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RESEARCH ARTICLE
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Knowledge, Attitudes and Behavior of Farmers towards Foot and Mouth Disease Outbreak

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ABSTRACT

This study examines the degree of knowledge, attitudes, and behavior of cattle farmers regarding Foot and Mouth Disease (FMD), which is a common health problem in cattle and can cause significant economic losses. The objective of this study was to determine the degree of knowledge of farmers regarding the disease as well as the extent to which farmers practice good attitudes and behaviors regarding the prevention and control of the disease. This study was conducted using observation, survey and interview methods with 101 cattle farmers in Gowa district using purposive sampling. The Likert scale was used with a scale of 1, 2, and 3 for know/always/agree, doubtful/rarely/less agree and don't know/never/disagree. This type of research is descriptive quantitative. Data were analyzed descriptively in the form of averages, frequencies and percentages. The results showed that the level of knowledge was medium category, the attitudes was low category and the behavior of beef cattle farmers about foot and mouth disease was in the high category. It can be concluded that training, guidance and support for cattle farmers to prevent FMD outbreaks were important.

Keywords: Knowledge, Attitude, Behavior, FMD.

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INTRODUCTION

A disease called Foot and Mouth Disease (FMD) affects even-toed livestock such as cattle, buffalo, and goats. FMD is caused by a RNA virus. According to Chen et al. (2022), the outbreak of FMD in Indonesia has caused major problems in the fields of socioeconomics, animal health, and biosecurity, indicating that coordination of support is needed for outbreak detection and control. Susila et al. (2023) added that the discovery and identification of FMD virus serotype O in Indonesia indicates that illegal trade of livestock from Southeast Asia could be a means of the disease's incursion. According to Sahara et al. (2023), the outbreak of FMD in Indonesia had a negative effect on the growth of the economy, real wage, consumption, and trade deficit, while also causing prices to rise in the beef and dairy sectors.

Colenutt et al. (2020) said that Environmental transmission of FMDV can results in an outbreak in cattle, with potential for transmission even before clinical signs are apparent. Cabezas et al. (2018) added that FMD infection in beef feedlot cattle can last 5 to 7 days, with high-virulent strains causing clinical disease and reducing feed consumption for 7 days. Parthiban et al. (2015) found that unvaccinated cattle excrete higher levels of FMDV for longer periods compared to vaccinated cattle, but the risk of new outbreaks in controlled conditions is low.

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The level of knowledge, attitude, and behavior of cattle farmers plays a very important role in preventing and controlling FMD in livestock. This disease can cause significant economic losses for farmers and has the potential to spread to other animals and even humans. Adequate knowledge about FMD and how it is transmitted is very important for cattle farmers. With a good understanding, they can recognize the early symptoms of the disease, apply appropriate preventive measures, and take necessary actions if any animals are infected. In addition, knowledge about good pen management, healthy feeding, and maintaining cleanliness can also help prevent the spread of this disease.

In addition to knowledge, attitude is also an important factor in preventing FMD. Responsible farmers will maintain the health of their livestock by providing good care, including maintaining the cleanliness of the pen, providing balanced feed, and providing the necessary vaccinations. They will also report incidents of disease to the authorities, so that steps can be taken immediately. The behavior of farmers also plays an important role in preventing the spread of foot and mouth disease. Disciplined farmers will maintain personal hygiene, such as washing hands with soap after contact with infected livestock. They will also isolate sick or infected animals, so that the spread of the disease can be stopped as quickly as possible. In addition, responsible farmers will also follow the rules and regulations set by the authorities regarding livestock maintenance.

Several researchers have conducted studies with similar titles, including Talabi et al. (2013); Soko et al. (2018); Baazizi et al (2019); Nyaguthii et al. (2019); Biesheuvel et al. 2021); Osmani et al. (2021); Bayantassova et al. (2023), but there has been no research on the knowledge, attitudes and behavior of cattle farmers towards FMD in Indonesia. This is the basis for conducting this study. In this article, we will discuss further the importance of the level of knowledge, attitudes and behavior of cattle farmers towards FMD. With a better understanding and implementation of correct practices, it is hoped that the risk of spreading this disease can be reduced and livestock health and sustainability of livestock businesses can be improved.

MATERIALS & METHODS

This research was conducted in Gowa district for 2 months from May-June 2024. Data sources were primary data and secondary data. Primary data was obtained through observation, Focus Group Discussion (FGD), interviews with cattle breeders using questionnaires, while secondary data was obtained from reports from the local Livestock Service and documents. Samples were taken purposively from breeders who have cattle. The number of samples was 101 people. The Likert scale was used in this study. For Knowledge, Likert scale 1, 2 and 3 were used. Score 1 for know, score 2 for doubt and score 3 for don't know. For the attitude variable, Likert scale 1, 2 and 3 were used with a score of 1 for always, score 2 for rarely and score 3 for never, while for behavior, the Likert scale used was score 1, 2 and 3 with a score of 1 for agree, score 2 for neutral, score 3 for disagree. This type of research is quantitative descriptive in the form of average, frequency and percentage.

How to calculate the category of Knowledge, Attitude and Behavior

Highest value : 101x3 = 303
Lowest value : 101x1 = 101
Range : $\frac{(303-101)}{3}$ = 66
Low category : 101 – 167
Medium category : 168 – 234
High category : 235 – 301

Adopted from Balkhy et al. (2010), the following information was intended to be gathered via an interview questionnaire: a) Sociodemographic variables, including age, gender, education, farming experience, family size, and livestock count. b) Understanding the disease's characteristics, mechanism of transmission, indications and symptoms, incubation time, communicability period, and preventive actions. To evaluate this knowledge, participants were given 9 factual questions to answer "know", “doubt” and "don’t know." To evaluate each subject's degree of knowledge, a score system was used: For every know response, 3 points were awarded, for every doubt response, 2 points were awarded and for every don’t know response, one point. c). Participants answered 9 attitudinal items with "always," "rare," and "never" to gauge their attitudes about handling cattle, looking for veterinarians, eating uncooked meat, and selling sick cows. With a 3-point Likert scale, 3 points were awarded for “always," 2 points were awarded for “rare” and 1 point was awarded for "never". d). Participants answered 11 behavior items with “agree”, “neutral” and “disagree” to gauge their behavior about wearing attributes in cage, providing and washing hand with soap, consume cooking meat and recording livestock health. With a 3-point Likert scale, 3 points were awarded for “agree," 2 points were awarded for “neutral” and 1 point was awarded for "disagree".

RESULTS & DISCUSSION

According to the study results, the average age of respondents was 43.39 years, with the youngest being 18 years old and the oldest being 70 years old. This shows that respondents are in the productive age group, which is an important asset in agricultural activities, especially in raising beef cattle. This relatively mature age can contribute to better experience and knowledge in agricultural practices. The involvement of individuals in this productive age group is very important, because they tend to have higher stamina and motivation to engage in physical activities required in agriculture. In addition, the life experience they have can help in making better decisions related to livestock maintenance and resource management. This research agrees with that of Kardaya et al. (2020) who said that farmer regeneration can ensure the long-term viability of the beef cattle breeding industry.

The respondents were 80 men (79.21%), according to the sex category. This indicates that in order to protect beef cattle, significant measures are required, such as searching for grass, providing food, and providing cage.

Only 21 female respondents (21.79%) were involved in this research. This is in contra with Mollel and Mtenga (2000) who argued that males and females of all ages shared duties related to cattle management. However, when it came to marketing, cleaning the shed, feeding, and medical care, men put in a little more work than women. Couples worked together to decide how much time to devote to each duty, as well as how to buy cattle, implement innovations, and market them.

The majority of respondents, namely 41 people (40.59%), stated that they had completed their education up to junior high school level. This shows that respondents are concerned about education, although the level of education achieved is still relatively low. Quality education is very important to improve knowledge and skills in agricultural practices. Efforts to improve access and quality of education for farmers are needed so that they can understand and implement better agricultural practices. The average respondent has 14.22 years of farming experience, indicating that they are quite experienced in caring for beef cattle. This experience can contribute to success in livestock management, because experienced farmers tend to understand the needs and behavior of cattle better. The experience gained can also be capital in facing challenges that may arise in livestock maintenance. Waris et al. (2019) stated that age, level of education and length of farming influence knowledge of cattle reproductive management.

The average number of families is around 3.29, indicating that respondents tend to collaborate in small categories. Collaboration in families can increase efficiency and effectiveness in resource management, as well as facilitate the exchange of knowledge between farmers. With small families, farmers can support each other and share relevant information, thus improving their ability to manage their livestock businesses. The average number of beef cattle owned by respondents was around 6.34, which is included in the medium category. This shows that respondents have the potential to increase their livestock production. However, it also indicates the need for support in terms of feed management and livestock health to achieve optimal results. Training and guidance from more experienced parties or related institutions are needed to help farmers improve their managerial capacity. According to Mastuti et al. (2023), the number of family members and number of livestock influence labor productivity.

Knowledge

Based on Table 1, it can be seen that in a comprehensive manner, the knowledge of the cattle farmers regarding FMD includes the category of medium with the weight 197. The highest weight, which is around 300, is used to assess a person's past or lack of FMD. The lowest weight was 99 which showed the importance of isolation for beef cattle which were invected by FMD. Beef cattle farmers must strengthen this understanding. It is necessary to increase the level of knowledge that cattle farmers have in the area of cattle handling. There are a few methods that can be used, such as through extension. The results of this study differ from those of Soko et al. (2018), who claimed that pastoralists in Kilosa district, Morogoro, Tanzania, had a high level of knowledge and positive attitudes that can aid them with coordinated FMD management initiatives and participatory surveillance.

Table 1: Knowledge of cattle farmers to FMD

Question	Number	Frequency	Percentage
1. Do you know what is meant by FMD?			
A. Know	83	249	92.22
B. Doubt	3	6	2.22
C. Don't know	15	15	5.56
		270	100
2. Do you know that your livestock have ever had FMD?			
A. Know	82	244	81.33
B. Doubt	1	2	0.67
C. Don't know	18	54	18.00
		300	100
3. Do you know the signs of FMD in cattle?			
A. Know	86	258	93.82
B. Doubt	2	4	1.45
C. Don't know	13	13	4.73
		275	100.00
4. Do you know the impact of livestock affected by FMD?			
A. Know	60	180	79.30
B. Doubt	6	12	5.29
C. Don't know	35	35	15.41
		227	100.00
5. Do you know the importance of preventing FMD?			
A. Know	11	33	26.4
B. Doubt	2	4	3.2
C. Don't know	88	88	70.4
		125	100
6. Do you know what actions should be taken to prevent your livestock from FMD outbreaks?			
A. Know	51	153	75.00
B. Doubt	1	2	0.98
C. Don't know	49	49	24.02
		204	100.00
7. Do you know that separation (isolation) is necessary if your livestock is infected with FMD?			
A. Know	18	54	54.55
B. Doubt	2	4	4.04
C. Don't know	41	41	41.41
		99	100.00
8. Do you know that it is necessary to give medication to livestock affected by FMD?			
A. Know	19	57	41.01
B. Doubt	0	0	0
C. Don't know	82	82	58.99
		139	100.00
9. Do you know that it is necessary to disinfect assets and all materials infected with FMD?			
A. Know	15	45	33.58
B. Doubt	3	6	4.48
C. Don't know	83	83	61.94
		134	100.00
Average		197	

Note: Low: 101-167; Medium: 168-234; High: 235-303

According to Osmani et al. (2021), Baghlan farmers in Afghanistan has a decent understanding of FMD, but in order to effectively treat the disease, information gaps and inadequate import controls must be rectified. Bayantassova et al. (2023) stated that farmers in West Kazakhstan identify oral mucosa lesions as indications of FMD, but they do not regularly vaccinate their animals and limit their travel, underscoring the urgent need to stop future outbreaks. According to Baazizi et al. (2019), Northern Algerian farmers and breeders are aware of the clinical symptoms of FMD, but few report cases or take preventative action because they are afraid of being killed and suffering financial losses. Talabi et al. (2013) found

that cattle producers in Ogun State, Nigeria, are aware of the consequences of FMD and understand the necessity of government support in order to provide vaccinations against the disease in a timely manner. According to Delgado et al. (2014), cow-calf farmers in Texas think that alerting physicians to calves exhibiting clinical symptoms of FMD can have beneficial emotional and financial outcomes; nevertheless, obstacles such as ignorance and infection fear prevent reporting. As stated by Manyweathers et al. (2022), the significance of co-creating, valuing, and sharing knowledge to enhance livestock producers' and other stakeholders' reactions to FMD outbreaks is exemplified by Australia's FMD Ready Farmer-led surveillance project. According to Nyaguthii et al. (2019), although farmers have a typically high level of knowledge about FMD, only 46.4% of them believe that vaccinations are a preventive measure to lower the risk of disease on their farm. The results of this study are consistent with the findings of Hartady et al. (2021), who state that farmers lack information about managing the health of beef cattle since they lack a background in animal health. The majority of breeders treat sick animals using natural remedies. The rise in helminthiasis cases (45%) was partly caused by farmers' concerns about routine anthelmintic administration and immunization, which were only around 15 and 22%, respectively. Smallholder losses can be reduced with better understanding of cattle diseases and convenient access to vets. This research didn't agree with that of Baazizi et al. (2019) who found that Northern Algerian farmers and breeders are aware of the clinical symptoms of FMD, few report cases or take preventative action because they are afraid of being killed and suffering financial losses.

Attitude

Based on Table 2, it can be observed that the attitude of cattle farmers with respect to FMD is on average present in the low category with a weight of 151.11. The result of this research is lower than that of Pancar et al. (2023) who said that in Kendari City, farmers' attitudes on FMD fall within the adequate category. The highest weight is determined by continuously washing hands with soap (249) with a highest percentage of 69.88%. This indicates that the breeders have already reached the conclusion that hands with soap can prevent FMD. Even so, the lowest weight is found in weight 104 with the highest percentage of respondents (95.20%) who have never eaten raw or undercooked meat. This indicated that eating raw or undercooked meat was not recommended. This was supported by Alshaikh et al. (2023) who argued that programs for food safety should be put in place to guarantee food safety and inform the public about the benefits of implementing food safety practices.

Based on this research, farmers always report to the veterinarian when there is sudden death or high mortality in cattle with the weight 99. This shows that farmers follow the instructions of the local livestock service to immediately report to the local veterinarian if there is a sudden death in their cattle. Besides that, farmers never sell sick livestock with the weight 94. The results of this study are better than the study conducted by Gunarathne et al. (2016) which found that approximately 23% of farmers were hesitant to report animals with foot-and-mouth disease and to sell animals with the disease, even if it is illegal to do so.

Table 2: Attitude of cattle farmers toward FMD

Question	Number	Frequency	Percentage
Practice before and after handling livestock			
a. Washing hands with soap			
• Always	58	174	69.88
• Rare	32	64	25.70
• Never	11	11	4.42
		249	100
b. Using gloves			
• Always	4	12	9.23
• Rare	11	22	16.92
• Never	96	96	73.85
		130	100
c. Wearing a mask			
• Always	1	3	2.73
• Rare	7	14	12.73
• Never	93	93	84.55
		110	100
d. Wearing a cage suit			
• Always	7	21	15
• Rare	25	50	35.71
• Never	69	69	49.29
		140	100
e. Wearing boots			
• Always	56	168	73.04
• Rare	17	34	14.78
• Never	28	28	12.17
		230	100
f. Cover the wound with a plaster			
• Always	3	9	8.26
• Rare	2	4	3.67
• Never	96	96	88.07
		109	100
I eat raw or undercooked meat			
• Always	1	3	2.88
• Rare	1	2	1.92
• Never	99	99	95.20
		104	100
I look for a veterinarian/livestock officer when there is sudden death or high mortality in cattle.			
• Always	33	99	55.00
• Rare	13	26	14.44
• Never	55	55	30.55
		180	100
I sell products from sick cows			
• Always	0	0	0
• Rare	7	14	12.96
• Never	94	94	87.04
		108	100
Average		151.11	

Note: Low: 101-167; Medium: 168-234; High: 235-303

Behavior

It can be seen from Table 3 that, on average, the performance of beef cattle farmers towards FMD has a score of 255, meaning that they fall into the high category. The highest score was 303 for meat must be cooked before consumption. The most important thing is that people tend to cook meat before they consume it. This indicates good performance. As soon as the meat is well-cooked, the FMD virus will be safe to consume. According to Kertawinata (2022), the bacteria and viruses found in FMD animal products can be eliminated by boiling water at least 70 degrees for 30 min. By using this technique, viruses can be kept out of the environment and away from healthy animals.

Table 3: Behavior of beef cattle farmers toward FMD

Questions	Frequency	Weight	Percentage
1. Wearing the following attributes is very important to protect against contracting FMD.			
a. Gloves			
Agree	66	198	75.57
Neutral	31	62	23.66
Disagree	2	2	0.77
	99	262	100
b. Boot			
Agree	68	204	75.84
Neutral	32	64	23.79
Disagree	1	1	0.37
	91	269	100
c. Home clothes			
Agree	67	201	75.56
Neutral	32	64	24.06
Disagree	1	1	0.38
	100	266	100
d. Mask			
Agree	69	207	77.81
Neutral	30	60	22.56
Disagree	2	3	1.13
	101	266	100
2. Soap must be available in the cage			
Agree	81	243	86.48
Neutral	18	36	12.81
Disagree	2	2	0.71
	101	281	100
3. Always wash your hands with soap after handling livestock			
Agree	92	276	94.52
Neutral	7	14	4.79
Disagree	2	2	0.69
	101	292	100
4. Meat must be cooked before consumption			
Agree	101	303	100
Neutral	0	0	0
Disagree	0	0	0
	101	303	100
5. There must be livestock health records			
Agree	65	195	73.03
Neutral	36	72	26.97
Disagree	0	0	0
	91	267	100
6. A veterinarian should be sought immediately if sudden death or high mortality occurs			
Agree	94	282	95.27
Neutral	7	14	4.73
Disagree	0	0	0
	101	296	100
7. The wound should be covered with a plaster			
Agree	57	171	66.79
Neutral	41	82	32.03
Disagree	3	3	1.17
	101	256	100
8. I am very concerned about FMD in livestock			
Agree	100	300	99.34
Neutral	1	2	0.66
Disagree	0	0	0
	101	302	100
Average		255	

Note: Low: 101-167; Medium: 168-234; High: 235-303.

The lowest score was 256 for the wound that should be covered with plaster. This indicates that cattle farmers are not very informed about their cattle's health. This research was supported by Hartady et al. (2021) who stated that farmers lack expertise in managing the health of beef cattle because they lack a background in animal health. The majority of breeders treat sick animals using natural remedies.

Positive behavior is found in the statement farmers agree to immediately report to the veterinarian if sudden death occurs or high mortality in livestock with the weight 282. This in contrary with that of Baazizi et al. (2019), who found that few take preventive measures or report cases due to fear of slaughter and economic loss.

Conclusion

Based on this study, it can be concluded that the level of knowledge was medium category, the level of attitude was low category, and behavior of beef cattle farmers toward FMD was high category. Because of this, it is necessary to carry out efforts to increase knowledge and understanding of the elderly, such as by providing education and socialization related to FMD, as well as by increasing awareness and adherence to the law regarding practices that contribute to the health of the beef cattle. It is hoped that this will result in a safe and healthy environment for beef cattle and the general public.

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