

## **Evaluation of veterinary practitioners in Afyonkarahisar for Foot-and-Mouth disease outbreaks and strategies in Turkey.**

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**Abstract:** Vaccination which is considered the only way to prevent FMD in the world does not always deliver the desired results. Does the phrase 'we are vaccinating, but it does not always protect' cause many factors which might be significant to be ignored also in Turkey? A survey consisting of 25 questions was prepared in order to find out what the clinician veterinary practitioners (n:40) thought about the applications and program in Afyonkarahisar province for 2009-2011 years.

Only 50% (n:20) of the veterinary practitioners who participated in the survey thought vaccination was an efficient way to combat the disease, 20% (n:8) thought it was partially efficient while 30% (n:12) it was an inefficient method. 77.5% thought breeders to be uninformed while 80% (n:32) indicated that they tried to inform animal owners. It was calculated that it cost US\$ 65,16 (45,91 EU) to treat a bovine for FMD.

Those who participated in the survey believed that the combat program was inadequate (80%) and that it would not be possible to eradicate FMD with the valid law, regulation and applications (57.5% n:23).

It is necessary to use new vaccines and diagnosis methods and develop feasible, realistic, different and reasonable methods in challenging FMD. The views and recommendations of veterinary practitioners, universities and breeders should be consulted when preparing national disease combat plans.

**Keywords:** Foot and Mouth Disease, cattle, vaccine, disease control

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## INTRODUCTION

Foot and Mouth Disease (FMD) is a disease caused by the *Aphthovirus* of the *Picornaviridae* family primarily in domestic and wild ruminant and pigs which is characterized by blisters, erosion and ulcers in the mouth, udders and interdigital areas of the animals. FMD is a severe, highly contagious viral disease of livestock with significant economic impact. The disease which progresses with a fever is contagious and acute (1, 2). The main loss is more economic loss (meat, milk, treatment/protective measures etc.) than death in most cases. Mortality is typically low in adult animals but can be high in young animals due to acute myocarditis (3, 4). Very few studies have been carried out regarding this subject and the impact/extension of this kind of infection is always debatable (5). Direct contact with infected animals is the most common mode of transmission and propagation of FMD. For this reason the movements of infected animals is a major risk factor. The incubation period is short (mean 1.7 days) and animals are not infectious until average 0.5 days after clinical signs appear (6). However, no publications about on detailed all risk factors of epidemiology are available. Such 'risk factors' have significant consequences.

Although considerable information is available on the virus, the disease and vaccines, FMD still affects extensive areas of the world. The epidemic in England in 2001 resulted in over 6.5 million animals being culled and slaughtered. It is estimated that the cost of the disease was US\$ 12.3-13.8 billion. Similarly, animals were destroyed as a control measure in USA, Japan and Korea (2). Turkey is included in the group of countries in which FMD is endemic (7, 8). The policy of the country to prevent spreading and transmission is to apply vaccination (8, 9) while culling is evaluated as a costly method (10) and not applied. The 3 year budget determined only for vaccination is over 65 million euros (US\$ 95 million) and includes only vaccines, transport costs, serosurvey, hygiene/disinfection and technical assistance while personnel and other requirements have not been included (11). Today only 75% of the animals in eastern and south eastern part of Anatolia can be vaccinated. In some provinces this percentage is much lower (11). Even if the prepared programs foresee the vaccination of at least 80% of the animals and expect a protection of 80% in practice the success rate is 50-70% (9).

In 2009, the seroprevalance for the FMD virus to be 8,81% positive in bovine and ovine animals in Turkey (11) while the figures for cattle was 12,37% positive and ovine animals was 30,73% positive in 2011 to total 21,69% positive (9). However, Afyonkarahisar is one of the rare provinces where it has been possible to engage not only ministry staff but private veterinary practitioners to contribute their services into the vaccination campaign particularly after 2006 and vaccinate close to 90% of cattle.

During 2008-2010 an increasing trend in disease was observed (7). 30% of the animals in East and South East Anatolia are reported to be positive (12). The main FMD vaccines in especially in developing countries are still inactivated vaccine, it is widely used in the world for preventing and controlling this disease. However, traditional FMD vaccines have many disadvantages, such as, virulence recurrent, incomplete inactivation and even virus leak (13). Although it is a known fact that vaccination does not only provide protection from the infection but also prevents the disease from spreading, the plan to vaccinate all cattle twice per year has not presented the desired results. The aim of this study is to survey and evaluate the FMD outbreaks in Afyonkarahisar and the strategies in Turkey by veterinarians.

## MATERIALS AND METHODS

Data of research was obtained by questionnaires from 40 veterinary practitioners selected at randomly in Afyonkarahisar province of Turkey (latitude, 38°45'N; longitude, 30°33'E). This province, at an altitude of 1015 m, is characterized by a continental climate. The questions (Table 1-3) were presented to the veterinary practitioners with face to face interviews and they were requested to

answer the questions without any intervention or steering. The answers to the questions were assessed with the use of the SPSS (10.0) program. Chi square and Rank tests were used with the responses rate when required.

## RESULTS

The results of the survey applied to the veterinary practitioners revealed that 10% had over 11 years of field experience as a veterinary practitioners while 7.5% had worked for 7-11 years, 47.5% between 4-7 years and 35% had been working for 1-3 years (Table 1). While 32.5% of the veterinary practitioners participating in the survey had applied FMD vaccinations previously while 17.5% stated that they never applied before (Table 1). 50% (n:20) of the veterinary practitioners stated that vaccination is effective in challengeing FMD, 20% (n:8) believe it is partially effective while 30% (n:12) believe that vaccination is inefficient (Table 1). 2.5% (n:1) of the interviewed veterinary practitioners claimed that they had encountered a case of FMD during the past 3 years, 32.5% (n:13) reported that they had encountered 1-10 cases of FMD per year, 22.5% (n: 9) reported 11-30, 5% (n: 2) reported 31-50, 2.5% (n:1) reported 51-80 cases while 10% (n: 4) reported 81-120 and 121-300 cases and 15% (n:6) reported over 300 cases of FMD (Table 1). The question, 'Do you think that the control precaution of animal markets is sufficient' 7.5% (n:3) of the veterinary practitioners answered that it was partially sufficient, 5% found them to be adequate (n:2) while 87.5% claimed the measures to be inadequate (n:35) (Table 1).

**Table-1.** Questionnaires for situations of FMD in Afyonkarahisar province

<b>How long ( year ) have you worked as a veterinary ?</b>							
<b>&gt;11</b>	<b>7-11</b>	<b>4-7</b>	<b>1-3</b>				
4 (10%)	3 (7,5%)	19(47,5%)	14(35%)				
<b>How many cases of FMD do you encounter in a year ?</b>							
<b>0</b>	<b>1-10</b>	<b>11-30</b>	<b>31-50</b>	<b>51-80</b>	<b>81-120</b>	<b>121-300</b>	<b>&gt;300</b>
1(2,5%)	13 (32,5%)	9(22,5%)	2 (5%)	1(2,5%)	4(10%)	4(10%)	6(15%)
<b>Do you think that the control precautions of animal markets is sufficient?</b>							
<b>Partly</b>	<b>Yes</b>	<b>No</b>					
3 (7,5%)	2 (5%)	35(87,5%)					
<b>Do you think the breeders have enough consciousness on FMD.?</b>							
<b>Partly</b>	<b>Yes</b>	<b>No</b>					
4 (10%)	5 (12,5%)	31(77,5%)					
<b>Do you think that the frequency of FMD is less in large and modern farms ?</b>							
<b>Yes</b>	<b>No</b>						
27(67,5%)	13(32,5%)						

10% of the veterinary practitioners reported that they found the breeders to be partially knowledgeable while 77.5% thought that they were uninformed. The percentage of veterinary practitioners who believed the breeders to be informed has been determined as 12.5% (Table 1). 67.5% (n: 27) of the veterinary practitioners believe that the frequency of FMD is less in large and modern farms while 32.5% (n:13) do not agree with this (Table 1). 50% (n:20) of the veterinary practitioners participating in the survey claimed that the alleviation treatment costs for a bovine with FMD were 40-80 ₺ (US\$ 26- 52), while 5% (n:2) marked the figure as more than 201 ₺ (US\$ 130) (Table 2).

**Table-2.** Some questionnaires for FMD vaccinations, treating and cost of FMD

<b>Do you believe that vaccination is effective in challenging FMD ?</b>					
<b>Partly</b>	<b>Yes</b>	<b>No</b>			
8(20%)	20(50%)	12 (30%)			
<b>How much does it cost to treat a cattle with FMD ?</b>					
<b>40-80</b>	<b>81-120</b>	<b>121-160</b>	<b>160-200</b>	<b>&gt;200</b>	
20 (50%)	9 (22,5%)	3 (7,5%)	6 (15%)	2 (5%)	
<b>What do you think how much is annual economic loss caused by FMD in our province? (milyon "m" Turkish liras "₺")</b>					
<b>No idea</b>	<b>1-3 m₺</b>	<b>3-5 m₺</b>	<b>5,1-7 m₺</b>	<b>7-11m₺</b>	<b>&gt;11m₺</b>
25 (62,5%)	6 (15%)	5 (12,5%)	2 (5%)	1 (2,5%)	1 (2,5%)

Regarding the question whether the veterinary practitioners considered the applied FMD combat program to be adequate 20% (n:8) of the veterinary practitioners claimed it to be sufficient while 80% (n:32) considered it to be insufficient. Regarding the question whether the veterinary practitioners considered animal trafficking to have an impact on the spreading of FMD 2.5% (n:1) replied that they did not know while 97.5% (n:39) gave an affirmative answer. Regarding the question whether the valid laws, regulations and applications effective enough to prevent FMD 12.5% (n:5) of veterinary practitioners answered perhaps, 30% (n:12) said yes while 57.5% (n:23) said no (Table 3).

**Table-3.** Questionnaires for FMD spreading and challenge programs

<b>Do you think the applied FMD challenge program is sufficient to remove FMD ?</b>			
<b>Yes</b>	<b>No</b>		
8 (20%)	32 (80%)		
<b>Do you think that animal trafficking has an impact on the spreading of FMD?</b>			
<b>No idea</b>	<b>Partly</b>	<b>Yes</b>	<b>No</b>
1 (2,5)%	0 (0%)	39 (97,5%)	0 (0%)
<b>Are the valid laws, regulations and applications effective enough to prevent FMD?</b>			
<b>Perhaps</b>	<b>Yes</b>	<b>No</b>	
5(12,5%)	12(30%)	23(57,5%)	

## DISCUSSION

FMD is one of the notifiable diseases. However, it progresses endemically and the average number of reported outbreaks per month is 160 (12). Even though it is not known how many of the outbreaks are actually reported, the most optimistic estimate is around 50%. Moreover, FMD outbreaks are hardly reported on farms where there is no loss of animals. The cases of FMD which continue to crop up all year long and in every region of our country with the exception of the Mediterranean Region are considered as routine-common cases. FMD cases are not reported by owners because the law and regulations require the application of significant quarantine measures. On the other hand veterinary practitioners who report cases are accused by farm owners and they decide to forgo veterinary services all together and when another case of disease crops up they treat it themselves. Veterinary practitioners also have a tendency to keep quiet and conceal information regarding FMD. There have been cases where the veterinary practitioners had been wary of filling out the survey form for this reason. Because of the business as usual perception regarding the disease and because of the lack in obtaining many reliable and sufficient data there are problems with country wide protection and epidemic plans as well as crisis plans (what conditions qualify for a 'crisis'?). It should be discussed whether such plans should be made for endemic areas, should such plans target 'eradication'.

However, it is not correct to make such plans without considering what is 'realistic, feasible, uneconomic, an inconvenience for breeders, animal welfare, ethical issues'. The approach of 'prevent the disease at any cost' is gradually being abandoned by countries which are renewing their plans (14; 15; 16; 17; 18). 20 (50%) of the veterinary practitioners believed that vaccination program was an effective way to combat FMD, 50% believed that it was partially effective or had no impact at all. However, considering that efforts to control FMD in our country only with vaccination the answers to the question 'Do you think the applied FMD combat program is sufficient to remove FMD?' 80% of the answers were negative. 12 veterinary practitioners with a clinical working experience of 1-3 years and as well as all of those who had been working for 7-13 years and >11 said 'no'. This situation displays a lack of confidence in terms of the applied program. It was also observed that 7 out of the 8 persons who claimed the program was appropriate had replied 'partially efficient' to the question 'is vaccination an efficient method in challenging FMD?'. In conclusion it appeared that almost all of the

veterinary practitioners who believed in 'the program to combat FMD' did not have complete faith in 'the vaccination program' as an efficient method.

23 veterinary practitioners replied 'no' and 12 replied 'yes' while 5 indicated 'perhaps' for the question 'Are the valid laws, regulations and applications effective enough to prevent FMD?' Out of those who said 'yes' 7 had been working for 1-3 years and 4 for 4-7 years; only 1 veterinary practitioner among those with more experience said yes. This shows that veterinary practitioners lose their faith in the impact of laws and regulations as their experience grows.

For the survey question 'How many cases of FMD do you encounter in a year?' only one person claimed that he had not treated any FMD cases. The highest average was maintained by the treatment of 1-10 cases (13 veterinary practitioners). It is evident that thirty veterinary practitioners combat 3600 cases of FMD/year. Considering that this data is provided by veterinary practitioners unwillingly it is safe to say that they encounter much more cases. According to the information acquired from the survey it emerged that most owners of sick animals did not call for the veterinary practitioner in cases of FMD. A separate study must be carried out in order to determine how many animals really are or have been sick.

Veterinary practitioners claim that as farms become larger in terms of animal numbers the occurrence frequency of FMD decreases. Although questions regarding the reasons for this were not asked it was indicated that these farms worked with contracted veterinary practitioners, they were aware of outbreaks in their area more quickly and were careful in terms of bio-security measures, they did not purchase new animals nor did they visit the animal market. It was indicated that farms of this type were more informed about issues such as vaccination times, which vaccine was to be used and quarantine measures when buying animals.

The Thrace region in Turkey acquired the status of free of FMD with vaccination with an EU project. The next target is to acquire a status of 'free of FMD without vaccination'. However, even in countries which are islands such as the UK and free of FMD without vaccination it is debatable what is to be done when the disease occurs (14; 17). What application should an intercontinental country 'free without vaccination' apply? Even if the country were successful how long could it be sustained? In fact should it remain 'free with vaccination' or 'free without vaccination'? We do not know the real answers to these questions.

87,5% (n:35) of the interviewed veterinary practitioner indicated the 'animal parks and market places' which are considered a significant control point and risk factor in spreading FMD disease to be 'inadequately inspected'. It was also indicated that in provinces other than Afyonkarahisar the inspections were even less frequent.

Although there are debates about 'should FMD be treated' since it is a viral disease, drugs are used to fill the need to protect from secondary infections and to activate the immune system. However, the risks of residue if the drugs are used haphazardly or having a negative impact on the immune system should not be forgotten. According to the answer the average cost of drugs was US\$ 65 /bovine and at least 3600 cases/year and many sick animals are milked (Table 4). Considering that the average loss of milk is 10% an animal which provides 6000 lt/year will incur a milk loss of 600 lt. The average price of milk on the day of the survey was US\$ 0,35 which means a financial loss of  $600 \times 0.35 =$  US\$ 210 /animal. Considering that the live weight loss in sickness is 5% and the average body weight of the animals is assumed to be 450 kg this means that a loss of 22.5 kg incurs. That is a yield loss of 50% which means that 11.2 kg of meat is lost. The price of one kg of carcass meat is around 12 ₺. A meat loss worth US\$86 (134 ₺) per animal can be foreseen (Table 4). However, due to the large number of animals which are treated by owners and not reported to the veterinary practitioner (an optimistic estimate is 2 fold:  $US\$ 1.202.400 \times 2 = 2.404.800$ ) these calculations are actually similar to the visible tip of the iceberg.

**Table-4.** Predicted economic loss with FMD in Afyonkarahisar

		<b>Number of Treated Animals/per year</b>	<b>Average number of milked animals</b>
	US\$	3600	1080
<b>Average drugs cost</b>	\$65	\$234.580	
<b>Average carcass meat loss</b>	\$86	\$311.225	
<b>Average milk loss</b>	\$213		\$229.935
		<b>TOTAL</b>	<b>\$755.741</b>

According to the figures for 2010-2011 there are approximately 270.000 cattle in our province. If only the cost of drugs, milk and meat losses for cattle with FMD are taking into consideration it is evident that a loss of US\$ 6 (8,9 ₺) incurs per animal. The number of cattle in Turkey according to the figures for 2010-2011 is around 10.000.000. Even if only half of the losses estimated for Afyonkarahisar incur in Turkey US\$ 3/per animal by drugs used to treat FMD and the cost of meat and milk losses brings the total loss to *approximately* US\$ 30 million. This figure does not include the costs vaccination, personnel and vehicle costs used for protection-control. These calculations do not include veterinary pay, loss of animals, loss of value during transport to the slaughterhouse and other negative aspects for the producers.

62.5% (n:25) of the veterinary practitioners claimed to have no idea regarding the losses incurring in Afyonkarahisar due to FMD, 15% (n:6) claim the losses to be US\$ 0.6-2 Million, 12.5% (n:5) thought US\$ 2-3.3 Million was about right, 5% (n:2) said US\$ 4.5-7 Million, 2.5% (n:1) said US\$ 7 Million or more 2.5% (n:1). More than half of the veterinary practitioners who participated in the survey said that the reason they indicated that 'they did not know' was because a study regarding the losses incurred by FMD had not been carried out to date in our province. Unfortunately the same situation is valid for the whole country and may be world.

80% of the veterinary practitioners who participated in the survey believed that FMD would not be eradicated with the FMD combat program applied in Turkey. Only 30% (n:12) of the veterinary practitioners gave an affirmative answer to the question 'is it possible to eradicate FMD with the enacted law, regulation and applications which are currently partially harmonized with EU regulations?' 12.5% (n:5) said perhaps, more than half 57.5% (n:23) answered in the negative .

None of the veterinary practitioners replied in the negative to the question 'Do you think that animal trafficking has an impact on the spreading of FMD' with the exception of one veterinary practitioner who said he 'did not know' all the others (97.5%, n:39) gave an affirmative answer.

In conclusion the plan to which is based on the vaccination of all cattle twice per year with one vaccine does not function as a result of many factors. Veterinary practitioners claim that this plan does not work. In addition to many factors, different vaccinations need to be researched in order to make a technological decision regarding the selection of a vaccine for prevention and to make cross protection decisions. The ability of vaccines to carry multiple serotypes and topotypes, that T cells in addition to B cells are stimulated in protection, that the immune system is stimulated with different mechanisms and the research of agents which could be used in an anti-viral capacity are important criteria (19). The situation today is that a FMD free status without vaccination is very

difficult for Turkey and seems to be a strategy which might lead to poor consequences. For this reason the status of 'free with vaccination' seems to be an easier and more humane approach. However, there is a need for new strategies in terms of many issues including vaccines, vaccinated animals, application and control.

The discourse 'we already know this disease, we know all this' should be abandoned by citizens, veterinary practitioners, the ministry and university scientists. 'FMD is the responsibility of the ministry' may be the case but it is not a problem that the ministry can resolve on its own. However, impositions with approaches and legislation in the vein of 'do this' does not resolve problems and is transformed into concealing the problem.

FMD epidemics in the country are reported in the printed press. Whereas it should be reported in detail which animals in which provinces were affected by the epidemic, how long did it last, when did it die down and the number of animals lost if any. It should also be announced which type was involved and what kind of vaccinations might have an impact. Such information needs to be put out on the internet.

Although there is a high prevalence of FMD in the east and southeast, it is the most susceptible area for the entry of illegal animals and has the lowest vaccination rate almost all disease notifications are made in the central provinces of the country. The real reasons for this must be uncovered. Reasons such as the Sacrifice Feast which is pinpointed as one of the reasons why the virus is endemic in our country are conjectural and not based on scientific data.

#### **ACKNOWLEDGEMENT**

Data from dissertations has been used in this publication. (AFYON KOCATEPE University, Graduate School of Health Sciences Department of Internal Medicine, Dissertation No: (2011-017).

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