SHORT COMMUNICATION

Trends in the Occurrence of Parvoviral Enteritis in Local Canine Population: A Trohoc Study

Saravanan Subramanian[1]*, Arulkumar Thangamani[2], Selvaraju Ganapathy[3]

Abstract

Parvoviral enteritis (PVE) in dogs causes haemorrhagic diarrhoea, vomiting and leukopenia resulting in sepsis and death. Though the disease is more commonly reported in young dogs, adult dogs of pure breeds are also vulnerable to PVE, due to the breakdown of immunity. Hence, a retrospective study on the occurrence of PVE in dog population of local region of Namakkal, Tamil Nadu (India) over two years was conducted. The incidence rate in the year 2023 and 2024 was high in dogs with the age group of 0-3 months (39.7% and 37.3%), males (77.9 and 70.7 %) and non-descript breeds (62.3 and 64.7 %). A high incidence was observed in summer (32.5 %) in the year 2023 and south-west monsoon (59.2 %) in 2024. Between the two years, a significant difference ($p<0.01$) was observed in the incidence rate with respect to the age, sex and season. Hence, due to increasing incidence of PVE every year, there is a need for region-wise surveillance of PVE to understand the susceptibility pattern of various pure and indigenous breeds of dogs in local regions.

Key words: Canine parvo virus-2, Haemorrhagic diarrhoea, Host factors, Retrospective study.

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Introduction

Canine parvo viral enteritis (CPVE) is caused by canine parvo virus (CPV-2) of the species, *Carnivore protoparvovirus* 1 (CPPV) (Alzuheir *et al*., 2024) and is a highly contagious with a high case-fatality rate resulting in haemorrhagic diarrhoea, vomiting, and death due to severe dehydration or septicaemia (Jyothi *et al*., 2024). The virus is transmitted directly by faeco-oral route or indirectly though food and water and it affects rapidly dividing cells in the small intestine, bone marrow precursors and cardiac muscle cells of dogs (Cenk and Mahamut, 2015). The virus infects lymphoid tissues resulting in leukopenia and associated immunosuppression (Mylonakis *et al*., 2016). The disease is more severe in growing pups between six weeks and six months of age, and adults may show mild or subclinical form of disease (Decaro *et al*., 2005). However, the disease has been reported in diarrhoeic dogs in the age group of 1-9 years in some countries like Greece (Kantere *et al.,* 2021).

Most of the puppies are protected during their first several weeks of life due to the transfer of maternal immunity from their dams which have been naturally infected or immunized (Greene, 2012). Though modified live vaccines are reported to protect the puppies from this fatal disease, there may be a gap in vaccine coverage due to the waning of maternal antibody levels in young puppies, resulting in increased susceptibility to CPV-2 (Decaro and Buonavoglia, 2012). Further the control becomes difficult owing to survival of the virus in the contained environment, emergence of new variants and associated vaccination failures (Jyothi *et al.,* 2024). In this situation, surveillance of canine PVE is essential for better understanding of the pattern of occurrence in dogs of different breeds from various geographical regions, host susceptibility and for updating the vaccine strains or schedule to face the future challenges. Hence, this study reports the distribution of PVE cases in dogs of local region of Namakkal, Tamil Nadu with respect to temporal and demographic pattern over a period of two years.

[1,3]Department of Veterinary Public Health and Epidemiology, Veterinary College and Research Institute, Tamil Nadu Veterinary Animal Sciences University, Namakkal-637 002, Tamil Nadu, India

[2]Teaching Veterinary Clinical Complex, Veterinary College and Research Institute, Tamil Nadu Veterinary Animal Sciences University, Namakkal-637 002, Tamil Nadu, India

Corresponding Author: Dr. Saravanan Subramanian, Professor, Department of Veterinary Public Health and Epidemiology, Veterinary College and Research Institute, TANUVAS, Namakkal-637 002, Tamil Nadu, India. e-mail: sarvet.25@gmail.com

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Materials and Methods

Dogs of various age and breeds presented to the Teaching Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal, TANUVAS, Tamil Nadu (India) during the year 2023 and 2024 were investigated for the incidence of parvo viral enteritis (PVE). Haemorrhagic gastro enteritis with characteristic signs of brownish or reddish or coffee

coloured diarrhoea with offensive/putrid odour, mild to severe dehydration, sunken eyeball, fever, haemetemesis and death associated with sepsis due to endotoxaemia were the clinical signs observed in PVE cases. All the cases had the history of incomplete or no vaccination schedule. A total of 838 and 967 cases were diagnosed as parvo viral enteritis (PVE) cases in the year 2023 and 2024, respectively (Fig. 1). The incidence rate with respect to host determinants such as age, sex, breed and season were determined in the year 2023 and 2024, and the significance was assessed by statistical analysis using Chi-square test. The distribution of cases with respect to host determinants was interpreted by clustered bar chart, and seasonal occurrence was interpreted by time-trend graph.

Results and Discussion

The clinical signs observed in this study, *viz.,* haemorrhagic diarrhoea (bloody/coffee coloured/brownish), vomiting and haemetemesis, were similar to the findings reported by Mylonakis *et al*. (2016) and Tangolli *et al*. (2025). In the year 2023 and 2024 both, the incidence rate was high in dogs with the age group of 0-3 months (39.7% & 37.3%, respectively) followed by 4-6 months (33.4% & 32.9%) and a lower incidence was recorded in the age group of 6-12 months (22.6% & 19.5%) followed by above 12 months age group (11.7% & 10.1%) (Table 1). The results were in accordance with Saravanan *et al.* (2020), Chetan *et al.* (2021), Patel *et al*. (2022), Sherasiya *et al.* (2024), and Jayaprasad *et al.* (2025). In contrast, Behera *et al.* (2015) reported a higher incidence of PVE in the age of 3-6 months than other age groups. The high susceptibility in very young puppies is due to the active replication of CPV-2 in cells with higher mitotic index in puppies of less than 3 months old and change in microbial flora (Khare *et al*., 2019). In contrast,a relatively higher incidence of PVE in older dogs (1-9 years; 26.7%) comparable to the young dogs (below 1 year; 28.4%), reported by Kantere *et al.* (2021), could be due to the breakdown of natural or acquired immunity associated with change in virus strain or it's virulence and lack of continuous (annual) vaccination. Generally, the adults acquire immunity due to the long-term persistence of virus in the environment and rapid intra-species transmission (Houston *et al*., 1996)

With respect to sex, the incidence rate was higher in males with 77.9 and 70.7 % than females in the year 2023 and 2024, respectively (Table 1). Similar findings were recorded by several authors (Khare *et al*., 2019). In contrast, Chetan *et al.* (2021) reported a high incidence in females. However, there is no sex preference reported in the occurrence of PVE (Greene, 2012). The high incidence in males could be due to the fact that male dogs are most commonly being preferred by pet owners and due to social behaviour of males.

With respect to breed, a higher incidence rate was recorded in non-descript breeds with 62.3 and 64.7 % than any other breeds in the year 2023 and 2024, respectively (Table 1). The high incidence in male, non-descript breeds could be due to the increased population density of non-descript dogs which are most preferred by pet owners, free ranging behaviour, unsanitary environment, ignorance of vaccination, insufficient anthelmintic prophylaxis and poor health care rendered toward the non-descript dogs (Kantere *et al.* (2021). In this study, the susceptibility in pure breeds cannot be ascertained, as the preference of pure breeds varies with geographical region (Archana *et al*., 2010).

Fig. 1: Signs of PVE showing reddish, brownish and coffee coloured diarrhoea in pure breeds

Table 1: Host factors in the occurrence of parvo viral enteritis in Namakkal region in the year 2023 and 2024

Host Determinants		PVE cases in 2023 (n=838)	Incidence rate(%)	Chi-square, P value	PVE cases in 2024 (n=967)	Incidence rate (%)	Chi-square, p value	Chi-square, p value (pooled)
Age (in months)	0-3 m	330	39.7		361	37.3		
	4-6 m	280	33.4		319	32.9		
	7-9 m	130	15.5	X^2=0 (p=1.0)	132	13.6	X^2=0 (p=1.0)	X^2=20.45 (p=0.0004)
	10-12 m	59	7.0		98	5.9		
	Above 12 m	39	4.7		98	10.1		
Sex	Male	645	77.9	X^2=0 (p=1.0)	684	70.7	X^2=0 (p=1.0)	X^2=11.47 (p=0.0007)
	Female	193	22.1		283	29.2		
Breed	Non-descript	522	62.3		626	64.7		
	Spitz	53	6.3		63	6.5		
	Labrador retriever	49	5.8		53	5.5		
	German Shepherd	47	5.6		47	4.9		
	Chippiparai	70	8.4		47	4.9	X^2=0 (p=1.0)	
	Dobermann	14	1.7	X^2=0 (p=1.0)	25	2.6		X^2=13.45 (p=0.09)
	Rajapalayam	9	1.1		15	1.6		
	Rottweiler	7	0.8		14	1.4		
	Other Pure breeds (Kanni,Dalmatian, Shitzu,Dachshund, Beagle, Kombai, Siberian Husky)	67	8.0		77	7.9		
Season	Southwest monsoon	252	30.1		572	59.2		
	Northeast monsoon	222	26.5	X^2=0 (p=1.0)	219	22.6	X^2=0 (p=1.0)	X^2=216.7 (p=0.0)
	Winter	92	10.9		93	9.6		
	Summer	272	32.5		83	8.6		

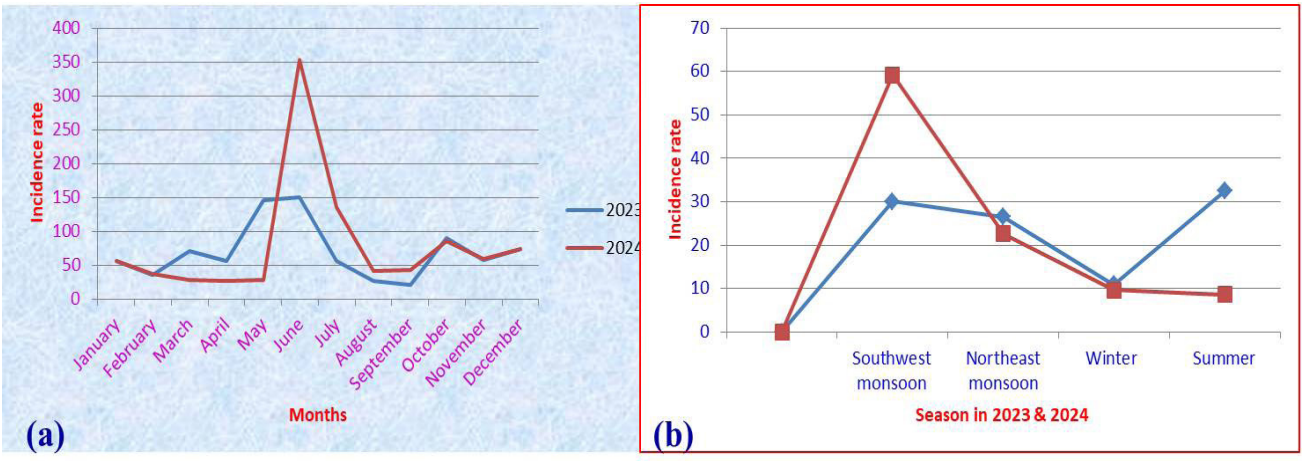

Fig. 2: Time-trend graph showing the distribution of PVE cases (a) from January-December over two years and (b) in various seasons over two years

The incidence rate was higher in summer with 32.5 % than other seasons in the year 2023, whereas the incidence was higher in south-west monsoon with 59.2 % than other seasons in the year 2024 (Table 1, Fig. 2). Similarly, Qi *et al*. (2020) and Sayed-Ahmed *et al*. (2021) recorded a higher incidence in summer, whereas Abdalla *et al*. (2023) recorded it in winter. The higher incidence of PVE observed in summer or south-west monsoon could be due to the increased susceptible population (below 3 months age) of unvaccinated puppies in summer, consequent to an increased birth rate in late winter. Another reason was an increase in total number of PVE cases observed in the year 2024 over 2023. However, CPV-2 infection is reported to occur throughout the year (Qi *et al*., 2020).

Statistically, no significant difference ($p>0.05$) was observed in the incidence rate of PVE between age groups, sex, breeds and seasons within the year 2023 or 2024. In contrast, between the year 2023 and 2024, a significant difference ($p<0.01$) was observed in the incidence rate with respect to age ($p=0.0004$), sex ($p=0.0007$) and season ($p=0.0$), but not with respect to breed ($p=0.09$).

In conclusion, the number of cases of PVE in local canine population has been on rise every year, indicating the need for surveillance of PVE in various geographical regions. Though a high incidence was recorded in non-descript dogs, there is a need to study incidence in various pure and native breeds of young and older age groups in various regions for understanding their immune response (natural or acquired) and underscore the need for continuous revaccination.

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