

PREVALENCE OF FOOT AND MOUTH DISEASE AT CHUADANGA SADAR UPAZILLA IN BANGLADESH

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ABSTRACT

A study on clinical observation, management and complication of foot and mouth disease (FMD) outbreak in cattle was carried out in Chuadanga sadar upazilla during 24 weeks period from July 2012 to January 2013. Clinical data were collected from 108 cattle of both sexes. The effect of season, breed, age, sex and purpose of keeping cattle on the incidence of the disease was analyzed. Seasonal variation of the disease was significant. Crossbred was found to be more susceptible than local breed. The prevalence of the disease was found significantly higher in male than female. The clinical prevalence of FMD increased in the month of November (31.48%). The prevalence of FMD in other months varies from 5-21%. Clinical observation of FMD affected cattle showed fever, anorexia, salivation and erosive lesion on oral mucosa and inter digital region of foot. Antibacterial drug could be recommended for clinical practice to control secondary bacterial infection in complicated FMD cases.

Key words: Foot and mouth diseases (FMD), prevalence, Bangladesh

INTRODUCTION

Foot and mouth disease (FMD) is a highly contagious viral disease of cloven footed domestic and wild animals such as cattle, buffaloes, yaks, sheep, goats, and swine. Other susceptible species are hedgehogs, armadillos, nutrias, elephants, capybaras, rats and mice. Camels, dromedaries and llama have low susceptibility. Horses are not susceptible to FMD and humans are affected only vary rarely (Samuel and Knowles, 2001). The causal agent is a small, non-enveloped, single stranded RNA virus. It is a member of genus aphthovirus in the family *Picornaviridae*. Seven immunologically distinct serotypes are recognized- A, O, C, Asia-1, South African Territories (SAT-1, SAT-2 and SAT-3). It is prevalent in Bangladesh with virus types A, O, C, Asia-1 and subtypes A-5 and A-22 (Khan *et al.*, 2002; Loth *et al.*, 2011). FMD appears in cattle of Bangladesh either generally in endemic or sometime in epidemic form. Amongst the livestock diseases FMD is thought to be most dreadful one owing to its fierce pathogenicity and complexity in controlling it. Once the outbreak starts, it continues round the year affecting large number of cattle herd. The incidence of the disease was recorded highest in 1990. Out of 64 districts FMD epidemic was broken out in 55. During that period the economic loss was disastrous due to all out production loss of cattle by the outbreak of FMD (Ali *et al.*, 2011). An average of 130 incidents (outbreak) of FMD every year has been reported from Bangladesh (Domingo *et al.*, 2002). Howlader *et al.* (2004) estimated an economic loss of taka 4168.4 thousand for 4750 FMD affected cattle and recorded 61.2% prevalence in cattle and 19.5% calf mortality due to this disease in Bangladesh. On the basis of the above circumstances the objective of this study was to determine FMD infection in terms of age, sex and breed. Evaluation of comparative efficacy of different antibacterial drugs on the course of disease healing of FMD lesions and complications of FMD infections will also be studied. This paper justifies the economic impact of FMD including how it varies in different settings and how knowledge of this should be used to guide control policy. This included a synthesis of current literature on the subject. To help appreciate the scale of global FMD impact estimates were made of the direct costs of disease and vaccination in endemic countries as well as outbreak costs in free countries. The findings of this study also emphasis the formulation of more effective disease management and control strategies, including appropriate vaccination policies in Bangladesh.

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MATERIALS AND METHODS

The study was conducted in the upazilla veterinary hospital, Chuadanga, during the period from July 2012 to January 2013. A total of 108 cattle suffering with skin disease were examined. A pre-set questionnaire was filled containing various types of information regarding to age, sex, breed, management, previous disease and preventive measures during examination. The field diagnosis of this disease was confirmed based on clinical history collected from owner and clinical findings of the affected cattle according to Rahman *et al.* (2012). Inspection, palpation, percussion and auscultation methods were used to examine the affected animal. To identify the case the following clinical signs were observed carefully such as high fever (104-106°F), nasal discharge, salivation, lesion on the dorsal surface of the tongue, foot lesion in the interdigital region. Secondary bacterial complication of FMD lesion may interfere with healing and lead to severe involvement of the deep structure especially the foot. Severely FMD affected cases were treated with antimicrobial drugs to control secondary bacterial infections. Some commercial antimicrobial drugs were used to evaluate for the management of clinical case of FMD (OIE, 2004).

Statistical analysis

Data were analyzed by chi-square test to observe the significant influence of different seasons, sex, age and breeds on the disease using Statistical Package for Social Science, SPSS Version 13.0 (Coakes *et al.*, 2006).

RESULTS AND DISCUSSION

The monthly variation of FMD infection is shown in Table 1. The mean monthly variation during the period was satisfactory significant. It reveals that the most of the animal affected with FMD was in the November.

Table 1: Prevalence of FMD at different seasons

Name of the Months	No of affected cattle	Percentage (%)	Chi square Test (P-value)
July, 2012	6	5.56	0.000**
August, 2012	23	21.30	
September, 2012	8	7.40	
October, 2012	15	13.89	
November, 2012	34	31.48	
December, 2012	15	13.89	
January, 2013	7	6.48	
Total	108	100	

** Significant at p<0.01

It is seen that the infection is higher in November (31.48%). Melo *et al.* (2003) found that FMD prevalence highest in November (35.59%) and December (37.14%) in Rajshahi.

Table 2. Prevalence of FMD at different sex, age and breeds

Breed of cattle	Animal infected	Sex variation		Age variation		Chi square Test (P-value)
		Male	Female	Young	Adult	
Local	41(38%)	26(63 %)	15(37 %)	7(17 %)	34(83 %)	0.000**
Crossbred	67(62%)	42(63 %)	25(37 %)	13(19 %)	54(81 %)	

** Significant at p<0.01

It is observed that cross-bred are more susceptible than local breed. It is supported by (Melo *et al.*, 2003). Male and adults are more susceptible than young. It is supported by (Rahman *et al.*, 2012). Thus in case of FMD vaccine crossbred animal may get the priority of vaccination.

Table 3. Prevalence of FMD in Chuadanga sadar

Cattle	No of animal	Affected	Prevalence (%)	Chi square Test (P-value)
Bull and Bullock	175	60	34.28	0.000**
Cow	90	28	31.11	
Calf	67	20	29.85	
Total	332	108	32.53	

** Significant at $p < 0.01$

The prevalence of FMD in bull was 34.28%, 31.11% in cow and 29.85% in calf (Table 3). The total prevalence rate is 32.53%. It is slightly different from Melo *et al.* (2003) where they found 25.07% FMD in Rajshahi. The first clinical sign in FMD affected cattle are pyrexia, lassitude and anorexia. Vesicle appeared on the oral mucosa especially on the tongue, and then the interdigital space of the feet. At his clinical picture resemble very closely to those described by (Samuel and Knowles, 2001). Although a marked reduction of milk production and loss of working ability of the FMD infected cattle were recorded during the study. However the economic loss of FMD due to calf mortality, reduce milk yield and plough loss are also found.

In uncomplicated cases the FMD lesion usually healed within 12 days either by gradual replacement of the epithelium or after scab formation, but in complicated case secondary bacterial infection occurs. The course of the disease varied from 14-21 days even more. The observation supports the findings of Domingo *et al.* (2002) who reported that FMD affected cattle suffered for a period of 12-22 days.

The FMD affected clinical cases complicated with secondary bacterial infection were treated with different anti-bacterial drug to evaluate their comparative efficacy on the course of the disease with healing of FMD lesion (Table 4). The sulphadimidine require 7-8 days, ampicillin required 8-9 days and oxytetracycline required 10-11 days to heal up the lesion. Although sulphadimidine injection was found more effective to control the secondary bacterial infections and healing of FMD lesion. But this entire drug was found to have a significant effect for healing of FMD lesions in comparison to infected cattle. Madhanmohan *et al.* (2009) reported that cattle fed with zinc sulphate have more antiviral activity and Gleenson *et al.* (2003) reported that cattle fed with green treated with caustic soda found to have some activity against FMD virus. No record of FMD infection was observed in vaccinated animal during 16 weeks of period, which is an indication of the effectiveness of vaccination. However, control of FMD in endemic country like Bangladesh can be achieved by vaccination and controlling management should be taken (OIE, 2004).

Table 4. Evaluation of antibacterial drugs against secondary bacterial infection in FMD

Drugs used	Dose and route of administration	Complete healing of foot lesion range (mean) days	Chi square Test (P-value)
Sulphadimidine	25ml/50 kg body weight IM daily for 5 days	7-8 (7.5)	0.000**
Ampicillin	12ml/100 kg body weight IM daily for 5 days	8-9 (8.5)	
Oxytetracycline	12ml/100 kg body weight IM daily for 5 days	10-11 (10.5)	

** Significant at $p < 0.01$

CONCLUSION

It could be concluded that cross-bred males are more susceptible than local breed. The prevalence of disease was found higher in adults than young. Seasonal variation of the disease was remarkable. The most animals affected with FMD were in rainy season, winter and during livestock marketing. A large number of cattle died of FMD and the financial loss incurred from this mortality. The economic losses due to calf mortality, reduced milk

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yield, draft power and poor body weight gain of fattening bull was seen. FMD is a fatal viral disease and causes severe economic loss of our country. Moreover, it has no specific treatment. So, vaccination is the only way to prevent the disease. Emphasis on vaccination should be given by the government and farmer also. Mutagenic change can occur thus vaccine production should be done by collecting sample from the field. If proper preventive measure can be taken we can reduce the economic loss caused by FMD.

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