**Investigation of Clinical Foot and Mouth Disease in Cattle in Upazilla Veterinary Hospital, Batiaghata, Khulna, Bangladesh**



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**Investigation of Clinical Foot and Mouth Disease in Cattle in Upazilla Veterinary Hospital, Batiaghata, Khulna, Bangladesh**



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# List of abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Elaboration** |
| BCS | Body Condition Score |
| FMD  mg/kg  N  SAT | Foot and Mouth Disease  Miligram per kilogram  Number  South Asian Territory |
| USA | United States of America |
| UVH | Upazilla Veterinary Hospital |

# Abstract

Foot and mouth disease (FMD) is an epitheliotropic and transboundary viral disease affecting the cattle, buffalo, sheep, goat and wild animal for several countries. It is a highly contagious disease that causes severe economic loss in terms of reduced productivity of the affected animals as well as mortality particularly among young animals. Both retrospective and prospective FMD clinical cases were included in this study at Batiaghata, Upazilla Veterinary Hospital (UVH), Khulna during 13 January to 15 March 2015. In addition to FMD cases registered at UVH, cases treated at different household and commercial farms were also included in the study. During this two-month study period, a total of 131 cattle with different diseases or disorders were registered at the UVH for treatment purpose. The proportionate prevalence of FMD in cattle was 16.8%. The proportionate prevalence of FMD at 75% of the unions were 18.2% each. The occurrence of FMD was higher in February (23.3%) than January (13.5%) and March (18.5%). Younger cattle were more commonly affected (59.1%) than older ones. Almost 96% female cattle were affected by FMD. Cattle with poor body condition score had higher FMD cases (77.3%) than cattle with better body condition score. The lactating animals and pregnant animals were more commonly affected (81.8% and 63.6%, respectively). The main clinical signs were high fever (100%), sored foot (72.7%) and sored mouth (63.6%). The category of 16-20 days of illness of FMD was recorded for 36.5% cases. The treatment was given by administration of sulphonamaide or amoxicillin along with other supportive drugs and the recovery rate was 60-80%.

***Key words:*** FMD, Proportionate prevalence, Clinical sign, Treatment

# Chapter 1: Introduction

Foot and Mouth Disease caused by Apthovirus belonging to the family Picornaviridae is one of the economic important and transboundary infectious viral diseases, responsible for global losses of livestock production and trade. This disease is characterized by high fever (104-1060 F), epithelial erosion in tongue and inner mouth leading to excessive drooling salivation and lesion on the foot causing lameness. Cloven footed animals are commonly affected such as cattle, buffalo, sheep, goat etc. (Blood *et al*., 1989).

Foot and Mouth Disease virus has seven immunologically distinct serotypes: A, O, C, SAT-1, SAT-2, SAT-3 and Asia-1. In Bangladesh serotypes O, A, C and Asia-1 have been circulating and are considered as endemic in cattle (Islam *et al*., 1985). Immunity of one strain cannot protect the other strain (Chowdhury *et al*., 1994). The Foot and Mouth Disease virus is most stable between pH 7.4 and 7.6 and rapidly destroyed by acid and alkali (Fraser *et al*., 1991). It survives well below 40C and may be stored for many years under freezing temperature. The most FMD field strains are inactivated by 560C temperature for 30 minutes (Loeffer and Frosch, 1997).

Foot and Mouth Disease virus enters into the body either by inhalation or ingestion and replicates in different tissues. After replication the virus form primary vesicle within 1 to 4 days and viraemia with fever is seen 2 days later. Secondary vesicle appears on stratified squamous epithelium like leaf gum, dental pad, interdigital cleft (Fraser *et al*., 1991). Virus passes to blood stream and goes to the predilection sites. In favorable condition virus multiplies and produces viraemia. Virus then sheds out from the respiratory tract and feces, urine, semen, saliva and milk (Forman, 1974).

Bangladesh is an agro-economy based country. About 70% of her people are directly or indirectly associated with agriculture and livestock production. Foot and Mouth Disease creates serious affect in dairy industry in this country due to loss of milk production and causing abortion (Chowdhury *et al.,* 1994; Loeffer and Frosch, 1997). Foot and Mouth Disease is endemic in cattle in this country along with seasonal epidemic (Winter and Rainy seasons) (Cottaral *et al*., 1970; Chakrabarty *et al*., 1979).

In Bangladesh the prevalence of FMD was reported to be 46-55% in cattle (Hysclop, 1970), 20-32% in buffalo (Gangopadhyay *et al*., 1990) and 9-18% in goat (Kamruddin and Pandit, 1988). Potential risk factors associated with FMD in different livestock species are breed, age, seasons, environmental factors and farm management factors (Blackwell, 1980; Chowdhury *et* *al*., 1994). Cross breed animals are more frequently affected than indigenous breed (Chowdhury *et al*., 1993). Young animals are affected more than adult (Falconer, 1972). Environmental factors such as temperature (200-340C), humidity (50-60%) and farm management factors such as contact with infected animal, entry of foreign materials are also potentially associated with the increase of occurrence of FMD (Cottaral *et al.,* 1970; Plotnikov, 1972; Radostits *et al.*, 2007). The consequences of FMD in any species causes reduced milk production, abortion and mortality of 50-100% (Hussain and Sarker, 1978; Kamruddin and Pandit, 1988).

No specific treatment is available for FMD affected animals but nursing and supportive antimicrobial therapy and applying antiseptics of potassium permanganate and glycerin on the affected parts may improve healing the lesions (Hussain and Sarker, 1978).

Foot and Mouth Disease can be controlled by a shedule vaccination programme. Commonly used local vaccines against FMD produced by Livestock Research Institute, Mohakhali, Dhaka, Bangladesh are monovalent (strain A) injected at 3 ml intramuscularly for a four- month old animal; bivalent (strain A and O) injected at 6 ml intramuscularly for a four-month old animal and trivalent (strain A, O and Asia-1) injected at 9 ml intramuscularly for a four-month old animal (LRI, 2015, personal communication). Booster doses should be maintained at 4-6 months interval afterwards (Fraser *et al.,* 1990). Strong biosecurity measures like prevention of entry of foreign materials, isolation of infected animal and quarantine of new animal and using foot bath in the entry of farm or shed will help control the disease (Chowdhury *et al*., 1993). Proper management systems like washing the manger, gutter, feeding materials, litter management etc will also prevent the occurrence of FMD (Radostits *et al*., 2007).

The present study was conducted at Batiaghata, Upazilla Veterinary Hospital (UVH), Khulna, Bangladesh. The total livestock population in Batiaghata are about 5000 and the main diseases encountered at UVH are FMD, bovine epimeral fever, babesiosis, parasitic infestation, pestides petis ruminant, pasteurellosis, contagious ecthyma etc. However, this study considered only FMD in cattle to investigate with the following objectives:

1. To estimate proportionate prevalence of FMD in cattle at Batiaghata Upazilla Veterinary Hospital, Khulna

2. To know distribution of FMD according to unions, age and sex of cattle

3. To describe frequency of clinical signs and duration of illness of FMD cases in cattle

4. To describe drugs used against FMD cases in cattle

# Chapter 2: Materials and Methods

Investigation of clinical Foot and Mouth Disease in cattle was conducted at Batiaghata Upazilla, Khulna during the two-month internship period (13 January to 15 March, 2015). In addition to FMD cases registered at UVH, cases treated at different household and commercial farms in Batiaghata during the internship period were also included in this study.

Cases of Foot and Mouth Disease were diagnosed according to recorded clinical signs and clinical history. Data related to animal demography (age, sex and breed), body condition score, lactation status, pregnancy status, rectal temperature, date of case occurrence, along with clinical signs and treatment given were recorded in the internship log book from the hospital register or through close physical inspection and also interviewing farmers. Body condition score was assessed by examining of rib, hind quarter, fore quarter, pin bone, thigh muscle and hip joint as per published description (Sil *et al*., 1995). Clinical cases other than FMD cases were also recorded to calculate the proportionate prevalence of FMD.

Vesicular stomatitis, rabies and foot rot also exhibit FMD like clinical signs and lesions (Blood *et al*., 1989). Therefore, FMD was differentiated from other diseases looking at pathognomonic clinical signs and lesions. Vesicular stomatitis only produces oral lesion; rabies shall have dog bite history and frenzy or drowsiness; Foot rot does not have oral lesion but vesicle formation in interdigital cleft is seen (Leslie and Sussman, 1998).

Data obtained were entered into Microsoft Excel 2010 and then transferred to STATA-13 (Stata Crop, 4905, Lakeway River, College Station, Taxas 77845, USA) for analysis. Descriptive analysis was performed. Results were expressed as frequency and percentage against each category of variable and clinical sign.

# Chapter 3: Results

## 3.1. Overall proportionate prevalence of Foot and Mouth Disease and its temporal distribution in cattle

The overall proportionate prevalence of clinical FMD in cattle was 16.8 % (N=131).The estimated proportionate prevalence of clinical FMD in cattle was 13.5% in January, 23.3% in February and 18.5% in March (Table 1).

|  |  |  |  |
| --- | --- | --- | --- |
| **Month** | **Total no. of cases** | **Total no. of FMD cases** | **%** |
| January | 74 | 10 | 13.5% |
| February | 30 | 7 | 23.3% |
| March | 27 | 5 | 18.5% |
| **Total** | 131 | 22 | 55.3% |

Table 1. Proportionate prevalence of Foot and Mouth Disease in cattle at Batiaghata Upazilla Veterinary Hospital, Khulna according to months (N=22)

## 3.2. Occurrence of Foot and Mouth Disease in cattle according to different factors

A range of 3-4 FMD cases per union were registered at UVH that came from 75% unions of Batiaghata upazilla. Younger cattle were more commonly affected than older cattle (13 versus 9 cases). Almost 96% FMD cases were female cattle. Cattle with poor body condition score (3) had higher FMD cases than cattle with better body condition score (4-5) (17 versus 5 cases). Lactating cattle had more cases than non-lactating cattle (18 versus 4 cases). Pregnant cattle were frequently affected by FMD as compared to non-pregnant cattle (14 versus 8 cases) (Table 2).

**Table 2**. Distribution of Foot Mouth Disease cases in cattle at Batiaghata Upazilla Veterinary Hospital, Khulna according to different factors

|  |  |  |  |
| --- | --- | --- | --- |
| **Factors** | **Categories** | **Frequency numbers** | **%** |
| Unions | Alamdanga | 1 | 4.5% |
| Baliadanga | 1 | 4.6% |
| Vangarpul | 1 | 4.6% |
| Surkhali | 3 | 13.6% |
| Gangarampur | 4 | 18.2% |
| Batiaghata sadar | 4 | 18.2% |
| Chakrakhali | 4 | 18.2% |
| Jalma | 4 | 4.6% |
| Age (Year) | < 3 | 13 | 59.1% |
| 3.1 to 4 | 9 | 40.9% |
| Sex | Male | 1 | 4.6% |
| Female | 21 | 95.5% |
| Body Condition Score | 3 | 17 | 77.3% |
| 4 | 3 | 13.6% |
| 5 | 2 | 9.1% |
| Lactation | Yes | 18 | 81.8% |
| No | 4 | 18.2% |
| Pregnancy | Yes | 14 | 63.6% |
| No | 8 | 36.4% |

## 

## 3.3. Description of clinical signs along with duration of illness of Foot and Mouth Disease cases in cattle

Cent percent animals had high fever (104-1060 F). Other common clinical signs and lesions encountered in FMD cases were frothy salivation (81.8%), sored foot (72.7%) and sored tongue (63.6%) (Table 3 and Figure 1). Besides, lack of appetite, anorexia, loss of milk production, hoof deformities and lameness were common clinical pictures for most of the studied animals. Duration of illness encountered in FMD cases were 3-5 days (9% cases), 6-10 days (31.8%), 11-15 days (22.7%) and 16-20 days (36.5% cases) (Table 4).

Table 3. Frequency of clinical signs of Foot and Mouth Disease cases in cattle registered at Batiaghata Upazilla Veterinary Hospital, Khulna (N=22)

|  |  |  |
| --- | --- | --- |
| **Classes of signs** | **Frequency numbers** | **%** |
| Fever (104-1060F) | 22 | 100% |
| Frothy salivation | 18 | 81.8% |
| Sored foot | 16 | 72.7% |
| Sored tongue | 14 | 63.6% |
| Flea in foot region | 1 | 4.6% |
|  | | |



Figure 1.2. Sored tongue

Figure 1.1. Frothy salivation

****

Figure 1.3. Sored foot

Figure 1.4. Fly in foot region

Figure 1. Different clinical signs and lesions of Foot and Mouth Diseases in cattle

Table 4. Frequency distribution of duration of illness of Foot Mouth Disease cases in cattle

|  |  |  |
| --- | --- | --- |
| **Duration of illness (Days)** | **Frequency numbers** | **%** |
| 3-5 | 2 | 9% |
| 6-10 | 7 | 31.8% |
| 11-15 | 5 | 22.7% |
| 16-20 | 8 | 36.5% |

## 3.4. Description of drugs given against clinical Foot and Mouth Disease cases in cattle

Different drug combinations were prescribed for the treatment of clinical FMD cases. Most common combination was sulphonamide along with apthocare and metamisol (45.5%) followed by amoxicillin along with glycerin and boric acid (22.7%), amoxicillin along with FMD cure and metamisol (18.2%) and sulphonamide along with glycerin and boric acid (13.6%). The recovery rate was 60-80% (Table 5).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 5. Frequency distribution of drugs used against Foot and Mouth Disease cases in cattle   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Drug prescribed** | **Doses and duration** | **Frequency numbers** | **%** | **Total recovered animal** | **Recovery %** | | Sulphonamide and 100% glycerin with 2% boric acid | • Sulphonamide-140 mg/kg for 5 days  • Glycerin with boric acid amount for 5 days | 3 | 13.6% | 2 | 66.7% | | Amoxicillin and 100% glycerin with 2% boric acid | • Amoxicillin-10 mg/kg for 5 days  • Glycerin with boric acid for 5 days | 5 | 22.7% | 3 | 60% | | Sulphonamide,  Apthocare (Glutamic acid-50mg) and Metamisol (Fevosol) | • Sulphonamide-140 mg/kg for 5 days  • Apthocare-25 g orally for 5 days  • Fevosol-8 ml/100kg for 5 days | 10 | 45.5% | 8 | 80% | | Amoxicillin, FMD Cure (Natrycarbone-40mg) and Metamisol (Fevosol) | • Amoxicillin-10 mg/kg for 5 days  • FMD Cure for 5 days  • Fevosol-8 ml/100kg for 5 days | 4 | 18.2% | 3 | 75 | | **Total** |  | 22 | 100% | 16 | 72.7% | |

# Chapter 4: Discussion

Foot and Mouth Disease is an acute, extremely contagious, and highly communicable viral disease of all cloven footed animals. The overall proportionate prevalence of 16.8% in this study corresponds to earlier studies such as 17.3% in Mymensingh (Chowdhury *et al*., 1994), 19.2% in Gaibandha (Islam *et al*., 1985), 21% in Manikgonj (Rahman and Chowdhury, 1989). The occurrence of FMD was higher in February than any other month in this study which is similar to the previous studies (Plotkinov, 1972; Chakrabarty *et al*., 1979). They found 26% FMD in Summer (April-June), 43% in Rainy (July-September), 52% in Winter (October-January) and 47% in Autumn (February-March) seasons (Chowdhury *et al.,* 1994). The proportionate prevalence of FMD in younger cattle was higher in this study, is inclined with many earlier studies (Hysclop *et al*., 1970; Sil *et al.,* 1995).

The present study identified that female cattle had commonly affected, which is similar to the previous study (Hussain and Sarker, 1978). Cattle having poor body condition score had more FMD cases in this study which is supported by Fraser *et al*. (1991). The lactating and pregnant animals were more susceptible to FMD and these results are coincided with the results of Rahman and Chowdhury (1989), Sil *et al*. (1995) and Bachrach (2001).

The clinical signs (high fever, frothy salivation, anorexia etc.) and lesions (sored mouth, sored foot, lameness etc.) observed in this study are strongly agreed with the study of Kamruddin and Pandit (1988), Blood *et al*. (1989) and Gangopadhyay *et al*. (1990).

Either sulphonamide or amoxicillin along with other symptomatic drugs were used for clinical FMD in this study which is supported by Rahman and Chowdhury (1989); Loeffer and Frosch (1997) and Bachrach(2001). Sulphonamide or amoxicillin was used to prevent secondary bacterial infection. Glycerine or boric acid was applied to produce soothing and coating effect on lesions along with antiseptic effect which can reduce excessive salivation. Glutamic acid or natrycarbone was also applied to the lesion to give soothing and coating effect with antiseptic action. Metamisol was used to reduce body temperature (Hussain and Sarker, 1978; Sil *et al*., 1995).

**Limitations**

The number of clinical FMD cases in this study was not big enough. Inclusion of retrospective FMD cases was also a limitation as information of retrospective cases may not be as accurate as fresh cases. The diagnosis of FMD was only based on clinical signs.

# 

# Conclusion

Foot and Mouth Disease was higher in younger than adult cattle. Female cattle were commonly affected by FMD. Common clinical signs were high fever, salivation, sored tongue, vesicle formation in mouth and interdigital space. Most commonly used drugs were the combination of sulphonamide along with apthocare (glutamic acid) and metamisol. The overall recovery rate was satisfactory (72.7%).

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# Biography

I am Shuvo Mazumder, son of Mr. Sunil Chandra Mazumder and Mrs. Nipu Rani Roy. I passed Secondary School Certificate examination in 2007 (G.P.A-4.81) followed by Higher Secondary Certificate examination in 2009 (G.PA-4.60). Now I am an intern veterinarian under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. In the future I would like to work as a veterinary practitioner and do research on clinical animal diseases in Bangladesh.