International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com
Volume 3, Issue 6 -2016

Research Article

SOI: http://s-o-i.org/1.15/ijarm-2016-3-6-3

Incidence and Therapeutic Management of Viral Diseases in Cattle at Jaintapur, Sylhet, Bangladesh

Md. Rejaul Alam[1], Khurshida Afrin[2], Amith Kumar Dash[3], Dipon Kumar Bhowmik[4], Ashim Baran Sen[5] and SabujKanti Nath[6*]

[1]DVM, Sylhet Agricultural University, Sylhet, Bangladesh.
[236]MS Fellow, Dept. of Animal and Poultry Nutrition, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh.
[4]DVM, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh.
[5]Veterinary Surgeon, Begumgonj, Noakhali, Bangladesh.
*Corresponding Author: *sabujkantinath@gmail.com*

Keywords

viral disease, incidence, therapeutic management and cattle.

Abstract

An investigation was undertaken to determine the incidence of common viral diseases in Jaintapurupazila under Sylhet district during December 2014 to November 2015. Out of 644 cattle 251 were found to be infected with viral diseases and the incidence of viral diseases were 38.98%. Among the viral diseases the incidence of FMD (foot and mouth disease) was high which is 16.92% followed by BEF (bovine ephemeral fever), BVD (bovine viral diarrhea), Rabies, Papillomatosis and there incidence were 2.48%, 3.26%, 2.48% and 7.3% respectively. Aged (7-12 years, 8.85%) Adult (2-7 years, 6.21%) are more susceptible to viral diseases than young (0-2 years, 3.42%). Season wise incidence of viral diseases in this area was 18.48%, 14.44%, & 6.05% in rainy, summer and winter season respectively. This investigation focuses on the incident viral diseases in Jaintapur area of Bangladesh. A case control study may help to reveal the factors responsible for such a high level of occurrence of these viral diseases. This study generated information which is not only valuable for the clinicians, researchers, animal health companies and policy makers but also for the academicians to update veterinary curriculum.

Introduction

Bangladesh is densely populated country.Livestock population in Bangladesh is currently estimated to comprise 23.2 million cattle(DLS, 2014). Our country has relative density of livestock population well above the average for many other countries in the world. Livestock is the most prospective sub sector of Agriculture, which contributes to reduce the poverty of marginal farmers. This sector contributes; about 10% of the total agriculture GDP and thus plays an important role in rural development and greatly in subsistence agricultural economy of Bangladesh. The contribution of livestock to earn foreign exchange through export of leather and leather products is about TK.5000 million which is around 14% of the total earnings. It is reported that more than 20% of the rural population of our country are engaged in this sub sector for their subsistence. In Bangladesh, similar to human population density, livestock density is also highest (cattle, goats, sheep andbuffaloes) in the world with an estimated 145 large ruminants/km2 compared with 90 for India and 20 for Brazil (BARC Bangladesh, 2010). It is estimated that

52.8 million livestock animals are present in Bangladesh, most of which are food producing cattle andgoats (DLS, 2014). About 20% of the human population is directly and 50% is partly dependent on the livestock sector (Bangladesh Economic Review, 2009).Among all of livestock population, cattle are one of the most important components for rural agricultural farming system in Bangladesh and it has been playing an important role in economy by providing food, draft power, transport, hides, bone, biogas etc. Although cattle are performing a vital role, maximum of them are emaciated and frequently affected with several types of diseases due to poor management practices and geo-climatic condition of Bangladesh. Among the various constrains in the development of cattle, diseases are the most important limiting factors that cause significant mortality of adult cattle and neonatal calves each year (Debnath*et al.*, 1990). It was reported that variation in different cattle breed, their sex, season and environmental factors greatly influence the disease prevalence in cattle (Alim*et al*., 2012; Islam *et al.*, 2014, Badruzzaman*et al*., 2015). Although some reports on clinical case records from HaluaghatUpazila Veterinary Hospital, Mymansingh (Sarker*et al*., 1999), Bangladesh Agricultural University Veterinary Clinic (Samad*et al.*, 2002), UlipurUpazila Veterinary Hospital, Kurigram(Kabir*et al.*, 2010), ChandanaishUpazila of Chittagong district, Bangladesh (Pallab*etal.*, 2012), Patuakhali Science and Technology University Veterinary Clinic (Rahman*et al*., 2012), MohammadpurUpazila Veterinary Hospital, Magura (Karim*et al.*, 2014) and from several veterinary hospital of Chittagong district, Bangladesh (Badruzzaman*et al.*, 2015) is available. Viral diseases greatly affect the livestock of Sylhet region Most of the livestock populations are reared together and livestock is an integrated part of our farming system and plays an important role in the traditional economy of Bangladesh. The cattle are important for good quality of milk and a source of income to farmers. This report describes the important clinical problems of cattle at Jaintapur at Bangladesh also with their therapeutic management. Moreover most of the people are unaware about the spread of disease. Most of the domestic animals suffer from many diseases which reduce the performance of them as well as economical loss of the farmer. Livestock not only support their income but also contributing our GDP. On Sylhet district, of viral disease causes divesting losses in cattle population. Farmer does not want to vaccinate the animal. For this, some viral diseases like, FMD, Bovine Ephemeral Fever, rabies, Papillomatosis& Rota viral diarrhea occur most frequently. Foot and mouth disease (FMD) epitheliotropic viral disease affecting thecattle, buffaloes, sheep and goat on all over countries. The causal agent was one of the first characterized viruses. It remains one of the most economically important viral diseases of farm animals that cause substantial reduction in productivity. It is a highly contagious disease that causes severe economic loss in terms of calf mortality and reduced productivity of the affected animals. Among infectious disease in Bangladesh, Foot and Mouth Disease is an endemic disease which is found year round although highest incidence occur mainly at the end of rainy season .The occurrence of the disease in draft cattle during land preparation has been contributing to a lot of sufferings of the farmers that lower crop production in locality. Types of FMD virus in Bangladesh were reported as types A, O, Asia 1 and subtype A2. The name ephemeral fever was applied very early in the disease's recorded history. The fever of ephemeral fever is generally biphasic, sometimes triphasic, with peaks of 40-41.5° C (104-107° F) spaced 12-18 hours apart. Rabies is fatal encephalitis of all warm-blooded mammals caused by a lyssa virus and manifested mainly in either a furious or dumb (paralytic) form. The infection usually originates in a bite wound and ascends a nerve trunk to the cord and brain. The incubation period is variable and, on occasions, has been longer than six months. Bovine viral diarrhea (BVD) is a contagious viral disease of Cattle, First recorded in 1946 in New York. It is now recognized that both the disease entities were caused by the pesti virus. Infectious papillomatosis or wart is a disease occurring in cattle in various parts of the world. Bovine Papillomatosis is a contagious disease of cattle occurring as Warts/Papilloma on skin and mucosa, caused by BPV types 1 to 10. Infection by BPV occurs as a result of multiplication of the virus in basal cells, leading to wart formation, however, most warts are benign and do not proliferate indefinitely. Papilloma virus infection in cattle can result in weight loss and retarded growth. The lesions are often associated with the mammary gland and interfere with milking. It can lead to reduction in milk yield. The quality of the hide is also deteriorated. Thus the disease can lead to a serious economic loss if not diagnosed and treated promptly. Vaccines and veterinary services are not always available. So disease is spread continuously. . Present study showed that the incidence rate of viral diseases is changed according to their age, sex, and season. A large no. of bull, cow &calves died due to those viral diseases and the financial loss are also occurred. Mortality is also seen due to those viral diseases. The economic losses due to calf mortality, reduced milk yield, draft power and poor body weight gain of fattening bull is seen.By proper vaccination of animal, good balance diet, cleaning the shed regularly, isolate the diseased animal and give proper treatment of

the affected we may reduce the incidence rate of viral diseases.

Materials and Methods

Study area:

The study area was upazila livestock office, Jaintapur under Sylhet district of Bangladesh.There were appointed at the upazila livestock office, Jaintapur for one month and the data collected with the help of upazila livestock officer and previous data was collected 11 month during this assignment study. The way of data collection was from the daily patient register book of upazila livestock office, Jaintapur, Sylhet.

Study time:

The duration of the study wasDecember 2014 to November 2015.

Collection of information:

A total of 644 sick cattle were recorded during this period. Cattle under 2 years were categorized as young and 2-7 years were categorized as adult and 7-12 years were categorized as aged. The clinical cases were recorded during the physical visit of the farms. The clinical diagnosis of the diseases were made based on the presenting clinical signs, clinical history, physical examination, laboratory diagnosis, gross lesionand the responses to treatment (Kelly, 1979; Rosenberger, 1979; Samad,1996,Jones*et al*, 1996).To determine seasonal prevalence seasons were divided into three i.e. summer (March- June), rainy (July – October) and winter (November- February) season.

Clinical sign:

The clinical signs were observed in each affected animal. Signs of diseases were also collected from the record book. (Kelly, 1979)

Postmortem examination:

Postmortem examination was carried out for the identification of diseases. Specific disease cause specific lesions in various organs. Various internal organs such as liver, lung, kidney, spleen, heart, intestine, trachea, bone, muscle etc. were collected and examined for the diagnosis of disease. (Rosenberger, 1979)

Laboratory test:

There is no diagnostic laboratory in upazila livestock office, Jaintapur. So the samples were regularly sent to FDIL.The test which performed in the FDIL at that time were Haemaglutination test, Haemaglutination inhibition test, viral neutralization test, Fluorescent antibody test(FAT) (Marchant*et al*,2000), agar gel precipitation test, plate or tube agglutination test, enzyme linked immunosorbent assay (ELISA).

Therapeutics:

Therapeutics of the disease were obtained by asking question to the case attendant, veterinary officer of hospital and also observed in the animal house.

Results and Discussion

Infection of viral diseases in Jaintapurupazila, Sylhet on cattle, the severity of viral infection depends upon the age of the animal and also in the seasonal variation of the year. Various viral infections are found like FMD, Rabies, Bovine viral diarrhea, BEF, Papillomatosis etc.

Table 1: The incidence of FMD, Rabies, Bovine viral diarrhea, BEF, Papillomatosis infection in cattle in Jaintapurupazila (December 2015 to November 2015), (Total animal 644)

Name of diseases	No of affected animals Age			Total
	0-2 years	2-7 years	7-12 years	
FMD	22 (3.42%)	37(5.74%)	50(7.76%)	109(16.92%)
Rabies	5 (0.78%)	5(0.78%)	6(0.93%)	16(2.48%)
BEF	8 (1.24%)	20(3.11%)	30(4.66%)	58(9.01%)
BVD	4(0.62%)	10(1.55%)	7(1.09%)	21(3.26%)
Papillomatosis	11 (1.71%)	16(2.48%)	20(3.11%)	47(7.3%)
Total	50 (7.76%)	88(13.66%)	113(17.55%)	251(38.98%)

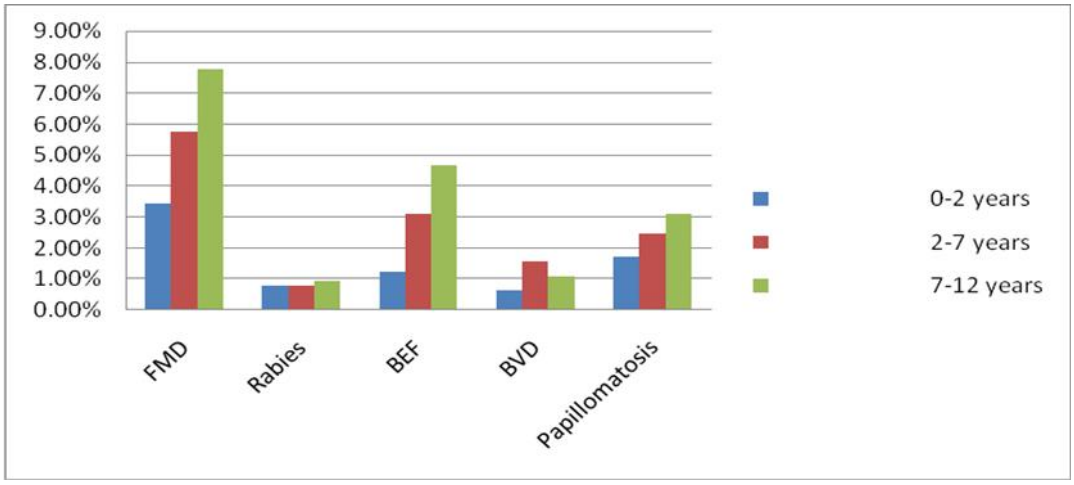

Fig 1: Graphical representation of incidence of different viral diseases

Table 1 shows that the incidence of FMD, Rabies, Bovine viral diarrhea, BEF, Papillomatosisin cattle in Jaintapurupazila from January 2015 to December 2015.Here total 109 cases of FMD and the incidence are 16.92%. Cases of Rabies are 16 and the incidence are 2.48% ,cases of Bovine viral diarrhea are 58 and the incidence are 9.01%, cases of BEF are 21 and the incidence are3.26% ,and cases of Papillomatosis are 47 and the incidence are7.3% . Table1 also show cases of FMD, Rabies, Bovine viral diarrhea, BEF, Papillomatosisaccording to age group. Most viral infection is found in adult animal rather than young animal.

Table 2: Seasonal incidence of FMD, Rabies, Bovine viral diarrhea, BEF and Papillomatosis in Jaintapurupazila (December 2015 – November 2015)
Summer Season (March-June) Total animal- 232

Name of diseases	No of affected animals Age			Total
	0-2 years	2-7 years	7-12 years	
FMD	11(4.74%)	19(8.19%)	27((11.63%)	57(24.56%)
Rabies	4(1.72%)	3(1.29%)	4(1.72%)	11(4.73%)
Bovine ephemeral fever	1(0.43%)	2(0.86%)	1(0.43%)	4(1.72%)
Bovine viral diarrhea	1(0.43%)	2(0.86%)	2(0.86%)	5(2.15%)
Papillomatosis	4(1.72%)	7(3.01%)	5(2.15%)	16(7.88%)
Total	21(9.05%)	33(14.22%)	39(16.89%)	93(40.16%)

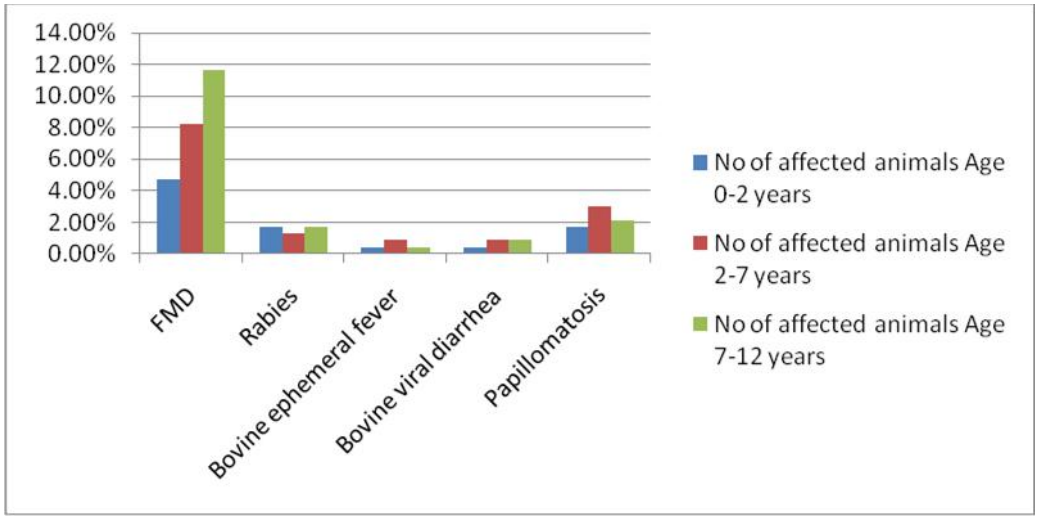

Fig 2: Graphical representation of incidence of viral diseases in summer season

During March –June, in summer season incidence rate was24.56% in FMD, 4.73% in Rabies,2.15%in Bovine viral diarrhea, 1.72% in BEF and 7.88% in Papillomatosis. Here total cases of FMD are 57, cases of rabies are 11, cases of Bovine viral diarrhea are 05, and cases of BEF are 04 and cases of papillomatosis are16. Above table2 shows that the incidence rate of FMD was4.74%, 8.19% and 11.63%, Rabies was 1.72%, 1.29% and4.73%, bovine viral diarrhea was 0.43%, 0.86% and0.86%,BEF was 0.43%, 0.86% and 1.72%,Papillomatosis was1.72%, 3.01%, 2.15% respectively in different age group.

Table 3: Seasonal incidence of FMD, Rabies, Bovine viral diarrhea, BEF and Papillomatosis in Jaintapurupazila (December 2015 – November 2015)
Rainy season (July –October) Total animal-260

Name of diseases	No of affected animals Age			Total
	0-2 years	2-7 years	7-12 years	
FMD	6(2.31%)	9(3.46%)	12(4.62%)	27(10.39%)
Rabies	00(0.00%)	1(0.38%)	1(0.38%)	2(0.76%)
Bovine ephemeral fever	6(2.31%)	18(6.92%)	28(10.77%)	52(20.00%)
Bovine viral diarrhea	3(1.15%)	5(1.92%)	4(1.54%)	12(4.61%)
Papillomatosis	7(2.69%)	7(2.69%)	12(4.62%)	26(10.00%)
Total	22(8.46%)	40(15.38%)	57(21.92%)	119(45.76%)

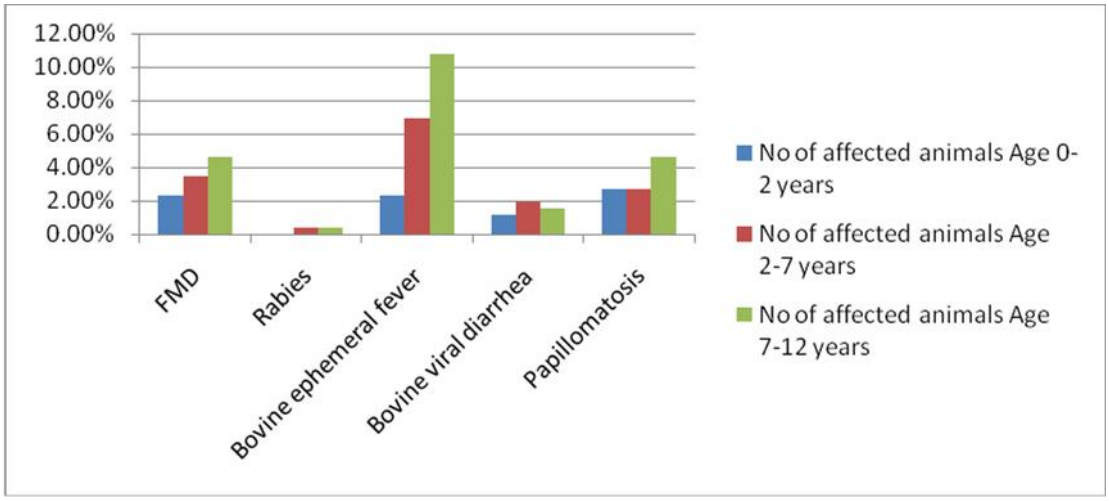

Fig 3: Graphical representation of incidence of viral diseases in rainy season

During July –October, in rainy season incidence rate was 10.39% in FMD, 0.76%in Rabies, 4.61% in Bovine viral diarrhea, 20.00% in BEF, 10.00% in Papillomatosis. Here total cases of FMD are 27, cases of rabies are 2, cases of Bovine viral diarrhea are 12, cases of BEF are 52, and cases of papillomatosis are 26. Above table3 shows that the incidence rate of FMD was 2.31%, 3.46% and 4.62%, Rabies was 0.00%, 0.38% and 0.38%. Bovine viral diarrhea was1.15%, 1.92% and1.54%,BEF was 2.31%, 6.92% and 10.77%,Papillomatosis was 2.69%, 2.69% and 4.62% respectively in different age group.

Table 4: Seasonal incidence of FMD, Rabies, Bovine viral diarrhea, BEF and Papillomatosis in Jaintapurupazila (December 2015 – November 2015)
Winter season (November-February) Total animal-152

Name of diseases	No. of affected animals Age			Total
	0-2 years	2-7 years	7-12 years	
FMD	5(3.29%)	9(5.92%)	11(7.24%)	25(16.45%)
Rabies	1(0.66%)	1(0.66%)	1(0.66%)	3(1.98%)
Bovine ephemeral fever	1(0.66%)	0(0.00%)	1(0.66%)	2(1.32%)
Bovine viral diarrhea	0(0.00%)	3(1.97%)	1(0.66%)	4(2.63%)
Papillomatosis	0(0.00%)	2(1.32%)	3(1.97%)	5(3.29%)
Total	7(4.61%)	15(9.87%)	17(11.18%)	39(25.66%)

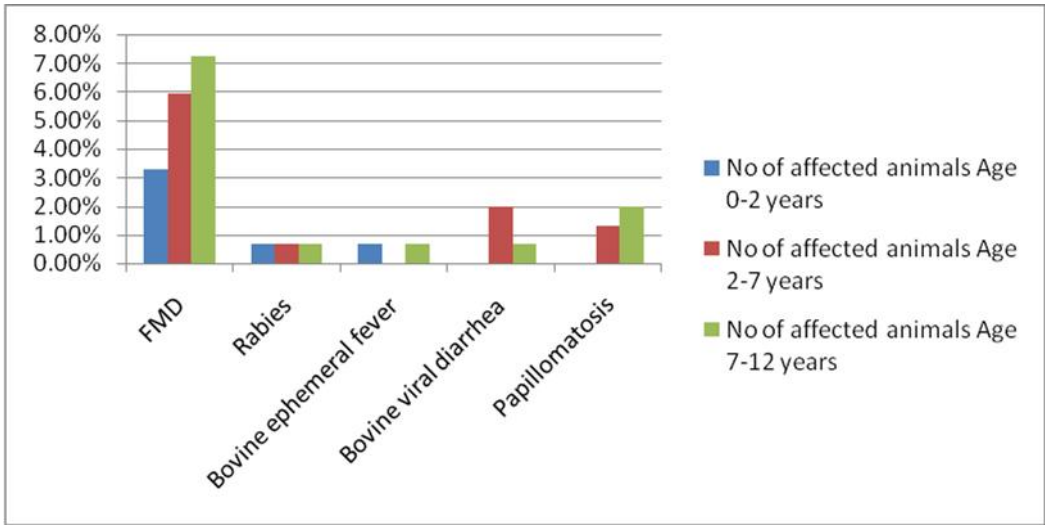

Fig 4: Graphical representation of incidence of viral diseases in winter season

During November –February, in winter season incidence rate was 16.45% in FMD, 1.98% in Rabies, 2.63% in Bovine viral diarrhea, 1.32% in BEF, 3.29% in Papillomatosis. Here total cases of FMD are 25, cases of rabies are 03, cases of Bovine viral diarrhea are 04, cases of BEF are 02 and cases of papillomatosis are 05. Above table4 shows that the incidence rate of FMD was 3.29%, 5.92% and 7.24%, Rabies was 0.66%, 0.66% and 0.66%, Bovine viral diarrhea was 0.00%, 1.97% and 0.66%,BEF was 0.66%, 0.00% and 0.66%, and Papillomatosis was 0.00%, 1.32% and 1.97% respectively in different age group.

Table 5: Summary of FMD, Rabies, Bovine viral diarrhea, BEF and Papillomatosis in cattle in Jaintapur in 2015

Name of the diseases	Summer season	Rainy Season	Winter Season	Total
FMD	57(8.85%)	27(4.19%)	25(3.88%)	109(16.92%)
Rabies	11(1.71%)	2(0.31%)	3(0.46%)	16(2.48%)
BEF	4(0.62%)	52(8.07%)	2(0.31%)	58(9.01%)
BVD	5(0.78%)	12(1.86%)	4(0.62%)	21(3.26%)
Papillomatosis	16(2.48%)	26(4.04%)	5(0.78%)	47(7.03%)
Total	93(14.44%)	119(18.48%)	39(6.05%)	251(38.98%)

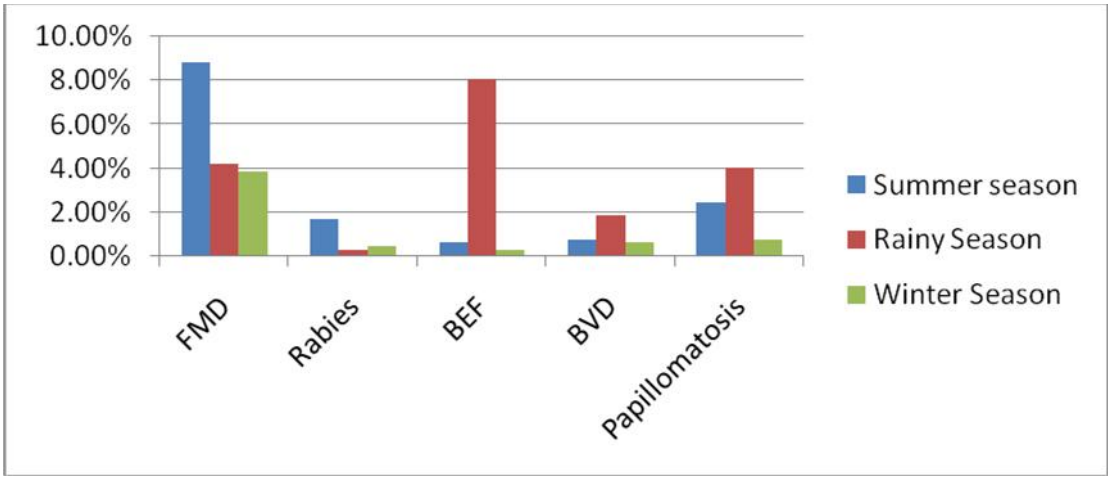

Fig 5: Viral infection in different season

During March-June, in summer season incidence rate was8.85% in FMD, 1.71% inRabies, 0.62% in BEF, 0.78% in BVD,2.48% in Papillomatosis. July-October, in Rainy season incidence rate was 4.19% in FMD, 0.31% in Rabies,8.07% in BEF,1.86% in BVD , 4.04% in Papillomatosis, and During November-February, in Winter season incidence rate was 3.88% in FMD, 0.46% in Rabies ,0.31% in BEF, 0.62% in BVD,0.78% in Papillomatosis .The highest incidence rate was noted in July- October for FMD 4.19% , 0.31% for Rabies ,8.07% for BEF , 1.86% for BVD and 4.04% forPapillomatosis .

Table 6: Record of FMD, Rabies BEF, BVD, and Papillomatosis in 2015

Diseases	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Diseases case found	42	44	73	63	47	43	63	61	63	62	39	44	644
FMD	7	8	28	17	7	5	9	7	6	5	4	6	109
Rabies	2	0	5	3	2	1	0	1	1	0	0	1	16
BEF	1	1	1	1	1	1	11	10	15	16	0	0	58
BVD	1	0	1	1	1	2	5	3	1	3	1	2	21
Papillomatosis	0	1	6	5	3	2	5	8	7	6	3	1	47
Total	11	10	41	27	14	11	30	29	30	30	8	10	251

Table 6 Shows that the record of FMD, Rabies BEF, BVD, and Papillomatosis from December 2014 to November 2015, here total infected animal was644,among them 109 animal were affected by FMD, 16 by Rabies, 58 by BEF, 21 by BVD, and 47 by Papillomatosis throughout the year.

In thesestudy there werefound the incidence rate of FMD was 16.92% whereasRahman*et al.*,(2012)reported that the incidence rate of FMD was 14.85% which was quietly similar. The difference wasfound due to environmental factor.The incidence rate of Rabies is 2.48% whereas Ali *et al.*, (1982) reported that the incidence rate of Rabies is 2.1% which was quietlysimilar. The difference was found due to availability of host. The incidence rate of BEF is 9.01% whereas other researchers reported that the incidence rate of BEF is 15.7%. Thedifference was found due to lack of vector. The incidence rate of BVD were 3.26% whereas (Khawlah and Saleem, 2012) reported that the incidence rate of BVD were 10.7%. The difference was found due to regional effects. The incidence rate of Papillomatosis were 7.3% whereas (Olson, 1990) reported that the incidence rate of Papillomatosis were 4.86%. The difference was found due to increasing outbreak of diseases at study area.

Conclusion

It was found that FMD, Rabies, BVD,Rota Viral Diarrhea and Papillomatosis were the most common viral diseases found at Jaintapurupazila, Sylhet. The study was carried out during and after an outbreak of viral diseases in cattle at Jaintapurupazila for a period of one year. Result showed that the incidence rate of viral diseases is changed according to their age, sex, and season. A large no. of bull, cow and calves died due to those viral diseases and the financial loss were also occurred. Mortality was also seen due to those viral diseases. The economic losses due to calf mortality, reduced milk yield, draft power and poor body weight gain of fattening bull was seen. By proper vaccination of animal, good balance diet, cleaning the shed regularly, isolate the diseased animal and give proper treatment of the affected we may reduce the incidence rate of viral diseases.

References

Ali M W, Majumder M J U, Haq F, Latif M A, Bari I F and Alam S. 1982. Studies on the presence of rabies virus among stray dogs in Dhaka city.Bangladesh Medical Research Council Bulletin 8: 59-62.

Alim MA, Das S, Roy K, Masuduzzaman M, Sikder S, Hassan MM, Siddiki AZ, Hossain M A. 2012. Prevalence of hemoprotozoan diseases in cattle population of Chittagong division, Bangladesh. Pakistan Veterinary Journal, 32: 221-22

Badruzzaman ATM, Md.SiddiquiMS I, FarukO F, Lucky NS, Zinnah MA, Hossain FM A,Rahman MM. 2015.Prevalence of infectious and non-infectious diseases in cattle population in Chittagong district ofBangladesh. International Journal of Biological Research, 3 (1):1-4.

Bangladesh Economic Review 2009.Ministry of Finance, Government of Bangladesh.

BARC Bangladesh 2010. Agricultural Research Priority: Vision-2030 and Beyond (Sub-sector: Livestock). Bangladesh Agriculture Research Council, Farm gate, Dhaka.

Debnath NC, Sil BK, Selim SA, Prodhan MA M and Howlader MMR. 1990.A retrospective study of calf mortality and morbidity on smallholder traditional farms in Bangladesh. Preventive Veterinary Medicine, 9:1-7

Department of Livestock Services 2014. Ministry of Fisheries and Livestock Services, Government of Bangladesh.

Islam K M, Rahman M, Islam MS, Adhikary G N, Rauf SM A. 2014.Epidemiological studies of fascioliasisin black Bengal goats. Eurasian Journal of Veterinary Science, 30: 152-156

Marchant A, Bhalerao R, Casimiro I, Eklöf J, Casero PJ, Bennett M and Sandberg G.
2000 AUX1 promotes lateral root formation by facilitating indole-3-acetic acid
distribution between sink and source tissues in the Arabidopsis seedling. Plant Cell
14 : 589 – 597.

Olson C. 1990. Papilloma viruses. In: Virus Infections of Fields Virology (3rd edition) (Fields B N, Knipe D M, Ruminants (Dinter, Z B. Morein, Eds.).

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

Jones, T.C, R.D, Hunt, N. W. King. 1996.Veterinary pathology 6th ed.USA.P.413-504

Kabir MH, Reza MA, Razi KMA, Parvez MM, Bag MAS, Mahfuz S U. 2010.A report on clinical prevalence of diseases and disorders in cattle and goat at the Upazilla Veterinary Hospital, Ulipur,Kurigram. International Journal of Biological Research, 2: 17-23.

Khawlah M I A, Saleem A H. 2012. Detection of bovine viral diarrhea –mucosal disease (BVD-MD) in buffaloes and cows using ELISA, The Iraqi Journal of Veterinary Medicine, 36: 45-50.

Karim MR, Parvin MS, Hossain MZ, Islam MT, Hussan M T. 2014.A report on clinical prevalence of diseases and disorders in cattle andgoats at the upazila veterinary hospital, Mohammadpur, Magura. Bangladesh Journal of Veterinary Medicine, 12 (1): 47-53.

Kelly, W R. 1979. Veterinary Clinical Diagnosis, Second Ed.1974. Bailliere, Tandall and Cassel Ltd. London 39-102.

Rahman MA, Islam MA, Rahman MA, Talukder AK, Parvin MS, Islam M T. 2012. Clinical diseases of ruminants recorded at the Patuakhali Science and Technology University veterinary clinic. Bangladesh Journal of Veterinary Medicine, 10(1&2): 63-73.

Rosenberger, G. 1979. Clinical Examination of Cattle. 2nd edn,VerlagPoulParey, Germany.

SamadM A. 1996. Veterinary Practitioner's Guide.1st Pub.No. 07,BAU Campus, Mymansingh.

Samad MA, Islam M A, Hossain A. 2002. Patterns of occurrence of calf diseases in the district of Mymansingh in Bangladesh. Bangladesh Veterinary Journal, 36: 01-05.

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

Access this Article in Online	
Quick Response Code	Website: www.ijarm.com
	Subject: Animal Sciences

How to cite this article:

Md. Rejaul Alam, Khurshida Afrin, Amith Kumar Dash, Dipon Kumar Bhowmik, Ashim Baran Sen and SabujKanti Nath. (2016). Incidence and Therapeutic Management of Viral Diseases in Cattle at Jaintapur, Sylhet, Bangladesh. Int. J. Adv. Multidiscip. Res. 3(6): 13-20.