

Identification of Risk Factors Associated with Feline Panleukopenia of Cats in CVASU and TTPHRC



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Session: 2015-2016

A clinical report submitted in partial satisfaction of the requirements for the
Degree of Doctor of Veterinary Medicine (DVM)

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List of Abbreviations

Abbreviation	Elaboration
FPL	Feline panleukopenia
CVASU	Chattogram Veterinary & Animal Sciences University
TTPHRC	Teaching and Training pet hospital and research center
SAQTVH	Shahedul Alam Quadary Teaching Veterinary Hospital
et al	et alia (and others)
N	Number of cases
FVM	Faculty of veterinary Medicine
CL	Confidence of interval
FPV	Feline panleukopenia Virus
CRFK	Crandell-Rees Feline Kidney

Abstract

A study to carried out to identify the risk factors associated with Feline panleukepenia of cats in Shahedul Alam Quadary teaching Veterinary Hospital (SAQTVH), Chattogram Veterinary & Animal Sciences University (CVASU) and Teaching and Training pet hospital and research center (TPHRC), Dhaka. Data were collected from both SAQTVH and TTPHRC from January 2022 to March 2022. After gathering clinico-epidemiological data, entering into Microsoft Excel 2016, and analyzing with STATA-14 software, the elaborative as well as univariable statistical analysis revealed that Vaccination status and exotic breed is the main risk factor for Feline Panleukepenia in SAQTVH and TTPHRC. Approximately 65% of unvaccinated cats have Feline panleukepenia (Table 1). Exotic breeds account for approximately 70% of Feline panleukepenia cases (Table 1). More risk factor for Feline panleukepenia were local breed, Gender, Age, vaccination status. Antibiotics, fluid therapy, and supportive drugs were frequently used to treat cases of feline panleukopenia. The study's implementation is that maintaining proper vaccination and body condition, as well as intensive health care kittens, can reduce the occurrence of diseases. Infected cats should be treated right away with intravenous fluid therapy, broad-spectrum antibiotics, and pain relievers.

Key Words: Risk factors, Exotic breed, Vaccination, Treatment.

Introduction

Cats are a popular pet animal in Bangladesh's urban life. Many cat owners raise cats as a hobby or for entertainment. Despite the fact that there is no official data on the cat population in Bangladesh, the cat population is increasing. This is due to better economic conditions for pet owners, increased vaccine supply and health care facilities, cat food supply and the development of breeder farms. However, one of the difficulties in Cat care is disease of various kinds. Parvoviral enteritis, canine distemper, and rabies are the most common viral diseases in dogs, while feline panleukopenia and calici viral infection are common in cats (Sultana et al., 2016).

Feline panleukopenia, also known as feline distemper is a highly contagious viral disease of cats caused by a non-enveloped, single-stranded DNA virus and characterized by enteritis, leukopenia and developmental abnormalities (Clemens and Carlson, 1989). Feline panleukopenia virus (FPV) is a member of the Parvoviridae family, along with canine parvovirus type 2 (CPV-2) and other carnivore parvoviruses (Greene, 1998), and is known to infect cats worldwide, as well as other felidae, raccoons, mink, and foxes (Steinel et al., 2001). FPL is highly resistant to physical and chemical agents, and it can survive in contaminated environments for weeks or even months (Uttenthal et al., 1999). It is a highly contagious disease affecting all members of Felidae (Scott FW et al., 1987).

A feline ataxia syndrome has been described, which is caused by lytic virus replication in Purkinje cells of infected kittens (Kilham et al., 1971). Fetal infection may induce immunological tolerance, causing kittens to shed virus for extended periods of time after birth (Pedersen, 1987). During the active stages of the disease, it is shed from all body secretions, but it is most constantly retrieved from the intestine and feces (Greene, 1998). The feline panleukopenia virus can be found in places such as cages, food bowls, litter boxes, and in people, and the death rate is high in young (3-5 months of age) cats and in susceptible cats (those with other illnesses, not vaccinated, or living in high risk situations) (Richards et al., 2006).

Severity of clinical signs depends on age, immune status and concurrent infections (Foley JE et al., 1999). Clinical disease ranges from subclinical infection to a peracute syndrome with sudden death. Typical initial signs include fever, lethargy, and anorexia (Addie DD et al., 1998). Affected cats initially may present for vomiting with lower frequency and develop watery to hemorrhagic diarrhea. Patients die from complications associated with secondary bacterial infection, sepsis, dehydration, and disseminated intravascular coagulopathy (DIC)

(Mantione NL and Otto CM, 2005). The highest morbidity and mortality occur in kittens up to 12 months of age (Addie DD et al. 1998). Mortality is 25–90% in acute panleukopenia and up to 100% in peracute infections (Hartmann K and Hein J, 2008). A marked decrease in circulating white blood cells has been recorded (Stuetzer and Hartmann, 2014). The virus is acquired through oro-nasal route and targets rapidly dividing cells, especially the epithelium crypt of the small intestine, lymphoid tissue and bone (Stuetzer and Hartmann, 2014). Feline panleukopenia can be diagnosed directly by isolating the virus from blood or feces in cultures of Crandell-Rees Feline Kidney (CRFK) (Miyazawa et al., 1999) or Mya 1 cells and demonstrating haemagglutination of porcine erythrocytes. (Goto, 1975). Rapid detection of FPV infection is critical for isolating infected cats and preventing secondary infections in susceptible animals. Because clinical diagnosis is not conclusive, laboratory techniques can only be performed in specialized laboratories and take longer to complete, whereas the immunochromatography assay is the most rapid field diagnostic method used in clinical practice because the test procedure is simple and can be performed by both veterinarians and owners (Mosallanejad et al., 2009). Clinical signs, a rapid FPV kit test, and lab tests were used to make the diagnosis. Clinical signs were used to make a preliminary diagnosis. Rapid FPV kit and lab tests are required for confirmation, but lab tests take a long time. Previous studies based diagnosis primarily on clinical signs by (Chisty et al., 2020) and (Sultana et al., 2016), clinical signs and rapid diagnostic test kits by (Islam et al., 2010), and clinical signs, test kits, and lab tests by (Truyen et al., 2009). In this study, the disease was also diagnosed based on clinical signs and a rapid diagnostic test kit.

No significant correlation has been found between outcome and living conditions, age, vaccination status (unvaccinated versus one or more vaccines administered), or severity of clinical signs (Stuetzer and Hartmann, 2014). To prevent the disease, all cats – including indoor cats should be vaccinated. Two injections, at 8–9 weeks of age and 3–4 weeks later, are recommended, and a first booster 1 year later (Truyen et al., 2009).

The specific goals of the current clinico-epidemiological study of FPL disease:

- a) Finding out which risk factor associated with FPL in Specific Location
- b) Describe the clinical manifestations of FPL.
- c) Analyze the drug pattern used to treat FPL.

Materials and Method

Study Area:

Shahedul Alam Quadary teaching Veterinary Hospital (SAQTVH) is regarded as Bangladesh's first Public pet hospital. It is situated in Chattogram. It's directed under the department of medicine & Surgery, CVASU. It has operation theater, X ray, ultra-sonogram and laboratory facilities.

The Teaching and Training Pet Hospital and Research Centre (TTPHRC) is a teaching hospital that opened its doors in 2018. Like SAQTVH, it has a well-equipped operating room, X-ray, ultra-sonogram, and laboratory facilities, as well as a hemoanalyser machine. Five veterinary surgeons and intern students work here to provide service. As a new hospital, TTPHRC handles approximately 25 cases per day on average.

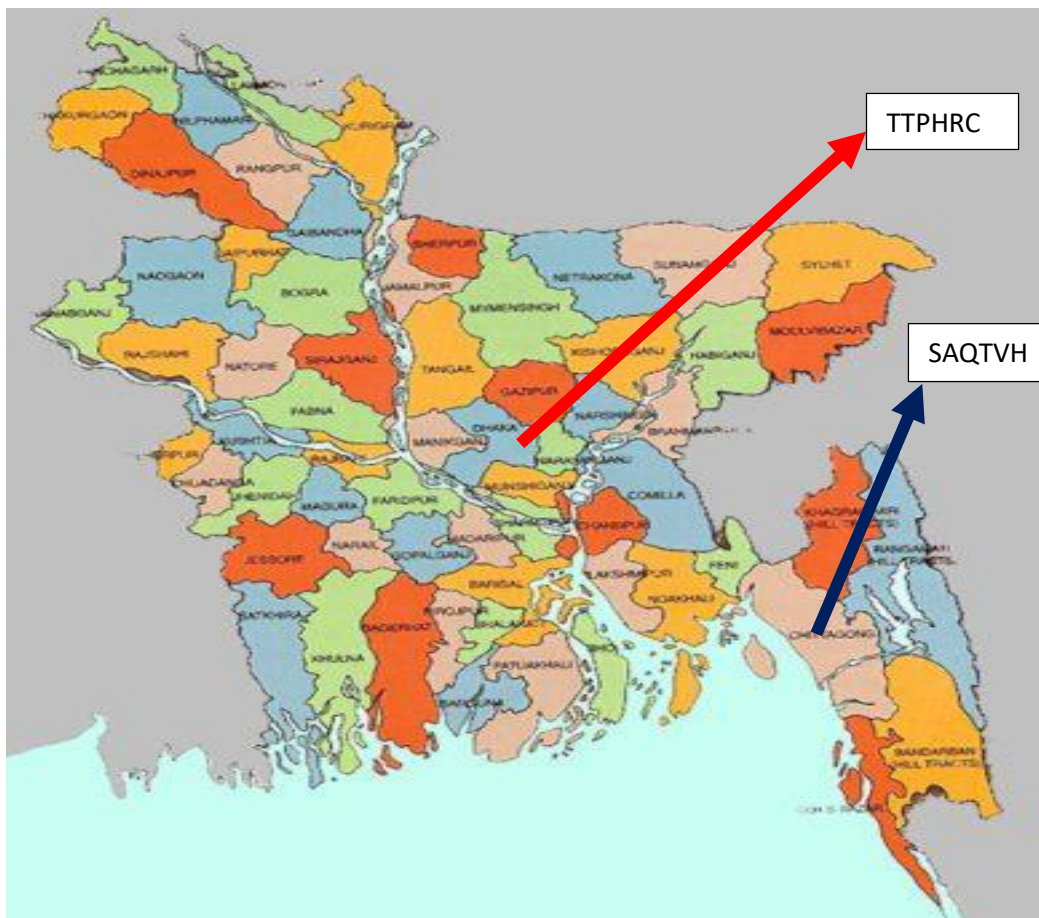


Fig 1: Study Area.

Study Period and cases:

A 3-month clinical rotation (January 2022 to March 2022) as a DVM intern was completed at SAQTVH, CVASU and TTPHRC, Dhaka. During the rotation, a total of 61 Cats (various breeds) brought for treatment (30 SAQTVH and 31 TTPHRC) were included in our study.

Data Collection:

Each case was examined clinically after initial registration and history taking. Each case's clinico-epidemiological findings were documented in the structured record keeping sheet. Address, date, breed, age, sex, body weight, vaccination, de-worming, duration of illness, defecation, and vomition, as well as client demographic information, were all included in the data. Pulse, respiration, and rectal temperature were measured. The drug data included the main and supporting drugs, doses and route.

Diagnostic Approach:

Cases were diagnosed based on the findings of the clinico-epidemiological history and examination. The FPL test kit was used for confirmation (Trade Name: Testsealabs Feline Panlekopenia Antigen FPV Ag test, Manufacturer: Hangzhou Testsea Biotechnology Co. Ltd.). The Cat taken to the hospital showing various sign like weakness, depression, vomition, anorexia, diarrhea was suspected as FPL as tentative diagnosis. For confirmatory diagnosis, FPL rapid diagnostic kit is used.

After collecting the cat's feces and vomit swab into the buffer tube, FPL test kit were used according to manufactures manual.

Statistical Analysis:

All collected data were entered into Microsoft Office Excel-2016. The data were cleaned, sorted, and coded before being exported to STATA-14 (Stata Corp, 4905 Lakeway Drive, College Station, Texas 77845, USA) for descriptive and multivariable statistical analysis.

Fisher's exact test was used to examine the relationships between the categorized response FPL and the selected independent variables (deworming, breed, gender, age, vaccination). The findings were presented in the form of a frequency number, a percentage, and a p value. 95%CI calculated by the modified Wald method using the Graph Pad Software Quick Calc.

Results and Discussion

Identifying risk factors:

The study is examining the risk factors for FPL, clinical manifestations, and drugs prescribed to FPL-affected cats at TTPHRC and SAQTVH and also undergoes multivariate risk factor analysis. FPL is a deadly and contagious disease that affects cats. FPL has become a common disease in Bangladesh in recent years. It is an endemic disease in cats in Bangladesh (Sultana et al., 2016) and a high level of FPL was expected.

The various risk factors linked to FPL. Exotic breeds are more susceptible (70.4%) than local breeds (64.7%) (Table 1). Females are more susceptible (58.33%) than males (43.24%). Another factor is age, with younger Cat (<10m) (57.14%) being more vulnerable than older Cat (>10m) (38.46%). One of the main factors for FPL is vaccination status. Those cats who were vaccinated (75%) were not affected by FPL, whereas 64% of those who were affected are not vaccinated (Table 1).

Exotic breeds (70.4%) are more vulnerable than local breeds (64.7%), Which didn't agree with the study (Chisty et al., 2020). They discovered that 24.2% of the affected cats were native to the area, while 10.5% were exotic breeds.

Female cats (58.33%) were affected more than male cats (43.24%), which was disagree with the study (Kruse et al., 2010). They found 59.5% males and 40.5% females cat were affected. It may be due to bring the more female cats than male cats in hospital.

This study found that younger cats (57.14%) are more susceptible to FPL, which is consistent with the findings (Kruse et al., 2010) and (Sultana et al., 2016), who found 25.71% and 56.7% FPV in young cats, respectively. The most likely reason is the susceptibility of kittens to feline panleukopenia when maternally derived antibodies (MDAs) decline below protective titers but can still neutralize vaccine antigen (Jackel V et al., 2012).

FPL prevalence was lower in vaccinated cats (25%) than in unvaccinated cats (64.86%). This statement is consistent with the findings (Chisty et al., 2020), who discovered that vaccinated cats (5.1%) were less susceptible to FPL.

Cats with no history of deworming were more susceptible (52%) than dewormed cats (47.22%). It could be due to a low level of immunity, as parasites affect immunity (Fekete and Kellems, 2007).

Table 1: Association between feline panleukopenia and the selected factors through Fisher’s exact test.

Factors	Categories	Feline panleukopenia		P
		Yes (%)	No (%)	
Breed	Local	22 (64.7)	12 (35.29)	0.01
	Exotic	19 (70.4)	8 (29.63)	
Gender	Male	16 (43.24)	21 (56.76)	0.300
	Female	14 (58.33)	10 (41.67)	
Age (Month)	<10m	20 (57.14)	15 (42.86)	0.198
	>10m	10 (38.46)	16 (61.54)	
Vaccination	Yes	6 (25)	18 (75)	0.004
	No	24 (64.86)	13 (35.14)	
Deworming	Yes	17 (47.22)	19 (52.78)	0.797
	No	13 (52)	12 (48)	

Clinical Manifestation:

FPL is characterized by anorexia, vomiting, and weakness. Other research findings back up these indicators (Truyen et al., 2009). Weakness exists in 45% of FPL cases. In FPL cases, the temperature is mostly normal (55.74%). Vomiting occurs in 63% of FPL cases. In FPL cases, feces are mostly normal (65.57%). In terms of feeding habits, the most common signs of FPL are loss of appetite (42%), and off feed (42%) (Table 2).



Fig. 2: Clinical Presentation of FPL Case.

Table 2: Shows the frequency distribution of clinical signs observed in Feline Panleukopenia (N=61) cases.

Signs	Feline panleukopenia N (%)
General Attitude	
Alert	7 (11.48)
Depressed	26 (42.60)
Weakness	28 (45.90)
Temperature	
Fever	22 (36.07)
Normal	34 (55.74)
Subnormal	5 (8.20)
Coughing, Yes	13 (21.31)
Vomition, Yes	38 (62.35)
Feces	
Normal	40 (65.57)
Bloody diarrhea	2 (3.28)
Diarrhea	14 (22.95)
No	3 (4.92)
Loose feces	2 (3.28)
Urination, Yes	61 (100)
Salivation, Yes	2 (3.28)
Feeding Habit	
Loss of appetite	26 (42.62)
Off feed	26 (42.62)
Normal	9 (14.75)
Lacrimation, Yes	18 (29.51)

Analyzing of Drug:

Current study the fluid therapy (5% dextrose saline, cholera saline), antiemetic (ondansetron), Antibiotic (ceftriaxone, amoxicillin, metronidazole), antihistaminic drug (pheniramine maleate) and multivitamin were prescribed against FPL.

Drugs that were prescribed against FPL were categorized into three categories, which were main drug, antibiotic and supportive drugs (Tables 3).

In 43% of FPL cases, 5% dextrose saline was chosen as the main drug. In other FPL cases, ceftriaxone (23%), Amoxicillin (20%), Metronidazole (7%), cholera saline (3%), ciprofloxacin (3%) (Table 3).

Table 3: Pattern of drugs prescribed for FPL cases (N=30)

Variable	Category	Feline panleukopenia N (%)
Main Drug	5% Dextrose saline	13 (43)
	Ceftriaxone	7 (23)
	Amoxicillin	6 (20)
	Metronidazole	2 (7)
	Cholera saline	1 (3)
	ciprofloxacin	1 (3)
	Antibiotic	Ceftriaxone
	Amoxicillin	6 (20)
	Metronidazole	6 (20)
	Doxycycline	3 (10)
	Ceftiofur	1 (3)
	Ampicillin	1 (3)
	Ciprofloxacin	1 (3)
Supportive Drug	Ondansetron	17 (56)
	Pheniramine Maleate	12 (40)
	Tolfenamic Acid	10 (33)
	Meloxicam	7 (23)
	Famotidine	5 (16)
	Pantoprazole Na sesquihydrate	5 (16)
	Dexamethasone	3 (10)
	Vitamin C	2 (6)
	Metoclopramide HCL	2 (6)
	Omeprazole	1 (3)

Risk Factor Analysis:

Table 4: Multivariate risk factor analysis for FPL.

Factor	Feline panleukopenia		
	Odds ratio	95% CI	P
Vaccination (No)	4.36	1.32 to 14.36	0.01
Exotic breed	0.30	0.09 to 0.96	0.04

According to the multivariate risk factors analysis for FPL, the odds ratio of vaccination (No) is 4.36, and the odds ratio of exotic breed is 0.30.

Limitations

1. Because the study was conducted in a small area, the results may not be representative of FPL cases in Bangladesh.

Conclusion

To identify the risk factors for FPL, a study was conducted at TTPHRC, DHAKA, and SAQTVH, CVASU. We can reduce the prevalence of FPL by understanding the risk factors. FPL was found in high concentrations on exotic breed female and unvaccinated young cats. FPL is common and lethal disease in cats. To prevent the FPL, we should vaccinate cats in proper time.

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Acknowledgment

All praise is due to Almighty Allah, the universe's creator and supreme ruler, who enabled the author to accomplish the project successfully.

I would like to express my gratitude to **DR. Mohammad Bayazid Bostami**, Assistant professor, TTPHRC for his cordial co-operations and time during the Internship Program. The author wishes to express his sincere gratitude and respect to **Professor Dr. A. K. M. Saifuddin**, Director of External Affairs, CVASU and **Professor Dr. Md. Alamgir Hossain**, Dean, Faculty of Veterinary Medicine, CVASU for allowing his to continue this internship program.

I would like to pay my immense graciousness to my internship supervisor **DR. Sharmin Akter**, Assistant Professor, Department of Medicine and Surgery of CVASU for her intellectual supervision, cooperation, genuine assistance, insightful recommendations, constructive criticism, and active participation in this report since its commencement. The author also expresses his thanks and great respect to all of his friends and well-wishers for their encouragement and support throughout the study time and in the preparation of this report.

Biography

The author Md. Tajbiur-Abir, son of Md. Monjurul Islam and Most. Sultana Begum passed his Secondary School Certificate (SSC) examination from Buzhruk Sontoshpur Adarsha High School, Rangpur in 2012 and Higher School Certificate (HSC) examination from Police Lines School & college, Rangpur in 2014. Thereafter he enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh and Now He is an Intern Student in this University.