

PREVALENCE AND RISK FACTOR OF FELINE PANLEUKOPENIA VIRUS INFECTION IN CATS AT ARCLINIC PET CARE BOGOR**Prevalensi dan Faktor Risiko Infeksi Feline Panleukopenia Virus pada Kucing di ArClinic Pet Care Bogor****Kayla Zahrah Hanafiah, Tetty Barunawati Siagian ***

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*Corresponding author email: tettybarunawatisiagian@apps.ipb.ac.idHow to cite: Hanafiah KZ, Siagian TB. 2026. Prevalence and risk factor of feline panleukopenia virus infection in cats at Arclinic Pet Care Bogor. *Bul. Vet. Udayana*. 18(3): 727-735. DOI: <https://doi.org/10.24843/bulvet.2026.v18.i03.p24>**Abstract**

Cat ownership in Indonesia has continued to increase over recent years, leading to greater awareness of pet health and veterinary care. One of the most common infectious diseases affecting cats is feline panleukopenia, caused by the Feline Panleukopenia Virus (FPV). FPV is a highly contagious disease associated with high morbidity and mortality rates, particularly in kittens and young cats. This study aimed to determine the prevalence of FPV infection and identify associated risk factors among cats examined at ArClinic Pet Care, Bogor, between January and September 2025. Medical records from this period identified 44 cats confirmed positive for FPV based on clinical examination, rapid antigen testing, and hematological analysis. The prevalence of FPV infection was 2.21%, indicating a relatively low occurrence during the study period. Chi-square analysis revealed that season ($p < 0.05$), age ($p < 0.05$), breed ($p < 0.05$), and vaccination status ($p < 0.05$) were significantly associated with FPV infection, whereas sex showed no significant association ($p > 0.05$). These findings highlight the importance of vaccination as the primary preventive measure against FPV and underscore the need for enhanced preventive efforts targeting young cats and domestic breeds, particularly during the rainy season when the risk of viral transmission is higher.

Keywords: cats, FPV, prevalence, risk factors

Abstrak

Kepemilikan kucing di Indonesia terus meningkat setiap tahun, sehingga mendorong masyarakat untuk lebih memperhatikan kesehatan kucing peliharaannya ketika mengalami gangguan kesehatan. Salah satu gangguan kesehatan yang sering dialami kucing adalah penyakit *feline panleukopenia* yang disebabkan oleh infeksi *Feline Panleukopenia Virus* (FPV). FPV merupakan penyakit infeksius dengan tingkat morbiditas dan mortalitas tinggi pada kucing, terutama kelompok umur muda. Penelitian ini bertujuan untuk mengetahui prevalensi kejadian FPV serta menganalisis faktor risiko infeksi pada kucing yang diperiksa di ArClinic Pet Care Bogor pada periode Januari–September 2025. Dari periode tersebut

diperoleh data dari rekam medis sebanyak 44 ekor kucing terkonfirmasi positif FPV melalui pemeriksaan klinis, *rapid test kit*, dan hematologi *analyzer*. Prevalensi FPV tercatat sebesar 2,21%, yang mana persentase tersebut termasuk kategori sangat rendah. Analisis uji *Chi-Square* untuk data kategorik membuktikan bahwa kondisi musim ($p < 0.05$), umur ($p < 0.05$), ras ($p < 0.05$), dan status vaksinasi ($p < 0.05$) memiliki hubungan yang signifikan ($p < 0.05$) terhadap kejadian infeksi FPV, sedangkan jenis kelamin tidak memengaruhi risiko infeksi ($p > 0.05$). Hasil penelitian ini menekankan kesadaran masyarakat akan pentingnya vaksinasi sebagai komponen utama pencegahan, serta perlunya perhatian khusus terhadap kucing muda dan ras domestik dalam pencegahan penyebaran virus terutama saat musim hujan.

Kata kunci: faktor risiko, FPV, kucing, prevalensi

INTRODUCTION

Cat ownership in Indonesia has increased steadily over the years, accompanied by a shift in the primary purpose of cat keeping from rodent control to companionship. This trend has led to greater public awareness of feline health and increased attention to veterinary care when cats develop health problems (Putri *et al.*, 2020). One of the most common infectious diseases affecting domestic cats is feline panleukopenia, which is caused by the Feline Panleukopenia Virus (FPV). FPV belongs to the genus *Protoparvovirus* and is a non-enveloped, single-stranded DNA virus (Marlissa *et al.*, 2022; Purnamaningsih *et al.*, 2025). The disease is associated with high morbidity and mortality, particularly in kittens and unvaccinated cats. Mortality rates vary depending on the severity of infection, age, immune status, and the presence of concurrent infections (Yeo *et al.*, 2023). FPV is primarily transmitted through the fecal–oral route and by contact with infected body fluids, fleas, or contaminated fomites such as bedding, food bowls, clothing, and footwear that have been exposed to infected cats (Susanti *et al.*, 2019). The virus is highly resistant in the environment, remaining infectious for up to one year at room temperature and for approximately 5–10 months outdoors, particularly in the feces of infected animals (Baroroh *et al.*, 2023).

Previous studies have reported that the prevalence of FPV in Indonesia remains relatively high, largely due to limited public awareness of the importance of vaccination (Kusumawardhani *et al.*, 2018). In addition to vaccination status, environmental factors contribute to the risk of viral diseases in cats. Climate change has altered temperature, rainfall, and humidity patterns, creating conditions that may facilitate viral transmission (Anggraeni *et al.*, 2025; Lewin *et al.*, 2018). Furthermore, extreme weather events, including sudden decreases in temperature and periods of excessive heat, have been reported to affect cats' activity levels and feeding behavior, potentially compromising immune function and increasing susceptibility to infection (Smit *et al.*, 2025).

Feline panleukopenia remains a recurrent disease in cats, highlighting the importance of monitoring its prevalence to support disease surveillance and epidemiological assessment. Based on medical records collected over a three-month period, Lesmana (2025) reported an FPV prevalence of 11.76% at Xing Pet Care and Clinic, with 12 confirmed cases. However, the prevalence of FPV at ArClinic Pet Care, Bogor, has not yet been documented. This lack of epidemiological data underscores the need for further investigation at this facility. Determining the prevalence of FPV infection at ArClinic Pet Care will provide baseline information for disease surveillance and contribute to a better understanding of the local epidemiology, thereby supporting the development of more effective educational, preventive, and disease control strategies.

RESEARCH METHODS

Study Subjects

The study population consisted of cats diagnosed with feline panleukopenia virus (FPV) infection and cats that tested negative for FPV. These two groups were included to facilitate data collection and enable comparisons for evaluating factors associated with FPV infection. The collected data were used to address the objectives of the study.

Study Design

This study employed a retrospective study design to investigate the association between FPV infection and selected risk factors. Both primary and secondary data were collected. Primary data were obtained directly from clinical examinations and diagnostic procedures performed on patients. Clinical examinations included measurement of body temperature using a thermometer, assessment of the oral and auricular mucous membrane color, evaluation of dehydration based on mucous membrane appearance and skin turgor, assessment of oral odor, and examination of fecal characteristics.

Definitive diagnosis of FPV infection was established using rapid antigen test kits (Anigen Rapid FPV Ag Test Kit, BioNote Inc., Seoul, South Korea, and Petx Rapid Test Kit, J&G Biotech Ltd./Hangzhou Immuno Biotech Co., Ltd., Hangzhou, China) in combination with hematological examination using an automated hematology analyzer (Licare CC3200 Vet-3 Diff Vet, Licare Biomedical Limited, Shenzhen, China). Hematological analysis was used as a supportive diagnostic tool to assess the severity of infection in affected cats.

Secondary data were obtained from the medical records of cats confirmed positive for FPV based on clinical findings, rapid antigen testing, and hematological examination. Information extracted from the records included signalment (age, sex, breed, and vaccination status) and clinical history. Medical records collected between January and September 2025 were included in the analysis.

Data Analysis

Data were analyzed quantitatively using the Chi-square test to evaluate the association between categorical variables and FPV infection. The prevalence of FPV infection was calculated by dividing the number of infected cats by the total number of cats presented to the clinic during the nine-month study period and multiplying the result by 100 to obtain the prevalence percentage (Tiwa *et al.*, 2021). All statistical analyses were performed using IBM SPSS Statistics software to ensure accurate and systematic data analysis.

RESULTS AND DISCUSSION

Results

The prevalence of feline panleukopenia virus (FPV) infection among cats presented to ArClinic Pet Care, Bogor, was 2.21%, as calculated using the prevalence formula. Cats suspected of FPV infection underwent confirmatory diagnostic testing using rapid antigen test kits and hematological analysis. Clinically, infected cats commonly exhibited anorexia, high fever, dehydration, vomiting, diarrhea, and leukopenia. As shown in Figure 1, hematological examination revealed a marked reduction in leukocyte counts in cats diagnosed with FPV.

Data collected between January and September 2025 indicated that the highest number of FPV cases occurred in September, accounting for 27.27% of all confirmed cases, whereas no cases were recorded in July (Table 1). Cats were classified into two age groups: young (1–24 months) and adult (>24 months). Young cats represented the majority of infected animals (90.91%).

Male cats accounted for 59.09% of FPV-positive cases, indicating a higher proportion of infection than females. Based on breed, domestic cats constituted the largest proportion of infected animals (28/44; 63.64%), followed by purebred cats. Regarding vaccination status, only 11.36% of infected cats had been vaccinated, whereas 88.64% had no history of FPV vaccination.

Discussion

The prevalence of FPV infection was determined using medical records collected between January and September 2025. During the study period, ArClinic Pet Care, Bogor, received 1,990 feline patients for examination and treatment, of which 44 were confirmed positive for FPV based on medical records, clinical findings, rapid antigen testing, and hematological examination. The calculated prevalence of FPV infection was 2.21%. According to Laurin *et al.* (2022), disease prevalence can be classified as disease-free (0%), very low (<5%), low (<10%), moderate (10–50%), high (>50%), or unknown when epidemiological data are unavailable. Therefore, the prevalence observed in the present study indicates that FPV occurred at a very low level in the study population.

Clinically, cats infected with FPV at ArClinic Pet Care commonly presented with anorexia, high fever, dehydration, vomiting, diarrhea, and leukopenia. Rusly (2022) reported that FPV causes destruction of the intestinal mucosa through crypt cell aplasia, resulting in collapse of the intestinal lining. This pathological process leads to severe diarrhea, rapid fluid loss, anorexia, depression, and pyrexia (39.4–40.6°C), and may progress to hypovolemic or endotoxic shock, with death occurring approximately two days after the onset of clinical signs, typically 7–10 days after infection. In acute cases, affected cats often exhibit dry oral and pharyngeal mucosa, congestion, halitosis, and intestinal thickening with yellow debris detectable on abdominal palpation (Almarahma, 2018).

Fever in cats infected with FPV results from alterations in thermoregulatory mechanisms triggered by endogenous and exogenous pyrogens. Activated phagocytic cells release pro-inflammatory mediators, including interleukin-1, which stimulate prostaglandin synthesis within the anterior preoptic region of the hypothalamus, thereby increasing body temperature (Alegria *et al.*, 2024). Vomiting in cats with FPV is primarily caused by viral destruction of rapidly dividing crypt cells in the small intestine rather than by dietary factors (Mahendra *et al.*, 2020). Diarrhea and dehydration occur following damage to the intestinal epithelium, resulting in villous atrophy. FPV preferentially replicates in actively dividing cells within the crypts of Lieberkühn, impairing epithelial regeneration and leading to intestinal lesions (Hasruni, 2022). Gastrointestinal damage is generally more severe in young animals because regeneration of virus-damaged enterocytes requires approximately 7–10 days, whereas epithelial repair in adult animals is typically completed within 2–3 days (Zachary, 2017).

Leukopenia is characterized by a reduction in circulating leukocyte numbers resulting from decreased leukocyte production, increased tissue demand, accelerated cellular consumption, or margination, whereby leukocytes migrate from the circulating blood to the vascular endothelium. This condition is commonly associated with viral infections, exposure to cytotoxic agents, hematopoietic stem cell disorders, or bone marrow atrophy (Ramadhani *et al.*, 2024). Mehaba (2023) further reported that FPV targets lymphoid tissues, including the lymph nodes, spleen, and thymus, which play essential roles in the immune response, ultimately leading to lymphopenia through depletion of circulating lymphocytes.

The highest number of FPV cases was recorded during January and September, when rainfall was relatively high, suggesting that seasonal variation may contribute to increased viral transmission. Radhy and Zenad (2019) reported that the incidence of FPV was considerably

lower during hot seasons (approximately 2%) but increased to 53% during cooler seasons. Consistent with these findings, Chi-square analysis in the present study demonstrated a significant association between season and FPV infection ($p < 0.05$). Among 37 cats presented during the dry season, 27.0% (10/37) tested positive for FPV, whereas 66.7% (34/51) of cats examined during the rainy season were FPV-positive. An odds ratio (OR) of 5.40 indicated that cats presented during the rainy season had a 5.4-fold greater likelihood of FPV infection than those presented during the dry season. Similar findings were reported by Hafid (2020), who suggested that the humid environmental conditions during the rainy season enhance viral persistence and environmental contamination, thereby facilitating disease transmission.

Age was identified as one of the strongest risk factors for FPV infection. In the present study, 40 of the 44 infected cats were younger than 24 months. This finding agrees with Awad *et al.* (2018), who reported that most FPV cases occurred in cats younger than six months of age. According to Astini *et al.* (2025), kittens younger than 12 weeks are particularly susceptible because their immune system has not yet fully matured, resulting in increased morbidity and mortality. Zhang *et al.* (2019) also reported that FPV infection in fetuses and neonatal kittens may cause cerebellar hypoplasia, ataxia, and ocular abnormalities, whereas infection in cats older than 4–6 weeks primarily manifests as severe gastrointestinal disease accompanied by leukopenia. Chi-square analysis demonstrated a highly significant association between age and FPV infection ($p < 0.05$). Only 10.8% (4/37) of adult cats tested positive for FPV compared with 78.4% (40/51) of young cats. The calculated OR of 30.0 indicates that young cats were approximately 30 times more likely to develop FPV infection than adult cats, confirming that young age is a major risk factor for disease.

The distribution of FPV infection according to sex showed no statistically significant association with disease occurrence ($p > 0.05$). Among female cats, 64.3% (18/28) tested positive for FPV, whereas 43.3% (26/60) of male cats were positive. Although the proportion of infected females was numerically higher, the odds ratio of 0.425 and the non-significant p -value indicate that sex was not a meaningful epidemiological risk factor for FPV infection in this study. These findings suggest that susceptibility to FPV is independent of sex and is likely influenced more strongly by other host and environmental factors.

Breed was significantly associated with FPV infection ($p < 0.05$). Domestic cats exhibited a substantially higher prevalence of infection than non-domestic (purebred) cats, with positive rates of 58.1% (36/62) and 30.8% (8/26), respectively. The calculated OR of 3.115 indicates that domestic cats were approximately three times more likely to become infected than non-domestic cats. This increased risk may be attributed to differences in population density, husbandry practices, and more frequent contact among free-roaming or community cats, all of which facilitate viral transmission (Putri *et al.*, 2020).

Vaccination status demonstrated the strongest association with FPV infection ($p < 0.05$). Among unvaccinated cats ($n = 51$), 76.5% (39/51) tested positive for FPV, whereas only 13.5% (5/37) of vaccinated cats were infected. The OR of 0.048 highlights the strong protective effect of vaccination, indicating that vaccinated cats had a substantially lower risk of FPV infection than unvaccinated cats. Ramadhani *et al.* (2024) suggested that adult cats generally possess stronger immune responses than young cats, particularly those that have acquired immunity through vaccination or previous natural exposure.

Jacobson *et al.* (2021) reported that cats lacking adequate antibody titers against FPV are unable to mount an effective immune response and are therefore at a markedly increased risk of severe disease and death. Despite the availability of effective vaccines, FPV remains a common infectious disease because vaccination coverage among pet cats is still inadequate in many

communities (Purnamaningsih *et al.*, 2025). Taken together, the findings of the present study indicate that vaccination status is the most influential determinant of FPV infection risk and should remain the cornerstone of FPV prevention and control programs.

CONCLUSION AND SUGGESTIONS

Conclusion

Cats diagnosed with feline panleukopenia virus (FPV) infection at ArClinic Pet Care, Bogor, between January and September 2025 commonly presented with anorexia, pyrexia, dehydration, vomiting, diarrhea, and leukopenia. The overall prevalence of FPV infection was 2.21%, indicating a very low level of disease occurrence during the study period. Chi-square analysis demonstrated that season ($p < 0.05$), age ($p < 0.05$), breed ($p < 0.05$), and vaccination status ($p < 0.05$) were significantly associated with FPV infection, whereas sex was not significantly associated with infection risk ($p > 0.05$). These findings emphasize the importance of vaccination as the primary preventive measure against FPV and highlight the need for enhanced preventive efforts targeting young cats and domestic breeds, particularly during the rainy season when the risk of viral transmission is greater.

Suggestions

Routine vaccination should be strongly encouraged among cat owners to reduce the risk of FPV transmission. Veterinary clinics should strengthen biosecurity measures, particularly during the rainy season when environmental conditions favor viral persistence and transmission. Cat owners are also encouraged to maintain their cats' immune health, ensure proper environmental hygiene, and limit outdoor access to reduce exposure to potential sources of infection.

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Tables

Table 1. Univariate analysis (frequency distribution) of risk factors associated with feline panleukopenia virus (FPV) infection in cats presented to ArClinic Pet Care, Bogor.

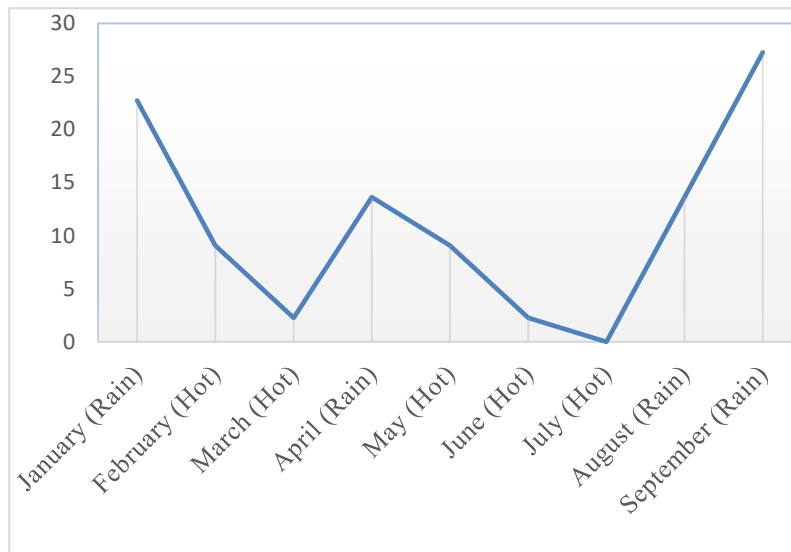
Variable	Categories	n	%
FPV	Negative	44	100
	Positive	44	100
Season	Hot	10	22.72
	Rainy	34	77.28
Age	Adult	4	9.09
	Young	40	90.91
Sex	Female	18	40.91
	Male	26	59.09
Breed	Non-domestic	16	36.36
	Domestic	28	63.64
Vaccination status	Vaccinated	39	88.64
	Unvaccinated	5	11.36

Table 2. Bivariate analysis of risk factors associated with feline panleukopenia virus (FPV) infection using the Chi-square test.

Kategori	FPV-negative		FPV-positive		Total	p	OR	95% CI	
	n	%	n	%				lower	upper
Hot season	27	73.0	10	27.0	37	0.000	5.400	1.417	3.382
Rainy season	17	33.3	34	66.7	51			0.231	0.713
Adult	33	89.2	4	10.8	37	0.000	30.000	2.421	7.062
Young	11	21.6	40	78.4	51			0.054	0.352
Female	10	35.7	18	64.3	28	0.067	0.425	0.366	1.086
Male	34	56.7	26	43.3	60			0.995	2.213
Non-domestic	18	69.2	8	30.8	26	0.019	3.115	1.119	2.436
Domestic	26	41.9	36	58.1	62			0.287	0.979
Unvaccinated	12	23.5	39	76.5	51	0.000	0.048	0.163	0.453
Vaccinated	32	86.5	5	13.5	37			2.469	12.968

Abbreviations: OR=Odd Ratio; CI=Confidence interval

Graph



Graph 1. Temporal distribution of feline panleukopenia virus (FPV) cases according to seasonal conditions at ArClinic Pet Care, Bogor, from January to September 2025.