed verbatim, and translated into the English language. Inductive coding was done after careful reading of the transcripts. Codes eventually led to sub-themes and theme generation. The data were analyzed using Atlas.ti version 7.

Results: The knowledge about rabies varied with different staff positions. A few did not have adequate knowledge about rabies. Some people still took harmful measures in case of animal bites. All of them perceived that rabies is fatal and yet vaccine-preventable. There were various misconceptions prevalent about pre-exposure prophylaxis.

Conclusion: The findings indicated that there are many lacunae in knowledge and perception about rabies among veterinary staff. With proper supportive activities and campaigns about animal vaccination and pre-exposure prophylaxis for humans, we can gear toward the goal of "Zero dog-mediated rabies deaths by 2030".

Keywords: Rabies, Qualitative, Vaccine, Pre-exposure Prophylaxis, Veterinary

Introduction

Neglected Tropical Diseases (NTDs) are a cluster of communicable diseases that affect impoverished groups of low- and middle-income countries. As per World Health Organization (WHO), Neglected Tropical Diseases (NTDs) affect over a billion people globally, especially in tropical areas.[1] As such they cause significant economic and social strain on affected countries. India shares the largest burden of at least 11 of these 20 NTDs.[2] Rabies is included in the list of NTDs and is a viral infection primarily caused by the bite of infected species belonging to the mammalian order Carnivora.

Rabies is a zoonotic disease. Despite being a vaccine-preventable disease, it causes about 59,000 deaths all over the world per year.[3] It is virtually 100% fatal once clinical symptoms appear. In as much as 99% of cases, domesticated dogs are accountable for rabies virus transmission to humans. In India, every year, dog-mediated rabies kills tens of thousands of humans. This represents one-third of the total global rabies burden. Rabies affects wild as well as domestic animals. It is spread usually via saliva and scratches or bites of the infected animal. Depending on factors like viral load and location of virus entry, the incubation period for rabies may range from 1 week to 1 year. Initial symptoms include fever with pain, burning or pricking sensation, and unexplained tingling at the site of the wound. With the spread of the virus from the site of the bite to the central nervous system, progressively fatal spinal cord and brain inflammation develop. Human rabies can be prevented by post-exposure prophylaxis or by canine vaccination causing the elimination of rabies at its source.[4]

Even though effective human vaccines and immunoglobulins for rabies are present, lack of availability or inaccessibility acts as a barrier to reaching those in need. More than 29 million people globally receive a post-bite vaccination every year. It is estimated that this measure prevents hundreds of deaths due to rabies annually. The same vaccine is used to immunize individuals before exposure to rabies in high-risk populations. In the year 2010, World Health Organization (WHO) published a position paper on rabies vaccines. It stressed the importance of research on the effect of including cell culture or embryonated eggs derived vaccines in immunization programs for children in terms of cost-effectiveness and feasibility, in areas where canine rabies is a major public health problem.[5] It also recommended increased frequency of booster vaccinations, pre-exposure prophylaxis regimens, as well as serological surveillance for individuals who might be at risk of contracting rabies. These people include individuals who work closely with both domesticated and wild animals that may be infected such as veterinarians, animal disease control staff, and wildlife rangers.[6]

Pre-exposure prophylaxis might also offer additional safety if post-exposure prophylaxis is delayed or if the individual is not aware of the rabies exposure. It decreases the number of post-exposure doses of vaccine needed and the need for rabies immunoglobulin.

Rationale

India shares 35% of global rabies deaths, higher than any country being the most populated country in the world.[3]

Veterinarians are at high risk of contracting zoonotic infections, and this depends on certain environmental conditions such as the prevalence of infections in animals, risk of transmission, or other factors such as the use of personal protection equipment or knowledge regarding zoonotic infections. Evidently, many zoonotic diseases that pose a potential risk to veterinarians are not endemic to India or have been previously eradicated or occur in such low prevalence that transmission is low. Animal-related injuries, particularly cat and dog bites, are important hazards for veterinary professionals in India,[7] but the risk of rabies has not been studied for veterinarians working in Behrampur, Odisha.

Therefore, it is important to explore their knowledge and understand their attitude and practices regarding rabies and pre-exposure prophylaxis.

Objectives

1. To describe the socio-demographic profile of the people working in the Veterinary Clinic
2. To explore their knowledge regarding rabies and its pre-exposure prophylaxis
3. To understand their attitude and practice regarding animal bites and pre-exposure prophylaxis of rabies

Material and Methods

It is a qualitative study conducted from the month of May to August 2022 among the staff of the Government Veterinary Hospital of Berhampur. Ethical approval was obtained from MKCG Medical College Ethics Committee. Purposive sampling was done. Eleven participants were selected from individuals who were working in the Government Veterinary Hospital in Berhampur.

The inclusion criteria were:

1. Staff of the Government Veterinary Hospital
2. Those who directly or indirectly come in contact with animals

The exclusion criteria were:

1. Staff who could not understand English, Hindi, or Odia language
2. Those who were not available after 5 visits
3. Those who did not give consent for the study

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Written informed consent was obtained from all participants after a thorough orientation of staff about the study. They were invited to participate and assured of anonymity and confidentiality. In-depth interviews were conducted to explore their knowledge regarding rabies and pre-exposure prophylaxis. The staff was interviewed one by one by the first author in a private room in the clinic using a narrative style. Interviews were conducted using a pre-designed pre-tested interview schedule with appropriate probes till data saturation. Probes were used along with an interview guide to get a better understanding. Each interview lasted for approximately 20-30 min. The in-depth interviews were recorded using voice recorders. The audio recordings were transcribed verbatim after which they were translated by an English translator. The material was evaluated by the first author as being saturated after interviewing 11 participants. Inductive coding was done after carefully reading the transcripts. The most frequently appearing codes were found out by the code cloud (Figure 1). This helped in narrowing down the themes. The data were analyzed using Atlas.ti version 7 in the Department of Community Medicine, MKCG Medical College and Hospital, Berhampur.

Results

A total of 11 participant interviews were conducted. Table 1 shows the demographic characteristics of the people working in the veterinary clinic. The majority (90.0%) of people were male, aged between 41 and 60 years of age (63.6%), at least graduated (72.8%), and working for more than 10 years (54.5%). Based on these demographic profiles, we considered the sample to have an adequate representation of different disciplines in a veterinary clinic.

Table 2 summarizes the aspects of their understanding, viewpoint, and application of rabies and its pre-exposure prophylaxis.

The veterinarians discussed the different aspects of rabies including its mode of transmission, symptoms in animals and humans, high-risk population, bite wound classification and primary wound management, its prevention, cure, safety precautions to be taken while handling animals, animal vaccination, and its pre, and post-exposure prophylaxis (Figure 2).

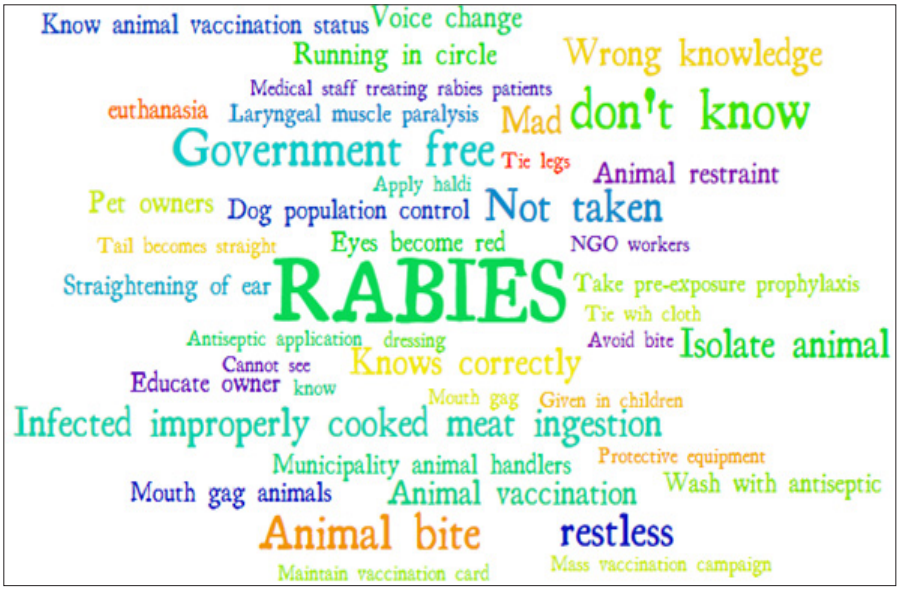

Figure 1.Code Cloud based on the Frequency of Different Codes

Table 1.Sociodemographic Profile of Participants

Characteristics	Number	Percentage
Age (years)		
20-30	2	18.18
31-40	2	18.18
41-50	4	36.36
51-60	3	27.27
Gender		
Male	10	90.90
Female	1	9.09

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Educational Qualification		
Secondary	3	27.27
Graduate	5	45.45
Postgraduate	3	27.27
Designation		
Specialist veterinary doctor	3	27.27
Peon	2	18.18
Livestock inspector	2	18.18
Attendant	4	36.36
Experience (years)		
0-5	2	18.18
5-10	3	27.27
10-15	1	9.09
15-20	2	18.18
> 20	3	27.27

Table 2.Themes, Sub-themes, Corresponding Codes, and Frequencies

Themes	Sub-themes	Codes	Frequency
1. Perception of rabies	Modes of transmission of rabies	Animal bite, scratch and contact with saliva	10
		Human-to-human transmission occurs theoretically	7
		No human-to-human transmission	4
		Infected improperly cooked meat ingestion	7
		No transmission by infected meat ingestion	4
		Don't know	1
	Symptoms of rabies in animals and humans	Laryngeal muscle paralysis	2
		Aggressive behaviour, restless	9
		Mad	6
		Eyes become red	3
		Running in circle	4
		Voice change	4
		Straightening of ear	3
		Cannot see	1
		Tail becomes straight	1
		Increased salivation	7
		Don't know	2
	High-risk population	Veterinary staff	9
		NGO workers	1
		Municipality animal handlers	3
		Medical staff treating rabies patients	1
		Pet owners	4
		Don't know	1
	Animal bite wound classification	Know correctly	2
		Wrong knowledge	6
		Don't know	3

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	Primary wound management	Wash with antiseptic	3
		Wash with soap and water	7
		Antiseptic and antibiotic application	7
		Stitch after prophylaxis if the wound is deep	8
		Tie with cloth	1
		Apply haldi	1
		Dressing	1
	Cure and prevention of rabies	No cure is available yet	11
		Preventable by vaccination	11
	Safety precautions while animal handling	Know the vaccination status of the animal	3
		Tie legs with rope or string	2
		Keep gag in mouth	3
		Animal vaccination	5
		Restrain the animal	1
	Safety while handling rabid animals	Educate the owner about rabies symptoms	2
		Isolate the animal	7
		Avoid getting bitten or scratched by it	1
		Keep gag in mouth	1
		Restrain the animal	1
		Take pre-exposure prophylaxis	2
		Wear protective equipment	1
		Euthanasia	3
		Don't know	1
	What more can be done by the government?	Educate about animal vaccination	1
		Conduction of mass vaccination campaign	1
		Stray dog population control	3
		Don't know	3
	What more can be done at the individual level?	Animal and human vaccination	1
		Avoid suspected rabid animal	1
2. Perception about prophylaxis	Vaccination of wild animals and strays	Not given as no one brings them	5
		Given when someone or municipality workers bring them	4
	Vaccination of pet animals	Provided free of cost by the government	9
		Some have to be purchased from private shops when not made available by the government	6
		Maintain vaccination card	4
	Pre-exposure prophylaxis of rabies	Taken free of cost from the government	1
		Taken from private	2
		Not taken	6
		Given in children so not taken	1
		Don't know about it	3

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	Post-exposure prophylaxis	Taken free of cost from the government	5
		Taken from private	2
		Not taken	3

Figure 2.Different Code Families

Mode of Transmission

Most people knew the correct transmission mode of rabies while one did not know anything about it.

"If the animal bites you or licks any open wound, then rabies can be transmitted to human beings through that saliva. If you have an injury and it comes with contact with blood or any bodily fluid of a rabid animal, then you can also have rabies." [Interview_2]

"When a rabid dog bites a specific region, the virus gets transmitted to the peripheral nerve route from where it is carried to the central nervous system. The incubation period of rabies is uncertain because the virus multiplies. Once it enters the peripheral nerve route, it will pass on to the central nervous system and affect the person". [Interview_8]

They also shared some correct knowledge on human-to-human transmission of rabies.

"It is theoretically possible according to books but no case of human-to-human transmission has been recorded yet." [Interview_1]

Almost all of them were of the opinion that rabies cannot be transmitted through ingestion of infected, improperly cooked animal meat while one person had quite a different outlook.

"If there is an abrasion in the oral mucosa and the infected meat comes in contact with the abrasion, rabies might be transmitted." [Interview_8]

They spoke of 4 key animals being the frequent transmitter of rabies which included dogs, cats, monkeys and jackals. Other animals included bats, foxes, and hyenas. Among

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those, dogs and cats were identified as the most common sources of human rabies.

Symptoms of Rabies

The majority of people were aware of the correct symptoms of rabies in animals whereas, some had wrong ideas.

Some of them knew about the correct symptoms of rabies in human beings while a few of them had wrong knowledge and some of them did not know anything about it.

Many of them knew correctly about hydrophobia while none of them had any correct knowledge about aerophobia.

"There are symptoms of salivation and aggressiveness. There are usually two stages, the dormant stage and the furious stage. In the dormant stage, the animal will not take food. There will be drooling of saliva and redness of the eyes. The symptoms vary from species to species too. The symptoms will be different for dogs and cattle. The drooling of saliva etc. is seen in the furious stage; the dog becomes aggressive and tries to bite dogs or animals or human beings which is followed by paralysis, especially laryngeal muscle paralysis." [Interview_8]

"If a human being has rabies, he will not touch water at all. He will be afraid as soon as he sees water." [Interview_4]

"Hydrophobia and aggressive behaviour are the symptoms of rabies in human beings." [Interview_1]

High-risk Population

10 out of 11 people had a correct idea about the high-risk population of rabies while one did not know anything about it. People who are usually handling animals very frequently like those working in veterinary clinics, pet owners, and animal handlers were identified to be at the highest risk. People associated with different NGOs who work with animals were also considered to have a higher risk of contracting rabies.

"Those who come in contact with animals more like pet keepers, veterinary doctors and animal handlers are at increased risk of contracting rabies." [Interview_3]

Bite Wound Classification and Primary Wound Management

Only a few of them knew the correct classification of an animal bite wound. Most of them had wrong ideas whereas, some of them did not know about wound classification.

Most of them knew about correct practices including judicious use of tourniquets and stitches while handling an animal bite wound. One of them still had a grossly wrong idea about the primary management of an animal bite wound.

"We put haldi on the wound. We just tie a cloth over it." [Interview_4]

Prevention and Cure

All of them knew that rabies is not curable. It is a 100% fatal disease that is preventable through vaccination.

"There is no treatment of rabies. It is preventable by vaccination." [Interview_5]

Safety Precautions while Handling Animals

All of them were aware of the safety precautions that need to be taken while handling animals and were practising the same.

"We restrain the animal and take bite safety precautions. A book is maintained for animals that have records of all the vaccinations the animal might have taken. We check the book to know the last vaccine that the animal has taken, whether it has been vaccinated for rabies or not. If it's a stray dog then we have to take extra precautions like restraining it well, putting mouth gag." [Interview_3]

"Suspected rabid animals are kept isolated for at least 10 days. Their food and water are given to them separately. They are not disturbed or touched very much. Precaution is taken so that they do not bite or lick the handling people." [Interview_1]

"If we suspect that any animal is having rabies we must take post-exposure prophylaxis after handling the animal." [Interview_8]

"Everyone who handles animals should be careful and they should take the vaccine for rabies." [Interview_11]

Animal Vaccination

All of them knew about the animal vaccines available for rabies. While some vaccines are available free of cost from the government, sometimes vaccines need to be purchased especially when the government supply gets exhausted.

"Vaccines are provided free of cost from the government but some vaccines need to be purchased from private. Free vaccination camps are held on World Rabies Day and World Zoonoses Day. All dogs that are brought in on that day are given vaccines free of cost." [Interview_2]

Usually, domestic animals are brought in on a regular basis for vaccination while wild and stray animals remain unvaccinated. This is due to the fact that there is no one to bring them in for vaccination on a regular basis.

Rabies Prophylaxis

While all of them are well aware of pre-exposure prophylaxis for rabies in human beings, some of them have the wrong idea about it.

"No, I have not taken it because it is usually given to children." [Interview_4]

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Only a few of them had taken pre-exposure prophylaxis. The rest of them planned on taking it soon. One of them said,

"There is no facility available here for human beings to take pre-exposure prophylaxis. There is a facility for pre-exposure prophylaxis of animals though." [Interview_6]

All of them had correct knowledge about post-exposure prophylaxis of rabies. Some of them had already taken post-exposure prophylaxis at least once. The rest of them did not take it because they haven't had any animal bite incident yet.

While a few of them preferred to take the vaccines from a private set-up, most of them preferred to take them from a Government set-up as it is available free of cost from the Government.

"I took it from a private setup as it was easily accessible to me. I would have to go to a government facility at a stipulated time to get it from the government but I am not always free at that time." [Interview_1]

"I took it from the government hospital, that is City Hospital because it was available free of cost. The only disadvantage is you have to come according to the hospital timings. in private it will cost some money but you can take it at your own convenient time." [Interview_2]

"If the government vaccines are easily accessible then we do not need to go and take vaccines from private setup." [Interview_3]

"I took it from a private setup because the government vaccines' supply had finished at that time." [Interview_10]

Suggestions to Control Rabies

The interviewees came up with quite a few good suggestions to help reduce the spread of rabies in the general population.

"The people at high risk should be educated about animal vaccination. It is already being done on World Veterinary Day and World Rabies Day to prevent rabies in populations. Vaccination campaigns are also organized on those two days and also on World Zoonoses Day. NGOs can come forward and together with them, vaccination for the animal population can be conducted along with the help of municipality." [Interview_1]

"Awareness is required about rabies. Anti-rabies vaccination should be given, both pre and post-exposure prophylaxis. The animal should be given anti-rabies vaccination since birth and proper record should be maintained." [Interview_3]

"Stray dog population should be controlled as a dog is the most common animal transmitting rabies. There are certain government programs taken up by the municipality to control the stray dog population. The animals are sterilized, both male and female dogs, to control rabies. This is known as an anti-rabies drive." [Interview_8]

Discussion

Rabies still kills approximately 60,000 people every year all over the globe. Dog-mediated rabies accounts for the majority of human deaths.[6] The lack of awareness of rural people regarding rabies caused by dog bites in developing countries, including India, is a major hurdle in managing disease incidence in humans.[8] The veterinarians provide advice to pet owners and handlers regarding the treatment of a dog. They help in disease surveillance because they might be the first to find out about a dog suffering from a notifiable disease like rabies. They collaborate with the police and other local authorities in dealing with neglected cases of mismanaged and stray dogs. They are involved in animal health programs and population control measures, which include testing for health, providing vaccines, identifying the animals, kennelling during the owner's absence, sterilization, and euthanasia.[3] Pre-exposure prophylaxis against rabies is highly essential for everyone who is at frequent, continual, or increased rabies virus exposure risks.[9]

Our study suggested that the majority of the study population was male, between 30 and 40 years of age, at least graduated, and working for more than 20 years. They include specialist veterinary doctors, peons, animal handlers, livestock inspectors, and attendants. Most veterinarians are willing to help in rabies control. In this study, the majority were unable to correctly identify the disease, in spite of having good knowledge about rabies. The findings are similar to those of a study by Alam et al.[10] who reported that though most of the participants were aware of the consequences of rabies, 58% of people were unaware of the disease. The findings were also in accordance with a study conducted in Ethiopia,[11] however, the results were higher than those of a study done in Morocco.[12] It was discovered that all the study participants possessed a good awareness of dog-mediated rabies transmission; however, the findings showed lacunae regarding the knowledge of the mechanism of rabies transmission. Other developing countries showed almost similar results.[13-17] Though some of them lack crucial knowledge about animal bites, rabies, and pre-exposure prophylaxis, most of them have a positive attitude towards the prevention of rabies and its prophylaxis and can identify their lacunae in working towards its prevention. Digafe et al.[11] observed a similar lack of knowledge among the Ethiopian people. On the other hand, people in Sri Lanka had better knowledge, attitudes, and superior practices regarding rabies.[18] This difference can be attributed to the lack of health education programs about rabies and its prophylaxis especially amongst the attendants and livestock inspectors. Health education is not

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done as there is a shortage of time though they appreciated the importance of educating the veterinarians beyond just how to handle animals. Researchers are of the opinion that professionals at risk should be enlightened through health education at the time of vaccine initiation for better treatment outcomes.[19] This aid in a rabies control program helps reduce dog-bite cases in high-risk populations. Studies have demonstrated the importance of counseling the staff regarding animal bite-related health hazards.[20] Two independent investigators from different personal backgrounds did the content analysis and then discussed the results to reach a consensus. This leads to an increase in the validity of the study, as even from the same data, different investigators may have different inferences. The study was monocentric, that is, it was conducted in a single center. This is a limitation of this study as it only reflects the perception of the staff of Berhampur Veterinary Hospital.

Conclusion

With proper supportive activities and campaigns about animal vaccination and pre-exposure prophylaxis in humans, we can gear towards the goal of "ZERO BY 30 of zero dog-mediated rabies deaths by 2030".[6] This can be achieved through intensive IEC activities for awareness about rabies and the importance of pre-exposure prophylaxis amongst all high-risk populations.

Through the increase in specific training and awareness amongst new recruits and refresher training, people can be made aware of the possible outcomes of dog bites and the importance of PEP measures in order to reduce the risk of rabies. Accessibility of required vaccines, along with proper animal bite management with the availability of staff trained to handle the same, is vital to ensure a reduction in mortality due to rabies.[21]

Mandatory pre-exposure prophylaxis during staff recruitment can be done. This should be followed up with booster doses at periodic intervals. Inter-sectoral coordination amongst government and NGOs for stray animal vaccination and population control including neutering of animals, sterilization, and euthanasia, wherever required, will facilitate our goal. Personal Protective Kits must be provided and used while handling suspected cases of rabies in animals and humans. Advocacy for free-of-cost pre-exposure prophylaxis for all high-risk populations to be made available 24x7 by the Government must be done. Special counseling about rabies for high-risk populations and after an animal bite can be given.

Refresher training can be arranged on a timely basis for the people involved in the treatment of humans with animal bites and veterinary personnel at tertiary and district-level hospitals. The departments should work together by adopting the One Health strategy to ensure proper management of these cases.[22]

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