



# Prediction Models to Estimate the Relative Contribution of Socio-Economic Characteristics of Dairy Farmers' Attitude towards Foot and Mouth Disease Vaccination

Subin K Mohan\* and P J Rajkamal

College of Veterinary and Animal Sciences, Mannuthy, KVASU, Thrissur – 680651 (Kerala)

## ABSTRACT

Foot and Mouth Disease (FMD) can be controlled effectively if the right attitude is inculcated in dairy farmers. The study was undertaken among a total of 120 dairy farmers (sixty experienced and sixty inexperienced) at three panchayaths of Thrissur district of Kerala State which threw light on the dairy farmers' attitude towards FMD vaccination using stratified random sampling technique. An attitude scale was constructed as per the standard procedure of Likert methodology and the dairy farmers' attitude towards FMD vaccination was measured. The results showed that the dairy farmers studied were having only an ambivalent or neutral attitude towards FMD vaccination despite half of the farmers studied were FMD experienced ones. Apart that it was found that between FMD experienced and in experienced dairy farmers there wasn't a significant difference in their attitude towards FMD vaccination. Mass media exposure (0.301) and trainings attended (0.297) were positively and significantly correlated with the attitude of FMD experienced dairy farmers towards vaccination whereas it was herd size (0.276) and interpersonal communication (0.217) in case of FMD inexperienced. Attending trainings on FMD (0.213) was positively and significantly correlated with the overall attitude.

**Key Words:** Attitude, Dairy farmer, Vaccination, Control, Correlation, Regression.

## INTRODUCTION

The foot-and-mouth disease (FMD) is a devastating livestock disease caused by foot-and-mouth disease virus (FMDV) and the outbreaks of this disease in a country always result in conspicuous economic losses to livestock industry and subsequently lead to serious socioeconomic damages due to the immediate imposition of trade restrictions (Loo *et al*, 2020). It is highly contagious and infectious for cattle and is endemic in India. It causes untold suffering to the animal and heavy economic loss to the poor animal owner. The annual loss caused by FMD in India is about ₹ 200 billion. Prevention is better than cure is the only apt strategy in this case. Foot-and-mouth disease control programme (FMDCP) is run in India by adopting series of measures from clinical diagnosis of the disease in the field, to sending clinical samples for laboratory diagnosis and till selection of vaccine

candidates. Vaccines are used to cover all the susceptible livestock population. This is expected to minimize economic losses to the livestock owners due to the disease. The Government of India has been carrying out intensive FMDCP in a phase wise manner since 2003–2004 and subsequently by 2017–2018; it has covered all the districts of the country.

The FMDCP is intending to vaccinate all the susceptible livestock population of the country such as cattle, buffalo, sheep, goats and pigs. That exercise was adopted to make the country free of the disease till 2025–2030 (Audarya, 2020). Considering the above facts, Government of Kerala has launched ADCP programme making vaccination against FMD obligatory on the part of the owner. FMD control programme, specifically named Goreksha were given considerable publicity and other educational efforts are being undertaken

**Table 1. Distribution of dairy farmers based on their attitude towards FMD vaccination.**

Sr. No.	Category	FMD Experienced (n=60)			FMD inexperienced (n=60)			Overall (n=120)		
		Score	f	%	Score	f	%	Score	f	%
1	Unfavorable	13-27	9	15	14-29	11	18	13-28	19	16
2	Neutral	28-37	35	58	30-33	16	27	29-36	64	53
3	Favorable	38-43	16	27	34-45	33	55	37-43	37	31
	<b>Z value- 0.071<sup>ns</sup></b> (ns-Non significant)									

apart from periodical door step vaccination. Things can change only with an attitudinal change. Therefore, the ways and means of bringing about attitudinal change, policy people and change agents should critically think of and be implemented and also should focus on the factors contributing to it. Thus, considering the significance of FMD control, the present study was undertaken.

### MATERIALS AND METHODS

Three panchayats of Thrissur district of Kerala viz. Chazhooor, Anthikkad and Paralam were selected for the study. Two groups of dairy farmers were selected applying stratified random sampling technique. A total number of 120 respondents were selected which comprised of sixty FMD experienced dairy farmers and sixty FMD inexperienced dairy farmers who were proportionately and randomly selected from the milk co-operatives of these panchayaths. Ex post facto research design was employed for the study. The selected socio-economic characteristics of the respondents were age, education, occupation, income from dairying, experience in dairying, herd size, mass media exposure, interpersonal communication, trainings attended. An attitude scale which was constructed to measure the dairy farmers' attitude towards FMD vaccination using the standard procedure given by Likert (1932) was adopted and administered to all the respondents under study. The respondents were required to record their positive or negative feelings on the five point continuum viz., strongly agree, agree, undecided, disagree and strongly disagree in the scale. Based on the total scores obtained, the respondents were categorized following Dalenius

Hodges cumulative square root frequency method into three groups namely favorable, neutral and unfavorable. To explore the relationship between the selected socio-economic characteristics of the dairy farmers towards attitude towards FMD vaccination, Coefficient of correlation (r) was computed using the standard formulae using SPSS 21. The relationship between the socio-economic variables with the attitude of dairy farmers, multiple regression tools was used and the multiple linear regression equations were compounded.

### RESULTS AND DISCUSSION

#### Distribution of dairy farmers based on their attitude towards FMD vaccination

The data (Table 1) showed that majority of the FMD experienced dairy farmers (58%) had a neutral attitude towards FMD vaccination. This was followed by favorable attitude (27%) and unfavorable attitude (15%). Majority of FMD inexperienced dairy farmers had favorable attitude towards FMD vaccination (55%). This was followed by neutral (27%) and unfavorable (18%) attitudes. The Z value (0.071) indicated that there was no significant difference between the attitudes of FMD experienced and inexperienced dairy farmers. But when overall respondents were taken into account, majority of the respondents (53%) had neutral attitude towards FMD vaccination. Thirty one percent of the respondents had favorable attitude and 16 per cent had unfavorable attitude towards FMD vaccination.

It was worth mentioning that this study has brought to light a hard fact that in general, most

## Prediction Models to Estimate the Relative Contribution of Socio-Economic Characteristics

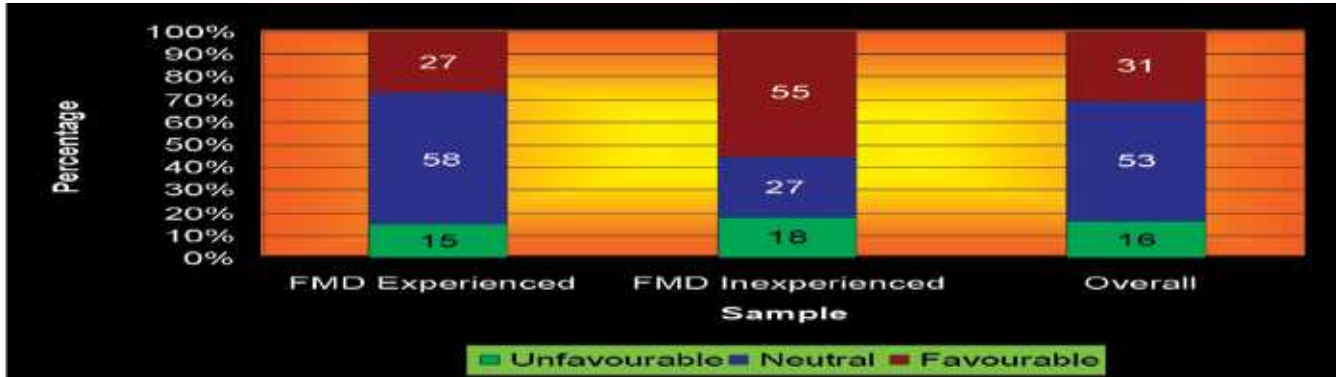


Fig 1 Distribution of dairy farmers based on their attitude towards FMD vaccination

of the dairy farmers studied were having only an ambivalent or neutral attitude towards FMD vaccination despite half of the farmers studied were FMD experienced ones. That apart, it was found that between FMD experienced and inexperienced dairy farmers there wasn't a significant difference in their attitude towards FMD vaccination. There could be many reasons for this ambivalent attitude towards FMD vaccination, born of a lack of confidence *viz.*, on the quality of the vaccine, the skill of the vaccinator and after effects. It is worth mentioning here that there have been incidences of vaccinated animals contracting FMD which has been a vociferous complaint of the cattle owners. Therefore, resistance to vaccination could be common place, though Government has made it obligatory. Hopker *et al* (2021) reported that farmers expressed passive attitudes to accessing vaccination services. Farmers were waiting for immunization drives rather than seeking vaccination by their own. Osmani *et al* (2021) studied the knowledge, attitudes, and practices (KAPs) of Farmers on Foot and Mouth Disease in Cattle in Baghlan Province of Afghanistan and reported that farmers were willing for their cattle herds to be vaccinated regularly if quality vaccines were available to control FMD. Development of such attitude towards vaccination among dairy farmers is a matter of serious concern as the Government is implementing various FMD eradication programmes particularly vaccination as eradication of the disease through vaccination is the

only choice in India because stamping out diseased animals is not possible due to socio-cultural and economic reasons. FMD can be controlled effectively if the right attitude is inculcated in dairy farmers.

### Relationship between independent variables and attitude towards FMD vaccination

*Multiple regression analysis of independent variables with dependent variable, attitude towards FMD vaccination to FMD experienced dairy farmers*

It was found that out of the nine independent variables studied, two variables *viz.*, media exposure and seminar/workshops attended were significantly correlated with the attitude towards FMD vaccination in FMD experienced dairy farmers. In order to assess the relative contribution of each of the independent variables, the data were subjected to multiple regression analysis. It could be observed that the two variables media exposure and experience in dairying were found to be significant in explaining variations in the attitude towards FMD vaccination in FMD experienced dairy farmers. The multiple regression equation fitted to the data was  $Y=36.15+0.0519x_1-1.109x_2-0.706x_3-0.0001x_4-0.185x_5+0.345x_6+1.631x_7+0.226x_8+1.75x_9$ . The coefficient of determination was found to be 31.5%. This indicated that 31.5 percent of total variability in the attitude towards FMD vaccination in FMD experienced dairy

**Table 2. Multiple regression analysis of independent variables with dependent variable, attitude towards FMD vaccination to FMD experienced dairy farmers.**

Sr. No.	Independent variable	Correlation coefficient	Regression coefficient	Standard error	t- value
1	Age	-0.030	0.0519	0.08	0.649
2	Education	-0.173	-1.109	1.251	0.887
3	Occupation	-0.185	-0.706	0.595	1.187
4	Income from dairying	-0.005	-0.0001	0	1.525
5	Experience in dairying	-0.301	-0.185	0.062	2.98**
6	Herd size	0.043	0.345	0.504	0.684
7	Mass Media exposure	0.301**	1.631	0.677	2.409*
8	Interpersonal communication	0.158	0.226	0.568	0.398
9	Trainings attended	0.297**	1.75	0.905	1.935

\* (P<0.05)    \*\* (P<0.01)    F=2.95\*\*    Intercept = 36.51    R square = 35.1%

farmers could be attributed to the nine independent variables. Since attitude creation among FMD experienced dairy farmers are mainly contributed by communication variables, considerable attention should be given in this regard while planning and implementing FMD eradication programmes like Goreksha.

The data (Table 3) indicated that out of the nine independent variables studied, two variables *viz.*, herd size and interpersonal communication were significantly correlated with the attitude towards

FMD vaccination in FMD inexperienced dairy farmers. In order to assess the relative contribution of each of the independent variables, the data were subjected to multiple regression analysis. It could be observed that the one variable herd size was found to be significant in explaining variations in the attitude towards FMD vaccination in FMD inexperienced dairy farmers. The multiple regression equation fitted to the data was  $Y=35.44- 0.099x_1+ 0.13x_2- 0.329x_3- 0.000037x_4+ 0.0099x_5+ 0.952x_6- 0.246x_7+ 0.649x_8+ 0.334x_9$ . The coefficient of determination was found to be 18.3%. This

**Table 3. Multiple regression analysis of independent variables with dependent variable, attitude towards FMD vaccination to FMD inexperienced dairy farmers.**

Sr. No.	Independent variable	Correlation coefficient	Regression coefficient	Standard error	t- value
1	Age	-0.189	-0.099	0.085	1.164
2	Education	0.059	0.130	1.001	0.129
3	Occupation	-0.105	-0.329	0.685	0.481
4	Income from dairying	0.122	-0.000037	0	0.583
5	Experience in dairying	-0.124	0.0099	0.062	0.161
6	Herd size	0.276**	0.952	0.473	2.012*
7	Mass Media exposure	0.085	-0.246	0.523	0.469
8	Interpersonal communication	0.217*	0.649	0.428	1.517
9	Trainings attended	0.11	0.334	1.131	0.295

\* (P<0.05)    \*\* (P<0.01)    F=1.24    Intercept = 35.44    R square = 18.3%

## Prediction Models to Estimate the Relative Contribution of Socio-Economic Characteristics

**Table 4. Multiple regression analysis of independent variables with dependent variable, overall attitude towards FMD vaccination.**

Sr. No.	Independent variable	Correlation coefficient	Regression coefficient	Standard error	t- value
1	Age	-0.105	-0.016	0.058	0.279
2	Education	-0.047	-0.876	0.769	1.139
3	Occupation	-0.149	-0.503	0.453	1.11
4	Income from dairying	0.069	-0.000064	0	1.206
5	Experience in dairying	-0.213	-0.096	0.044	2.191*
6	Herd size	0.16	0.488	0.341	1.431
7	Media exposure	0.187	0.567	0.409	1.384
8	Interpersonal communication	0.185	0.476	0.336	1.418
9	Seminar/ workshops attended	0.213*	1.107	0.696	1.591

\* (P<0.05)    \*\* (P<0.01)    F=2.56\*\*    Intercept = 36.98    R square = 17.5%

indicated that 18.3 percent of total variability in the attitude towards FMD vaccination in FMD inexperienced dairy farmers could be attributed to the nine independent variables. Even though herd size had importance in attitude molding, in spite of that communication should be there with all dairy farmers to inculcate a right attitude among them. Interpersonal communication should be also promoted among dairy farmers and the authorities should make necessary arrangements to provide stage for this.

Multiple regression analysis of independent variables with dependent variable, overall attitude towards FMD vaccination.

The data (Table 4) indicated that out of the nine independent variables studied, one variable viz., seminar/ workshops attended was significantly correlated with the overall attitude towards FMD vaccination. In order to assess the relative contribution of each of the independent variables, the data was subjected to multiple regression analysis. It could be observed that the one variable, experience in dairying was found to be significant in explaining variations in the overall attitude towards FMD vaccination. The multiple regression equation fitted to the data was  $Y=36.98-0.016x1-0.876x2-0.503x3-0.000064x4-0.096x5+0.488x6+$

$0.567x7+0.476x8+1.107x9$ . The coefficient of determination was found to be 17.5%. This indicated that 17.5 percent of total variability in the overall attitude towards FMD vaccination could be attributed to the nine independent variables. Things can change only with an attitudinal change. Therefore, the ways and means of bringing about attitudinal change, policy people and change agents should critically think of and be implemented. In this connection, the present study revealed that attending trainings on FMD was positively and significantly correlated with the overall attitude. So much so more of training programmes should be organized participating dairy farmers.

### CONCLUSION

FMD is a highly contagious animal disease and vaccination is the only choice in India to eradicate it because stamping out diseased animals is not possible due to socio-cultural and economic reasons. FMD can be controlled effectively if the right attitude is inculcated in dairy farmers. It is worth mentioning that this study has brought to light a hard fact that in general, most of the dairy farmers studied were having only an ambivalent or neutral attitude towards FMD vaccination despite half of the farmers studied were FMD experienced ones. That

apart, it was found that between FMD experienced and inexperienced dairy farmers there wasn't a significant difference in their attitude towards FMD vaccination. There could be many reasons for this ambivalent attitude. The present study revealed that attending seminars, group discussions and lecture classes on FMD was positively and significantly correlated with the overall attitude. So much so more of seminars, group discussions and lecture classes should be organized participating dairy farmers.

### REFERENCES

- Audarya S D (2020). Foot-and-Mouth Disease in India: Past, Present and Future Outlook - A Review. DOI: 10.5772/intechopen.93348
- Hopker A, Pandey N, Bartholomew R, Blanton A, Hopker S, Dhamorikar A, Goswami J, Marsland R, Metha P, Sargison N (2021). Livestock vaccination programme participation among smallholder farmers on the outskirts of National Parks and Tiger Reserves in the Indian states of Madhya Pradesh and Assam. *PLoS ONE* **16**(8): e0256684. <https://doi.org/10.1371/journal.pone.0256684>
- Likert R (1932). A technique for the measurement of attitudes. *Archiv of Psychology* **22** (140) : 1-55.
- Loo WC, Yeah YC, Kian OH, Lian HK and Siang TW (2020). Advances in the diagnosis of foot-and-mouth disease. *Front Vet Sci* **7** | <https://doi.org/10.3389/fvets.2020.00477>
- Osmani A, Habib I and Robertson I D (2021). Knowledge, Attitudes and Practices (KAPs) of Farmers on Foot and Mouth Disease in Cattle in Baghlan Province, Afghanistan: A Descriptive Study. *Animals* **11**(2188). <https://doi.org/10.3390/ani11082188>

Received on 30/11/2021      Accepted on 10/03/2022