A Seminar Paper on

Prevention and Control of Cattle Diseases in Gazipur District

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Prevention and Control of Cattle Diseases in Gazipur District[1]

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ABSTRACT

Animal diseases are the most important constraints to livestock development in Bangladesh and animal diseases alone constitute half of the causes of death of all livestock population. Cattle are affected by many infectious and noninfectious diseases that can lead to economic losses to the farmers. This study was conducted to explore the prevalence of cattle diseases in Gazipur district. Also to identify the prevention and control strategy of prevalent cattle diseases in Gazipur district. This seminar paper is a review paper and all the information was collected from secondary sources. A comprehensive literature review was conducted to investigate the prevalence of cattle diseases, causal agent of the diseases, associated risk factors of the disease and the impact of these diseases on cattle population. The findings of this seminar paper showed that the prevalence of LSD was higher in case of Crossbred (12.58%), Female (11.23%) and Adult Cattle (14.61%). In case of parasitic infestation, higher prevalence found in crossbred (9.21%), Male (10.11%) and in adult cattle (9.66%). This paper assessed the prevention and control measures of prevalent diseases. Prevention measures help to prevent the occurrence of diseases in the cattle. Control measures helps to eradicate the disease totally from the root. Proper biosecurity helps to prevent the entry of pathogens in the cattle shed. Slaughtering in some cases helps in disease prevention. Diseased animals must be isolated from the healthy one. Maintaining proper quarantine procedures before the entry of new cattle in the herd helps in prevention and control of diseases.

Keywords: Livestock population, Vaccination, Prevalence, Biosecurity, Prevention

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CHAPTER I

INTRODUCTION

Livestock farming, a major component of agriculture, is playing a crucial role in the rural economy of Bangladesh. The cattle population in Bangladesh is currently estimated 245.45 lakh in number. The milk and meat production in 2020-2021 in Bangladesh are 119.85 lakh Metric Ton and 84.40 lakh Metric Ton, respectively (BBS, 2021).

Although an encouraging number of dairy farms in both government and private sectors have been established but most livestock are reared by smallholder farmers in integrated agricultural farming system in Bangladesh.

Most of the livestock population is reared in the villages by smallholder farmers who are attacked by diseases due to various reasons such as unhygienic management practices, imbalanced feed supply, lack of deworming, inadequate veterinary services, illiteracy, etc. The environmental and climatic conditions of our country are also favorable for the occurrence of diseases (Khatun *et al*., 2021).Animal diseases are the most important constraints to livestock development in Bangladesh and animal diseases alone constitute half of the causes of death of all livestock population (Samad, 2019). Livestock diseases produce both direct and indirect effect. The direct effect of the livestock diseases are the morbidity and mortality of animals. Indirectly they are associated with market disruption of the livestock and livestock products, costs of prevention and control of diseases and impacts on human health especially zoonotic diseases and public health over the security, quality and safety of livestock products (Samad, 2019).

Various types of infectious and non-infectious cattle diseases are prevalent in Gazipur district. Among the various constrains in the development of cattle, both infectious and noninfectious diseases are the most important limiting factors that cause significant mortality of adult cattle each year.

It was reported that variation in different cattle breed, their sex and environmental factors greatly influence the disease prevalence in livestock animals including cattle (Islam *et al*., 2014).

The infectious diseases mainly LSD, FMD, Rabies, Mastitis, Dermatophilosis etc. are mostly prevalent in Gazipur district. Parasitic infestations are also a great problem. Some digestive disorders are also found here. These diseases produce various illness in the cattle. These diseases

also cause huge economic loss to our farmers and our country. Prevention and control of these diseases are very important. Different studies were done in different district of Bangladesh. But limited study was done at Gazipur District in Bangladesh.

With these considerations in regard, the present review study is aimed with the following objectives-

1. To explore the prevalence of cattle diseases in Gazipur district.
2. To ascertain the prevention and control strategy of prevalent cattle diseases in Gazipur district.

CHAPTER II

MATERIALS AND METHODS

This seminar paper is completely a review paper. All the information here has been collected from secondary sources. Secondary sources include a variety of papers, journals, and articles etc. that have been already published. During the preparation of this review paper, the several sources including relevant papers, journals, proceedings, reports, statistical yearbooks, and the internet so on are followed. Moreover, most of the information was collected from internet browsing and with the help of the library facilities of Bangabandhu Sheikh Mujibur Rahman Agricultural University. Good suggestions, valuable information and kind consideration were taken from honorable seminar course instructors, major professor, and other resource personnel to enrich this paper. Afterward, all the collected information was arranged according to the sequence and presented in this paper.

Figure 1. Study area for prevention and control of cattle disease

CHAPTER III

REVIEW OF FINDINGS

Major diseases of cattle in Gazipur district in Bangladesh include infectious disease, parasitic disease, digestive disorder, and metabolic disease of which infectious disease and parasitic diseases are predominantly prevalent diseases. Proper knowledge on causal agent, pathogenesis, pathology, and risk factors are very important for the prevention and control of diseases.

3.1. Overall disease prevalence in Gazipur district

Prevalence, sometimes referred to as prevalence rate, is the proportion of individuals in a population who have a particular disease or attribute at a specified point in time or over a specified period. Various factors are responsible for the prevalence of disease in different areas.

3.1.1. In accordance with breed, the prevalence of infectious and parasitic diseases in cattle in Gazipur district

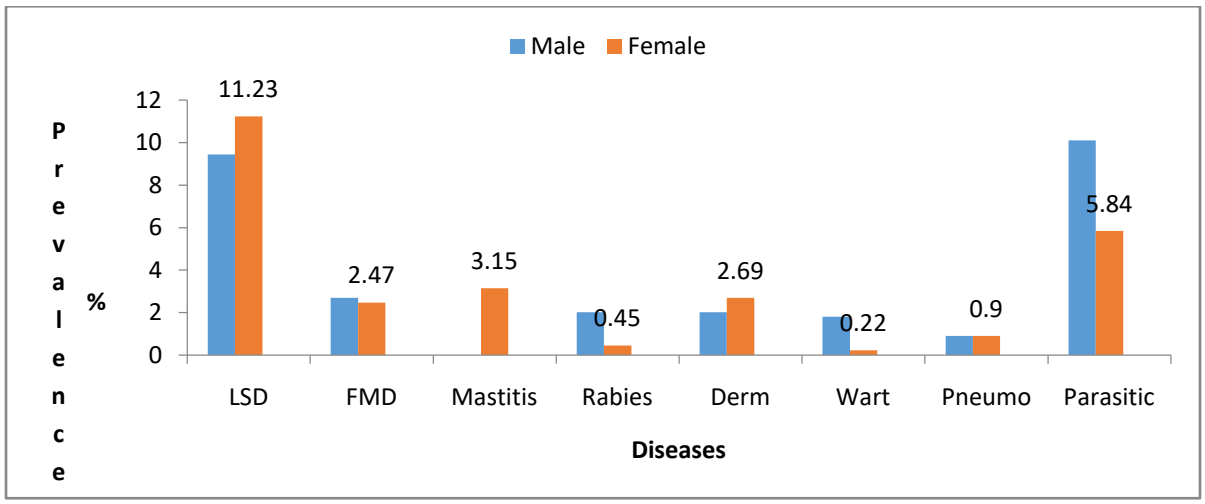
Table 1. The prevalence of infectious and parasitic diseases in cattle in Gazipur district according to breed

Diseases	Prevalence%	
	Crossbred	Indigenous
LSD	12.58	8.09
FMD	3.37	1.80
Mastitis	2.25	0.90
Rabies	0.90	1.57
Dermatophilosis	2.92	1.80
Wart	1.57	0.45
Pneumonia	1.12	0.67
Parasitic infestation	9..21	6.74

*LSD=Lumpy Skin Disease; FMD=Foot and mouth disease Source: (Rahman *et al*., 2020)

33.92% of diseases were recorded in crossbred and 22.02% in indigenous cattle. Higher prevalence of LSD, FMD, Mastitis were seen in crossbred cattle than indigenous cattle.

3.1.2. In accordance with sex, the prevalence of infectious and parasitic diseases in cattle in Gazipur district



(Source: Rahman *et al.*, 2020)

Figure 2. The prevalence of infectious and parasitic diseases in cattle in Gazipur district according to sex.

*LSD=Lumpy Skin Disease; FMD=Foot and mouth disease; Derm=Dermatophilosis; Pneumo=Pneumonia.

In this figure, LSD shows higher prevalence (11.23%) in female and Parasitic disease shows higher prevalence in male. Both diseases have significant economic effect on cattle production.

3.1.3. In accordance with age, the prevalence of infectious and parasitic diseases in cattle in Gazipur district

Table 2. The prevalence of infectious and parasitic diseases in cattle in Gazipur district according to age

Diseases	Prevalence%	
	Calf	Adult
LSD	6.07	14.61
FMD	1.12	4.04

Mastitis	0.00	3.15
Rabies	2.25	0.22
Dermatophilosis	0.90	3.82
Wart	0.00	2.02
Pneumonia	1.12	0.67
Parasitic infestation	6.29	9.66

Source: (Rahman *et al*., 2020)

In this table adult cattle shows higher prevalence for all the diseases such as LSD, FMD, Mastitis, Dermatophilosis and Wart except for Rabies and pneumonia.

3.2 Lumpy Skin Disease (LSD)

3.2.1 Causal agent

Lumpy skin disease (LSD) is a highly infectious and economically important transboundary disease of cattle caused by LSD virus (LSDV). Lumpy skin disease virus (LSDV) also known as Neethling virus is under the family poxviridae and genus capripox virus along with sheep pox and goat pox (Babiuk *et al.*, 2008).

3.2.2 Clinical signs and occurrence of LSD

LSD is characterized by fever and the appearance of nodular lesions in the skin covering all parts of the body. In Bangladesh first outbreak was known to start in Karnaphuli Upazila (sub-district) of Chattogram district on 22nd July, 2019 although confirmed as Lumpy skin disease through real-time PCR on 27th August, 2019. The initial attack rate was 18% with no mortality (Rahman, 2020).

Figure 3. Lumpy skin Disease in cattle Source: (Kayesh *et al*., 2020)

3.2.3 Economic Importance of LSD

The morbidity rate of the disease may range from 3% to 85% and in endemic areas it is usually around 10%. Although the disease is not associated with high mortalities (1-3%), the economic losses accompanying LSD eruption is higher. It results in great economic losses due to decreased feed intake, milk production, weight conversion, abortion and infertility, and damaged hides (Mulatu and Feyisa, 2018).

3.2.4 Risk factors and transmission of LSD

It is mainly spread through arthropods like mosquitoes, flies, and ticks but variations appeared in region to region. Stomoxyscalcitrans and Haematopota spp. are primary vectors for mechanical transmission of LSD . Three species of hard ticks and Aedes aegypti mosquito play a crucial role along with Stomoxyscalcitrans flies. Mosquitoes carry the virus from infected animals to a new one through biting. Animals could also be infected through the consumption of contaminated feed, water and through semen from infected bull.

3.2.5 Pathogenesis of LSD

In the generalized form there is viremia and fever, followed by localization in the skin and development of inflammatory nodules. Following Subcutaneous or intradermal inoculation of cattle with LSDV, localized swelling at the site of inoculation developed 4 to 7 days which is varying in size from 1 to 3 cm and covering up to approximately 25% of the skin surface. Enlargement of the regional lymph nodes and generalized eruption of skin nodules usually follows 7 to 19 days. Viral replication in microphages, fibroblasts, pericytes, endothelial cells and probably other cells in blood vessel and lymph vessel walls causes vasculitis and lymphangitis in some vessels in affected areas. Immunity after recovery from natural infection is life-long; calves of immune cows acquire maternal antibody and are resistant to clinical disease for about six months (Sevik and Dogan, 2015).

3.2.6 Pathology of LSD

3.2.6.1 Gross pathological lesions

Skin nodules are usually uniform in size, firm round and raised, but some may fuse into large irregular and circumscribed plaques. Regional lymph nodes become enlarged (up to 10 times than their usual size), edematous and congested, in addition to local cellulitis, Pleuritis and enlargement of mediastinal lymph nodes are also involved in severe cases (Abera *et al.,* 2015).

3.2.6.2 Histopathological findings

The pathognomonic LSD lesion eosinophilic intracytoplasmic inclusion bodies may be detected microscopically in the keratinocytes, macrophages, endothelial cells and pericytes from skin nodules in addition to ballooning and degeneration of the cell layers. Inflammatory cells including macrophages, lymphocyte and eosinophils are infiltrated the affected area (Namazi and Khodakaram, 2021).

3.2.7 Treatment, Prevention and Control

The treatment of LSD is only symptomatic and targeted at preventing secondary bacterial complications using antimicrobial therapy. However, the treatment of LSD (its complications) is costly as well as does not ensure full recovery therefore; prevention is more beneficial to avoid the substantial economic losses. Vaccination is the only effective method to control the disease in endemic areas as movement restrictions and removal of affected animals alone are usually not effective. Members of the Capri poxvirus are known to provide cross protection. Hence, homologous (Neethling LSDV strain) and Heterologous (sheep pox or goat pox virus) live attenuated vaccines can all be used to protect cattle against LSD infection. Eradication measures, such as quarantine, slaughter-out of affected and in-contact animals, proper disposal of carcasses, cleaning and disinfection of the premises and insect control can be implemented as soon as possible during the eruption (Kayesh *et al.,* 2020).

3.3 Mastitis

3.3.1 Causal agent

Mastitis is an inflammation of the mammary gland which, together with physical, chemical and microbiological changes. Bacterial organisms known to cause mastitis are *Pasteurella multocida,*

Staphylococcus aureus; Str. agalactiae; Str. pyogenes; etc. Among them *Staphylococcus aureus* is predominant for mastitis in cattle in Gazipur district (Zhao & Lacasse, 2008).

3.3.2 Clinical signs of Mastitis

Inflammation of the udder turns into a red and hard mass in case of mastitis. The swollen mammary gland is hot and the mere touching causes pain and discomfort to the animal. Animals do not allow touching of the udder even kicking to prevent milking. Sometimes milk tainted with blood clots, foul smelling brown discharge and milk clots occur. Body temperature of the animal increases.

3.3.3 Importance of Mastitis

Different pathogens can cause chronic, subclinical, subacute, acute and peracute forms of the disease (Sumon *et al.,* 2017). In subclinical mastitis, there are no obvious clinical signs. Subclinical mastitis (SCM) is 3-40 times more common than clinical mastitis and causes the greatest overall losses in most dairy herds (Bachaya *et al.,* 2011). However, health risk to consumers can be associated with milk, due to the presence of zoonotic pathogens and antimicrobial drug residues. *Staphylococcus aureus* is an important contagious pathogen that causes both nosocomial and community acquired infections in people and is also responsible for disease in animals specially clinical and subclinical mastitis in dairy cattle worldwide (Petrovski *et al.,* 2009).

Table 3. CMT screening results and status of *S. aureus* isolated from CMT positive quarter milk samples

Parameters	No. of dairy cows(%)	No. of quarters(%)
CMT performed	104	416
SCM positive	32(30.77)	52(12.50)
S.aureus isolates		20(38.46)

*CMT=California Mastitis Test, SCM= Subclinical Mastitis (Source: Sumon *et al*., 2018)

Based on CMT screening, the overall prevalence of SCM in lactating cows in Gazipur district was 30.77%. The quarter level prevalence of SCM was 12.50%. S. aureus was associated with 38.46% cases of SCM.

3.3.4 Risk factors of Mastitis

The cows with a history of previous mastitis are two to five times more susceptible to clinical mastitis than those without history of previous mastitis (Bitew *et al.*, 2010).

Cows with pendulous type of udder had significant association with SCM. Pendulous udders sweep the ground all the time that facilitate ascending entry of mastitis pathogens. Additionally, pendulous type of udder does not wear well due to bigger size, and it is more likely to become injured than an udder held up closure to the body.

The SCM was significantly associated with body condition score of 2–2.5, compared to other scores which suggests that individual health condition influences the occurrence of SCM (Sarker *et al.,* 2013).

Table 4. Herd level prevalence of SCM in study area

Herd size	Farm studied	SCM positive herd (%)
1-5	10	40.00
6-10	04	50.00
11-20	02	100.00
21-30	01	100.00

(Source: Sumon *et al.,* 2018)

The farm was grouped into four on the basis of cattle population (Table 4). The majority of the dairy farms in the study area had 1-5 lactating cows and there was a considerable variation in the prevalence of mastitis depending on the farm size (40.00 to 100%). The farm with large herd size (21-30) was more prone to SCM than smaller farm.

3.3.5 Prevention and control of Mastitis

It is better to prevent mastitis before it becomes a problem. It is essential to provide clean, dry and adequate bedding for cows to lie. Different factors are significantly associated with the occurrence of subclinical mastitis, which need to be considered in the control of the disease. Special emphasis should be put on reducing the incidence of SCM in cows with pendulous udder

and history of previous clinical mastitis. This can be attempted by enhanced cleanliness in the barns and proper treatment with appropriate antibiotics, respectively. Particular attention should also be paid on grass feeding and BCS (Body Condition Score) because these traits can be modified or improved to allow prevention of SCM. In addition, frequent cleaning should be done in the barns of straw fed cows so that less amount of straws are left to contaminate the barn environment mixed with urine, feces, and other wastes (Sarker *et al.,* 2013).

3.4 Foot and Mouth disease (FMD)

Foot and mouth disease (FMD) is a highly contagious disease that affects a wide range of domestic and wild animal species. This, combined with the high variability of the virus, determines that control of FMD virus infections is challenging and extremely expensive.

3.4.1 Causal agent and clinical signs

Foot-and-mouth disease virus (FMDV; family Picornaviridae; genus Aphthovirus) causes an acute disease of cloven-hoofed animals characterized by fever, lameness and vesicular lesions of the feet, tongue, snout, and teats. These debilitating effects, rather than high mortality rates, are responsible for severe productivity losses associated with foot-and-mouth disease (FMD) (Azeem *et al.,* 2020).

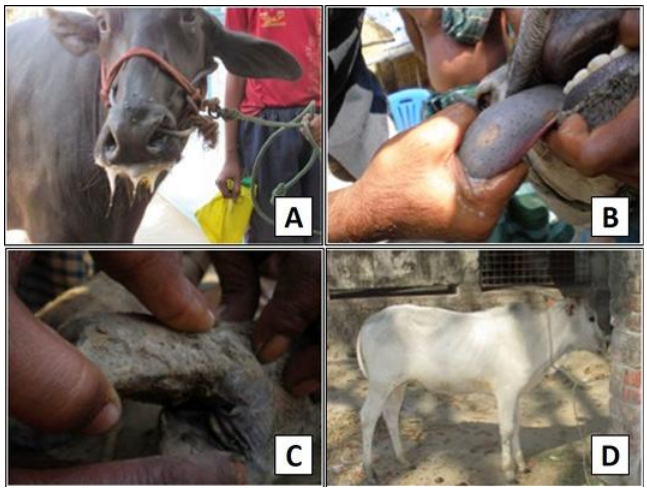


Figure 4. Foot and mouth Disease in Cattle (Source: Azeem *et al*., 2020)

Table 5. Clinically detection of FMD in relation to farm management systems, age, sex and breed of cattle in Kapasia upazila at Gazipur District

Variables		Animal examined	Animal infected	Percentage(%)
Farm management system	Rural household farm	207	63	30.43
	Intensive farm	108	23	21.30
Age	Young(1 to <=2yrs)	70	11	15.71
	Adult(2 t0 <=4yrs)	55	12	21.81
	Old(4 yrs)	190	63	33.15
Sex	Male	105	35	33.65
	Female	211	51	24.17
Breed	Indigenous	186	66	35.48
	crossbred	129	20	15.50

(Source : Alam *et al*., 2016)

3.4.2 FMD Pathogenesis in Cattle

There are four stages of pathogenesis of FMD in cattle

Pre-viraemia: The period from when an animal is first infected with FMDV until virus is first detected within the intravascular (i.e. blood) compartment with a sustained and quantitatively increasing trend.

Establishment of viraemia: Temporally occurs within pre-viraemia. However, because of the importance of this transition, it will be treated as a distinct event.

Viraemia: The period during which FMDV can be detected within the intravascular compartment with kinetics suggestive of active viral replication. This period typically coincides with the clinical phase of disease.

Post-viraemia: The period following viraemia starting with the first negative assay on blood which includes:

(i) Resolution of clinical signs

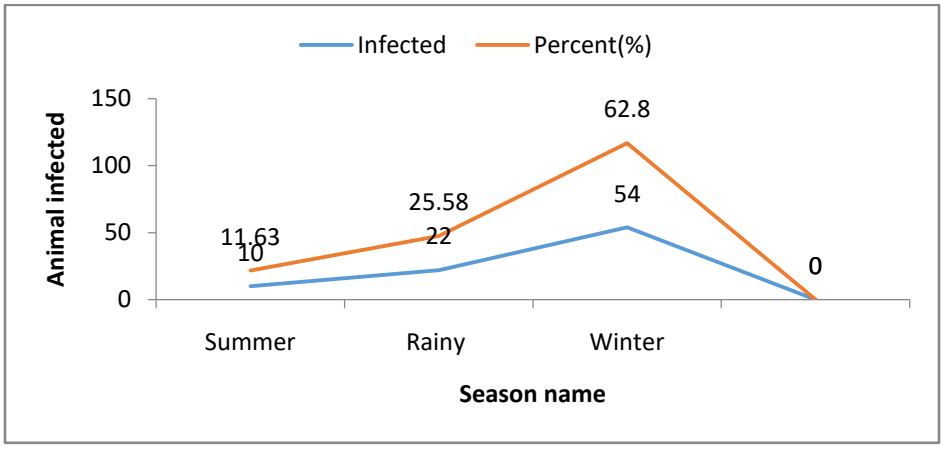
(ii) Short-term persistence of infectious virus, antigen and/or RNA in specific tissues

(iii)Persistent infection (carrier state): the period after 28 days in which infectious FMDV may be detected on at least one of multiple oesophageal–pharyngeal (OP) samples (as defined by OIE)

(iv) Chronic long-term sequelae including hirsutism, heat-intolerance (panting) and thyroid dysfunction, which have been reported in recovered cattle (Alexandersen and Mowat, 2005).

3.4.3 Occurrence of FMD in relation to seasons of Kapasia upazila at Gazipur district

In Gazipur disease prevalence is higher in case of winter season than any other season.



(Source : Alam *et al*., 2016)

Figure 5. Occurrence of FMD in relation to seasons of Kapasia upazila at Gazipur district.

3.4.4 Economic losses due to FMD outbreak

FMD infection in the livestock causes significant drop in milk yield (minimum 25%), reduction in meat and wool production, crippled agricultural draught power, and abortion in pregnant animals, poor semen quality in bulls, and increased mortality in calves. Trade barrier for export of FMD infected livestock and their products and massive expenditure spent by Governments on FMD control and treatment of ailing animals also cause a great economic loss to the countries endemic to FMD. Furthermore, prolonged convalescence, short term immunity with no inter-serotype cross protection, and establishment of carrier status complicates the control and eradication of this devastating disease.

3.4.5 Prevention and control of FMD

Foot-and-mouth disease can be controlled by sanitary measures and vaccination but this is difficult owing to the existence of multiple serotypes of the causative virus, multiple host species including wildlife and extreme contagiousness. Although intolerable to modern high-production livestock systems, the disease is not usually fatal and often not a priority for control in many developing countries, which remain reservoirs for viral dissemination. Phylogenetic analysis of the viruses circulating worldwide reveals seven principal reservoirs, each requiring a tailored regional control strategy. Considerable trade benefits accrue to countries that eradicate the disease but as well as requiring regional cooperation, achieving, and maintaining this status using current tools takes a great deal of time, money and effort (Singh *et al.*, 2019).

3.5 Rabies

Rabies is a fatal zoonotic viral disease. It is a threat to half the world's population and kills>59k people each year, most of them children. Globally, >29 million people annually undergo post-exposure prophylaxis (PEP) for rabies.

3.5.1 Causal agent

Rabies is caused by Rabies virus (Genus- Lyssa virus) under the family of Rhabdoviridae.

3.5.2 Transmission of Rabies

Biting or scratching wounds, and licking of broken skin and mucous membranes are the common modes of virus transmission from rabid animal saliva to humans and other animals. In humans, it is transmitted mostly by canines, cats, mongoose, and bats and infrequently by farm animals. Domestic dogs cause >99% of all human cases. In humans, the disease is fully preventable through wound management, prompt administration of Post Exposure Prophylaxis (PEP) and inoculation of rabies immunoglobulin to bite victims.

3.5.3 Control of Rabies

Rabies can be controlled through mass vaccination of domestic dogs. PEP is costly and often not available in rural areas where the disease is more prevalent. In contrast, dog vaccination is relatively more cost-effective and a feasible method to decrease the incidence of human and domestic animal rabies. Considering this, the World Health Organization (WHO) and partners have adopted a goal to eliminate dog-mediated human rabies by 2030 via the control of the disease in dogs (Noman *et al*., 2021).

Female, crossbred and older cattle especially in rural areas should either be managed indoors during the dog breeding season or vaccinated. Prevention of rabies in rural dogs and jackals will reduce the incidence of this disease in both humans and domestic ruminants.

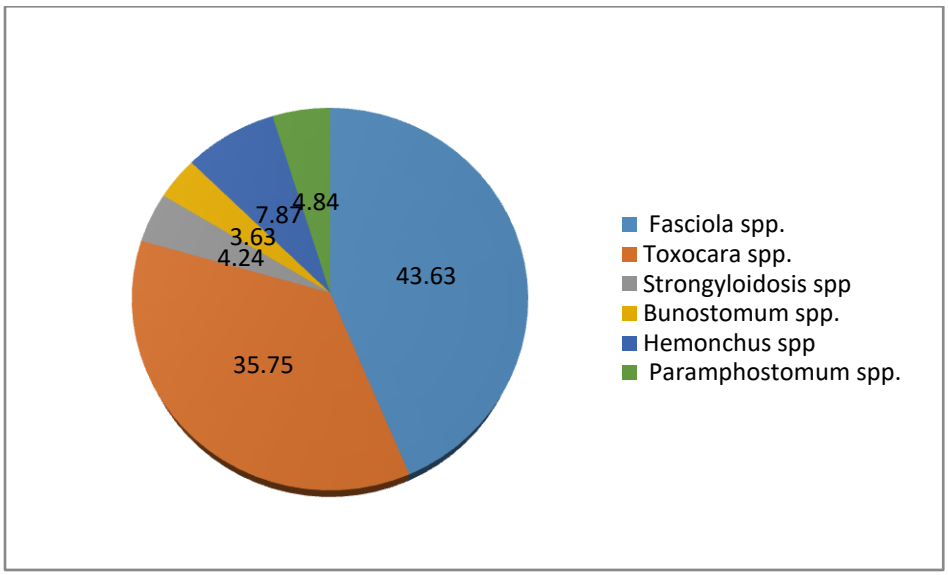
In Bangladesh canine rabies elimination program has focused primarily on PEP and mass dog vaccination to reduce the incidence of human deaths.

3.6 Parasitic infestation

Parasitic infection is a major impediment to health and livestock production in tropical and subtropical countries including Bangladesh. All age groups of cattle are infected by a diverse set of gastrointestinal parasites (Islam *et al*., 2020). Among the gastrointestinal parasites; coccidian, ascarid, strongyle, setaria, and amphistomes were mostly in tropical and temperate countries like India, Bangladesh, South Africa, Sri Lanka, Italy, and Mongolia, with a prevalence rate ranging from 20 to 96% (Hassan *et al.,* 2011). Gastrointestinal parasitic infestation varies depending on the prevailing climatic conditions and farm management practices.

3.6.1 Prevalence of Parasitic infection

The prevalence of parasitic infection depends on ecology, geographical and climatic condition prevailing in Bangladesh (Hossain *et al*., 2004).



(Source: Khatun *et al.*, 2021)

Figure 6. Prevalence of parasitic diseases in Gazipur.

Since Gazipur is the central place of Bangladesh, so its geo-climatic conditions represent the whole of Bangladesh. In addition, this district has a rich source of cattle. This figure shows the overall prevalence of gastrointestinal parasitic diseases in cattle in Gazipur Sadar. The prevalence of Fasciola spp. was (43.63%) followed by Toxocara spp. (35.75%) and Haemonchus spp. (7.87 %). The highest incidence of parasites was observed in the rainy season (45.55%) followed by summer (32.12%) and winter (22.42%).

Table 6. Prevalence/occurrence of gastrointestinal parasitic infections in different seasons

Season	*Fasciola spp*	*Toxocara spp.*	*Strongyloidosis spp.*	*Bunostomum spp.*	*Haemonchus spp.*	*Paramphistomum spp.*
Winter	40.54%	45.94%	2.70%	5.40%	5.54%	-
Rainy	46.66	33.33%	5.33%	2.66%	4.00%	8.00%
Summer	41.50	32.07%	3.77%	3.77%	15.095	5.40%

(Source: Khatun *et al.*, 2021)

This table shows the overall prevalence of gastrointestinal parasitic diseases in cattle in Gazipur district. The prevalence of *Fasciola spp.* was (43.63%) followed by *Toxocara spp.* (35.75%) and *Haemonchus spp.* (7.87 %). The highest incidence of parasites was observed in the rainy season (45.55%) followed by summer (32.12%) and winter (22.42%). They mentioned relatively high temperature and humidity are suitable for the larval development and survival in the pasture of such parasites.

3.6.2 Economic losses due to Parasitic infection

Although these infections are always not injurious with high mortality in cattle, their effects are commonly characterized by retarded growth, low productivity, and increased susceptibility of animals to other infection. These parasitic infestations are associated with overall economic losses in the livestock industry (Bary *et al.,* 2018). Among the factors affecting the health and productivity of cattle, gastrointestinal parasitism is one of the leading obstacles in the cattle industry in Bangladesh.

3.6.3 Prevention and control of Parasitic disease in cattle

Intermediate host control is very important for prevention of parasitic disease. Snail and Vector should be controlled. Regular deworming is essential for the prevention of parasitic disease.

3.7 General prevention and control strategy for cattle diseases

Disease prevention is a procedure through which individuals, particularly those with risk factors for a disease, are treated in order to prevent a disease from occurring. Vaccination is an important part of disease prevention. Prevention is better than cure.

Table 7. Vaccination Schedule for Cattle

Sr. No.	**Name of Disease**	**Age at first dose**	**Booster dose**	**Subsequent dose**
1	Foot and Mouth Disease (FMD	4 months and above	1 month after first dose	Six monthly
2	Haemorrhagic Septicaemia (HS)	6 months and above	-	Annually in endemic
3	Black Quarter (BQ)	6 months and above	-	Annually in endemic areas
4	Brucellosis	4-8 months of age (Only female calves)	-	Once in a lifetime
5	Theileriosis	3 months of age and above	-	Once in a lifetime. Only required for crossbred and exotic cattle.
6	Anthrax	4 months and above	-	Annually in endemic areas.
7	IBR	3 months and above	1 month after first dose	Six monthly
8	Rabies (Post bite therapy only)	Immediately after suspected bite.	4th day	7,14,28 days after first dose.

(Source : Hossain *et al*.,2016)

Causal agent removal is very important for disease prevention. If there is any disease, it should be treated with proper antiviral, antibacterial and anthelmintic drugs. Snail causes many diseases. Snail removal is crucial for disease control. CuSo4 is very much effective for snail control. During rainy season, grass contain many snails and intermediate host. So, grass should not be given too much during this time. In case of vector borne disease, vector should be controlled.

Control means total eradication of the disease. There are two recognized methods for eradication of disease. First one is the slaughter method. By slaughtering of all infected and exposed animals

in the shortest possible time, the disease can be absolutely eradicated. Second one is the quarantine method. It mainly related with the isolations and treatment of affected animals. The vectors will no more be available if properly controlled. Once upon a time small pox was very prevalent in the world. Many deaths occur due to this disease. But small pox virus is now totally eradicated. Small pox virus vaccination was done after years and years. Seed virus of small pox has also been destructed. It is totally controlled now. There is no chance to regain this disease. So, improvement of proper vaccine is necessary to prevent and control any disease. Isolation and quarantine are important terms for disease control. Isolation separates sick animals with a contagious disease from animals who are not sick. Quarantine mainly separates and restricts the movement of individuals who were exposed to a contagious disease to see if they become sick. These people may have been exposed to a disease and do not know it, or they may have the disease but do not show symptoms.

Before introducing new cattle in the shed it should be quarantined for 14-21 days to see if there is presence of new disease or not. Proper biosecurity in the farm should be maintained to prevent and control these diseases.

CHAPTER IV

CONCLUSION

The present paper gives an idea about the prevalence of cattle diseases in Gazipur district. It also gives a clear conception about the prevention and control of prevalent cattle diseases in this district. The findings of this seminar paper conclude that the prevalence of LSD was higher in case of crossbred (12.58%), Female (11.23%) and Adult Cattle (14.61%). In case of parasitic infestation, higher prevalence found in crossbred (9.21%), Male (10.11%) and in adult cattle (9.66%). Every year these prevalent diseases cause huge production loss and economic loss in our country.

To prevent these huge loss, proper treatment, prevention, and control measures of diseases are very important. Prevention measures help to prevent the occurrence of diseases in the cattle. Control measures helps to eradicate the disease totally from the root. Proper biosecurity helps to prevent the entry of pathogens in the cattle shed. Slaughtering in some cases helps in disease prevention. Diseased animals must be isolated from the healthy one. Maintaining proper quarantine procedures before the entry of new cattle in the herd helps in prevention and control of diseases. More study about prevention and control of cattle diseases in this area will help to reduce the losses. If it is possible to maintain the proper preventive and control measures, it will be easy to maintain healthy herd and can improve our dairy industry.

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