

# Serological Survey of Hepatitis E Virus in Cats and Dogs in Samarra City, Iraq

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## Abstract

Hepatitis E virus (HEV) is an crucial zoonotic pathogen that can infect humans and a extensive variety of animal species, together with domesticated cats and puppies. On this look at, we conducted a serological survey to assess the prevalence of Hepatitis E virus (HEV) infection in cats and puppies in Samarra City, Iraq. A overall of a hundred and fifty serum samples from cats and one hundred fifty serum samples from dogs had been accumulated and analyzed using an enzyme-connected immunosorbent assay (ELISA) to stumble on unique antibodies towards HEV. The effects offer valuable insights into the capacity function of cats and dogs as reservoirs or sources of HEV transmission to human beings. Among the 150 cat serum samples tested, 25 (sixteen.7%) have been found superb for HEV-precise antibodies. In the canine samples, 22 (14.7%) out of one hundred fifty have been seropositive for HEV. Overall, the seroprevalence of Hepatitis E virus infection in puppies and cats did not display a widespread difference ( $p > 0.05$ ).

**Keywords:** Hepatitis E virus, cats, dogs, serological survey, zoonotic pathogen, Samarra City, Iraq

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## 1. Introduction

Hepatitis E virus (HEV) is a positive-sense, single-stranded RNA virus belonging to the family Hepeviridae. It is the causative agent of hepatitis E, a significant public health concern worldwide. HEV infections are typically transmitted via the fecal-oral route, primarily through contaminated water or food. While humans are the primary reservoir for HEV, zoonotic transmission from animals to humans has been reported, and various animal species, including domesticated cats and dogs, have been identified as potential hosts (Caballero-Gómez, Rivero-Juarez et al. 2022, Cagirgan, Yildirim et al. 2022).

A serological survey of Hepatitis E virus (HEV) in cats and dogs in Samarra City, Iraq is a study conducted to determine the presence and prevalence of HEV infection in the feline and canine populations in that specific location. Hepatitis E is a viral infection that primarily affects the liver (Denner 2019). It is caused by the Hepatitis E virus and is usually transmitted through contaminated water or food. While humans are the primary hosts of HEV, it has been found that certain animal species, including cats and dogs, can also be infected (Li, Qu et al. 2020, Mrzljak, Balen et al. 2021). The serological survey involves collecting blood samples from a representative sample of cats and dogs in Samarra City. These blood samples are then tested for the presence of antibodies against the Hepatitis E virus. Antibodies are produced by the immune system in response to an infection and can indicate whether an animal has been exposed to the virus (Emerson and Purcell 2003).

The main objective of this have a look at was to decide the seroprevalence of HEV infection in cats and dogs in Samarra City, Iraq. By conducting a serological survey, we aimed to assess the capability function of these animals inside the transmission of HEV to humans and compare the zoonotic risk associated with those pets. Additionally, it is able to assist verify the danger of zoonotic transmission (transmission between animals and human beings) in the studied location. By undertaking this survey, researchers can acquire statistics on the superiority of HEV infection in cats and dogs in Samarra City, Iraq. This information can be used to develop

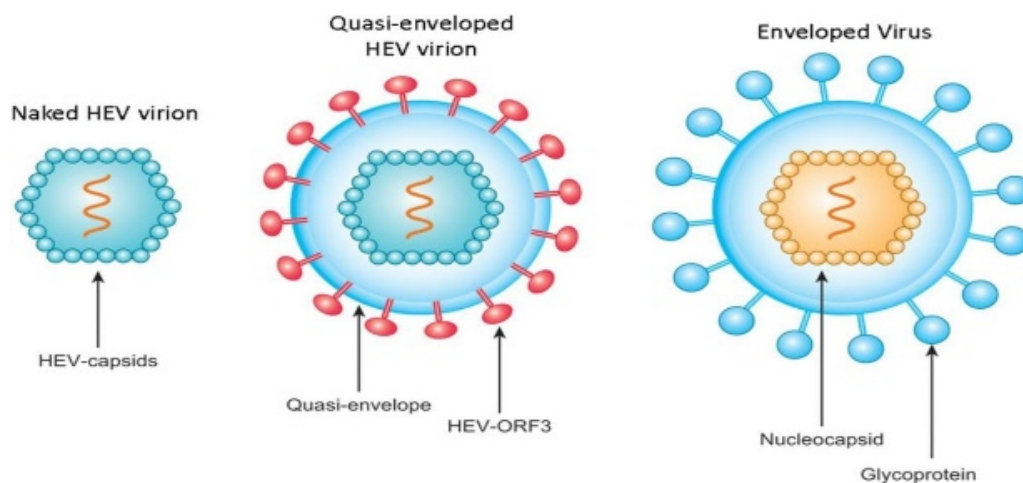
techniques for the prevention and manage of HEV transmission, each in animals and humans, and to elevate cognizance about the ability risks associated with the virus (Caballero-Gómez, Rivero-Juarez et al. 2022).

### 1.1. Hepatitis E virus (HEV)

Hepatitis E virus (HEV) is a wonderful-sense, single-stranded RNA virus belonging to the own family Hepeviridae. It is in general liable for causing hepatitis E, a liver ailment which could range in severity from slight to fulminant (severe acute liver failure) (Hriskova, Marosevic et al. 2021, Jelacic, Ferenc et al. 2022). HEV is transmitted in most cases via the fecal-oral route, commonly because of the intake of infected water or meals(Denner 2019).

HEV is assessed into 4 principal genotypes: genotypes 1 and a pair of are located particularly in people and are related to big outbreaks in useful resource-limited areas, particularly in Asia, Africa, and Central America (Di Profio, Sarchese et al. 2022). These genotypes are usually transmitted via contaminated water resources and reason widespread morbidity and mortality. Genotypes three and four, then again, are zoonotic and can infect each people and animals. They are normal in advanced nations and are usually related to sporadic cases or localized outbreaks. The primary reservoirs for genotypes 3 and four are domestic pigs, wild boars, deer, and other animals (Di Profio, Sarchese et al. 2022). Clinical manifestations of HEV contamination can vary. Most inflamed people stay asymptomatic or experience moderate flu-like signs and symptoms. However, in some cases, especially among pregnant ladies and people with pre-existing liver ailment or compromised immune systems, HEV infection can cause intense sorts of hepatitis, which include acute liver failure, which can be fatal. Prevention of HEV infection ordinarily revolves around ensuring get entry to to smooth consuming water and working towards good sanitation and hygiene measures. This consists of proper sewage disposal, non-public hygiene, and the intake of appropriately cooked meals, specifically meat products derived from animals that can bring HEV.

While cats and dogs were observed to carry HEV, their function within the transmission of the virus to human beings is still being investigated. Studies advocate that zoonotic transmission can occur thru direct contact with infected animals, intake of raw or undercooked meat, or exposure to infected environments. However, the overall threat of HEV transmission from pets to humans is considered low in comparison to other routes of transmission (Di Profio, Sarchese et al. 2022, Fanelli, Tizzani et al. 2022).



**Figure 1:** Structure of Hepatitis E Virus

## 2. Materials and Methods

### 2.1 Study Area and Sample Collection

The take a look at became conducted in Samarra City, positioned in Iraq. A general of one hundred fifty serum samples have been accrued from cats and 150 serum samples from puppies dwelling in one-of-a-kind neighborhoods of the town. Samples had been acquired from both male and girl animals, covering various age groups and breeds.

## 2.2 Serological Analysis

Serum samples have been examined for the presence of HEV-specific antibodies the use of a commercially to be had enzyme-linked immunosorbent assay (ELISA) kit. The assay observed the producer's instructions and changed into designed to detect anti-HEV immunoglobulin G (IgG) antibodies. A cutoff value was established based on the optical density readings of negative control samples provided with the kit. Samples with optical density values equal to or greater than the cutoff were considered positive for HEV-specific antibodies.

## 3. Results

Among the 150 cat serum samples tested, 25 (16.7%) were found positive for HEV-specific antibodies. In the dog samples, 22 (14.7%) out of 150 were seropositive for HEV. The seroprevalence rates differed slightly between the two animal species but indicated a notable presence of HEV infection in both cats and dogs in Samarra City.

**Table 1:** Seroprevalence of Hepatitis E Virus (HEV) in Cats and Dogs in Samarra City, Iraq.

| Animal species | Number of senum samples | Number of seropositive samples | Seroperalence % |
|----------------|-------------------------|--------------------------------|-----------------|
| Cats           | 150                     | 25                             | 16.7            |
| Dogs           | 150                     | 22                             | 14.7            |

These effects suggest the proportion of animals within every species that tested tremendous for HEV-particular antibodies, representing the seroprevalence of HEV infection.

## 4. Discussion

The seroprevalence of HEV in cats and dogs discovered in this take a look at suggests that these animals may additionally function as potential reservoirs for the virus in Samarra City. Zoonotic transmission of HEV from cats and puppies to humans ought to occur through direct contact, ingestion of infected animal products, or environmental exposure to HEV-infected feces. Further research is needed to decide the genotypes and lines of HEV circulating in those animals and discover the molecular epidemiology of HEV in Samarra City.

## 5. Conclusion

This have a look at found out a widespread presence of Hepatitis E virus (HEV) infection in cats and puppies in Samarra City, Iraq. The seroprevalence quotes of HEV-specific antibodies in cats and dogs were 16.7% and 14.7%, respectively. These findings suggest that cats and puppies in Samarra City may want to probably serve as reservoirs for HEV and pose a zoonotic threat to human beings. The consequences spotlight the importance of thinking about cats and puppies as capacity sources of HEV transmission in the place. Further studies is needed to discover the unique genotypes and lines of HEV circulating in these animals and to discover the molecular epidemiology of HEV in Samarra City.

This information will make a contribution to a higher information of the transmission dynamics and ability public health implications of HEV infection in the region. It is critical to elevate focus among puppy proprietors and veterinary professionals approximately the zoonotic capacity of HEV and the importance of training exact hygiene and right handling of animal waste to decrease the threat of transmission. Additionally, persevered surveillance of HEV in each animals and people is necessary to monitor the superiority and identify any rising strains or outbreaks. Overall, this serological survey offers valuable insights into the prevalence of HEV in cats and puppies in Samarra City, Iraq, and underscores the significance of considering these animals as capacity contributors to the transmission of HEV to people.

### Author Contribution

All authors worked equally in this study.

### Conflict of Interest

The authors do not have any conflict of interest declares that it is not.

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