

*Research article***Epidemiological investigation of different disease and ailments of livestock in the summer season**

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ABSTRACT

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Upazilla Veterinary Hospital plays a significant role in veterinary service where lots of livestock animals are brought for treatment of various diseases. Previously, a few studies were conducted to investigate animal diseases during summer in Jhenaidah Sadar. So, the present study was aimed to estimate the proportionate prevalence of diseases and disorders and to know the pattern of antimicrobials used for the treatment of food animals during summer (March to June 2019). A total of 1588 diseased animals' data were extracted from the paper-based hospital register book of three randomly selected Upazilla Veterinary Hospital namely Jhenaidah Sadar, Horinakundu and Kotchandpur. Out of all clinical cases, digestive disorders were the highest percentage (35.4%) in which 35.1%, 35.9%, 32.1% and 14.3% in cattle, goat, sheep, and buffalo, respectively. The overall proportionate prevalence of disease during summer was endo-parasitic (17.6%), followed by bacterial disease (11.4%), whereas the proportionate prevalence of viral disease (3.0%) was very negligible. Among total individuals cases (N=1588), A significant number of animals (n=598) were prescribed with antimicrobials in which highest percentage was sulfonamides (29.9%) followed by tetracycline (27.4%), penicillin (7.9%) and aminoglycosides (5.2%). However, among the combined drug combination of aminoglycosides and penicillin (23.7%) were prescribed most frequently. This study brings to an end that the digestive disorder was mostly prevalent disease condition during summer. So, this study would be conducive to build up a better management strategy to prevent the digestive disturbance of animals in this area.

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1. INTRODUCTION

Agriculture sector comprises of crop, livestock, fisheries and forest subsector play a crucial role in the National economy of Bangladesh. Livestock encompasses around 24.09 million cattle, 1.49 million buffalo, 26.1 million goats, 3.47 million sheep, 282.15 million Chicken,

55.85 million duck (Anon, 2019). The the livestock sector is playing a pivotal role in the livelihood of around 10 million people (Karim et al., 2010) and contributing 1.53% of National GDP (Gross Domestic Product) at constant prices whereas 1.86% at current market price (Anon, 2019). Livestock providing animal protein through supplying milk, meat, and eggs

to mitigate the daily protein requirement of a huge population. Presently the annual production status is around 9.41 million metric ton of milk, 7.26 million metric ton of meat and 1552 crore egg (Anon, 2019).

The major hindrance of livestock is a different disease and disorder that deteriorate the production status. Various infectious diseases like bacterial, viral and parasitic may increase mortality and decrease productivity and market values of livestock product and byproduct. In ruminants, the most commonly occurring bacterial diseases are pneumonia, mastitis, tetanus, foot rot, black quarter and enterotoxaemia whereas viral disease includes FMD, PPR, bovine ephemeral fever and rabies causing a devastating loss for the farmers (Anjum et al., 2004). Several studies in different district stated the overall prevalence of different bacterial and viral diseases. The prevalence of the bacterial disease in Gopalganj was 26.67% in cattle and 51.29% in goat whereas in Chittagong the prevalence was 2.24% in cattle and 2.63% in goat (Parvez et al., 2014). So, this study has been conducted to estimate the proportionate prevalence of different diseases in Jhenaidah, Bangladesh.

In Bangladesh, veterinary services are Upazilla veterinary hospital-based. A huge burden of livestock population gets their treatment and vaccination facility from nearby veterinary hospitals located either Upazilla or district city. In the veterinary hospital, the personnel are government employees having the facility to diagnosis and treatment of the animals. They are responsible to provide vaccine and another facility including artificial insemination, training to farmers and consultancy as well. Most of the veterinary hospital has disease record book where they make entry of a patient data along with diagnosis and treatment provided by the veterinarian. The hospital comprises of Veterinary Surgeon, Upazilla or Zilla livestock officer and their subordinate. Different types of disease affected animals are brought to the hospital for treatment purpose which is a representation of the total livestock population of that area. So, hospital data is the best source of information to know the exact disease situation of any specific area of Bangladesh. This study has been conducted based on the

hospital database to determine the exact disease scenario of Jhenaidah, Bangladesh.

Earlier many of the hospital-based study has been conducted by different authors where only prevalence has been reported but the temporal pattern of disease has not been studied in broadly. So, this study has been conducted to know the statistics of the temporal distribution of different diseases in Jhenaidah. Hence this study has been conducted to estimate the proportionate prevalence of disease and disorders during summer and frequency of different antimicrobial used pattern in animal diseases.

2. MATERIALS AND METHODS

Study area

The study was carried out at Jhenaidah district a small administrative area Under Khulna division. It is situated in the southwestern part of Bangladesh lies between 23°13` and 23°46` North latitudes and between 88°42` and 89°23` East longitudes having an area of 1964.77 square kilometres (Anon, 2011). It has a huge livestock population of having around 0.53 million cattle and buffalo, 0.48 million goats and 0.007 million sheep (Anon, 2011). Jhenaidah district is subdivided into six Upazilla for easy running of the administrative activities. Jhenaidah Sadar, Horinakundu, Shaikupa, Kaliganj, Kotchandpur and Moheshpur are the Upazilla of Jhenaidah. The study has been conducted at three Upazilla Veterinary Hospitals which were selected by chance method namely Jhenaidah Sadar, Horinakundu and Kotchandpur.

Time and duration of the study

The study has been conducted as the partial fulfilment of the requirement of Doctor of Veterinary Medicine degree of the author. A cross-sectional study was designed and performed throughout four-month from March to June 2019 which was treated as summer season (Parvez et al., 2014) and the author was recruited at one of the three Upazilla veterinary hospitals at that time as intern vet. The author has collected the rest of the hospital data by personal communication with the responsible officer either a veterinary surgeon or livestock officer of the Upazilla.

Data recording system

A structured questionnaire was developed and reviewed to make it similar to the hospital record book then the author recorded the data using the questionnaire. In a hospital, all the patients that are brought for treatment purpose were tentatively diagnosed by the responsible surgeon through clinical sign and symptoms. If any case cannot be diagnosed based on clinical signs only then they went for further laboratory diagnosis. The findings were recorded at a paper-based register book with owner name and address, along with patients age, sex, species, body weight, clinical history, clinical findings, tentative diagnosis and treatment provided by the veterinary surgeon.

For the diagnosis of diseases and disorders, the veterinary surgeon performed various types of examination including general examination by visual inspection for animals' posture, behavior, skin lesions, any discharge and prolapsed of any part of the body. Physical examination performed by palpation and auscultation.

Data collation and analysis

A total of 1588 diseased animals including cattle (n=664), goat (n=889), sheep (n=28) and buffalo (n=7) data were extracted from the paper-based register book and recorded into Microsoft Office Excel spreadsheet-2007. Initially recorded clinical diseases and disorders were categorized based on the treatment requirements and systems affected. All the cases were categorized as bacterial, viral, endo and ectoparasites, respiratory, digestive and reproductive disorders, poisoning and surgical cases.

Anorexia, diarrhea, enteritis, bloat, tympany, colic and calf scour were categorized as digestive disorders whereas bottle jaw, tick and lice infestation were categorized as ecto and endo parasitic infestation respectively. Again dermatitis, allergy, burn, trauma and fungal infection were categorized as integumentary disorders. Dystocia, anestrous, vaginal prolapsed, retained placenta and infertility were under reproductive disorder. Moreover, wound, fracture, naval ill, abscess, myiasis, hernia, castration, cyst and atresia ani were categorized as surgical cases. Other clinical

cases were paralysis, subnormal temperature, fox bite, dog bite and pain sensation.

Further categorization has been performed to estimate the species-specific disease status and antimicrobial prescribing pattern. After necessary coding and recoding the data were forwarded for statistical analysis using STATA-14.2 (College station road, Texas, USA). The result was expressed in the frequency number, percentage and 95% Confidence Interval.

3. RESULTS

Proportionate prevalence of different disease and disorders

Irrespective of species, the proportionate prevalence of digestive disorder was 35.4% in which 35.1%, 35.9%, 32.1% and 14.3% were in cattle, goat, sheep, and buffalo respectively. In the case of endo-parasitic cases, the overall proportionate prevalence was 17.6% in which 21.1% was in cattle, 15.0% was in goat and 14.3% was in sheep. The proportionate prevalence of integumentary disorders was 9.8%. The overall proportionate prevalence of bacterial cases was 11.4% which was highest in sheep and the lowest was in cattle. Among other disease categories, the proportionate prevalence of viral cases were 3.0%, reproductive disorders were 2.6% and surgical cases were 5.2% (Table 1).

Proportionate prevalence of different diseases of cattle and Buffalo

In cattle and buffalo, the proportionate prevalence of disease conditions were 41.1% which was highest in Horinakundu followed by Kotchandpur and Jhenaidah Sadar upazilla. Whereas the proportionate prevalence of endoparasites cases were 21.2% which was highest in Horinakundu and lowest in Jhenaidah Sadar. Overall proportionate prevalence of ectoparasite infection and mastitis in cattle and buffalo was 2.4% and 0.9% respectively which was highest in Kotchandpur. Among other clinical cases, proportionate prevalence of FMD was 1.5% in which Horinakundu contributes 90.0% among total frequency (Table 2).

Table1: Frequency distribution of different clinical cases in Jhenaidah district

Categories	Cattle n (%)	Goat n (%)	Sheep n (%)	Buffalo n (%)	Total n (%)
Digestive disorders	233 (35.1)	319 (35.9)	9 (32.1)	1 (14.3)	562 (35.4)
Endo-parasitic cases	140 (21.1)	133 (15)	4 (14.3)	2 (28.6)	279 (17.6)
Integumentary disorders	102 (15.4)	50 (5.6)	2 (7.1)	1 (14.3)	155 (9.8)
Bacterial cases	38 (5.7)	128 (14.4)	13 (46.4)	2 (28.6)	181 (11.4)
Viral cases	15 (2.3)	33 (3.7)	-	-	48 (3.0)
Ecto-parasitic cases	16 (2.4)	23 (2.6)	-	-	39 (2.5)
Protozoal cases	23 (3.5)	2 (0.2)	-	-	25 (1.6)
Respiratory disorders	17 (2.6)	79 (8.9)	-	-	96 (6.0)
Reproductive disorders	9 (1.4)	32 (3.6)	-	-	41 (2.6)
Nutritional cases	23 (3.5)	19 (2.1)	-	-	42 (2.6)
Poisoning cases	6 (0.9)	-	-	-	6 (0.4)
Surgical cases	34 (5.1)	48 (5.4)	-	1 (14.3)	83 (5.2)
Other cases	8 (1.2)	23 (2.6)	-	-	31 (2)
Total	664 (41.8)	889 (56)	28 (1.8)	7 (0.4)	1588

Table 2: Proportionate prevalence of different diseases of cattle and Buffalo during summer (March to June)

Name of disease	Jhenaidah sadar		Horinakundu		Kotchandpur		Total, n (%)
	Frequency (%)	95%CI	Frequency (%)	95%CI	Frequency (%)	95%CI	
Disease condition	14 (5.0)	2.8-8.3	202 (72.7)	67.0-77.8	62 (22.3)	17.5-27.7	278 (41.4)
Endoparasitic infection	10 (7)	3.4-12.6	99 (69.7)	61.5-77.1	33 (23.2)	16.6-31.1	142 (21.2)
Allergy &/or Dermatitis	1 (1.7)	0.04-8.9	55 (91.7)	81.6-97.2	4 (6.7)	1.8-16.2	60 (8.9)
Inflammatory condition	-	-	47 (94)	83.5-98.7	3 (6)	1.3-16.5	50 (7.5)
Surgical cases	4 (11.4)	3.2-26.7	19 (54.3)	36.6-71.1	12 (34.3)	19.1-52.2	35 (5.2)
Babesiosis	-	-	23 (100)	85.2-1*	-	-	23 (3.4)
Pneumonia	-	-	13 (81.3)	54.4-96	3 (18.8)	4.0-45.6	16 (2.4)
Ectoparasitic infestation	7 (43.8)	19.8-70.1	1 (6.3)	0.2-30.2	8 (50)	24.7-75.3	16 (2.4)
FMD	-	-	9 (90)	55.5-99.7	1 (10)	0.3-44.5	10 (1.5)
Gynecological disorders	1 (11.1)	0.3-48.2	5 (55.6)	21.2-86.3	3 (33.3)	7.5-70.0	9 (1.3)
Mastitis	-	-	1 (16.7)	0.4-64.1	5 (83.3)	35.9-99.6	6 (0.9)
Food poisoning	-	-	6 (100)	54.1-1*	-	-	6 (0.9)
Ephemeral Fever	-	-	-	-	5 (100)	47.8-1*	5 (0.8)
Bloat &/or Tympany	1 (25)	0.6-80.6	2 (50)	6.8-93.2	1 (25)	0.6-80.6	4 (0.6)
Milk fever & Ketosis	-	-	4 (100)	39.8-1*	-	-	4 (0.6)
Calf scour	2 (66.7)	9.4-99.2	-	-	1 (33.3)	0.8-90.6	3 (0.5)
Foot rot	-	-	1 (50)	1.3-98.7	1 (50)	1.3-98.7	2 (0.3)
Acidosis	1 (50)	1.3-98.7	-	-	1 (50)	1.3-98.7	2 (0.3)
Total	41 (6.1)		487 (72.6)		143 (21.3)		671 (100)

*97.5% confidence interval

Disease condition: Anorexia, fever, diarrhea, weakness etc.; Others: Dog bite, fox bite

Proportionate prevalence of different diseases of Sheep and Goat

In sheep and goat, the proportionate prevalence of disease conditions and endoparasites infection was 52.0% and 14.9% respectively which was highest in Horinakundu followed by Kotchandpur and Jhenaidah Sadar Upazilla. The overall proportionate prevalence of pneumonia was 5.5% which was highest in Horinakundu and lowest in Kotchandpur. The proportionate prevalence of mastitis was equal (30.8%) in both Horinakundu and Kotchandpur (Table 3).

Antimicrobial prescribing pattern

The highest percentage of clinical cases were prescribed with sulfonamides (29.9%) followed by tetracycline (27.4%) and combined preparation of aminoglycosides and penicillin (23.7%). Sulfonamides were most frequently prescribed to treat disease conditions (87.2%). Combined preparation of aminoglycosides and penicillin was highly prescribed in surgical (44.4%) and gynecological disorders (11.3%). Fluoroquinolone and macrolids were commonly prescribed for mastitis (50.0%) and Inflammatory conditions (50.0%) (Table 4).

Table 3: Proportionate prevalence of different diseases of Sheep and Goat during summer (March to June)

Name of disease	Jhenaidah sadar		Horinakundu		Kotchandpur		Total, n (%)
	Frequency (%)	95%CI	Frequency (%)	95%CI	Frequency (%)	95%CI	
Disease condition	69 (14.5)	11.4-17.9	225 (47.2)	42.6-51.8	183 (38.4)	34-42.9	477 (52)
Endoparasitic infection	10 (7.3)	3.6-13.0	107 (78.1)	70.2-84.7	20 (14.6)	9.1-21.6	137 (14.9)
Pneumonia	-	-	37 (74)	59.7-85.4	13 (26)	14.6-40.3	50 (5.5)
Surgical cases	20 (41.7)	27.6-56.8	-	-	28 (58.3)	43.2-72.4	48 (5.2)
Inflammatory condition	1(2.4)	0.06-12.6	25 (59.5)	43.2-74.4	16 (38.1)	23.6-54.4	42 (4.6)
Gynecological disorders	9 (29)	14.2-48.0	4 (12.9)	3.6-29.8	18 (58.1)	39.1-75.5	31 (3.4)
Bloat &/or Tympany	4 (14.8)	4.2-33.7	12 (44.4)	25.5-64.7	11 (40.7)	22.4-61.2	27 (2.9)
PPR	-	-	-	-	24 (100)	85.8-1*	24 (2.6)
Ectoparasitic infestation	4 (17.4)	5.0-38.8	7 (30.4)	13.2-52.9	12 (52.2)	30.6-73.2	23 (2.5)
Allergy &/or Dermatitis	-	-	8 (47.1)	23-72.2	9 (52.94)	27.8-77	17 (1.9)
Mastitis	5 (38.5)	13.9-68.4	4 (30.8)	9.1-61.4	4 (30.8)	9.1-61.4	13 (1.4)
Other	1 (9.1)	0.2-41.3	-	-	10 (90.9)	58.7-99.8	11 (1.2)
Tetanus	3 (50)	11.8-88.2	-	-	3 (50)	11.8-88.2	6 (0.7)
Acidosis	-	-	-	-	5 (100)	47.8-1*	5 (0.6)
Foot rot	-	-	4 (100)	39.8-1*	-	-	4 (0.4)
Babesiosis	-	-	2 (100)	15.8-1*	-	-	2 (0.2)
Total	126 (13.7)		435 (47.4)		356 (38.8)		917 (100)

*97.5% confidence interval

Disease condition: Anorexia, fever, diarrhea, weakness etc; Others: Dog bite, fox bite

Table 4: Antimicrobial Prescribing pattern in different cases of food animal recorded in UVH, Jhenaidah

	Sulfonamides		Tetracycline		Aminoglycoside & Penicillin		Penicillin		Aminoglycoside		Cephalosporin		Fluoro-quinolone &/or Macrolid	
	n (%)	95% CI	n (%)	95% CI	N (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Disease condition	156 (87.2)	81.3-91.7	75 (45.7)	37.9-53.7	6 (4.2)	1.6-9	14 (29.8)	17.3-44.9	22 (71)	52-85.8	-	-	-	-
Surgical cases	4 (2.2)	0.6-5.6	2 (1.2)	0.1-4.3	63 (44.4)	36-52.9	4 (8.5)	2.4-20.4	2 (6.5)	0.8-21.4	-	-	-	-
Inflammatory condition	2 (1.1)	0.1-4	47 (28.7)	21.9-36.2	5 (3.5)	1.2-8	2 (4.3)	0.5-14.5	6 (19.4)	7.5-37.5	4 (19.1)	5.4-41.9	7 (50)	23-77
Pneumonia	-	-	8 (4.9)	2.1-9.4	33 (23.2)	16.6-31.1	13 (27.7)	15.6-42.6	-	-	12 (57.1)	34-78.1	-	-
Gynecological disorders	-	-	7 (4.3)	1.7-8.6	16 (11.3)	6.6-17.7	3 (6.4)	1.3-17.5	-	-	-	-	-	-
Allergy &/or Dermatitis	-	-	20 (12.2)	7.6-18.2	1 (0.7)	0.02-3.9	-	-	-	-	1 (4.8)	0.1-23.8	-	-
Mastitis	-	-	-	-	9 (6.3)	2.9-11.7	1 (2.1)	0.05-11.3	-	-	2 (9.5)	1.2-30.4	7 (50)	23-77
PPR	10 (5.6)	2.7-10	-	-	-	-	-	-	-	-	-	-	-	-
FMD	-	-	5 (3.1)	1-7	2 (1.4)	0.2-5	1 (2.1)	0.05-11.3	1 (3.2)	0.08-16.7	-	-	-	-
Foot rot	-	-	-	-	5 (3.5)	1.2-8	1 (2.1)	0.05-11.3	-	-	-	-	-	-
Food Poisoning	-	-	-	-	-	-	5 (10.6)	3.5-23.1	-	-	-	-	-	-
Ephemeral fever	4 (2.2)	0.6-5.6	-	-	-	-	-	-	-	-	1 (4.8)	0.1-23.8	-	-
Tetanus	-	-	-	-	1 (0.7)	0.02-3.9	2 (4.3)	0.5-14.5	-	-	1 (4.8)	0.1-23.8	-	-
Calf scour	3 (1.7)	0.3-4.8	-	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	1 (0.7)	0.02-3.9	1 (2.1)	0.05-11.3	-	-	-	-	-	-
Total	179 (29.9)		164 (27.4)		142 (23.7)		47 (7.9)		31 (5.2)		21 (3.5)		14 (2.3)	

Disease condition: Anorexia, fever, diarrhea, weakness etc.; Others: Dog bite, fox bite

4. DISCUSSION

Proportionate prevalence of diseases

In this study, the highest proportionate prevalence in summer was digestive disorder (cattle 35.1% and goat 35.9%) which is in line with (Rahman et al., 2012; Parvez et al., 2014; Lucky et al., 2016) but differ with (Kabir et al., 2010; Islam et al., 2015b; Sen et al., 2018), who reported the lowest prevalence of digestive disorders was 11.73%, 11.5% and 13.62% in cattle and 11.94%, 8.96% and 12.79% in goat respectively. This discrepancies may be due to difference in study area.

The proportionate prevalence of endo-parasitic cases were 21.1% in cattle and 15.0% in goat which is in consistent with the study findings reported by Rahman et al. (2012) Parvez et al. (2014) and Sayeed et al. (2020) but differed with the study conducted by Islam et al. (2015b) in Gopalganj reported endo-parasitic cases in cattle (58.1%) and goat (41.8%) during summer was higher in contrast to the findings of this study. This discrepancy may be due to the difference in sample size.

The proportionate prevalence of integumentary disorders were 15.4% in cattle and 5.6% in goat which is in line with the study conducted by Kabir et al. (2010) who stated the prevalence of skin disease in cattle was 6.6% and goat was 9.6% in Kapasia but disagreed with the findings of other studies conducted by Parvez et al. (2014) and Sen et al. (2018) who reported the lowest prevalence of skin disease in Chittagong and Sylhet respectively. This divergence may be due to differences in geographical distribution.

The proportionate prevalence of bacterial cases was 5.7% in cattle and 14.4% in goat. This observation is in consistent with Parvez et al. (2014) reported 2.24% bacterial cases in cattle and Alam et al. (2015) who reported 17.9% in goat. Another study conducted by Islam et al. (2015b) showed the prevalence of bacterial cases in Gopalganj was in cattle 26.67% and in goat 51.29% which was higher than the current study.

A study in Chittagong which was conducted by Parvez et al. (2014) reported, the prevalence of viral cases were 9.94% in cattle and 9.32% in goat which is in agreement with this study

findings (cattle 2.3% and goat 3.7%). Again this study findings is not agreed with the other studies conducted by Alam et al. (2015) and Islam et al. (2015b). This divergence may be due to variation in study design.

This study estimated the proportionate prevalence of ectoparasitic cases in cattle and goat were 2.4% and 2.6% respectively which was in line with (Karim et al., 2014; Parvez et al., 2014; Alam et al., 2015; Islam et al., 2015a; Sen et al., 2018) but Islam et al. (2015b) stated highest prevalence of ectoparasitic cases in cattle and goat was 41.93% and 48.20% respectively.

This study stated the proportionate prevalence of reproductive disorders was 1.4% in cattle and 3.6% in goat which is supported by the earlier studies conducted by (Rahman et al., 2012; Karim et al., 2014; Parvez et al., 2014; Alam et al., 2015; Islam et al., 2015a; Islam et al., 2015b; Sen et al., 2018).

Antimicrobial prescribing pattern

The mostly prescribed antimicrobial was sulfonamides 29.9% which is supported by an earlier study conducted by Samad et al., (2020) who reported 29.3% sulfa drug was prescribed in Jhenaidah. Another study conducted by Bhowmik et al. (2017) in Chittagong reported, 13.95% of sulfonamides were used in goat. The second most prescribed drug was tetracycline (27.4%) which is diverged from the study outcome revealed by Sarker et al. (2016) and Bhowmik et al. (2017). This discontinuity may be due to variation in diagnostic capability among the veterinarian of the study region.

Earlier, a study conducted by Sarker et al. (2016) and Bhowmik et al. (2017) reported that aminoglycosides and β -lactamase were used to treat 12.94% and 31.1% diseased animals which are agreed with this study. Again the overall penicillin and cephalosporin were used to treat 7.9% and 3.5% patients which were in consistent with Sarker et al. (2016) for penicillin and Bhowmik et al. (2017) for cephalosporin prescribing pattern.

Limitations

Sometimes the owner provided very little or wrong information during data recording. In

Bangladesh, Upazilla veterinary Hospitals are not well equipped with sophisticated diagnostic tools so that only tentative diagnosis was made and no laboratory tests were performed for confirmatory diagnosis.

5. CONCLUSION

This study reported that digestive disorders and endo-parasitic infections were more prevalent in this territory during summer. Proper feeding practice and hygienic management with routine deworming of food animal are essential to reduce the prevalence. To research the whole scenario of diseases and disease conditions this study is not adequate and further comprehensive research is essential to get the precise prevalence of food animal diseases in this territory.

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