STUDY ON STATUS OF CATTLE DISEASES IN RELATION TO AGE, SEX AND SEASON AT DEBIDWAR, COMILLA

A THESIS

BY

Kazi Dilshad Mostari
Registration No.: 1605140
Session: 2016-2017
Semester: January-June, 2017

MASTER OF SCIENCE (M.S.)
IN
PATHOLOGY

DEPARTMENT OF PATHOLOGY AND PARASITOLOGY

HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR-5200, BANGLADESH

JUNE, 2017

STUDY ON STATUS OF CATTLE DISEASES IN RELATION TO AGE, SEX AND SEASON AT DEBIDWAR, COMILLA

A THESIS

BY

Kazi Dilshad Mostari
Registration No.: 1605140
Session: 2016-2017
Semester: January-June, 2017

MASTER OF SCIENCE (M.S)
IN
PATHOLOGY

DEPARTMENT OF PATHOLOGY AND PARASITOLOGY

HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR-5200, BANGLADESH

JUNE, 2017

STUDY ON STATUS OF CATTLE DISEASES IN RELATION TO AGE, SEX AND SEASON AT DEBIDWAR, COMILLA

A THESIS

BY

Kazi Dilshad Mostari
Registration No.: 1605140
Session: 2016-2017
Semester: January-June, 2017

Approved as to style and content by

…………………………………...	………………………………
(Prof. Dr. Md. Harun-ur-Rashid)	(Dr. Md. Golam Azam)
Supervisor	Co-Supervisor

……………………..……………

(Dr. Md. Haydar Ali)
Chairman, Examination committee
Department of Pathology and Parasitology

DEPARTMENT OF PATHOLOGY AND PARASITOLOGY
HAJEE MOHAMMAD DANESH SCIENCE AND TECHNOLOGY UNIVERSITY, DINAJPUR-5200, BANGLADESH

JUNE, 2017

DEDICATED
TO MY
BELOVED PARENTS

ACKNOWLEDGEMENT

All praises are due to the Almighty Allah, the creator and supreme authority of earth, who possess the author to complete the research work successfully.

The author wishes to express the deepest sense of gratitude, sincere appreciation, indebtedness and best regards to her respected teacher and research supervisor Professor Dr. S.M Harun-ur-Rashid, Department of Pathology and Parasitology, Faculty of Veterinary and Animal Science, Hajee Mohammad Danesh Science and Technology University (HSTU), Dinajpur for his patience and motivation, enthusiasm, affectionate feeling, sympathetic supervision and constructive criticism in all phases of this study and preparing the manuscript.

The author deeply owes to her respectable co-supervisor Dr. Md. Golam Azam, Assistant Professor, Department of Pathology and parasitology, Faculty of Veterinary and Animal Science, HSTU, Dinajpur for his valuable advice and encouragement throughout the period of this study.

The author desires to express her profound respect and thanks to her respected teacher Md. Haydar Ali, Chairman, Department of Pathology and Parasitology, Hajee Mohammad Danesh Science and Technology University, Dinajpur for his help, cooperation and inspiration to conduct the course works and research smoothly and perfectly.

Thanks are also extended to Dr. A F M Rakibul Bhuiya, Upazilla Livestock officer, Debidwar, Comilla for his cordial help and allow to do my research work in Upazilla veterinary hospital.

The author is ever indebted to her beloved mother for her endless sacrifice, heartiest blessings and support throughout her entire life.

The author would like to extend thanks to his elder brother Kazi Md. Al Noman, Beloved husband Dr. Md. Abdullah-Al-Tanver Talukder, friend Md. Gausur Rahman, Tethi Tannaby, other friends for their good wishes and co-operation to conduct this research work.

The Author
June, 2017

ABSTRACT

This study detects the prevalence of several diseases and to evaluate the disease condition of cattle population in the selected area with relation to age, sex and seasonal variation at Comilla district of Bangladesh. The duration of the experiment was on year and conducted from July, 2016 to June, 2017. According to the case record, a total of 1145 sick animals were examined and 45 types of diseases were identified during this period. Disease diagnosis was made on the basis of owner's statement, general examination, physical examination and clinical examination. The clinically observed cases in cattle were bacterial (12.66%; n=145/1145), viral (19.56%; n=224/1145), gyneco-obstetrical (15.46%;n=71/1145), Parasitic diseases (8.91%; n= 102/1145), surgical affection(4.63%,n=53/1145), digestive disorder (16.9%,n=1145) and other clinical disorder (15.72%,n=180/1145) respectively. According to the study the highest prevalence were recorded by viral diseases followed by bacterial diseases, gyneco-obstetrical cases, parasitic diseases, surgical affection, digestive disorder and other clinical condition. Identification and analysis of the clinical diseases available in study area will be useful for veterinary practitioners, researcher's, academician and also for policy planner to take necessary steps to control the incidence of clinical diseases of cattle.

LIST OF ABBREVIATIONS

%	: Percentage
BCS	: Body Condition Score
BQ	: Black Quarter
CDCP	: Centers for Disease Control and Prevention
CPE	: Cytopathic Effect
DLS	: Department of Livestock Service
EM	: Electron Microscopy
SPA	: *Staphylococcus aureus* protein A PCR poly
BEF	: Bovine Ephemeral Fever
BEFV	: Bovine Ephemeral Fever Virus
E.COLI	: *Esherichia Coli*
FMD	: Foot and Mouth Disease
FMDV	: Foot and Mouth Disease Virus
FY	: Fiscal Year
GDP	: Gross Domestic Product
HS	: Hemorrhagic Septicemia
No.	: Number
NS	: Not Significant
UVH	: Upazila Veterinary Hospital
et al	: and his associates
/	: or
<	: Less than
>	: Greater than

CONTENTS

CONTENTS (Contd.)

CONTENTS (Contd.)

CONTENTS (Contd.)

CONTENTS (Contd.)

LIST OF TABLE

LIST OF FIGURE

LIST OF PHOTOS

CHAPTER 1
INTRODUCTION

The economy of Bangladesh depends mainly on agriculture. Agriculture consisting of crop, fisheries, livestock and forest sub sector continues to be the largest sector of Bangladesh. Livestock are domesticated animals raised in an agricultural setting to produce commodities such as food, fiber and labor. The term is often used to refer solely to those raised for food and sometimes only farmed ruminants, such as cattle and goats (Wikipedia). The livestock sector not only the vital source of animal protein (about 44%) but also plays an important role in poverty reduction, employment generation, women empowerment and earning of leather goods (4.31% of total export) (DLS, 2016). Livestock plays a significant role to keep the rural economy endurable. There are about 25.7 million cattle, 0.83 million buffalo, 14.8 million goats and 1.9 million sheep, 118.7 million chickens and 34.1 million ducks in Bangladesh (DLS, 2016). These livestock population plays a significant responsibility in the urban economy (Kamaruddin, 2003). The contribution of livestock in the magnitude of Gross Domestic Product (GDP) is about 1.66% in Bangladesh (FY, 2015-16). Though Bangladesh has one of the highest livestock populations in the world, but characterized by very low productivity, particularly in cattle because of low productivity, inferior genetic material, indiscriminate breeding leading to severe genetic erosion, neglect of animal health care and non-existence of an efficient value chain, shortage of feeds and fodder resources and lack of awareness (BIDS, 2012).

The management practices of animals and geo-climatic condition of Bangladesh are favorable for the occurrence of various diseases (Onneshan, 2014). Among the various constrains in the development of cattle, disease are one of the most important limiting factors which not only degrade the productivity of cows but also causing mortality (Sarker *et al.,* 1999). The incidence of disease not only higher in the developing nations but in the absence of any national control and eradication program, is also increasing worldwide particularly in the Asian, African and Latin American countries (Bakshi *et al.,* 2001). Among the different constrains of cattle rearing, outbreak of several devasting disease is the major constrains causing economic loss and discouraging dairy farming in this country. Among the different diseases available in the comilla district include Food and mouth diseases (FMD) which is severe, highly contagious viral disease of livestock with significant economic impact. The disease affects cattle, swine, sheep, goats and other cloven hoofed ruminants. Furthermore, elephant and girffe are susceptible to FMD (Kitching, 2005 and Mahy, 2005).

Parasites are organisms that are metabolically and physiologically dependent on other organisms, their hosts, for survival and development (Sobecka, 2001). The distribution of parasitic diseases is throughout the world, but it varies in effects in the developed and developing world. The most impact of diseases is probably due to costs of control, particularly helminthic parasitosis of the developed world.

Poor reproductive performance is a crucial production imitating issue. It has been reportable that reproductive disorders are accountable exceptional economic losses to the dairy farmers in Bangladesh (Talukder *et al*., 2005). The dairy industry's major goal is to provide milk for the consumer market.

Amongst domestic farm animals the metabolic diseases achieve their greatest importance in dairy cows. In farm cows, the incidence of metabolic diseases is highest within the amount commencing at parturition and lengthening till the height of lactation is reached, and this susceptibleness seems to be relating to the extremely high turnover of fluids, salts and soluble organic materials throughout the first a part of lactation (Erband Corohn, 1988).

There were exist a variety of problems in livestock sector of Bangladesh such as insufficient pasture land, lack of technical expert, insufficient supply of vaccine, lack of epidemiologic study and shortage of government employee in the field level and various diseases of different systems of animals. Infectious diseases cause a great harm in livestock. It has been estimated that about 10% animals die annually due to diseases (Ali *et al*., 2011). Disease also causes nutritional deficiency and disturbances in fertility. Understanding on the incidence, prevalence, distribution and determinants or risk factors of diseases in a region is important for effort economical management program.

The Veterinary hospitals are the ideal and compatible resource of information about animal diseases and their illustration. Veterinary clinics and hospitals become a crucial source of the information about animal diseases and their management. The animals that are affected with various diseases and disorders are always bringing to Veterinary Clinics and Hospital. The owners of the animals from the clinging areas to the Veterinary hospital or clinic bring their sick animals daily. Cautiously record and analysis of these disease problems at different Upazilla Veterinary Hospital gives correct idea about the cases in local areas for cattle. The ambient information knows about the disease status by the investigation of the case record at particular areas. Although some reports on clinical case records from Bangladesh Agricultural University Veterinary Clinic (Rahman *et al.*, 1972; Hossain *et al.*, 1986; Das and Hashim, 1996; Samad, 2001 and Samad *et al.*, 2002), Haluaghat Upazila Veterinary Hospital, Mymensingh (Sarker *et al.*, 1999) and Dairy Cooperatives in Pabna district (Pharo, 1987), Ulipur Upazila Veterinary Hospital, Kurigram (Kabir *et al.*, 2010), Chandanaish Upazila of Chittagong district, Bangladesh (Pallab *et al.*, 2012) and Patuakhali Science and Technology University Veterinary Clinic (Rahman *et al.*, 2012) are available but similar report on ruminants are very limited in Debidwar Upazila of Comilla district of Bangladesh.

The objectives of this investigation were

(i) To study the diseases and disorders in cattle at the Upazilla Veterinary Hospital (UVH), Debidwar, Comilla.

(ii) To study the seasonal occurring diseases and various disorders and their percentage are recorded at the clinic.

(iii) To find out the clinically occurring diseases and disorders of the cattle.

CHAPTER 2
REVIEW OF LITERATURE

The review of literature is presented with a view to obtaining the vital information conducted by other workers relevant to the research study. This chapter will concentrate on the related studies of this present study. It reviews the studies on viral disease, bacterial disease, parasitic disease, metabolic disease, surgical affection and gyneco-obstetrical cases.

2.1 Viral Disease

2.1.1 Foot and mouth disease

Foot and mouth disease (FMD) is an acute systemic infection affecting cloven-hoofed animal species (Murphy *et al.,* 1999; Bastos *et al.,* 2003). FMD generally involves mortality below 5% but it is considered the most economically important disease of farm animals since it causes significant decreases in livestock productivity and trade in livestock products (Domingo *et al.,* 1990; Domingo *et al.,* 2002. The main route of infection of ruminants such as cattle is the inhalation of airborne virus, but infection via alimentary tract or skin lesions is also possible. Some of the clinical symptoms of FMD include fever, anorexia, weight loss, lameness, salivation and vesicular lesions (mouth and skin). An asymptomatic persistant infection can be established in ruminants for several years. Animals with this kind of infection are referred to as carrier animals and are important reservoirs of the causative virus. African buffalo (Synceruscaffer) are important carriers and are a possible source of FMD outbreaks by virus transmission to susceptible animals such as cattle (woodsbury *et al.,* 1995) Although FMD rarely causes death in adult animals, mortality rates are high in young animals (Doel, 1996). Recent outbreaks of the disease in a number of once FMD free countries particularly Taiwan (1997), United Kingdom (2011) have significantly increased public awareness of this highly infectious disease (Anon, 2002; Grubman and Baxt, 2004).

Loth *et al.,* (2011) stated that foot and mouth disease (FMD) is endemic in Bangladesh and tp implement an effective FMD control programme, it is essential to understand the complex epidemiology of the disease. Here, we report on the characterization of FMD virus (FMDV) recovered from FMD outbreaks in Bangladesh in late 2009. All isolated viruses belonged to the FMDV serotype O. The phylogenetic reconstruction showed that all isolates belonged to the Middle East South Asia (Me-SA) topo type, but fell into two distinct sub lineages, one named IInd-2001 (the other has not been named). Within both sub lineages, the 2009 Bangladesh isolates were most closely related to viruses from Nepal collected during 2008 and 2009.Additionally, both sub lineages contained older viruses from India collected in 2000 and 2001. In south Asia, there is extensive cross-border cattle movement from Nepal and India to Bangladesh. Both these findings have implications for the control of FMD in Bangladesh. Because of the porous borders, a regional FMD control strategy should be developed. Further, animal identification and monitoring animal movements are necessary to identify the cross-border movements and market chain interactions of ruminants, leading to improved border and movement controls. Additionally, a vaccination strategy should be developed with the initial objective of protecting small-scale dairy herds from disease. For any successful FMD control programme, long term Government commitment and adequate resources are necessary. A sustainable programme will also need farmer education, commitment and financial contributions.

Rainwater-Lovett *et al.,* (2009). Assessed in study, FMD, infrared thermography (IRT) as a means of detecting foot and mouth disease virus (FMDV)-infected cattle before and after the development of clinical signs. Preliminary IRT imaging demonstrated that foot temperatures increased in FMDV-infected animals. The maximum foot temperatures of healthy (n=53), directly inoculated (DI) (n=12), contac (CT) (n=6), and vaccine trial (VT) (n=21) cattle were measured over the course of FMD infection. A cut-off value was established at 34.4??C (sensitivity=61.1%, Specificity=87.7%) with the aim of detecting FMDV-infected animals both before and after clinical signs were observed. Seven of 12 (58%) DI and3/6 (50%) CT animals showed maximum foot temperature exceeding the 34.4??C cut-off before the development of foot vesicles. In contrast, only 5/21 (24%) VT animals displayed preclinical foot temperature above this cut-off possibly indicating partial vaccine protection of this group. These results show IRT as a promising screening technology to quickly identify potentially infected animals for confirmatory diagnostic testing during FMD outbreaks. Further evaluation of this technology is needed to determine the value of IRT in detecting animals with mild clinical signs or sub-clinical infections.

2.1.2 Rabies

Lojkic *et al.,* (2013) examined cases of clinical rabies on a beef cattle farm in east Slavonija (Croatia) reported in July 2012 are described. The clinical signs, diagnosis, control and prevention through vaccinaton of the disease are discussed. The rabies strain isolated from these cases have been subjected to phylogenetic analysis. The results of an epidemiological investigation are also presented. It is assumed that the rabies virus has been transmitted most likely to the cattle through contact with wildlife carrying the NEF/e lineage before they have been transported from Braslov, Romania to Croatia

Stadtfeld are Haberkorn (1986) found that diagnostic results of the post-mortem examinations of the brains of 99 rabies-suspected but actually not infected cattle are reported. In 19 cases listeria encephalitis was stated. Furthermore non-purulent encephalitis 9 X, including 1 X malignant catarrhal fever of cattle and 2 X mucosal disease; purulent encephalitis 1 X ; crticocerebral necrosis 1 X and arterial necrosis 1 X and arterial sclerosis 1 X were diagnosed . 68 cases proved to be no cerebral disease.

2.1.3 Bovine ephemeral fever (BEF)

Bastawecy *et al.,* (2011) reported that bovine ephemeral fever virus (BEFV) isolates after their identification and confirmation by virus neutralization test (VNT) were subjected for characterization with negative staining electron microscopy (EM) before and after improving its performance with BEFV antibodies binded to *Staphylococcus aureus* protein A (SPA) using *Staphylococcus aureus* protein A coagulation ultrastructure analysis (SPA COA-EM). Negative staining EM could detect rhabdoviral particles coated with the specific antibody were observed in addition to their attachment to the surface of staphylococcus aures. It is concluded that negative staining EM and SPA COA-EM could characterize BEF viral particles following their isolation in green monkey kidney (Vero) cells.

Walker and Clement, (2015) reported that Bovine ephemeral fever (or3-day sickness) is an acute febrile illness of cattle and water buffaloes. Caused by an arthropod –borne rhadovirus, bovine ephemeral fever virus (BEFV), the disease occurs seasonally over a vast expanse of the glove encompassing much of Africa, the Middle East, Asia and Australia. Although mortality rates are typically low, infection prevalence and morbidity rates during outbreaks are often very high. Causing serious economic impacts through loss of milk production, poor cattle condition at sale and loss of traction power at harvest. There are also significant impacts on trade to regions in which the disease does not occur, including the Americas and Europe. In recent years, usually severe outbreaks of bovine ephemeral fever have been reported from several regions in Asia and the middle East, with mortality rates through disease or culling in excess of 10-20%. There also concerns that, like other vector-borne diseases of livestock, the geographic distribution of bovine ephemeral fever could expand into regions that have historically been free of the disease. Here, we review current knowledge of the virus, including its molecular and antigenic structure and the epidemiology of the disease across its entire geographic range. We also discuss the effectiveness of vaccination and other strategies to prevent or control infection.

2.2 Bacterial Disease

2.2.1 Anthrax

Sweeny *et al*., (2011) found that *Bacillus anthracis* infection is rare in developed countries. However, recent outbreaks in the United states and Europe and the potential use of the bacteria for bioterrorism have focused interest on it. Furthermore, although anthrax was known to typically occur as one of the three syndromes related to entry site of (i.e., cutaneous, gastrointestinal, or inhalational), a fourth syndrome including severe soft tissue infection in injectional drug users is emerging. Although shock has been described with cutaneous anthrax, it appears much more common with gastrointestinal, inhalational (5 of 11 patients in the 2001 outbreak in the United States), and injectional anthrax. Based in part on case series, the estimated mortalities of cutaneous, gastrointestinal, inhalational and injectional anthrax are 1%, 25 to 60%, 46% and 33% respectively. Nonspecific early symptomatology makes initial identification of anthrax cases difficult. Once anthrax is suspected ,the diagnosis can usually be made with Gram stain and culture from blood or surgical specimens followed by confirmatory testing (e.g, PCR or immunohistochemistry) Although antibiotic therapy is the mainstay of anthrax treatment, the use of adjunctive therapies such as anthrax toxin antagonists is a consideration.

2.2.2 Black Quarter

Sultana *et al*., (2008) conducted a study in Upazila Veterinary Hospital at Raozan in Chittagong from June to August. During the study period, 25b cases of BQ in cattle were found in eight Unions. Among then the highest (32%) proportion of BQ was found in Raozan Upazila. Frequency of BQ according to demographic variable was age incidence of >12 month (60%), male (60%), breed of Red Chittagong (44%), body condition score (BCS) of BCS-2 (88%) and affected body part involving hind quarter muscle (35%). Death was observed with 73% cases. In case of animal that were suffered from BQ, septicemia developed after 12 hr of onset of clinical signs and symptoms. Treatment was ineffective in advanced septicemic stage. Antibiotic therapy was found to be effective when administered within 12hr of the clinical symptoms.

Balaskrisnan, *et al*., (2013), was reported in this study, thigh muscle samples from 6 cows and 2 buffalos dies in outbreaks of BQ at different districts of Punjub were processed for isolation and characterization of pathogenic clostridia. Clostridium chauvoei isolated from all the samples and identified through biochemical and fermentation tests. All of the eight isolates of *Clostridium chauvoei* caused death in guinea pigs within 24-72 hours with rapid development of symptoms identical to the symptoms of BQ in cattle. All local isolates of *C. chauvoei* were found serologically homologous to *Clostridium chauvoei* Hershey strain used for BQ vaccine production at Veterinary Research Institute Lahore when subject to agar gel precipitation test.

2.2.3 Hemorrhagic Septicemia

Shivachandra *et al.,* (2011) exhibitied that *Hemorrhagic septicemia* (H.S), an acute fatal and septicemic disease of cattle and buffaloes caused by *Pasteurella multocida*, is important in tropical regions of the world, especially in Africa an Asian countries. The prevalence of disease has been well documented with predominant isolation P. multocida serotypes B:2 and E:2. Conventional methods of identification such as serotyping, biotyping, antibiogram determination and pathogenicity as well as molecularmethods (P. multocida-specific PCR,a serogroup B-specific PCR assay, multiplex capsular typing system and loop-mediated isothermal amplification techniques) and characterization (restriction endonuclease analysis, randomly amplification polymorphic DNA analysis, repetitive extra genic palindromic PCR and enter bacterial repetitive intergenic consensus PCR analysis) are applied in parallel for rapid epidemiological investigations of HS outbreaks. Although several vaccine formulations including alum precipitated, oil adjuvant and multiple emulsion vaccines are commercially available, the quest for suitable broadly protective HS vaccines with long-lasting immunity is on the upsurge. Concurrently, attempts are being made to unravel the mysteries of the pathogen and its virulence factors, pathogenesis and determinants of protective immunity as well as diversity among strains of P. multocida. This review highlights advances in this various aspects of H.S.

2.2.4 Tetanus

CDCP (USA) (2015) presented that Tetanus 341 21 Tetanus is an acute, often fatal disease caused by an exotoxin produced by the bacterium *Clostridium tetani.* It is characrerize by generalized rigidity and convulsive spasm of skeletal muscles. The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized. Although records from antiquity (5^{th} century BCE) contain clinical descriptions of tetanus, it was Carle and Rattone in 1884 who first produced tetanus in animals by injecting them with pus from a fatal human tetanus case. During the same year, Nicolair produced tetanus in animals by injecting them by samples of soil. In 1889, Kitasato isolated the organism from a human victim, showed that it produced disease when inject into animals, and reported that the toxin could be neutralized by specific antibodies. In 1897, Nocard demonstrated the protective effect of passively transferred antitoxin, and passive immunization in humans used for treatment and prophylaxis during first World War. A method for inactivating tetanus toxin with formaldehyde was developed by Ramon by in the early 1920's which lead to development of tetanus toxoid by Descombey in 1924. It was first widely used during second World War

2.2.5 Tuberculosis

Gilbert *et al*., (2005) reported in a study that 20 years, bovine tuberculosis (BTB) has been spreading in Great Britain (England, Wales and Scotland) and is now endemic in the southwest and parts of central England and in southwest Wales, and occurs sporadically elsewhere. Although its transmission pathways remain poorly understood, the disease's distribution was previously modeled statistically by using environmental variables and measures of their seasonality. Movements of infected animals have long been considered a critical factor in the spread of livestock diseases, as reflected in strict import/export regulations. The Government recently published strategic framework for the sustainable control of BTB since January 2001, it has been mandatory for stock-keepers in Great Britain to notify the British Cattle Movement Service of all cattle births, movements and deaths. Here we show that movements as recorded in the Cattle Tracing System data archive and particularly those from areas where BTB is reported consistently outperform environmental, topographic and other anthropogenic variables as the main predictor of disease occurrence. Simulation distribution models for 2002 and 2003, incorporating all predictor categories, are presented and used to project distributions for 2004 and 2005.

2.2.6 Mastitis

Royster and Wagner (2015) explained the understanding of mastitis, its cause and the rationale for treatment or no treatment of mastitis under various circumstances continues to evolve. This article presents research based evidence about the use or nonuse of drugs to treat mastitis. Nondrug factors involved in decision making about mastitis, including cow characteristics and epidemiology of mastitis, are also briefly discussed. This article provides information that helps in the making knowledgeable, evidence-based decisions about therapy for mastitis. Focus is primarily on the use of antimicrobial drugs.

Bradley (2002) described that Mastitis remains a major challenge to the worldwide dairy industry despite the widespread implementation of mastitis control strategies. The last 40 years have seen a dramatic decrease in clinical mastitis incidence but this has been accompanied by a change in the relative and absolute importance of different pathogens. *E. coli* and Streptococcus are now the two most common causes of bovine mastitis and are an increasing problem in low somatic cell count herds. This paper reviews the changes in incidence and pattern of mastitis in the UK over the last four decades and discusses some of the possible explanations for these changes. It focuses in particular on apparent changes in the behavior of E. coli and its ability to cause persistent inflammatory infection; which may be as a result of bacterial adaptation or unmasking of previously unrecognized patterns of pathogenesis. The prospects for novel approaches to mastitis control are discussed, as are the current and future challenges facing the industry.

2.2.7 Dermatophilosis

Ndhlovu & Masika (2016) conducted a cross-sectional study to assess cattle owners awareness, perception, attitudes and drug-usage practices with regard to bovine dermatophilosis. Knowledge of these farmers attributes is important for animal health policy makers in their endeavors to provide optimum disease control strategies that are acceptable to the communities. Data on cattle owner awareness of bovine dermatophilosis, causes, and treatment practices, perceptions about its importance and potential dangers to humans were collected using an interviewer-administered questionnaire. A total of 185 stockowners and cattle herds were involved in the study, with bovine dermatophilosis determined clinically by veterinarians. The result showed that 45.4% of the herds were clinically positive for dermatophilosis, and most farmers

(79.5%) were generally aware that dermatophilosis is a cattle disease. In the event of a dermatophilosis outbreak in a herd, 74.1% of the farmers treated their cattle using antibiotics; the proportion of farmers treating cattle did not differ ($p>0.05$) across the dip tanks. 52 farmers (52/63) indicated that drugs had to be administered 4 to 7 times before an animal recovered from infection. Tetracyclines were the antibiotic used by most farmers (79.3%) to treat dermatophilosis, with 19.1% using penicillin's. Concern were raised by farmers about the effectiveness of these drugs against bovine dermatophilosis. Across the study sites, 48.6% and 27.6% of the farmers perceived bovine dermatophilosis to be an important disease at the herd and area level, respectively. A small proportion (12.4%) of the farmers regarded bovine dermatophilosis as a potentially zoonotic disease. The high level of stockowners' general awareness, with regards of bovine dermatophilosis, sets ideal conditions for the mobilization of farmers by animals health authorities in the control of the disease. However, further research needs to be undertake to investigate effective antibiotic delivery protocols and potential zoonotic impact of bovine dermatophilosis in a situation of high disease prevalence.

2.3 Parasitic Diseases

2.3.1 Protozoal Diseases

2.3.1.1 Babesiosis

Beugnet and Moreau (2015) reported that Babesiosis is a disease caused by infection of the erythrocytes of mammals by Babesia species, which are apicomplexa protozoa belonging to the suborder Piroplasmidea and the family Babesiidae. They are different from the Theileriidae, which can also infect white blood cells and endothelial cells. Babesiosis is one of the most important Tick-borne infectious disease of domestic and wild mammals and still posses significant diagnostic and therapeutic challenges for veterinary practitioners around the world. It is an increasing problem worldwide because of expansion of Tick habitants and increase morbidity of animals, which promote the spread of parasites into new geographic areas. Babesia species can, exceptionally, infect humans, specially splenectomised or immunocompromised individuals. The majority of human cases involve *B. microti*, a parasite of rodents, but human infections may also caused by *B. divergens*, which infects cattle, or by Babesia related to *B. odocoilei*, which infect cervids. The majority of new developments, in regard to taxonomy, epidemiology, pathogenesis and control, concern canine babesiosis, whereas piroplasmosis in horses or cattle retain the classical description, therefore the focus of this article will be on infection in dogs.

Bock *et al*., (2004) observed that Tick fever or cattle fever (babesiosis) is economically the most important arthropod-borne disease of cattle worldwide with vast areas of Australia, Africa, South and Central America and the United States continuously under threat. Tick fever was the first disease for which transmission by an arthropod to a mammal was implicated at the turn of the twentieth century and is the first disease to be eradicated from a continent (North America). This reviews describes the biology of Babesia spp. in the host and tick, the scale of the problem to the cattle industry, the various components of control programmes, epidemiology, pathogenesis, immunity, vaccination and future research. The emphasis is on *Babesia bovis* and *Babesia bigemina.*

2.3.1.2 Theileriosis

Theileriosis is an arthropod-borne disease caused by one or more haemoprotozoan parasites of the genus Theileria. Traditionally, Theileria infection in cattle in Australia was largely asymptomatic and recognized to be associated with Theleria buffeli, now assigned to the Theleria orientalis-group. There have been some recent outbreaks of theileriosis in dairy and beef cattle, mainly in subtropical climate zone (New South Wales) of Australia. Here, we provide the first published evidence of an outbreak of bovine theileriosis in the south-eastern Australia (State of Victoria) linked to the ikeda and chitose genotype of *T. orientalis*. Further investigation should focus sharply on the elucidating the epidemiology and ecology of Theileria in this region to subvert the possible impact on the cattle industry.

2.3.1.3 Anaplasmosis

Audry and Geale (2011) stated that Bovine Anaplasmosis , caused by Anaplasmosis marginale , is an infectious but non-contagious disease. It is spread by the mechanical transfer of fresh blood from infected to susceptible cattle from bitting flies or by blood-contaminated fomites including needles, ear tagging, dehorning and castration equipment. Transplacental transmission of *A. marginale* may contribute to the epidemiology of bovine Anaplasmosis in some regions. Bovine anaplasmosis occurs in tropical ans subtropical regions worldwide. Cattle of all ages are susceptible to infection with *A. marginale* but the severity of disease increases with age. Once cattle of any age become infected with *A. marginale* , they remain infected carriers for life. Diagnosis of bovine Anaplasmosis can be made by demonstration of *A. marginale* on stained blood smears from clinically infected animals during the acute phage of disease, but it is not reliable for detecting infection In pre-symptomatic or carrier animals. In this instances, the infection is generally diagnosed by serologic demonstration of antibodies with confirmation by molecular detection methods. The susceptibility of wild ruminants to infection by *A. marginale* and the role of wild ruminants in the epidemiology of bovine Anaplasmosis are incompletely known owing to lack of published research, lack of validation of diagnostic tests for these species and cross reaction of Anaplasma spp. antibodies in serologic tests. Control measures for bovine Anaplasmosis vary from geographical location and include maintenance of Anaplasma-free herds, vector control, administration of antibiotics and vaccination.

2.3.1.4 Coccidiosis

Shudhakara Reddy *et al*., (2015) approved that Coccidiosis is caused by the protozoan parasite belongs to the genous *Eimeria spp* .which parasitizes the epithelial lining of the alimentary tract. Infection damages the lining of the gut causing diarrhea and possibly dysentery. Coccidiosis is primarily a disease of young animals but can affect older animals that are in poor condition. In a farm, several adult cattle had foul smell bloody diarrhea, anorexia, emaciation condition, smudging of the perineum and tail with blood stain dung. Laboratory examination of dung samples revealed the presence of coccidian oocytes. Animal were treated with 33.33% (w/v) sulphadimidine along with supportive and fluid therapy. After completion of 1 week of therapy all the affected cattle were recovered from diarrhea.

2.3.2 Internal Parasite

2.3.2.1 Fascioliasis

Phiri *et al*., (2006) examined that the liver fluke burden and pathology in condemned and non-condemned livers and the correlation of fluke and fecal egg fluke counts. The authors showed that a significantly higher number of liver flukes *(Fasciola gigntica*) (P<0.001) were found in the condemn (means SD=0.70.5) . Liver found in 9.4% of the non-condemned liver suggest that abattoir records of the liver inspection may underestimate *Fasciola gigantica* infections. Average fecal fluke egg counts from animals with condemned liver (5 eggs per gram, EPG) were significantly higher (P<0.001) than in animal with non-condemned livers (0.8 EPG). No correlation was found between egg counts and number of flukes. Fibrosis and calcification were common in condemned livers and severe near the bile ducts. It was was observed that only two (6.3%) showed pathological changes on the liver edges.

Singh *et al*., (2009) recorded 35.8%, 19.3% and 4.4% incidence of amphistomes *Fasciola gigantica* and Schistosomes, respectively in cattle. Trematode incidence was highest during the rainy season (74.38%), followed by winter (57.2%) and summer (24.4%), *L. auricularis* (6.8%) were involved transmission of Fascioliasis.

2.3.2.2 Roundworm

Clark *et al*., (1971) detailed a sampling system has been devised to reduce the amount of work required to produce estimates with a defined accuracy of the roundworm burdens of sheep and cattle The technique is based on the determination of the number of worms in a specific numbers of 5% or 1%aliquors of the total volume of gut contents and method has been validated in the counting of neomatodes from the anthelmintic trials.

2.3.2.3 Tapeworm

Rozario & Newmark (2015) exhibited that Tapeworms are pervasive and globally distributed parasites that infect millions of human and livestock every year, and are the causative agents of two of the 17 neglected tropical diseases prioritized by the World Health Organization. Studies of tapeworm biology and pathology are encumbered by the complex life cycles of disease relevant tapeworm species that infect hosts such as foxes, dogs, pigs and humans. Thus, studies of laboratory models can help overcome the practical, ethical and cost-related difficulties faced by tapeworm parasitologists. The rat intestinal tapeworm *Hymenolepis diminuta* is easily reared in the laboratory and has the potential to enable modern molecular based experiment that will greatly contribute to our understanding of multiple aspect of tapeworm biology, such as growth and reproduction. As part of our efforts to develop molecular tools for experiment on *H. diminuta,* we have characterized a battery of lectins, antibodies and commn stains that label different tapeworm tissue and organ structures. Using confocal microscopy, we have assembled an ‘’atlas’’ of *H. diminuta* organ architecture that will a useful resource for helminthologist. The methodologist we describe will facilitate characterization of loss-of-function perturbations using *H. diminuta*. This toolkit will enable a great understanding of fundamental tapeworm biology that may elucidate new therapeutic targets toward the eradication of these parasites.

2.3.3 External Parasite

2.3.3.1 Tick

Magona *et al*., (2011) revealed that Tick abundance and seroconversion rates of 640 indigenous cattle in a mixed crop livestock system in Uganda were investigated in a 14 month long study. Up to 100% of the cattle in Buyumuni, Kubo, Nanjeho, ojilai and setingo villeges (high tick challenge zone) were consistently infested with *Rhipicephalus appendiculatus*, whereas on average 50% of the cattle in Bunghaji Hitunga and Magoje villages (low tick challence zone) were inconsistently infested . Likewise, up to 50% of cattle in Buyimini, kubo, Nanjeho, Ojilai and setingo villages were consistently infested with R. (Boophilus) decoloratus ticks, while on average 30% of the cattle in Bunghaji, Hitunga Magoje were inconsistently infested. Seroconversion rates of cattle to *Anaplasma marginale* infection under low tick challenge, but the reverse was true for *Babesia bigemina* infection. For *Theileria parva* infection , seroconversion rates of cattle older than 6 months under low tick challenge were significantly higher than those under high tick challenge ($P<0.05$). however, the likelihood of occurrence of theileriosis cases among calves (0-6) under high tick challenge was 6 times (Odd ratio= 5.82;1.30-36.371) higher than under low tick challenge. The high density of anti-tick plants Lantana camara and Ocimum suave that were widespread in villages with low tick challenge, among other factors , was probably the cause for unfavourable tick survival.

Tirloni *et al*., (2014) exposed that the cattle tick *Rhipicephalus microplus* is one of the most harmful parsites affecting bovines. Similarly other hematophagous ectoparasites, *R. microplus* saliva contains a collection of bioactive compounds that inhibit host defence against tick feeding activity. Thus, the study of tick salivary components offers oppurtunities for the development of immunological based tick control methods and medicinal applications. So far, only a few proteins have been identified in cattle tick saliva. The aim of this work is to identify proteins presnt in *R. microplus* female tick saliva at different feeding stages. Proteomic analysis allowed identifying peptides corresponding to 187 and 68 tick and bovine proteins, respectively. Our data confirm that *R. microplus* saliva is complex, and that there are remarkable differences in saliva composition between partially engorged and fylly engorged female ticks. *R. microplus* saliva is rich minly in (1) hemelipoproteins and other transporter proteins, (2) secreted cross-tick species conserved proteins, (3) lipocalins, (4) peptidase inhibitors, (5) antimicrobial peptides, (6) glycine rich proteins, (7) housekeeping proteins and (8) host proteins. This investigation represents the first proteomic study about R. microplus saliva, and reports the most comprehensive Ixodidae tick saliva proteome published to date. Our results improve the understanding of tick salivary modulators of host defense to tick feeding, and provide novel information on the tick-host relationship.

2.3.3.2 Mite

Corral-Hernandez and Iturroudobetia (2012) discovered that the effect of industrial and cattle activities on oribatid mite communities of grassland soil was studied in the Basque Country of Spain. Environmental and community variables were studied in three grassland areas: an industrial site with heavy metal pollution, cattle farming site with medium and higher fertilizer inputs and natural site – the last one as control. Although the industrial areas presented high concentration of heavy metals, they showed high biodiversity, perhaps because the metals were bound to high clay content. Concentrations of Cd, Pb, Cu and Mg at the industrial site were positively correlated with abundance of Oribatula tibialis, Laoroppiasimilifallax, Tectocephus minor, Scheloribates minifimbriatus, Oribatellaquadricornuta, Ceratozetesconjunctus and Xenillustegeocranus. In contrast, the cattle area had poor soil with very low oribatid diversity, which was inversely correlated with fertilizer input. The high-input cattle grass land had a fewer and less uniformly distributed species compared to the medium input site. Species positively associated with cattle grasslands are Zygoribatula undulata Microppia minus, Certozetes armatus, Peloptulusmontanus, Scheloribateslatips and Minunthozetes reticulates. The natural grassland had the highest oribatid mite diversity, with species being well distributed.

McClain *et al.*, (2009) were discovered that mite infestations are important in dermatology because these may cause dermatologic diseases that range from papule squamous eruotion urticarial lesions to bullous eruptions and may spread infectious diseases. These clinical manifestations are important to recognize because mite associated diseases may have systemic complications and may confused with other dermatologic conditions. In treating mite infestations oral antibiotic may be necessary. Prevention of mite infestation may be accomplished by pre-treating clothing with Permethrin. Using insect repellent N, N-Diethyl-meta-toluamide on clothing and skin, and treating animals infected with mites.

2.3.3.3 Lice

Nafsad (2001) conducted a field study, the purpose of the field study was to develop and evaluate eradication as a strategy to control the lice in cattle. 32 herds of cattle were selected and observed during a period of two and a half years. Before eradication biting lice (*Damalinia bovis*) were presented in 94% of the herds and 27% of the animals. Sucking lice (*Linogthus vituli*) were presented in 42% of the herds and 5% of the animals. These level were very similar to those reported from other countries in North Europe. The eradication strategy was successful in 28 of 33 herds, but lice were still present in 5 herds 3 to 6 months after treatment. Biting lice were present in all these 5 herds, sucking lice were present in 3 herds. During the next 12 months, 9 of the 28 herds were re infected with lice. 6 herds were re infected with just biting lice, 2 herds with just sucking lice and one herd was re infected with both. There was no significant difference between the 2 louse species regarding the risk of unsuccessful eradication or re infection. The only significant risk factor for re infection was either purchase of livestock or use of common pasture, combined with failure in pre-treatment of newly introduced animals.

Reeves *et al*., (2006) conducted a study and collected 1,023 lice, representing 5 species, from rets and domestic cattle throughout 13 governorates in Egypt and tested these lice for *Anaplasma marginale, Bartonella spp, Brucella spp, Coxinella burnetii, Francisella tularesis and Rickettsia spp*. by PCR amplication and sequencing. 5 different louse-borne bacterial agents were detected in lice fromrodents or cattle, including *"Bortonella rattimassiliensis ". "B. phoceensis" and Bartonella sp.* Near *Bartonella tribocorum, Coxiella burnetii, and Rickettsia tuphi.* More lice from governorates bordering the Mediterranean and Red Seas contained pathogens. Our data indicate that lice of urban and domestic animals harbor pathogenic or potentially pathogenic bacterial agents throughout Egypt.

2.4 Metabolic disease

Wilson *et al*., (2002) found that the main metabolic diseases of cattle recognized 50 years ago, ketosis, grass tetany (hypomagnesaemia) and milk fever (hypocalcaemia), are even more important today and how we view them has changed radically. Prior to 1950, the emphasis in New Zealand was on identifying these diseases and defining clinical signs and tests useful for their diagnosis, so that appropriate treatment could be provided. By the 1970s, metabolic diseases were considered to result primarily from a breakdown of an animal's ability to cope with the metabolic demands of high production diseases evolved. A further major change has occurred over the last three decades due to recognition, especially in New Zealand, of the subclinical effects that deficiencies of glucose, magnesium and calcium have on milk production and reproduction.

Gerloff, (1988) described that the lactating period should be regarded as a preparatory phase for the next lactation, rather than a rest phase from the preceding one. During the early dry period, a diet should be provided that meets nutrient requirements for energy, protein, calcium, phosphorus, selenium, vitamins and other minerals. This can usually be accomplished by feeding a blend of roughages with little or no grain and providing a vitamin and mineral supplement. The diet during the late dry period or transitional stage should provide increased energy (an additional 3 to 4meal) and a pp preventive regimen can be instated at this time. Five to six pounds of concentrate containing 200gm of an ammonium sulfate and chloride mixture and 6gm of niacin can be added to the diet to aid in the transition to lactation. Feeding high calcium, lactating cow grain mix should be avoided until after parturition. Stress should be minimized at and after parturition and a quiet maternity area should be available. The normal depression in dry matter intake at parturition should be minimized; feeding high-quality roughages at this time is beneficial. Concentrate composition should be increased gradually following parturition and careful attention to the soluble and upgradable protein fractions of the diet is warranted. In group feeding situations, introduction to the energy dense, high –lactation ration should probably be avoided. However, attempts to manipulate body condition during the dry period tend to be unrewarding and counterproductive. Following these guidelines should reduce the incidence of metabolic diseases in high producing dairy cattle.

2.5 Surgical affection

Waltner-Toews *et al*., (1986) out of total 1223 surgical cases46.93% were navel ill or omphalities in calves. It may be prevented by improving maternity pen hygiene, reducing calf residency time in unhygienic calving pens, ensuring adequate early intake of good quality colostrums and repeated cord dipping with chlorhexidine.

2.6 Gyneco-obstetrical cases

Mahe Alam *et al*., (2016) Total 286 of different cases were registered during the study period. The proportionate prevalence of different reproductive cases were respectively 5.2% and 8.8% dystocia;4.6%and 5.3% respectively retained placenta ;3.5% and 7.9% abortion respectively;2.9% and 2.7% ovarian cyst respectively in VCRI and MVC, Reproductive cases were more frequently occured in cross-breeds. Antibiotics and hormonal drugs were used for treatment of reproductive cases. Most of the reproductive cases/dystocia were corrected manually where the complicated cases were performed by caesarean operation.

CHAPTER 3
MATERIALS AND METHODS

3.1 Study area:

This clinical study was undertaken at the Upazila Veterinary Hospital, Debidwar, Comilla to determine the general clinical prevalence of diseases and disorders in cattle.

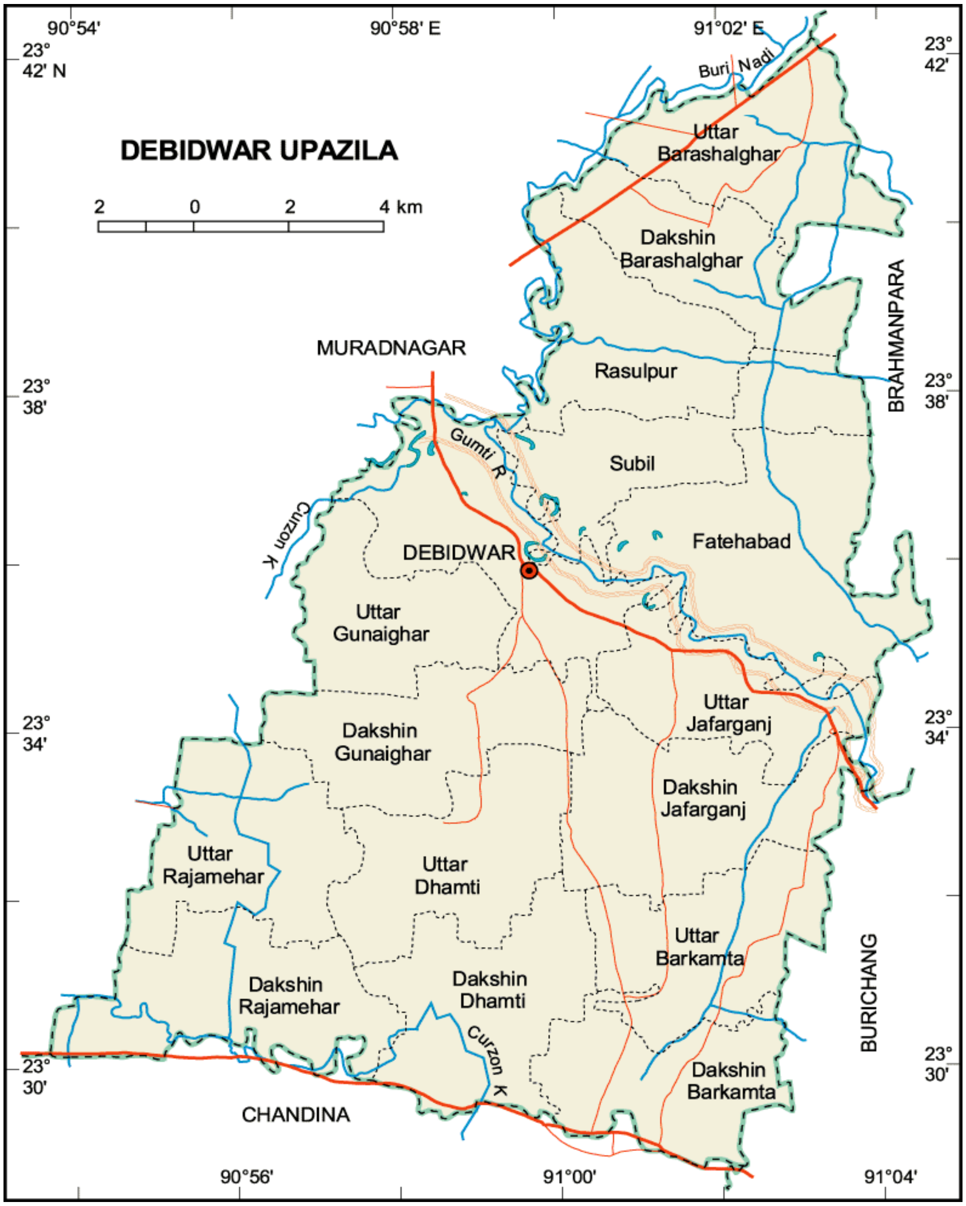

Figure: 1 Map of Debidwar Upazila

3.2 Experimental animal:

The patient registered and physically visited for the diagnosis and treatment at the upazila veterinary hospital, Debidwar in Comilla district were considered as the experimental cattle.

3.3 Study Period:

The duration of the experiment was one year and conducted from July, 2016 to June, 2017. A total of 1145 cattle were recorded. For the examination of the animals, clinical history of each cases were cautiously recorded. Various types of diseases like bacterial, Viral, parasitic, metabolic, respiratory, Gyneco-obstetrical and surgical cases were registered in the study. The season comprised summer (March to June), rainy (July to October) and winter (November to February). The following events were adopted for performing of this work- (i) by general examination of affected animal, (ii) physical examination and (iii) clinical examination.

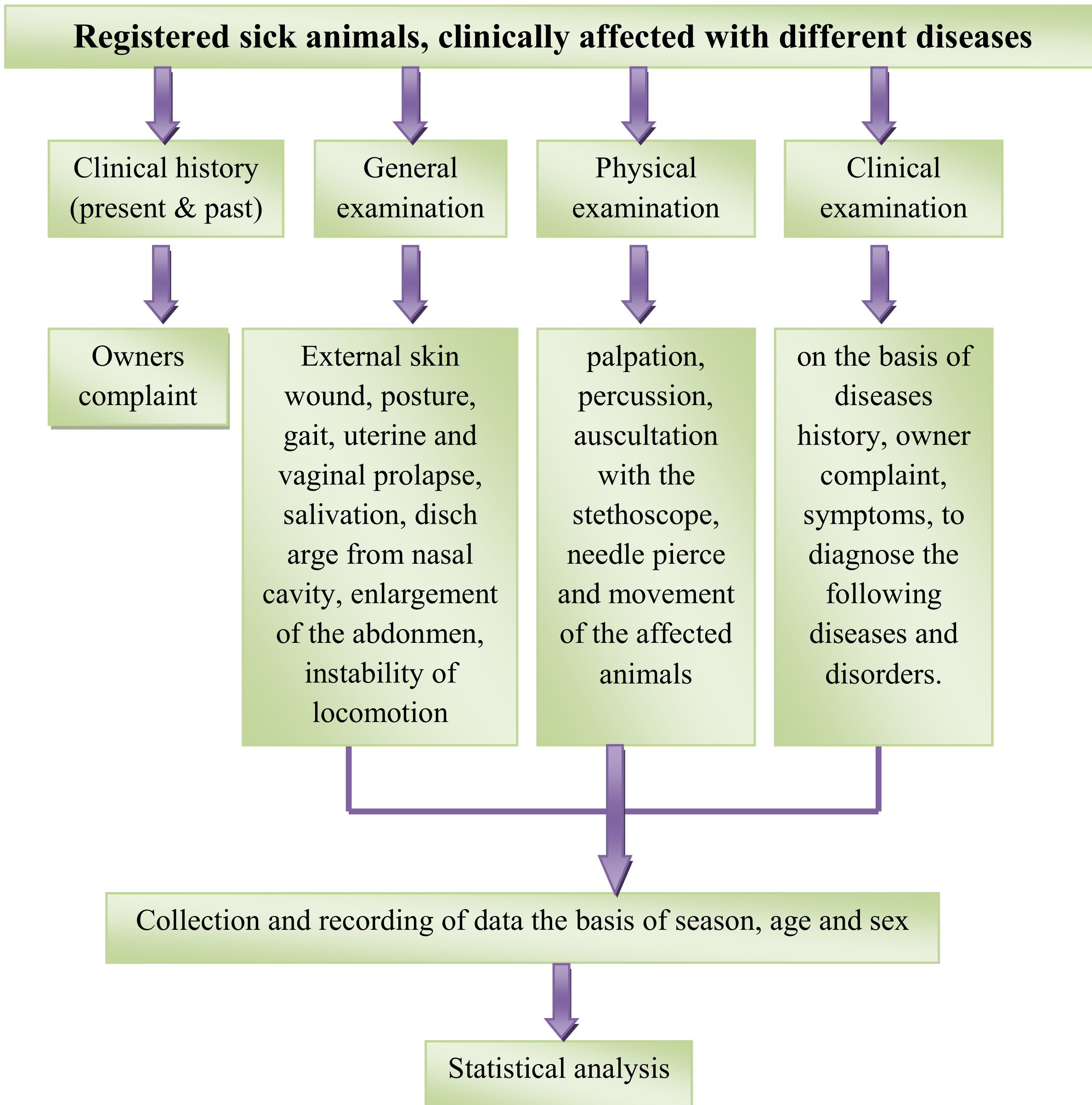

Figure: 2 Layout of the experiment

3.4 Procedure:

3.4.1 General examination

In the procedure of general examination, behavior, physical condition, external skin wound, posture, gait, uterine and vaginal prolapse, salivation, discharge from nasal cavity, enlargement of the abdomen, instability of locomotion were observed of the patient by visual examination were recorded.

3.4.2 Physical examination

In physical examination, various parts and structures of the body were examined by palpation, percussion, auscultation with the stethoscope, needle pierce and movement of the affected animals.

3.4.3 Clinical examination

The temperature, pulse and respiratory rate from each of these sick animals were recorded. Clinical examinations of all cattle and goats were conducted on the basis of diseases history, owner complaint, symptoms, to diagnose the following diseases and disorders. History of each cases (present and past) were carefully taken which gave a guidelines for examination of the animals.

According the merit of the individual case, general clinical examination were conducted on the basis of disease history and owners complaint, symptoms and techniques such as microscopic examination, laboratory common techniques used by Rosenberger (1979) and Samad *et al.,* (1988).

3.4.3.1 Fever

Fever was diagnosed on the basis of recorded rectal temperature (Blood and Radostits, 1989).

3.4.3.2 Anorexia

Anorexia syndrome were diagnosed on the basis owner's complaint with the history of partial and complete absence of appetite with varying decreased food intake and following the procedure of Prasad *et al.*, 1976.

3.4.3.3 Digestive disorders (diarrhoea)

Faecal samples of the diarrheic selected animals were examined in the laboratory and those samples found negative on parasitological examination were diagnosed as diarrhoea and also by taking history whether of regular anthelmintic treatment of this animals were practiced or not.

3.4.3.4 Dysentery

Clinical Presumptive diagnosis of dysentery can be on history of growing animals and clinical signs including dysentery, tenesmus, mild systemic involvement and dehydration. Confirmatory diagnosis can be made by demonstrating the oocysts in faecal sample of clinically affected animals.

3.4.3.5 Respiratory disorders (pneumonia)

This disorder was diagnosed on the basis of owner's complaint and recording abnormal function respiratory system like polypnoea, dyspnoea, coughing, sneezing, nasal discharging, thoracoabdominal breathing etc and by examining the entire respiratory tract as described by Blood and Radostits, 1989.

3.4.3.6 Skin diseases

Different type discrete and diffuse skin lesions were diagnosed clinically by visual examination.

3.4.3.7 Corneal opacity

Corneal opacity was diagnosed on examination. The presence of non-transparence, cloudiness and opaque condition on the cornea was diagnosed as corneal opacity.

3.4.3.8 Viral diseases

Foot and Mouth Disease (FMD) was diagnosed in calves and adult cattle on the basis clinico-epidemiological determinants. The presence of fever and vesicular eruption in the mouth and on the feet of same animal with the history of rapid spread of the disease in bovine population were regarded as Foot and Mouth Diseases.

Papillomatosis was diagnosed in calves and visual examination and palpation of solid outgrowth of epidermis.

3.4.3.9 Bacterial disease

Black quarter diagnosed in young cattle on the basis of clinical examination. The presence of fever, lameness and palpation of the affected muscles revealed crepitation and needle puncture of the affected muscles resulted oozing blackish fluid confirmed the diagnosis of black quarter.

Clinical mastitis was diagnosed on the basis of owner's complaint about abnormalities of udder and milk production. Palpation of udder revealed enlarged and painful with the presence of clots/ flakes in the milk confirmed the diagnosis of mastitis.

3.4.3.10 Arthritis

Clinically arthritis in sucking and growing animals was diagnosed using clinical signs of lameness and swollen joints.

3.4.3.11 Urogenital diseases

Urolithiasis was diagnosed on the basis of the history and owners complain of complete retention of urine and clinical findings of distension of urinary bladder, restlessness, occasionally rupture of urinary bladder and aspiration of fluid from the abdominal cavity rupture of the bladder.

3.4.3.12 Reproductive diseases

Reproductive diseases and disorders are frequently occurred in livestock in subcontinent and cause significant economic losses. Common reproductive cases are dystocia, retained placenta, abortion, ovarian cyst etc.

Repeat breeders was diagnosed on the basis of reproductive history of the cow, checking of individual breeding records and giving a special view to the characteristic of repeat breeder's cow (Samad, 2008). Cows with the history of failure to conceive after insemination for more than three times were examined by rectal palpation.

Anestrus was diagnoses on the basis of history of not coming into heat within the normal cycle length.

Uterovaginal prolapse was diagnosed when uterus was descended into the vagina and visible of the vaginal orifice.

3.4.3.13 Parsitological diseases

Ectoparasitic infection (mange infestation) was diagnosed by itching, scab and alopecia lesion on skin. Parasitic infestation was diagnosed by hair loss, emaciaton, weakness, rough coat and pale visible mucus membrane.

Humpsore (Stephanofilariasis), fascioliasis and paramphistomiasis were diagnosed on the basis of history, clinical findings and faeces examination (Blood and Radostits, 2000).

The metabolic disorder was diagnosed by just after parturition. In surgical cases myiasis wound was found and abscess was confirmed by needle puncture.

3.5 Prevalence:

Prevalence were calculated as number of cases of disease divided by population at risk and multiply by 100.

Prevalence rate (%) = $\frac{No.of\ cases\ of\ disease}{Population\ at\ risk} \times 100$

3.6 Statistical analysis:

The collected data was analyzed by a statistical software namely, SPSS version 20. For the significant differences in the conditions of the diseases among groups and seasons, the Chi-square goodness of fit test was done.

Photo-1 Dermatophillosis

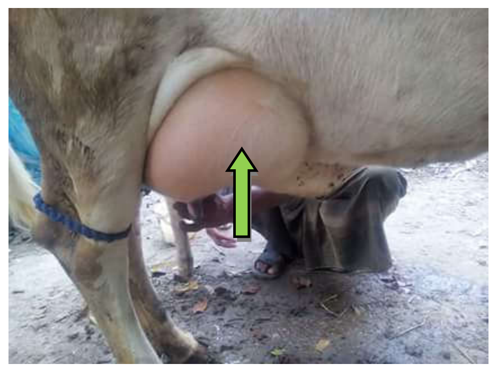

Photo-2 Mastitis

Photo-3 Bovine Ephemeral Fever

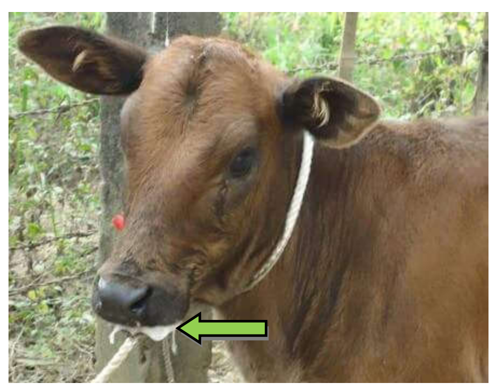

Photo-4 Food and mouth disease


Photo-5 Papillomatosis

Photo-6 Myiasis

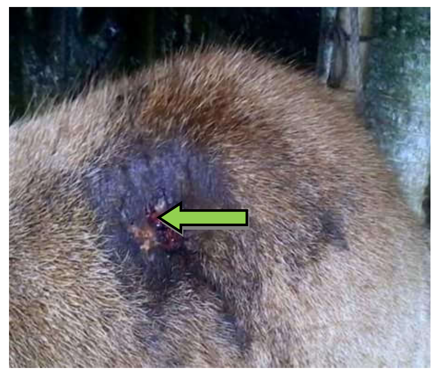

Photo-7 Hump sore

Photo-8 Abscess

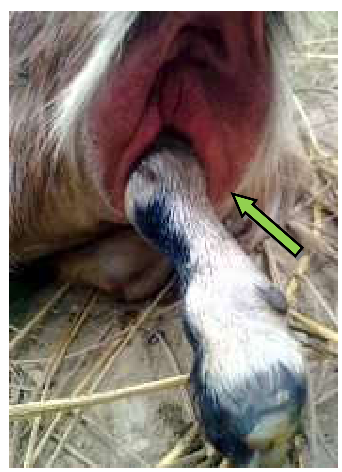

Photo-9 Dystocia

Photo-10 Navel ill **Photo-11 Upward patellar Fixation**

Photo-12 Metritis **Photo-13** Retention of placenta

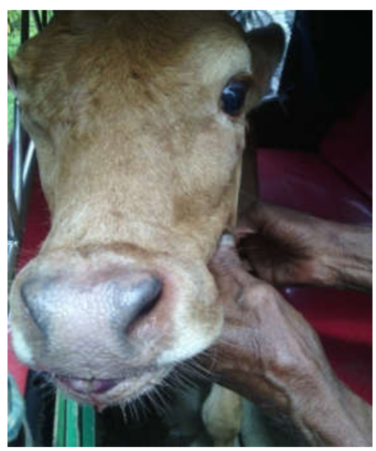

Photo-14 Skin Disease **Photo-15** Congenital Defect

CHAPTER 4
RESULTS

4.1 PREVALENCE OF BACTERIAL DISEASES IN CATTLE

The prevalence of bacterial diseases in cattle were shown in (Table 1). Where the overall prevalence were 12.66% and the highest prevalence of bacterial diseases was Dermatophilosis (5.68%) followed by Mastitis (5.32%), Foot rot (1.05%), Black quarter (0.44%) and lowest Actinobacillosis (0.17%)

Table 1: Prevalence of bacterial diseases in cattle

Name of Diseases	No. of animal examined	No. of positive cases	Percentage (%)	Percentage by Category (%)
Dermatophilosis	1145	65	5.68	12.66 (145)
Mastitis	1145	61	5.32	
BQ	1145	5	0.44	
Actinobacillosis	1145	2	0.17	
Foot rot	1145	12	1.05	

4.2 Prevalence of bacterial diseases in cattle based on season

Regarding the data shown in (Table 2) bacterial diseases of cattle in relation to the different seasons of the year differed insignificantly ($p>0.05$). In the summer season the highest prevalence of bovine bacterial disease was observed in Dermatophilosis (7.73%) and the lowest was found in Actinobacillosis (0.22%) the rest of bacterial disease show intermediate. Moreover in rainy season the highest prevalence of bovine bacterial disease was observed in Dermatophilosis (4.90%) and Mastitis (4.90%) and the lowest in Actinobacillosis (0.33%) the rest of bacterial disease show intermediate. Furthermore in winter season the highest prevalence of bovine bacterial disease was observed in Dermatophilosis (3.89%) and Mastitis (3.89%) and the lowest in Black quarter (0.26%), Actinobacillosis was absent in winter season. The result showed that Dermatophilosis was the most prevalent bacterial disease in all the three seasons.

Table 2: Prevalence of bacterial diseases in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Dermatophilosis	35	7.73	15	4.90	15	3.89
Mastitis	31	6.84	15	4.90	15	3.89
BQ	2	0.44	2	0.65	1	0.26
Actinobacillosis	1	0.22	1	0.33	-	-
Foot rot	2	0.44	3	0.98	7	1.81
Total	71	15.67	36	11.76	38	9.84
Chi-square Test (P-value)			9.681 (0.288)			
Level of significance			NS			

NS=Not significant (p>0.05)

4.3 Prevalence of bacterial diseases in cattle based on sex

The sex wise annual incidences of bacterial diseases in cattle was found more in females (14.64%) followed by male animals (10.48%) (Table 3). Incidence of bacterial diseases in the different sexes was significant (p<1%)

Table 3: Prevalence of bacterial diseases in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Dermatophilosis	45	8.27	20	3.33
Mastitis	-	-	61	10.15
BQ	4	0.74	1	0.17
Actinobacillosis	1	0.18	1	0.17
Foot rot	7	1.29	5	0.83
Total	57	10.48	88	14.64
Chi-square Test (P-value)		71.405 (0.000)		
Level of significance		**		

** Highly signieicant (p<0.001)

4.4 Prevalence of bacterial diseases in cattle based on age

The age wise annual incidences of bacterial diseases in cattle was found more in adult (14.34%) followed by young (8.75%) (Table: 4). Significant (p<1%) annual incidence of bacterial diseases in cattle was observed due to the variation of age of animal.

Table 4: Prevalence of bacterial diseases in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
Dermatophilosis	20	5.83	45	5.61
Mastitis	-	-	61	7.61
BQ	5	1.46	-	-
Actinobacillosis	-	-	2	0.25
Foot rot	5	1.46	7	0.87
Total	30	8.75	115	14.34
Chi-square Test (P-value)		42.844 (0.000)		
Level of significance		**		

** significant (p<0.001)

4.5 Prevalence of viral diseases in cattle

The overall prevalence of viral diseases in cattle were (19.56%) as shown in Table 5. Among viral diseases the highest prevalence was found in Foot and Mouth disease (12.66%) followed by Bovine ephemeral fever (5.50%), whereas the lowest prevalence was documented in Papillomatosis (1.40%).

Table 5: Prevalence of viral diseases in cattle

Name of Diseases	No. of animal examined	No. of positive case	Percentage (%)	Percentage by Category (%)
FMD	1145	145	12.66	19.56 (224)
Bovine ephemeral fever	1145	63	5.50	
Papillomatosis	1145	16	1.40	

4.6 Prevalence of viral diseases in cattle based on season

There was significant variation of viral diseases in cattle according to the season of the year in study area which shown in (Table 6). The incidence of Foot and mouth disease was common in all three season followed by bovine ephemeral fever and papillomatosis.

Table 6: Prevalence of viral diseases in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
FMD	25	5.52	35	11.34	85	22.02
Bovine ephemeral fever	23	5.08	22	7.19	18	4.66
Papillomatosis	4	0.88	4	1.31	8	2.07
Total	52	11.48	61	19.93	111	28.76
Chi-square Test (P-value)			16.956 (0.002)			
Level of significance			**			

** significant (p<0.001)

4.7 Prevalence of viral diseases in cattle based on sex

The sex wise annual incidences of viral diseases in cattle was found more in males (24.44%) followed by female animals (15.14%) (Table 7). Incidence of viral diseases in the different sexes was insignificant ($p>0.05$)

Table 7: Prevalence of viral diseases in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
FMD	85	15.63	60	9.98
Bovine ephemeral fever	37	6.80	26	4.33
Papillomatosis	11	2.02	5	0.83
Total	133	24.44	91	15.14
Chi-square Test (P-value)		0.628 (0.730)		
Level of significance		NS		

NS=Not Significant ($P>0.05$)

4.8 Prevalence of viral diseases in cattle based on age

The age wise annual incidence of viral diseases was found more in adult animals (14.34%) followed by young animals (8.74%) (Table 8). Insignificant ($p>0.05$) annual incidence of viral disease in cattle was observed.

Table 8: Prevalence of viral diseases in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
FMD	60	17.49	85	10.6
Bovine ephemeral fever	27	7.87	36	4.49
Papillomatosis	9	2.62	7	0.87
Total	30	8.74	115	14.34
Chi-square Test (P-value)		1.301 (0.522)		
Level of significance		NS		

NS=Not significant ($p>0.05$)

4.9 Prevalence of gyneco-obstetrical cases in cattle

The overall prevalence of gyneco-obstetrical cases in cattle were (15.46%) as shown in Table 9. Among gyneco-obstetrical cases the highest prevalence was found in repeat breeding (4.02%) whereas the lowest prevalence was documented in teat fistula (0.17%).

Table 9: Prevalence of gyneco-obstetrical cases in cattle

Name of Diseases	No. of animal examined	No of positive case	Percentage (%)	Percentage by Category (%)
Retention of placenta	1145	15	1.31	15.46 (177)
Repeat breeding	1145	46	4.02	
Teat fistula	1145	2	0.17	
Abortion	1145	36	3.14	
Dystocia	1145	15	1.31	
Endometritis	1145	8	0.70	
Pyometra	1145	5	0.44	
Anestrus	1145	35	3.06	
Uterine prolapse	1145	12	1.05	
Vaginal prolapse	1145	3	0.26	

4.10 Prevalence of gyneco-obstetrical cases in cattle based on season

There was insignificant variation of gyneco-obstetrical cases in cattle according to the season of the year in study area which shown in (Table 10).

Table 10: Prevalence of gyneco-obstetrical cases in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Retention of placenta	5	1.10	7	2.29	3	0.78
Repeat breeding	23	5.08	17	5.56	6	1.55
Teat fistula	1	0.22	-	-	1	0.26
Abortion	18	3.97	10	3.27	8	2.07
Dystocia	3	0.66	10	3.27	2	0.51
Endometritis	-	-	5	1.63	3	0.78
Pyometra	2	0.44	2	0.65	1	0.26
Anestrus	15	3.31	12	3.92	8	2.07
Uterine prolapse	3	0.66	7	2.29	2	0.78
vaginal prolapse	2	0.44	1	0.33	-	-
Total	72	15.89	71	23.20	34	8.80
Chi-square Test (P-value)			20.088 (0.328)			
Level of significance			NS			

NS=Not Significant (P>0.05)

4.11 Prevalence of metabolic disorder in cattle

The overall prevalence of metabolic disorder in cattle were (6.20%) as shown in Table 11. Among metabolic diseases the highest prevalence was found in acidosis (3.93%) where as the lowest prevalence was observed in ketosis (0.26%).

Table 11: Prevalence of metabolic disorder in cattle

Name of Diseases	No. of animal examined	No. of positive case	Percentage (%)	Percentage by Category (%)
Milk fever	1145	18	1.57	6.20 (71)
Acidosis	1145	45	3.93	
Ketosis	1145	3	0.26	
Grass tetany	1145	5	0.44	

4.12 Prevalence of metabolic disorder in cattle based on season

There was significant variation of cattle metabolic disorder in relation to the season of the year which shown in (Table 12). The result showed that acidosis was the most prevalence metabolic disorder in all the season.

Table 12: Prevalence of metabolic disorder in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Milk fever	4	0.88	4	1.31	10	2.59
Acidosis	32	7.06	6	1.96	7	1.81
Ketosis	2	0.44	-	-	1	0.26
Grass tetany	-	-	2	0.65	3	0.78
Total	38	8.39	12	3.92	21	5.44
Chi-square Test (P-value)			20.072 (0.003)			
Level of significance			**			

** significant (p<0.001)

4.13 Prevalence of metabolic disorder in cattle based on sex

The sex wise annual incidences of metabolic disorder in cattle was found more in males (6.25%) followed by female animals (6.16%) (Table 13). Incidence of metabolic disorder in the different sexes was significant ($p<0.05$).

Table 13: Prevalence of metabolic disorder in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Milk fever	-	-	18	3.00
Acidosis	33	6.07	12	2.00
Ketosis	1	0.18	2	0.33
Grass tetany	-	-	5	0.83
Total	34	6.25	37	6.16
Chi-square Test (P-value)		33.066 (0.000)		
Level of significance		**		

** significant ($p<0.001$)

4.14 Prevalence of metabolic disorder in cattle based on age

The age-wise prevalence of metabolic disorder in cattle was found more in young (4.37%) followed by adult (6.98%) (Table 14). Incidence of metabolic disorder in the different ages was significant ($p<0.01$).

Table 14: Prevalence of metabolic disorder in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
Milk fever	-	-	18	2.24
Acidosis	15	4.37	30	3.74
Ketosis	-	-	3	0.37
Grass tetany	-	-	5	0.62
Total	15	4.37	56	6.98
Chi-square Test (P-value)	10.988 (0.012)			
Level of significance	*			

*significant ($p<0.05$).

4.15 Prevalence of Parasitic diseases in cattle

The overall prevalence of parasitic diseases in cattle were (8.91%) as shown in (Table 15). The highest prevalence of parasitic disease was observed in tick (3.93%) and the lowest prevalence was detected in hump sore (0.35%).

Table 15: Prevalence of Parasitic diseases in cattle

Name of Diseases	No. of animal examined	No. of positive case	Percentage (%)	Percentage by Category (%)
Tick infestation	1145	45	3.93	8.91 (102)
Mite infestation	1145	13	1.13	
Fascioliasis	1145	15	1.31	
Paramphistomiasis	1145	10	0.87	
Maggot	1145	15	1.31	
Hump sore	1145	4	0.35	

4.16 Prevalence of Parasitic diseases in cattle based on season

It was evident from (Table 16) that cattle parasitic diseases significantly varied in relation to season of the year at study area. In all three season the highest prevalence of bovine parasitic disease was observed in tick whereas the lowest prevalence was observed in hump sore.

Table 16: Prevalence of Parasitic diseases in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Tick infestation	27	5.96	10	3.27	8	2.07
Mite infestation	4	0.88	2	0.65	7	1.81
Fasioliasis	4	0.88	8	2.61	3	0.78
Paramphistomiasis	2	0.44	2	0.65	6	1.55
Maggot	6	1.32	7	2.29	2	0.51
Hump sore	2	0.44	2	0.65	-	-
Total	45	9.93	31	10.13	26	6.74
Chi-square Test (P-value)			24.148 (0.007)			
Level of significance			**			

** significant (p<0.001)

4.17 Prevalence of parasitic diseases in cattle based on sex

The sex wise annual incidences of parasitic diseases in cattle was found more in male animals (12.3%) followed by female animals (5.82%) (Table 17). Prevalence of parasitic diseases in cattle was insignificant (p>0.05).

Table 17: Prevalence of parasitic diseases in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Tick infestation	27	4.96	18	3.00
Mite infestation	8	1.47	5	0.83
Fasioliasis	11	2.02	4	0.67
Paramphistomiasis	7	1.29	3	0.50
Maggot	10	1.84	5	0.83
Hump sore	4	0.73	-	-
Total	67	12.3	35	5.82
Chi-square Test (P-value)		3.312 (0.652)		
Level of significance		NS		

NS=Not Significant (p>0.05)

4.18 Prevalence of parasitic diseases in cattle based on age

There was significant (p<0.01) variation of cattle parasitic diseases in relation to the age of the year which shown in (Table 18). Prevalence of parasitic diseases was found more in adult (10.97%) followed by young (4.08%).

Table 18: Prevalence of parasitic diseases in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
Tick infestation	-	-	45	5.61
Mite infestation	2	0.58	11	1.37
Fasioliasis	3	0.87	12	1.50
Paramphistomiasis	-	-	10	1.25
Maggot	9	2.62	6	0.75
Hump sore	-	-	4	0.50
Total	14	4.08	88	10.97
Chi-square Test (P-value)		37.040 (0.000)		
Level of significance		**		

** significant (p<0.001)

4.19 Prevalence of surgical affection in cattle

The overall prevalence of surgical affection in cattle were (4.63%) as shown in (Table 19). The highest prevalence of surgical affection was observed in abscess (1.31%) and the lowest prevalence was detected in myiasis (0.35%).

Table 19: Prevalence of surgical affection in cattle

Name of Diseases	No. of animal examined	No. of positive case	Percentage (%)	Percentage by Category (%)
Navel ill	1145	10	0.87	4.63 (53)
Abscess	1145	15	1.31	
Myiasis	1145	4	0.35	
Fracture	1145	7	0.61	
Upward patellar fixaton	1145	5	0.44	
Atresia ani	1145	12	1.04	

4.20 Prevalence of surgical in affection in cattle based on season

There was insignificant variation of surgical affection in cattle according to the season of the year in study area which shown in (Table 20).

Table 20: Prevalence of surgical affection in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Navel ill	2	0.44	4	1.31	4	1.04
Abscess	3	0.66	12	3.92	-	-
Myiasis	-	-	2	0.65	2	0.52
Fracture	3	0.66	2	0.65	2	0.52
Upward patellar fixaton	2	0.44	-	-	3	0.78
Atresia ani	2	0.44	4	1.31	6	1.55
Total	12	2.65	24	7.84	17	4.40
Chi-square Test (P-value)			18.101 (0.053)			
Level of significance			NS			

NS=Not Significant ($p>0.05$)

4.21 Prevalence of surgical affection in cattle based on sex

Regarding the data shown in (Table 21) there was insignificant dissimilarity of cattle surgical affection in relation to the sex of the year. The sex wise incidence was found more in male (4.78%) followed by female animals (4.49%).

Table 21: Prevalence of surgical affection in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Navel ill	4	0.74	6	1.00
Abscess	9	1.65	6	1.00
Myiasis	2	0.37	2	0.33
Fracture	5	0.92	2	0.33
Upward patellar fixaton	3	0.55	2	0.33
Atresia ani	3	0.55	9	1.50
Total	26	4.78	27	4.49
Chi-square Test (P-value)		5.469 (0.361)		
Level of significance		NS		

NS=Not significant (P>0.05)

4.22 Prevalence of surgical affection in cattle based on age

The age-wise prevalence of surgical affection in cattle was found more in young (8.16%) followed by adult (3.12%) (Table 22). Incidence of surgical affection in the different ages was significant ($p<0.01$).

Table 22: Prevalence of surgical affection in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No of animals affected (>2.5 years)	Percentage (%)
Navel ill	10	2.92	-	-
Abscess	4	1.17	11	1.37
Myiasis	-	-	4	0.50
Fracture	2	0.58	5	0.62
Upward patellar fixaton	-	-	5	0.62
Atresia ani	12	3.50	-	-
Total	28	8.16	25	3.12
Chi-square Test (P-value)		35.496 (0.000)		
Level of significance		**		

** significant (p<0.001)

4.23 Prevalence of digestive disorder in cattle

The overall prevalence of digestive disorder in cattle were (16.9%) as shown in (Table 23). The highest prevalence of digestive disorder was observed in diarrhoea (6.38%) and the lowest prevalence was observed in dehydration (1.31%) and bloat(1.31%).

Table 23: Prevalence of digestive disorder in cattle

Name of Disease	No. of animal examined	No. of positive cases	Percentage (%)	Percentage by Category (%)
Diarrhoea	1145	73	6.38	16.9 (193)
Dysentery	1145	37	3.23	
Dehydration	1145	15	1.31	
Anorexia	1145	53	4.63	
Bloat	1145	15	1.31	

4.24 Prevalence of digestive disorder in cattle based on season

There was insignificant variation of digestive disorder in cattle according to the season of the year which is shown in (Table 24). In summer season the highest prevalence of bovine digestive disorder was observed in diarrhea (11.70%) and the lowest was is found in dehydration (1.77%) Moreover in rainy season the highest prevalence was observed in anorexia (3.92%) and the lowest was found in bloat (0.98%). Furthermore, in winter season, the highest prevalence of bovine digestive disorder was observed in diarrhea (2.59%) whereas the lowest was observed in dehydration (0.78%) and bloat (0.78%).

Table 24: Prevalence of digestive disorder in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Diarrhoea	53	11.70	10	3.27	10	2.59
Dysentery	25	5.52	7	2.29	5	1.30
Dehydration	8	1.77	4	1.31	3	0.78
Anorexia	35	7.73	12	3.92	6	1.55
Bloat	9	1.99	3	0.98	3	0.78
Total	130	28.70	36	11.76	27	7.00
Chi-square Test (P-value)			3.871 (0.869)			
Level of significance			NS			

NS=Not significant (p>0.05)

4.25 Prevalence of digestive disorder in cattle based on sex

The sex wise annual incidences of digestive disorder in cattle was found more in males (23.16%) followed by female animals (11.15%) (Table 25). Incidence of viral diseases in the different sexes was insignificant (p>0.05)

Table 25: Prevalence of digestive disorder in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Diarrhoea	45	8.27	28	4.66
Dysentery	23	4.23	14	2.33
Dehydration	11	2.02	4	0.67
Anorexia	38	6.99	15	2.50
Bloat	9	1.65	6	1.00
Total	126	23.16	67	11.15
Chi-square Test (P-value)		2.162 (0.706)		
Level of significance		NS		

NS=Not significant (p>0.05)

4.26 Prevalence of digestive disorder in cattle based on age

The age-wise prevalence of digestive disorder in cattle was found more in young (23.91%) followed by adult (13.84%) (Table 26). Incidence of digestive disorder in the different sexes was insignificant (p>0.01).

Table 26: Prevalence of digestive disorder in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
Diarrhoea	31	9.04	42	5.24
Dysentery	18	5.25	19	2.37
Dehydration	6	1.75	9	1.12
Anorexia	23	6.71	30	3.74
Bloat	4	1.17	11	1.37
Total	82	23.91	111	13.84
Chi-square Test (P-value)		2.167(0.705)		
Level of significance		NS		

NS=Not Significant (p>0.05)

4.27 Prevalence of other clinical disorder in cattle

The overall prevalence of other clinical disorder in cattle were (15.72%) as shown in (Table 27). The highest prevalence was observed in fever (6.29%) and the lowest prevalence was observed in dog bite (0.44%).

Table 27: Prevalence of other clinical disorder in cattle

Name of Diseases	No. of animal examined	No. of positive cases	Percentage (%)	Percentage by Category (%)
Fever	1145	72	6.29	15.72 (180)
Pneumonia	1145	47	4.10	
Allergic reaction	1145	25	2.18	
Arthritis	1145	25	2.18	
Corneal opacity	1145	6	0.52	
Dog bite	1145	5	0.44	

4.28 Prevalence of other clinical disorder in cattle based on season

There was insignificant variation of surgical affection in cattle according to the season of the year in study area which shown in (Table 28).

Table 28: Prevalence of other clinical disorder in cattle based on season

Name of Diseases	Season					
	Summer (n=453)		Rainy (n=306)		Winter (n=386)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Fever	14	3.09	14	4.58	44	11.40
Pneumonia	7	1.55	10	3.27	30	7.77
Allergic reaction	7	1.55	6	1.96	12	3.11
Arthritis	3	0.66	7	2.29	15	3.89
Corneal opacity	-	-	3	0.98	3	0.78
Dog bite	2	0.44	-	-	3	0.78
Total	33	7.28	40	13.07	107	27.72
Chi-square Test (P-value)			9.256 (0.508)			
Level of significance			NS			

NS=Not significant (p>0.05)

2.29 Prevalence of other clinical disorder in cattle based on sex

The sex wise annual incidences of other clinical disorder in cattle was found more in males (18.57%) followed by female animals (13.14%) (Table 29). Incidence of other clinical disorder in the different sexes was insignificant (p>0.05).

Table 29: Prevalence of other clinical disorder in cattle based on sex

Name of Diseases	Male (n=544)		Female (n=601)	
	No. of animals affected	Percentage (%)	No. of animals affected	Percentage (%)
Fever	42	7.72	30	5.00
Pneumonia	27	4.96	20	6.54
Allergic reaction	13	2.39	12	2.00
Arthritis	13	2.39	12	2.00
Corneal opacity	4	0.74	2	0.33
Dog bite	2	0.37	3	0.50
Total	101	18.57	79	13.14
Chi-square Test (P-value)		1.320 (0.933)		
Level of significance				

NS=Not significant (p>0.05)

4.30 Prevalence of other clinical disorder in cattle based on age

The age-wise prevalence of other clinical disorder in cattle was found more in young (25.66%) followed by adult (11.47%). Incidence of other clinical disorder in the different ages was significant (P<0.01).

Table 30: Prevalence of other clinical disorder in cattle based on age

Name of Diseases	Young (n=343)		Adult (n=802)	
	No. of animals affected (<2.5 years)	Percentage (%)	No. of animals affected (>2.5 years)	Percentage (%)
Fever	27	7.87	45	5.61
Pneumonia	27	7.87	20	2.50
Allergic reaction	7	2.04	18	2.24
Arthritis	25	7.29	-	-
Corneal opacity	2	0.58	4	0.50
Dog bite	-	-	5	0.62
Total	88	25.66	92	11.47
Chi-square Test (P-value)		40.981 (0.000)		
Level of significance		**		

** significant (p<0.001)

CHAPTER 5
DISCUSSION

5.1 PREVALENCE OF BACTERIAL DISEASES IN CATTLE

5.1.1 DERMATOPHILOSIS

Bovine dermatophilosis has worldwide distribution and more prevalent in the tropical and subtropical regions (Zaria, 1993; Ambrose *et al*., 1999 and Makinde, 2004). Bangladesh is geographically placed in the subtropical regions of the world and dermatophilosis in cattle has been diagnosed in the context of this environment of Bangladesh (Nooruddin and Khaleque, 1986a and 1986b and Mannan, 2009). In this study the prevalence of bacterial diseases in cattle were shown in Table 1. Where the overall prevalence were 12.66% and the highest prevalence of bacterial diseases were by Dermatophilosis (5.68%) followed by Mastitis (5.32%), Foot rot (1.05%), Black quarter (0.44%) and lowest Actinobacillosis (0.17%). According to the bacterial diseases the present result was lower than the result of Juli *et al*., (2015) who reported that the overall prevalence of bacterial diseases in Dinajpur were15.27%. In which highest prevalence was observed in dermatophilosis (10.43%), followed by conjunctivitis (1.76%), pneumonia (1.76%), mastitis (0.73%), black quarter(0.59%). Nath *et al*, (2010) reported that the prevalence of dermatophilosis 13.55% which is higher than this result. Badruzzamman *et al*., (2015) reported prevalence of dermatophilosis 0.19% which significantly differ from this result and mastitis 1.30% which is lower than this result. All of the variation in prevalence may be due to the variation in place of work or may be the variation in pattern of disease occurrences. So the result may differ from higher to lower.

5.1.2 Mastitis

Maitis an economically important disease of milch animals, was diagnosed on the basis of history and physical abnormalities of udder (Radostits *et al*., 2007). In this study mastitis was recorded 5.32% (Table 1) .Rahman *et al*., (1997) reported 13.3% of clinical mastitis in cows which is higher than the result and comparatively lower portion of mastitis (0.84%) was reported by Samad, (2001).

5.1.3 Black quarter

In cattle the disease is mostly confined to young stock between 6 months to 2 years but occasionally it may occur in younger animals and cattle up to 3 years (Radostits *et al*., 2007). In my study black quarter was recorded 0.44% (Table1). These observations support the earlier findings of Rahman *et al*., (1972), Rahman *et al*., (1999) and samad (2001) who reported 0.31%, 0.46% and 0.23% incidence of BQ in cattle. However, Haque *et al*. (1988) reported 0.04% and Hoque and Samad (1996) reported incidence of BQ in cattle from different geographical location in Bangladesh.

5.1.4 Actinobacillosis

In this study Actinobacillosis was recorded 0.7% (Table 1). Rycroft and Garside (2000), Vadillo *et al*., (2002), Drisken *et al*., (2005) and Radostits *et al*., (2007) reported that actinobacillosis is an infectious disease with a worldwide distribution that often affects the soft tissues of cattle and sheep. Lucky *et al*., (2016) reported prevalence of actinobacillosis 1.37% which almost similar of the present study.

5.1.5 Foot rot

In this study Foot rot was found in cattle 1.05% as mentioned in (Table 1). John and Webb (2005) stated that the foot rot is a transferable disease of cattle, sheep and goats and in the medium to high rainfall areas it was the mostly the mostly found. . Lucky *et al*., (2016) reported prevalence of foot rot 4.82%% which is higher than the present study.

5.2 Prevalence of viral diseases in cattle

5.2.1 Foot and mouth disease

The occurrence of FMD has been reported in all age groups of animals and all the seasons of the years but higher susceptibility to young's and associated with increased movement of animals of the start of dry winter grazing season in Pabna district (pharo, 1987). FMD is a transboundry disease (Rweyemamu *et al*., 2008). In the present study FMD was found in 12.66% in cattle (Table5). Sarker *et al*., (2011) and Mannan *et al*., (2009) reported that the prevalence of foot and mouth disease (25.07%) at Rajshahi district 24.51% at Megna upazila of comilla respectively which was higher than this result.

5.2.2 Bovine ephemeral fever

In this study Bovine ephemeral fever was recorded 5.50% (Table 5) .Badruzzaman *et al*., (2015) conducted a study in Chittagong district of Bangladesh and reported that the prevalence of ephemeral fever was 0.27% which is significantly lower from this result.

5.2.3 Papillomatosis

In present study Papillomatosis was recorded 1.40% in cattle (Table 5). 0.7% cases of papillomatosis was observed by karim *et al*., (2014), Samad (2001) showed 0.58% and Rahman *et al*., (2012) showed 0.19% occurrence of warts in Bangladesh.

5.3 Prevalence of gyneco-obstetrical cases in cattle

5.3.1 Retention of placenta

In current study retention of placenta was found in cattle 1.31% (Table 9). Rahman *et al*. (1999) and Samad *et al*., (2001) who reported 0.37% and 0.50% cases of retention of placenta in cows respectively which is close to the present observation.

5.3.2 Repeat breeding

Repeat breeding was found in 4.02% in the present study (Table 9). Samad (2001a) found repeat breeding in 1.26% in cattle. Rahman *et al*., (2012) and Kabir *et al*., (2010) recorded 16.2% and 1.15% repeat breeding cases.

5.3.3 Teat fistula

In the current study the disease was recorded 0.17% (Table 9). Lucky *et al*., (2016) reported teat fistula 2.35% in cattle.

5.3.4 Abortion

In the present study abortion was recorded 3.14%. Lucky *et al*., (2016) reported abortion (7.06%) in cattle which is higher than the present study.

5.3.5 Dystocia

The prevalence of dystocia was 3.14% (Table 9) Hansen *et al*., (2004) reported this rate over 50% .Rahman *et al*., (2012) described the disease of dystocia was recorded in 1.15% cows.

5.3.6 Endometritis

Endometritis was recorded 0.70% (Table 9). Samad (2001a) reported only 0.10% metritis in cows. Galavo *et al*., (2009), Hammon *et al*., (2006) and Huzzy *et al*., (2007) worked on metritis cases in several farms and reported about 20% lactating dairy cows were suffering from metritis.

5.3.7 Pyometra

Pyometra was recorded 0.44% in cattle (Table9). Lucky *et al*., (2016) reported 7.06% pyometra in cattle which is higher than the present study.

5.3.8 Anestrus

This disease was recorded 3.06% (Table 9). Samad (2001b) worked on anestrus case and reported 0.86% in cattle which is lower than the present study.

5.3.9 Uterine Proplase

Uterine proplase was recorded 1.05% (Table 9). Hiranya *et al*., (2012) reported 86.36% suffering from uterine proplase.

5.3.10 Vaginal Proplase

Vaginal proplase was recorded 0.26% (Table 9). Lucky *et al*., (2016) reported 2.35% in cattle.

5.4 Prevalence of parasitic diseases in cattle

The overall prevalence of parasitic diseases in cattle were (8.91%) as shown in (Table 15). The highest prevalence of parasitic disease was observed in tick (3.93%) and the lowest prevalence was detected in hump sore (0.35%). Rony *et al*., (2010) conducted a study in Gazipur of Bangladesh and recorded 68.49%, 65.5%, 65.4% and 64.07% prevalence of tick infestation in cattle, respectively which was higher than this result. Ghosh *et al*., (2007) reported 80% cattle affected by ticks in Bangladesh, India and Pakistan. Singh *et al*., (2004) recorded hump sore in indigenous cattle as 22.60%, whereas in exotic cattle and crossbred, it was 36.64%. Rahman *et al*., (2009) reported 53% of the crossbred cattle affected with maggot.

5.5 Prevalence of metabolic disorder in cattle

The overall prevalence of metabolic disorder in cattle were (6.20%) as shown in Table 11. Among metabolic diseases the highest prevalence was found in acidosis (3. 93%) followed by milk fever 1.57%, Grass tetany 0.44% and ketosis 0.26%. Lucky *et al*., (2016) documented 23.64% acidosis in cattle. Bar and Ezra (2005) observed clinical hypocalcaemia before, during or after calving caused by milk fever. Thirunavuk arasue *et al*., (2010) reported that among the 3774 cows in five milk sheds at the state of Tamil Nadu, 516 (13.67%) were affected with milk fever. Hutjens (2003) studied on Israil Holstein cows and reported that 8% of the pretentious animals died and culled were 12% of them due to milk fever. Radostits *et al*., (2007) worked on grass tetany and stated that the occurrences of this case was seasonal and it was more frequent in cool and rainy weather conditions. An occurrence of 34% ketosis has been reported by Duffield (2000). The incidence rates of ketosis between 11.10% and 12.10% have been reported by Ostegard and Grohn (2000).

5.6 Prevalence of Surgical affection in cattle

The overall prevalence of surgical affection in cattle were (4.63%) as shown in (Table 19). The highest prevalence of surgical affection was observed in abscess (1.31%) followed by atresia ani (1.04%) Navel ill (o.87%), Fracture (0.61%), upward patellar fixation (0.44%) andmyiasis (0.35%). Rahman *et al*., (2012) reported 1.1% cattle affected with abscess at Patuakhali Science and Technology University which is lower than the present observation. Karim *et al*., (2014) and Rahman *et al*., (2012) who reported that navel ill presence in calf 12.5% and 10.1% which is higher from the present observation.

5.7 Prevalence of digestive disoeder in cattle

The overall prevalence of digestive disorder in cattle were (16.9%) as shown in (Table 23). The highest prevalence of digestive disorder was observed in diarrhoea (6.38%) followed by anorexia 4.63%, dysentery 3.23%, dehydration 1.31% and bloat 1.31%. Karim *et al*., (2014) reported 13.4% diarrhea in cattle. Karim *et al*., (2014) and Samad (2001a) reported 1.10% and 1.76% dysentery in cattle. Smith (2005) studied on clinical signs of dehydration in cattle. Rahman *et al*., (2012) and Karim *et al*., (2014) reported 2.2% and 2.5% bloat in cattle.

CHAPTER 6

CONCLUSION

This study was conducted to detect the present situation of occurrence of clinical diseases and disorders at study area. The knowledge derived from this study will increase our understanding the clinical case of cattle in a particular area and taking necessary preventive measure to disease control at national policy level. The district has border area as a result diseases like FMD frequently outbreaks in cattle. From the above results it could be concluded that viral diseases were the most prevalent in this district therefore recommendation it will be heading following way. Because of the porous borders, a regional FMD control strategy should be developed. Further, animal identification and monitoring animal movements are necessary to identify the cross-border movements and market chain interactions of ruminants, leading to improved border and movement controls. Additionally, a vaccination strategy should be developed with the initial objective of protecting small-scale dairy herds from disease. For any successful FMD control programme, long term Government commitment and adequate resources are necessary. A sustainable programme will also need farmer education, commitment and financial contributions. Therefore further studies would be required for the identification and characterization of etiological agents.

CHAPTER 7
REFERENCES

Ali MH, Bhuiyan MKJ and Alam MM. 2011. Retrospective study of diseases in ruminants in Khagrachari hill tract district of Bangladesh .Bangladesh Journal of Veterinary Medicine. 9:145-153.

Anon. 2002. Infectious diseases in livestock. A policy document 15/20. The royal society, London. Lippincott, Williams & Wilkins Philadelphia. 685-715.

Badruzzaman ATM, Siddiqui MMSI, Faruk OF, Lucky NS, Zinnah MA, Hossain FMA and Rahman MM. 2015. Prevalence of infectious & non-infectious diseases in cattle population in Chittagong district of Bangladesh. *International Journal of Biological Research. 3 (1): 1-4.*

Bakshi CS, Shah DH. Verma R, Singh RK and Malik M. 2005. Rapid differentitation of Mycobacterium bovis & Mycobacterium tuberculosis based on a 12.7-kb fragment by a single tube multiplex-PCR. Journal Veterinary Microbiology. 109 (3/4): 211-216.

Balakrishan G, Ravikumar G, Roy P and Purushothaman V. 2013. Isolation & Identification of Clostridium chauvoei from cattle suffered from black quarter. Journal of Pure and Applied Microbiology. 7(930): 2447-2449.

Bastos Ada Anderson EC. Bengis Rg. Keet DF, Winterback HK and Thomson GR. 2003. Molecular epidemiology of SAT -3 type foot- and-mouth diseases. Journal of virus Genes. 27(3): 283-290.

Beugnet F and Moreau Y. 2015. Babesiosis. Revue Scientifiqueet Technique (International Office of Epizootics). 34 (2), 627-639.

Bhuyan MA. 1970. A survey of helminthes parasiting the liver of domesticated animals in East Pakistan. M. Sc. Thesis Submitted to the Department of Parasitology, Bangladesh Agricultural University, Mymensingh.

BIDS. 2012. Barriers to the development of Livestock in Bangladesh.

Bock R, Jackson L. de Vos A and Jorgensen W. 2004. Babesiosis of cattle, Parasitology, 129 Suppl. S247-S269.

Centers for Diseases Control and Prevention (CDCP) (U.S.). 2015. Tetanus Epidemiology and Prevention of Vaccine Preventable Diseases. 341-52.

Clark CJ, Tucker AM and Turton JA. 1971. Sampling technique for estimating roundworm burdens of sheep & cattle. Experimental Parasitology. 30 (2): 181-186.

Correl-Hernandez, E and Iturrondobeitia JC. 2012. Effects of cattle & industries on oribatid mite communities of grassl and soil in the Basque Country (spain). International Journal of Acarology. 38(3): 217-229.

Cuneo SP, Card CS and Bicknell EJ. 2008. Diseases of Beef cattle Associated with Post-calving and Breeding. Cattle Producer's Library (Animal Health Section) Western Beef Resource Committee. The University of Arizona, Second edition. pp. 36- 37.

Das BC and Hashim MA. 1996. Studies on surgical affections in calves of Bangladesh. Veterinary Journal. 30: 5357.

Department of livestock Service 2016.

Dhaliwal GS, Murray RD and Dobson H. 1996. Effects of milk yield, and calving to first service interval, in determining herd fertility in dairy cows. Animal Reprod. Sci. 41(2): 109–117.

Dirksen G, Gründer HD and Stöber M. 2005. Medicina Interna y Cirurgía del Bovino. Vol.1. 4th Edn., Interamericana, Buenos Aires. pp 131-132.

Doel TR. 1996. Natural & vaccine induced immunity to foot-and-mouth disease. Scientific and technical Review Office International des Epizotes. 15: 883-911.

Domingo E, Baranowski E and Escarmis S. 2002. Foot-and-mouth disease. Journal of Comparative Immunology, Microbiology and infectious Disease. 25(5): 297-308.

Domingo E, Mateu MG, Martinez MA, Dopazo J, Moya A and Sobrino F. 1990. Genetic Variability and antigenic diversity of foot-and-mouth disease virus. Journal of Applied virus Research. 2: 233-266.

Drillich M, Wittke M, Tenhagen BA, Unsicker C and Heuwieser W. 2005b. Behandlung chronischer Endometritiden bei Milchkühen mit Cephapirin, Tiaprost oder einer Kombination aus beiden Wirkstoffen. Tierärztl Prax. 33: 404-441.

Duffield T. 2000. Subclinical Ketosis in Lactating Dairy Cattle. Veterinary Clinics of North American Food Animal Practice. 16: 231-253.

Erb HN and Corohn YT. 1988. Epidemiology of metabolic disorder in the parturient dairy cows. Journal of Dairy Science. 9 (7): 2557.

Eriksson S, Näsholm A, Johansson K and Philipsson J. 2004. Genetic parameters for calving difficulty, stillbirth, and birth weight for Hereford and Charolais at first and later parities. Journal of Animal Science. 82: 375-383.

Galvão KN, Frajblat M, Brittin SB, Butler WR, Guard CL and Gilbert RO. 2009b. Effect of prostaglandin F2alpha on subclinical endometritis and fertility in dairy cows. Journal of Dairy Science. 92:4906-4913.

Gerloff BJ. 1998. Feeding the dry cow to avoid metabolic disease. The veterinary Clinics of North America. Food America. Food Animal Practice. 4(2): 379-390.

Ghosh S, Bansal GC, Seitzer U and ahmed JS. 2007. Status of tick distribution in Bangladesh, India & Pakistan. Para .Res. 2: 207-216

Gilbert M, Mitchell ABD, Mawdsley J, Clifton-Hadley R, and Wint W. 2005. Cattle movements and bovine tuberculosis in Great Britain. Native. 435(7041): 491-496.

Grubman MJ and Baxt B. 2004. Foot-and-mouth disease. Clinical Microbiology Review. 17(2): 465-493.

Hammon DS, Evjen IM, Dhiman TR, Goff JP and Walters JL. 2006. Neutrophil function and energy status in Holstein cows with uterine health disorders. Veterinary Immunology & Immunopathology. 113: 21-22.

Hansen M, Misztal I, Lund MS, Pedersen J and Christensen LG. 2004. Undesired phenotypic and genetic trend for stillbirth in Danish Holsteins. Journal of Dairy Science. 87: 1477-1486.

Hiranya K, Bhattacharyya, Mujeeb R, Bashir AF and Afzal HB. 2012. Genital prolapse in crossbred cows: prevalence, clinical picture and management by a modified Bühner's technique using infusion (drip) set tubing as suture material. Veterinary Arhive. 82: 11-24.

Hossain MA, Shaidullah M and Ali Ma. 1986. A report on surgical diseases & reproductive disorders recorded at the veterinary Hospital of Bangladesh Agricultural University, Mymensingh . Bangladesh veterinary Journal. 20: 5.

Huzzey JM, Veira DM, Weary DM and Von Keyserlingk MA. 2007. Prepartum behavior and dry matter intake identify dairy cows at risk for metritis. Journal of Dairy Science. 90: 3220-3233.

Islam Mk, Jabbar A, Campbell BE, Cantacessi C and Gasser RB. 2011. Bovine theileriosis–An emerging problem in south-eastern Australia? Infection, Genetics and Evolution. 11(8): 2095-2097.

John D and Webb ware. 2005. Foot rot control and Eradication. The Mackinnon Project Veterinary Clinical centre, University of Melbourne 250 Princes Highway , Wernibee, Victoria. 3030.

Juli MSB, Fazlul HM, Badruzzaman ATM and Kawser HM. 2015. Bovine diseases at Dinajpur District of Bangladesh: Epidemiological status with relation to age & season. Annals of Veterinary & Animal Science. i.e 2 (3): 55-63.

Kabir1 MH, Reza MA, Razi KMA, Parvez MM, Ba MAS and Mahfuz SU. 2010. A Report on Clinical Prevalence of Diseases and Disorders in Cattleand Goat at the Upazilla Veterinary HospitaL, Ulipur, Kurigram. International Journal. BioRes. 2(11): 17-23.

Kamaruddin K. 2003. Controlling Grass Tetany in Livestock. Cooperative Extension Service. College of Agriculture and Home Economics New Mexico state University. Guide B-809.

Karim MR, Parvin MS, Hossain MZ, Islam MT and Hussan MT. 2014. A report on clinical prevalence of diseases & disorders in Cattle and goats at the upazilla Veterinary hospital, mohammadpur, magura. Bangladesh Journal of Veterinary Medicine. 12(1): 47-53.

Kitching RP. 2005. Global epidemiology and prospects for control of foot-and-mouth disease pp. 133-148, In Mahy BWJ. Eds. Foot & mouth disease virus. Springer-Verlog, Manitoba, Canada.

Lojkic L, Bedekovic T, Cac Z. Lemo N and Cvetnic Z. 2013. Clinical rabies in cattle imported into Croatia. Veterinary Record. 172(1): 22-23.

Loth L, Osmani MG, Kalam MA, Chakraborty RK, Wadsworth J, Knowlesm NJ and Beningo C. 2011. Molecular characterization of foot-and-mouth disease virus: Implications for disease control in Bangladesh. Transboundry and Emerging Diseases . 58(3): 240-246.

Lucky NS, Hossain MK, Roy AC and Haque MM. 2016. A longitudinal study on clinical diseases and disorders of cattle and goats in Sylhet, Bangladesh.

Magona JW, Walubengo J, Olaho-Mukani W, Jonsson NN, Welbum SW and Eisler MC. 2011. Spatial variation of tick abundance & seroconversion rates of indigenous cattle to Anaplasma marginale., Babesia bigemina & Theilaria parva infections :in Uganda, Experimental and Applied Acarology. 55(2): 203-213.

Mahe Alam and Islam KMF, 2016 Clinical Investigation Reproductive Cases in Cows and Buffaloes at Teaching Veterinary Hospitals in India.

Mahy BWJ. 2005. Introduction and history of foot and mouth disease virus pp.1-9. InB WJ. Mahy Eds. Foot and mouth disease virus. Springer-Verlag, Berlin Heidelbrg, Germany.

Makinde AA. 2004. Dermatophilosis in animals and man: Recent studies on Dermatophilus congolensis. VJVS, 1: 87-102.

Mannan MA. 2009. Isolation and characterization of Dermatophilosis bacteria from the skin lesions of cattle in an around BAU campus, Bangladesh Agricultural University, Mymensingh . Bangladesh.

Milnes ASO, Callaghan CJ and Green LE. 2003. A longitudinal study of a natural lice infestation in growing cattle over two winter periods. Veterinary parasitology. 112 (4): 307-323.

Murphy FA, Gibbs EP and Horzineck MC. 1999. Picornaviridae. International Veterinary Virology. 47-518.

Nafstad O and Gronstol H. 2011. Eradication of lice in cattle. Acia Veterinaria Scandinavica. 42 (1): 81-89.

Nath BD, Ahsan MS, Rahman MS and Fazlul Huque AKMF. 2010. Prevalence & therapeutic management of bovine dermatophilosis. Bangladesh Research publications Journal. 4 (3): 198-207.

Ndhlovu DN and Mastica PJ. 2016. Bovine dermatophilosis; Awareness, perceptions & attitude in the small-holder sector of north-west Zimbabwe. Onderstepoort . Journal of Veterinary Research. 83 (1).

Nooruddin M. Khaleque MA. 1986a. Clinical features of bovine Dermatophilosis .Bangladesh Veterinarian. 3(1-2): 3-5.

Nooruddin M and Khaleque MA. 1986b. Prevalence of bovine Dermatophilosis in Bangladesh. Indian Journal of Animal Science. 56 (3): 337-338.

Onneshan U. 2014. Recent Trends of Growth in Agriculture, Industry and power Bangladesh Economic update.

Pallab MS, Ullah SM, Uddin MM and Miazi OF. 2012. A cross sectional study of several diseases in cattle at Chandanaish Upazilla of Chittagong district. Scientific Journal of Veterinary Advances. 1: 28-32.

Pharo HJ. 1987. Analysis of clinical case records from dairy co-operatives in Bangladesh. Tropical Animal Health and Production. 19:136-142.

Phiri AM, Phiri IK, Sikasunge CS, Chembensofu M and Monard J. 2006. Comparative fluke burden & pathology in condemned & non condemned cattle livers from selected abattoirs in Zambia. Onderstepoort Journal of veterinary Research. 73(4): 275-281.

Radostits Gay CC, Hinchcliff KW and Cons PD. 2007. Veterinary Medicine. A Textbook of the Diseases of cattle ,Horses, Sheep,Pigs and Goats. Saunders Flsevier, Spain.

Rahman MA, Ali KM and Rahman A. 1972. Incidence of diseases of cattle in Mymensingh. Bangladesh Veterinary Journal. 6:25-30.

Rahman MA, Islam MA, Rahman MA, Talukder Ak, Parvin MS and Islam MT. 2012. Clinical diseases of ruminants recorded at the patuakhali science & technology University veterinary clinic, Bangladesh Journal of Veterinary Medicine. 10 (1 and 2): 63-73.

Rainwater-Lovett K, Pacheco JM, Packer C and Rodriguez. 2009. Detection of foot and mouth disease virus infected cattle using infrared thermography. Veterinary Journal. 80 (3): 317-324.

Reeves WK, Szumlas DE, Moriarity JR, Loftis AD, Abbasy MM, Helmy IM and Dasch GA. 2006. Louse-borne bacterial pathogens in lice (Phthiraptera) of rodents & cattle from Egypt . The Journal of Parasitology. 92 (2): 313-318.

Rozario T and Newmark PA. 2015. A confocal microscopy based atlas of tissue architecture in the tapeworm Hymenolepis diminuta (Experimental Parasitology). 158: 31-41.

Rweyemamu M, Roeder P, Mackay D, Sumption k, Brownlie J, Leforban Y, Valacher JF, Knowles NJ and Saravia V. 2008. Epidemiological patterns of Foot-and-mouth disease worldwide. Transboundry and Emerging Diseases. 55 (1): 57-72.

Rycroft AN and Garside LH. 2000. Actinobacillus species and their role in animal disease. Veterinary Journal. 159:18-36.

Samad MA, Bari ASM and Bashar SA. 1988. Gross and histopathological studies on bovine babesiosis in Bangladesh. Indian Journal of Animal Science. 58: 926-928.

Samad MA, Islam MA and Hossain A. 2002. Patterns of occurrence of calf diseases in the district of Mymensingh in Bangladesh. Bangladesh Veterinary Journal, 36: 1-5.

Samad MA. 2001. Observations of clinical diseases in ruminants at the Bangladesh Agricultural University Journal. 35:93-120.

Sarker MAS, Hashim MA, Rahman MB and Begum H. 1999. Studies on bovine lymphadenitis syndrome. Bangladesh Veterinarian. 10: 6-8.

Sheldon IM, Lewis GS, LeBlanc S and Gilbert RO. 2006. Defining postpartum uterine disease in cattle. Theriogenology. 65: 1516-1530.

Shivachandra SB, Viswas KN and Kumar AA. 2011. A review of hemorrhagic septicemia in cattle and buffalo. Animal Health Research Review. 12: 67-82.

Singh KS, Mukhopadhayay SK, Majumder S, Laha R, Niyogi D and Ganguly S. 2014. Study on different aspects of stephanofilarial dermatitis infection in cattle population of west Bengal, The IIOAB Journal. 5: 19-22.

Smith G. 2005. Fluid therapy in adult cattle. The North American Veterinary Conference- 2005 proceedings. pp 38-39.

Sobecka E. 2001. Changes in the iron level in the organs and tissues of wels catfish, Silurusglanis L. caused by nickel, ActaIchthyologica et Piscatoria. 31: 2.

Stadtfeld H and Haberkom K. 1986. Rabies in cattle Tierarztliche Praxis. 14: 325-331.

Sudhakara , Reddy B, Sivajothi S and Rayuiu VC. 2015. Clinical coccidiosis in adult cattle. Journal of parasite Diseases: Official organ of the Indian Society for Parasitology: 39(3): 557-559.

Sultana M, Ahad A, biswas PK, Rahman MA and Barua H. 2008. Black Quarter (BQ) Disease in Cattle and diagnosis of BQ septicaemia Based on Gross Lesions & Microscopic Examinatons. Bangladesh Journal Microbiology. 25(1)13-16.

Talukder MAS, Khandoker MAMY, Rahman MGM, Islam MR and Khan MAA. 2005. Reproductive problems of cow at Bangladesh Agril. University Dairy Farm and possible remedies. Pakistan Journal of Biological Science. 8: 1561-1567

Thirunavukkarasu M, Kathiravan G, Kalaikannan A and Jebarani W. 2010. Quantifying Economic Losses Due to Milk Fever in Dairy Farms. Agricultural Economics Research Review. 23: 77-81.

Tirloni L, Reck J. Terra RMS, Martins JR, Mulenga A, Sherman NE and Vaz IDS. 2014. Proteomic analysis of cattle tick Rhipicephalus (Boophilus microplus) sliva: A comarison between partially and fully engorged females PLoS\E, 9(4).

Vadillo S, Píriz S, Mateos E. 2002. Manual de Microbiología Veterinaria. Mc Graw-HillInteramericana, Madrid. pp 357-364.

Waltner-Toews D, Martin SW and Meek AH. 1986. Dairy calf management, morbidity and mortality in Ontario Holstein herd SIV. Association of management with mortality. Preventive Veterinary medicine. 4:159-171.

Wilson GF. 2002. Metabolic diseases of grazing cattle from clinical event to production disease . New zeal and veterinary Journal . 50 (3): 85-87.

Woodsbury RL. 1995. A review of the possible mechanisms for the persistence of foot and mouth diseases virus . Journal of Epidemiology & infections. 114:1-13.

Zaria LT. 1993. Dermatophilus congolensis infection (dermatophilosis) in animals and man! An update Comparative Immunology, Microbiology and Infectious Diseases. 16: 179-222.