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Effects of Foot and Mouth Disease on domestic cow's milk production in Nangrahar Province, Afghanistan

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ABSTRACT

Milk as an animal product has a great biological importance and protects three vital materials protein, calcium and riboflavin. Drinking one-liter milk by 70 kg animal or human fulfill the need of 60% protein, 150% calcium, 112% phosphorus and 94% riboflavin The aim of this study was to know how (Foot and Mouth Disease) FMD effect on cow milk production. This research was conducted in Jalal Abad city of Nangarhar province and in the four districts of this province: Khewa, Kama, Behsood and Surkhrood districts. From this research average data showed that FMD decreased 58% caw milk production in Ningrahar province. This result indicated that FMD significantly decreased milk production and farmer's owners have to implement vaccination and prevention in dairy farms to produce enough milk for daily requirement.

1. Introduction

Agriculture and livestock sector is one of the most productive sectors in Afghanistan. Around 85% of the people are related directly or indirectly to this sector. Especially in rural areas, large part of the income of the local people is from agriculture and livestock. In rural areas, in addition to the farmers, the families with no land to grow, keep one or two cows and use their milk product or dairy products as food at their houses and sell the rest in the market and this is the only source of their daily income and also have one or two calves to sell in the market (CIA, 2012).

As for decades, there are different disasters in our country and like other sectors agriculture and livestock sector and especially milk production sector is demolished and is paid no attention yet, so the animals are affected by different metabolic, epidemic and non-epidemic diseases due to which a great number of animals died every year, which affect badly on the income of the people and the country. One of these epidemic diseases is the Foot and Mouth disease (FMD)in ruminants.

FMD is an extra ordinary epidemic disease of ruminant which easily and abruptly spreads in the animals of different areas. The effect of this disease on the economic growth especially on the milk production of milk cows is a large worldwide problem. As the farmers and animal owners do not have enough knowledge about the diseases of animals, they treat the FMD as a simple disease which can be cured by itself and they do not care of vaccinations and cleanness of their animals.

FMD is an extra ordinary epidemic viral disease. This disease affects ruminants, pet and wild animals. The affected adult animals are generally cured. The rate of affection of FMD is 100%. It causes heavy pain in different types of animals and reduces the amount of milk. It permanently demolishes hoof and breast in some animals, and sometimes the rate of death in young pet and wild animals is very high. Though this disease is demolished in some countries of the world like North America and West Europe, it affects badly the livestock business internationally in the areas where it spreads epidemically. FMD can be reappeared by the affected animals or by their products in the areas where it is demolished (Kitching, 2002).

Ekboir (1999) reported the effect of FMD on the product of milk and other dairy foods in his research in California State, the United State of America. He pointed in his research paper that the existence of FMD in the cow milk farms belongs to different factors: type of production, Process method of animal products, storing time and temperature of animal products. O'Toole et al (2002) reported that Effects of FMD incidents on the economy of Ireland and he pointed that the animals in the farm, lost their weight because of FMD can never gain their lost weight after cure and is always defected. The milk cows cannot give as much milk as they can give before affection of FMD. Rate of fertilizing get reduced in cows. Yong animals grow slowly and they cannot get enough weight compared to the expenses done upon them. If a herd is affected with FMD, 80% of cows and sheep may be affected.

Based on the survey of FAO (2008-2009), Afghanistan is the first country in Asia which has lots of FMD cases, and till now this disease is treated as a simple disease and no attention is paid to its economic drawbacks especially the decrease in the milk products of the milk cows. It is very important to pay the attention of the farmers to the economic drawbacks of this issue especially the drawbacks occurred in the decrease of cow milk and in general the attention of livestock specialists.

The most important issue is that, there is no big farms of milk cows to produce milk and fulfill the need of dairy food or milk food of our country people, beside of this farmers or small farm owners do not gain enough milk from their cows because of FMD. Looking at the need of dairy food and also to the internal production of milk which does not fulfill half of the required amount, this is the reason that according to the report

of the center statistics Afghanistan exports 50000-ton dry milk and 18-million-liter liquid milk every year. Approximately, Afghanistan export dairy food which costs 42 million US dollars from different countries (Annual Report, 2008). On the other hand, health of the people is under threat because of the out of date and low quality dairy food and milk.

A survey under the title of (Ways of control of FMD) was conducted in 2008-2009 in Afghanistan, Pakistan, Uzbekistan, Turkmenistan and Tajikistan by FAO and based on this survey, based on the recorded cases Afghanistan was the first among the above mentioned countries and this survey revealed that the above countries are in zero degree in demolishing FMD (FAO, 2008). Jonathan Rushton and Theo Knight-Jones conducted a research under the title of (Effects of FMD) in 2012. Based on the report of this research, FMD affects 27 million pet animals. To reduce economic drawbacks of this disease, 2.35 billion dose vaccine is produced and applied (Rushton & Knight, 2012). This is why in this study I want to know how FMD effect cow milk production in Ningrahar province.

2. Methodology

2.1 Epidemiologic areas of the research

This research was conducted on domestic milk cows in Jalal Abad city of Nangarhar province and in the four districts of this province: Khewa, Kama, Behsood and Surkhrood district to study the effect of FMD on the production of milk in this breed and to know how much FMD reduces production of milk in milk cows. To achieve this aim, data and information were collected from2015, 23 August to 23 October.

Based on the report of central statistics (2003) Afghanistan has 3.7 millions cows among which 204299 are in Nangarhar province. From the above mentioned number in Nangarhar, 20900 are in Khewa district, 52200 are in Kama district, 7500 are in Behsood district and 12800 are in Surkhrood district. These four districts including Jalal Abad city is the area of this research (1).

2.2 Sample Size

In this research, effects of FMD on the production of milk was investigated on 74 domestic milk cows. The cows were affected by the disease at different stages of lactation. In this research, sampling unit for the data collection was the animal owner that keeps domestic milk cows at houses and small farms.

2.3 Data Collection

Questionnaire, direct observation and interview methods were used in this research.

2.4 Statistical Analysis of the Data

The statistical analyses were performed using STAT View (STAT View for Windows, version 5; SAS Institute, Cary, NC). Analysis variance was performed within each treatment means were tested using the least significant difference test at a level of 0.05.

3. Result

In this research, effects of FMD on 74 FMD affected domestic cows in different stage of lactation in Jalal Abad city and in four districts: Khewa, Kama, Surkhrood and Behsood were studied. First, based on the information asked from the cow owner, daily milk production of every observed cow before FMD affection was determined and set in Table 1.

Table 1 - Before the affection of FMD, daily milk production rate of the domestic cows is shown.

X	F	F × X (Milk Kg)
3	10	30
3.5	3	10.5
4	10	40
5	15	75
5.5	1	5.5
6	11	66
7	10	70
8	10	80
9	3	27
10	1	10
Total	74	414

In the above table:
X is the daily milk production of every observed domestic cow before FMD affection.
F is the frequency or repetition of milking.

In Table 2, decreasing in daily production of milk in observed domestic cows is determined.

Table 2 - Due to FMD, the decreasing rate and repetition or milking of domestic cows

X	F	F x X (Milk Kg)
1	2	2
1.5	3	4.5
2	15	30
2.5	8	20
3	20	60
3.5	2	7
4	11	44
4.5	1	4.5
5	6	30
5.5	1	5.5
6	3	18
7	2	14
Total	74	239.5

In the above chart:
X is the decreasing rate of daily milk production rate in kilogram of every domestic cow due to FMD.
F is the frequency or repetition of milking.

Getting benefit of table 1 and 2, the daily average of domestic cow milk, before and after FMD is shown in Figure 1. 58% decreasing was occurred in the daily milk production of domestic cows by FMD.

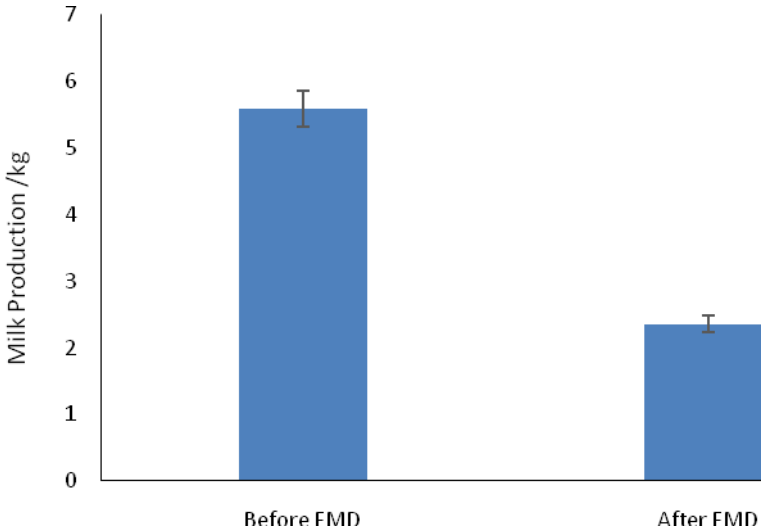

Figure 1: Milk production of domestic cows before and after FMD.

Variance for the population was obtained in terms of the bellow formula:
Variance =

$$S^2 = \sum(X - \bar{X})^2 \div n - 1 = 130.61 \div 74 - 1 = 130.61 \div 73 = 1.79$$

In the above formula:

X is the amount of the daily decreased milk of every observed cow due to FMD.

$\bar{X}$ is the average of decreased milk of observed cows.

n is the number of observations.

After getting of the variance, Standard deviation for the same population is indicated with the help of the bellow formula:

Standard Deviation

$$= SD = \sqrt{\frac{\sum(X-\bar{X})^2}{N-1}}$$

Standard Deviation $= SD = \sqrt{1.79} = 1.34$

For the better understanding, milk production of domestic cows before FMD and after FMD is compared in chart3.

Table 3: Average milk production of the domestic cows before FMD and after FMD and percentage of milk decreasing due to FMD.

Type	Average Milk/ kg before FMD	Average milk/Kg before FMD	Decline Differences (%)
Domestic cows	**5.59**	**2.36**	**58**

4. Discussion

Cow owners, in addition to other animal related economic problems, are in trouble with FMD in Nangarhar province. The reason might be no veterinary services in the area.

As there are not enough instruments to recognize FMD factors and serotypes in the central veterinary clinic laboratory in Nangarhar, it cannot be said that what serotype of FMD virus creates FMD. Those Polyvalent vaccinations of FMD that create immunity in the animals against A, O and Asia-1 serotypes of this disease are used in the area and in a number governmental and private farms, they give good result and indicate that the above mentioned serotypes might be present in Nangarhar and cause great lost in livestock sector. To prove my above mentioned claim, your attention is paid to report of (Awan, 2009) in Pakistan. He wrote based on the report of Zulfiqar in 2003 that A, O and Asia-1 serotypes of FMD are very common in Pakistan that cause losses of cost 6 billion Pakistani rupees in dairy sector. As Afghanistan has very long and unsafe border with Pakistan and hundreds of animals exports and imports illegally to one and another side besides that the weather condition of Pakistan and Afghanistan especially Nanngarhar does not have great difference, I am sure that A, O and Asia-1 serotypes of FMD cause FMD in Nangarhar.

One of the economic losses of FMD is the reduction of milk production. My research indicates that due to FMD, 58% decreasing in domestic cow milk production occurred in Nangarhar province, which is not align with the report of James and Rushto (2002). They performed their research in a farm in

Colombia. They found 26% decreasing in the milk production of the FMD affected cows. Based on the report of Bousfield and Brown (2010), the milk production of cows was 50% decreased by FMD. This report agrees with my research. The result of my research in Nangarhar indicates 58% decreasing in milk production and the research in Colombia indicates 50% decreasing in milk production which has 8% difference with the result of my research. A report published in Pakistan by Giancarlo Ferrari (2010) says that the effects of FMD on the decreasing of milk production is approximately same for cows and buffalos. For cows it is 56% and for buffalos it is 53%. My research agrees with this report. The results of my research agrees 90% with the reports published in different countries of the world on this issue.

5. Conclusion

This research indicates that FMD is existed with its full strength in Nangarhar province but because of the lack of the instruments in the central clinic of veterinary of Nangarhar, the serotypes of the virus which cause FMD is not clear. Different factors have rules in the spreading of FMD in Nangarhar. Some of these factors are: no public awareness of animal owners about the economic losses of FMD, long and unsafe border with Pakistan, far away residence of animal owners from veterinary clinics, no vaccination or lack of vaccination programs, different seasons and traditional feeding systems. FMD can be controlled with implementation of arranged vaccination programs. Though serotypes of the virus of FMD are not clear, doctors of the area private veterinary clinics are satisfied with the polyvalent vaccinations implemented against A, O and Asia1 serotypes. FMD is observed more in the animals feed in the green areas than the animals feed in the farms. This research indicates 58% decreasing of milk production in domestic cows in Nangarhar province four districts: Khewa, Behsood, Surkhrood, Kama and Jalalabad city. FMD not only causes decreasing in the products of animals but also weakens the load carrying animals. It causes the reduction of the growth of pet animals besides it causes death in young animals and it causes abortion in fertilized animals.

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