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## Prevalent Cattle diseases of West Bengal: A survey in four districts

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### ABSTRACT

West Bengal is one of the most populated states of India. The residents of the state are mostly dependent on agriculture and allied activities for their livelihood. Livestock also provide economic support and food security to them. A survey in veterinary hospitals and cattle farms of Murshidabad, Nadia, Malda and Birbhum district of West Bengal indicated the frequent occurrence of bacterial, fungal, viral and protozoan diseases in cattle. Some of these diseases like cryptosporidium diarrhoea, ringworm and salmonellosis are zoonotic in nature and thus, are easily transmitted to human. The frequency of diseases increases during rainy season. Infection of alimentary canal and pneumonia are more common in calves whereas, arthritis is more common in male. Most of the common diseases of cattle like anthrax, rabies, foot and mouth disease, bovine tuberculosis, etc., can be prevented by proper vaccination. Some of these diseases can easily be diagnosed by modern techniques like ELISA, PCR, etc. But lack of veterinary hospitals, socio-economic backwardness and misconception have prevented easy diagnosis and treatment of these common diseases. Common antibiotic like kanamycin, antifungal drugs and antitoxins are generally applied to treat these diseases. Further, maintenance of proper hygiene, isolation of diseased animal, regular check-up and vaccination can prevent easy transmission of the diseases and thus, will put a check on livestock damage.

**Keywords:** Cattle of West Bengal, Survey, Cattle diseases, Zoonotic diseases, Treatment and Vaccination, illnesses of cows

## **1. INTRODUCTION**

India is a tropical country which shows huge diversity in term of soil type, temperature, rainfall and humidity. From steep slope to plain, hard rocks to fertile land, heavy to low rainfall and humidity, temperature from 0 °Celsius to about 45° Celsius, high salinity to lack of microsalts in soil and desert to marshy shallow land, all kind of variation in geographical condition can be found in India. India is an agronomic country, where West Bengal is the most populous state of the country. The population of West Bengal is 8% of the total population of country. 65% of people in West Bengal are involved in agriculture and allied activities. A large percentage of population also depends on livestock for their economic support and food security. Livestock provide protein rich items like meat, milk and milk products and egg. They also provide raw materials for production of other items like leather. Cow and buffalo dung is used as manure. Animals are also used for ploughing in the field. The bovine population in West Bengal is 17.1 million, where the percentage of indigenous cattle is more compared to crossbred cattle. The percentage of crossbred cattle population is comparatively higher in Hilly regions and in Murshidabad, Nadia, Hooghly and Howrah districts of West Bengal. 13.804 thousand Kg milk is produced per day in West Bengal, which is 3.2% of total milk production in the country [1].

Huge variation in geographical condition sometime leads to low fodder crop production. Decrease in grazing land with urbanization and natural hazards like drought, flood and cyclone also decreases the availability of sufficient food for the livestock. Natural calamities also lead to huge loss of livestock population. After the calamities, there is rapid spread of infectious diseases among the cattle. In 2007, there have been 191.88 lac cattle and 7.6 lac buffaloes in West Bengal. By 2012, 14% decrease in cattle population has been observed [1]. Bovine disease is an important factor behind this decline. Insufficient food, improper growth conditions and diseases decrease the productivity, growth and reproductive capacity of livestock. Cattle show variety of bovine diseases, some of which lead to death of the animal. Viral diseases like Foot and Mouth disease, Rinderpest, Infectious bovine Rhinotracheitis, bacterial diseases like Tuberculosis, Paratuberculosis, Brucellosis, Hemorrhagic septicemia, protozoan diseases like Theileriosis, parasitic disease like Fascioliasis and diseases due to malnutrition, unhygienic condition and improper housing, like Fungal infection, Dermatitis are very commonly found in cattle. Some of these diseases might get easily transmitted to human. Such types of diseases are called Zoonotic diseases. These diseases get easily transmitted to human by animal bite and scratch, washing of cattle and washing teats during milking. For example, diseases like Paratuberculosis, Tuberculosis, Brucellosis, Fascioliasis, Rinderpest are zoonotic in nature. Many of these diseases can be diagnosed easily by modern techniques like ELISA, PCR, sequencing and hybridization of bacterial or viral DNA, Serum ring test, Milk ring test, etc. But lack of proper infrastructure and Veterinary centers, socio-economic backwardness, misconception have prevented implementation of these techniques for diagnosis. Once diagnosed, many of these diseases can easily be treated by common and easily available antibiotics like Tetracycline, Chloramphenicol, Rifampicin, Streptomycin, etc., [2-16].

Even the occurrence of these diseases can be prevented by proper vaccination. But due to shortage of vaccines available, insufficient effort to implement vaccination programs, less number of veterinary centers and laboratories, the decrease in bovine population cannot be overcome easily. Therefore, these diseases can get easy, unrestricted and quick way to spread among the large number of cattle residing together in an area and sometimes to human involved

with cattle culture. In absence of proper diagnosis and treatment the diseased cattle are disposed off. Few diseases of cattle are very common in fetus and calves like Brucellosis, Bovine respiratory disease and Naval ill omphalitis. These diseases are bacterial diseases that cause abortion in late gestation, infection in umbilicus, stillborn, etc., and even if the calf survives it can transmit the causal organism to others [6, 7, 17-20].

Also, due to tropical environment of the state, the temperature during summer reaches up to about 50 °C in some districts of West Bengal. At this high temperature heat stock, sunburn, dehydration and rashes in cattle are very common. These altogether lead to high mortality and morbidity rates and huge economic loss in long run. Socio-economic constraints like poverty, high population density, poor literacy rate and lack of proper guidance have prevented large number of small marginal livestock cultivar from adopting modern technique like Artificial Insemination. Such technique can increase the number of healthy and highly productive cattle [21]. These can lead to upgradation of cattle population by increasing the pregnancy rate, thereby increasing the cattle population.

This will allow the cultivars to overcome the loss of bovine resources, low production and low income easily. In general, these diseases in cattle can be prevented and controlled by maintaining proper hygienic condition, providing sufficient nutrition and regular vaccination, isolation from diseased animal and regular check-ups in Veterinary centers.

In this research article, we have made a survey concerning the farmers, cattle breeders and Veterinary centers to collect information regarding general cattle diseases found in four districts of West Bengal. The aim is to find out whether there is any relation of cattle diseases with age, sex, geographical location, nutritional status, family history and life style of cattle.

## **2. METHODS**



**Figure 1.** Visit to the cattle farm to collect the information

The study on diseases of cattle in West Bengal and zoonoses was conducted from April to October 2018 (6 months). The area of study was rural as well as urban parts of 4 districts of West Bengal, India – Murshidabad (24.769 N, 88.2802 E), Birbhum (23.9167 N, 87.5333 E), Maldah (25.1786 N, 88.246 E), Nadia (23.4710 N, 88.555 E). The methodologies of diagnosis included general examination (observation of different body parts, sitting curvature) and physical examination (rate of breathing, body temperature, heart rate, eye colour and their movement). Also certain clinical diagnoses were done and information were collected from veterinary hospital authority. We had consulted with 3 local veterinary doctors to collect the data. Information from cattle-breeder and farm owners were also taken into account (Figure 1). The study has mainly focused on cattle (cows and buffaloes included) and calves to find out any relation between respective bovine diseases, food habit, age, sex, seasonal changes and also to acquire information about zoonoses.

### **3. RESULTS AND DISCUSSION**



**Figure 2.** Foot and mouth disease

The information are collected from veterinary hospitals and from cattle farms, and some cattle breeders. The study was conducted in four districts – Murshidabad, Birbhum, Maldah,



Nadia encompassing an area of 17,500 km<sup>2</sup>. We found some common and prevalent diseases of cattle through this study which include Foot and mouth disease (FMD), a viral disease mainly caused by Picorna virus. The symptoms are blisters on lip and tongue, coronary band on hoofs, high fever for around 2-6 days (Figure 2). No specialized treatment is present for this disease. Therefore, vaccination before occurrence is a prime treatment. Bovines affected with this disease die with time.

Anthrax is a bacterial disease caused by *Bacillus anthracis*. Anthrax is found to spread from infected animal or insects. Diseased affected cattle shows symptoms like *reduce milk production, swelling of neck and body, abdominal pain, vomiting of blood*. Antibiotic treatment is found to cures most infection. Though annual vaccination helps the most. Mastitis is another bacterial disease infected by *Streptococci* and *Staphylococci*. Flies are a large factor in the spread of the disease, moving bacteria from the skin surface into the tissue by biting. The disease also spreads from cow to cow during milking process. The symptoms of this disease are abnormalities in udder, watery appearance in milk, redness and hardness of udder. Infected cows are usually treated using penicillin, streptomycin. Ring worm is a fungal disease caused by *Trichophyton verrucosum*. Ringworm is found to spread by direct contact with infected animal. The symptoms of this disease are lesions appearing around eyes, hair loss (Figure 3&4). Local treatment with iodine compounds is time-consuming, as it needs scraping of crusty lesions. It can also be treated by using vaccine like imaverol. Oral administration of antifungal drugs is also used as a step in treatment.



**Figure 3.** Fungal infection in the tail of a cow

Bovine viral diarrhoea is a viral disease caused by Bovine Viral Diarrhoea virus (BVDV) member of Pestivirus genus. The infected cattle shows symptoms like Immuno-suppressor effects, fertilities issues, milk drop, pyrexia, diarrhoea. Vaccines prevent foetal infections (like BVD vaccines). Bovine tuberculosis is another bacterial disease caused by *Mycobacterium bovis*. It is found to spread by contact with domestic and wild animals. The symptoms are

abdominal infection, weight-loss, less amount of milk production, low grade fever. Vaccination is most important preventive measure. Apart from this, Amikacin and kanamycin antibiotics are helpful. Rabies is a viral diseases caused by Lyssavirus. Infected animals, insects can spread the virus by biting another animal. The symptoms are paralysis of throat, hypersensitivity.



**Figure 4.** Fungal infection in the neck of a cow

Specialist treatment is present for this disease. Only vaccination can help. Tetanus is caused by an infection with the bacterium *Clostridium tetani*, which is commonly found in soil, dust, etc. The symptoms of this disease are stiffness and difficulty in movement, muscles become stiff and rigid, and there is locking of jaws. The infected cattle are treated with very high doses of penicillin. Large amount of tetanus antitoxin is applied around the wound. Majorities of the cattle including cows, buffaloes and goats are found to be suffering from unknown fever. The symptoms are high body temperature (103-104F), weakness, and abnormal behaviour. The affected ones are found to be treated by with drugs like paracetamol only after proper diagnosis. Blot is a bacterial disease, which results in rumen tympanitis. Engulfing of certain weeds may be cause of this disease. It has a life threatening impact.

The symptoms are distended rumen, pain and discomforts, even anxiety. This disease is not only seen in goat but is observed in cows and buffaloes. Administration of antacid and anti foaming agent is the primary mode of treatment. Pleuropneumonia is exclusively seen in goats and calves especially during rainy season. *Mycoplasma sp.* is the chief pathogen which mainly affects the lungs when the cattle are exposed to heavy rain. Usually the symptoms are high-fever (105-106F), respiratory complexities, cough. Usually the cattle are dead just after 7 days. In certain cattle, the problem of runny eyes was observed (Figure 5). Bacterial infection is believed to be causative in the case. Apart from this sunlight allergy may be a cause. Digital dermatitis is a disease that causes lameness in cattle.

This disease is caused by a mixture of bacteria including anaerobic bacteria like Spirochetes of *Treponema* genus. The affected one develops lesions (Figure 6) which initially looks like red-oval ulcer on the back of the heel. These lesions later develop hair like projections or wart like lesions. They gradually appear in the front part of the claw. After diagnosis the skin is cleaned and kept dry prior to treatment. Topical Oxytetracycline (OTC) is often applied as the cattle show fast recovery under this treatment.



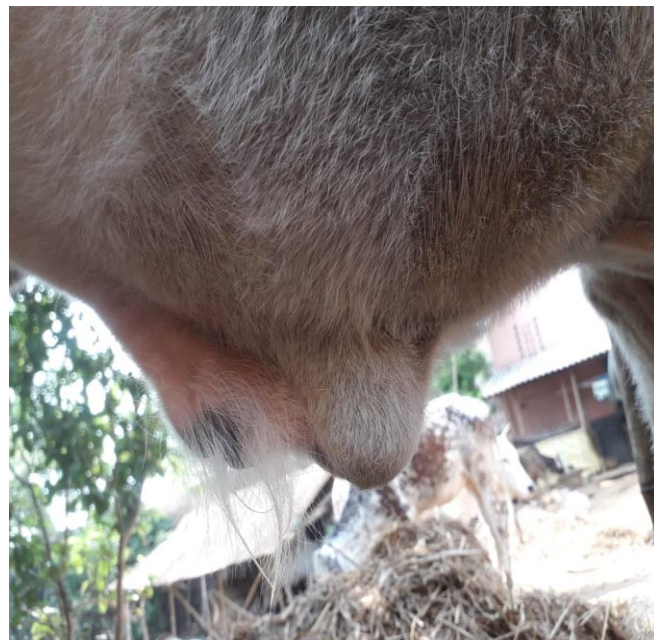
**Figure 5.** Runny eye of a cow

Dehydration and heat stroke are common threats livestock face in hot summer months. The symptoms are sunken eyes, “Skin tent” after pinching skin, Yellow and dark urine, fever, etc. Treating dehydration requires rehydration of the animal with plenty of water and electrolytes. Shades for cattle should be constructed and water should be sprinkled to reduce the body temperature of the cattle. Another cattle disease observed is Bovine hernia. The umbilicus in newborn calves consists of the **urachus, a tube that connects the foetal bladder to the placental sac** and the remnants of the umbilical vessels that transported blood between the foetus and its mother. Normally, just after birth, these structures shrink until only tiny remnants remain within the abdomen. If bacteria gain entry through the umbilicus, those remnants can become infected and require surgical removal. Additionally, if the body wall remains open, these structures could get exposed in the environment.

The intestines can protrude through this defect, an umbilical hernia occurs. **Umbilical hernias are the most common birth defect in calves** (Figure 7). It shows certain symptoms like fever and poor growth rate. Usually surgical removal is done.



**Figure 6.** The affected cattle show lesions on neck



**Figure 7.** Bovine hernia usually observed in calves near the point of umbilical chord.



Zoonotic diseases can be transmitted from animals to human and vice versa. Zoonotic diseases may be spread in a variety of ways: transmission through the air, by direct contact, by insect bite etc. Here we discussed some common zoonotic diseases about which we got sense from our survey. Ringworm is a skin infection caused by fungi of the *Trichophyton* or *Microspora* species. Ringworm infection is characterized by hairless crusty circular areas on the skin. People are infected with ringworm through direct contact with infected animals. Good hygiene and thorough washing of hand and forearm after handling infected cattle will help to decrease the risk of ringworm infection. *Cryptosporidium* is a protozoan parasite that causes diarrhoea. Most animals can be infected with *Cryptosporidium*, but clinical signs are most commonly observed in calves less than 1 month old.

*Cryptosporidium* can be ingested from infected food or water. Humans are infected by consuming food or water contaminated with the organism or by failing to wash their hands after exposure to infective animals. Young children, pregnant women and immune compromised adults are most severely affected. Calves with diarrhoea should be separated from healthy ones and the infected area should be disinfected with bleach. Prevention efforts in humans focus on hand washing, especially after handling or being around animals and before eating or handling food. *Escherichia coli* are normally found in the intestines of humans and animals. However, some strains cause severe bloody diarrhoea in humans. Animals are the carriers of the bacteria and humans become infected by ingesting contaminated food or water, especially undercooked ground beef, vegetables and unpasteurized juice and milk. Humans may also become infected after handling or being exposed to the faeces of a carrier animal. *coli0157:H7* is a particularly virulent strain of *E. coli* that cause abdominal cramping, bloody diarrhoea and occasionally haemolytic uremic syndrome, a life threatening kidney disease.

*E. coli* may cause diarrhoea in young calves, but most infected cattle show no clinical signs. Prevention focuses on hand washing and proper food hygiene. Meats should be thawed in the refrigerator. Washing hands after handling animals, not eating food around animals and avoiding swimming in public areas are some of the precautionary measures. *Salmonella* are found in the faeces of infected animals. Many animals are susceptible to *Salmonella* infection, including cattle. Infection occurs as a result of the ingestion of contaminated food, water or grass. The bacterium can survive months to years in the environment, especially in wet and warm conditions. Young, stressed or pregnant animals are the most susceptible to *Salmonella* infection. Infection may result in fever, foul smelling diarrhoea, and severe dehydration. People acquire *Salmonella* from undercooked contaminated meat, infected eggs, or unpasteurized milk products. If hands are not washed after direct contact with infected faeces, then accidental ingestion of bacteria can occur. Humans may develop diarrhoea, abdominal cramping and fever, which can be very severe. Animals with diarrhoea should be isolated and the area should be disinfected. Meat and eggs should be adequately cooked and proper food handling hygiene should be maintained.

#### **4. RELATION BETWEEN BOVINE DISEASES AND FOOD HABIT, AGE, SEASON AND SEX**

The survey has revealed that there is a clear relationship between the food habit and the various diseases of the cattle. Unhygienic condition, improper grazing and use of stagnant water causes diseases like bloat, fever of unknown etiology, bovine diarrhoea. Very often cattle like

cows, buffaloes are found to intake plastics resulting in the death of the cattle. A serious deficiency of essential nutrients and fat content in the cattle food was observed during the survey. Low quality of food weakens the cattle and facilitates the development of bovine diseases. It was also observed that the cattle dependent upon grazing are susceptible to more diseases than the cattle reared in farms. During our survey we found relation of bovine diseases with the age of the respective cattle. The calves were found to be more infected with GI tract complexities including loose motion, bovine diarrhoea etc., whereas, rarely calves were infected with Pleuropneumonia and Bovine tuberculosis. Mature cattle were seen to be affected with fungal diseases, ringworm infection, skin lesion, Foot and mouth disease (FMD), and digital dermatitis. Pregnant cattle are seen to develop Salmonellosis in certain cases.

The cattle associated with milk production, develops mastitis, milk fever. But disease like runny eyes did not show its dependence upon the age of the cattle. The survey was conducted from spring to early winter, providing information on dependence of bovine diseases over season. In summer, cattle of all ages are found to be suffering from dehydration. If the causes remain untreated then the older cattle are affected by heat stroke. At the same time cattle are seen to develop fungal infections, skin lesions with increased frequency during rainy season. The severity of fungal infection, skin lesions, digital dermatitis, and bovine flue increases in the monsoon. The calves on exposure to rain develop Pleuropneumonia. Diseases like diarrhoea are found to increase in rainy season too. All the fungal disease, skin lesions, runny eyes are seen to be fully or partially cured in early winter. At this time, the cattle appeared healthier and diseases reduced in frequency. No such sex dependence of diseases was observed during the survey. Usually the mastitis, milk fever are predominantly observed in female cattle and male are found to suffer from arthritis. Apart from this, other disease like Runny eyes, fungal infections, Dermatitis, Bovine tuberculosis are seen in both male and female cattle.

It is clear from the survey that in most of the cases either food habit or unhygienic living place is responsible for the disease. Lack of nutrition to the calves and new-born, causes fatal diseases. As a remedial approach following measures could be applied- The living place of the cattle and the cattle itself should be regularly cleaned. For this purpose, disinfectant can be used in the farm. Unhygienic and improper grazing should be stopped. This will reduce the chances of various bovine diseases. Owners or cow breeders should be more cautious regarding the nutrition of the cattle. Depending upon the specific requirements, calves, adults and pregnant cattle should be provided with their food. During summer months, sprinkling of cold water and presence of shade is essential for protection from heat stress. Routine check up and vaccination is important. Cattle faeces should not be handled with bare hands to prevent the spread of zoonotic diseases.

## **5. CONCLUSIONS**

The current scenario of the cattle population in West Bengal represents an extremely pitiable condition. There is 14% decrease in the cattle population in 5 years (2007-2012). The main factor behind this is the cattle diseases. Various fungal, protozoan, viral and bacterial diseases are common in cattle. Diseases like Tuberculosis, Fascioliasis, Brucellosis, Rinderpest are zoonotic in nature, which further aggravates the problem. Though quick and confirmative diagnosis of these diseases can be done by PCR, ELISA and sequencing, insufficient number of veterinary centers and lack of proper guidance and experienced health personnel along with

misconception and poverty, prevents proper diagnosis. Many of the common diseases can be prevented by proper vaccination, isolation of diseased animal, maintenance of good hygiene and regular check-ups. Commonly available antibiotics like Streptomycin, Rifampicin, Chloramphenicol, etc., can easily treat some of these diseases. High population density, socio-economic backwardness, poor literacy rate are some of the reasons behind failure to adapt modern techniques like Artificial Insemination. These modern techniques can overcome the huge loss of bovine population, loss of economy and production very easily. Therefore, organization of regular veterinary camps in villages can provide proper guidance and knowledge to cattle breeders regarding prevention, diagnosis and treatment of common cattle diseases. Government should take initiative to provide free vaccination to cattle in the villages. Along with this, improvement of socio-economic condition and construction of sufficient veterinary hospitals will improve the state of the cattle in West Bengal.

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