



# Seroprevalence of the Hepatitis E Virus in the Absence of an Epidemic among Refugees in Eastern Chad

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## Abstract

**Objective:** The objective of this study was to determine the seroprevalence and identify the factors of exposure to the hepatitis E virus (HEV) outside of the periods of sudden spread and massive contagion of HEV among refugees in eastern Chad. **Materials and Methods:** This was a cross-sectional, observational study with descriptive and analytical aims, conducted continuously over a twelve-month period (January 2024 to December 31, 2025) to recruit Sudanese refugees and Chadian returnees presenting with jaundice at refugee camp health centers. The study was conducted in 25-day sequences for three consecutive months. Group 1 consisted of people without any signs suggestive of HEV, Group 2 included people with jaundice. Plasma from the collected whole blood samples was diagnosed using the immunochromatographic test (D-HEVD20 Rapid Labs) in district hospital laboratories in each city surveyed, following the manufacturer's instructions. **Results:** A total of 3571 subjects were included in this study, divided into Group 1 (n = 2303) and Group 2 (n = 1268). Immunoglobulin M (IgM) was identified in 657 cases, representing a prevalence of 18.4% for HEV, and 105 (2.94%) volunteers tested positive for IgG. The average age of the participants was 38.5 years for Group 1 versus 45.5 years for Group 2. Males were predominant ( $p = 0.01$ ), with an overall sex ratio of 2.32 (2.40 for Group 1 versus 2.18 for Group 2). All ages were affected, ranging from 2 to 89 years. The most affected age group was 2 - 11 years (38.38%), followed

by 12 - 21 years (27.22%). Antibodies (LgM, IgG) were detected much more frequently in participants in Group 2 than in Group 1 ( $p = 0.001$ ). There was a higher participation rate of Sudanese refugees than Chadian refugees in the study ( $p = 0.001$ ). **Conclusion:** This survey determined the prevalence of HEV among refugees in eastern Chad. Reducing this disease will require promoting education on good hygiene practices for individuals, communities, and food in confined spaces.

## Keywords

Hepatitis E Virus, Absence of an Epidemic, Refugee, Returnee, Eastern Chad

## 1. Introduction

Hepatitis E virus (HEV) is without envelope RNA virus belonging to the Hepeviridae family. The increasing number of strains identified in different hosts has led to the classification of two genera within the Hepeviridae family: *Piscihepevirus* (including the trout virus) and *Orthohepevirus* (including mammalian and avian strains). The latter genus has been subdivided into four species: *Orthohepevirus A* (including the genotypes that infect humans), *Orthohepevirus B* (bird virus), *Orthohepevirus C* (rodent virus), and *Orthohepevirus D* (bat virus). The *Orthohepevirus A* species includes 7 genotypes that infect humans (genotypes 1, 2, 3, 4 and 7), pigs (genotypes 3 and 4), wild boars (genotypes 3, 4, 5, and 6), deer (genotype 3), rabbits (genotype 3) and camels (genotype 7) [1].

The virus is transmitted to humans via the fecal-oral route through contaminated food and beverages [2]. In recent years, HEV has caused epidemics of acute enteric hepatitis that are clinically indistinguishable from other acute viral hepatitis (HVA/HVB/HVC) infections in humans worldwide [3]. The case fatality rate varies according to age and pregnancy status [4]. In Chad, a hepatitis E outbreak was reported in 2017 in the Am-Timan health district [5], and another study conducted in 19 provinces revealed an overall seroprevalence of 34.1%. More recently, in January 2024, an outbreak was reported in the Adré and Hadjer-Hadid health districts [6]. First described in 1955 during an epidemic in New Delhi and India [7], one serotype is currently known, with a total of 9 to 11 genotypes, including 4 major ones depending on the classifications and genomic regions analyzed [8]. Jaundice and asthenia are the two most frequently observed symptoms during acute viral hepatitis (HAV/HBV/HCV) or other endemic infections (yellow fever) [9]. Ribavirin may prove useful in the acute stage of severe hepatitis E in patients with pre-existing liver disease. However, its clinical benefit in these situations has not been demonstrated [10]. The most widely used control measures, including individual and collective protection against HEV, include effective handwashing, thorough cooking of high-risk foods to an internal temperature of at least 71°C for 20 minutes, and the provision of pathogen-free water to water systems to limit the risk of exposure. Similarly, an effective wastewater treatment system would

help limit the risk of epidemics in areas where HEV is endemic [11]. However, systematic screening for HEV of donations of labile blood products (packed red blood cells and platelet concentrates) is necessary. Studies on vaccine molecules are promising. A recombinant vaccine based on the viral capsid protein (amino acids 368 to 660 of the capsid protein) has been developed, but its availability is currently limited in China. Clinical efficacy in studies was 100% after three injections [12]. Chad is experiencing a massive refugee crisis, primarily due to the conflict in Sudan since April 2023, with Sudanese arriving in late 2024, adding to the already existing displaced population, by July 2025, overwhelming infrastructure and causing shortages of water, food, and services. These refugees, often women and children (86%), are fleeing violence and human rights violations, finding refuge in makeshift camps in eastern Chad, but face alarming humanitarian conditions and insufficient funding for basic needs [13].

Although several cases and outbreaks of hepatitis E have been documented by the Integrated Epidemiological Surveillance Service (SSEI) of the Ministry of Public Health and Prevention (MSPP) of Chad, no studies have been conducted on hepatitis E in refugee settings. The objective of this study was to determine the seroprevalence and identify the factors of exposure to the hepatitis virus outside of periods of sudden spread and mass contagion of HEV in refugee camps in the cities of Adré, Biltine, and Goz-Beida in eastern Chad.

## 2. Materials and Methods

### 2.1. Framework, Period, Type of Study and Progress of Research Work

This was a cross-sectional, observational study with descriptive and analytical aims, conducted over a twelve-month period from January 1, 2024, to December 31, 2025, and including 3571 participants (Sudanese and Chadian) who had fled the war in Sudan. Group 1 consisted of people without any signs suggestive of hepatitis E (HEV), Group 2 included people with the icteric sign (jaundice). This multicenter survey, involving data collection and blood sampling, was conducted continuously to recruit Sudanese refugees and Chadian returnees with jaundice associated with viral hepatitis at refugee camp health centers throughout the study period. Recruitment of individuals without jaundice was conducted in 25-day intervals over three consecutive months. The D-HEVD20 Rapid Labs rapid diagnostic test was performed on plasma from blood samples collected in district hospital laboratories in each city surveyed, following the manufacturer's instructions.

### 2.2. Study Population

Our study will conduct a combined cross-sectional and multicenter study in three cities (Adré, Biltine and Goz-Beida) hosting Sudanese refugees and Chadian returnees in eastern Chad. We will proceed by: 1) surveys on the presence or absence of signs of jaundice; 2) surveys on the general living conditions of refugees in confined environments (water source, sanitation, food practices, contact with an-

imals, overcrowding, pregnancy, immunodeficiency status, unprotected sexual intercourse, use of contaminated sharp objects), and 3) epidemiological approaches (people exposed to HEV: locality, sex, age, etc.).

The study included a total of 3571 people, aged 2 to 89 years, comprising 2496 (70.60%) men and 1075 (29.39%) women ( $p = 0.01$ , significant difference in favor of males), with a mean age of 45.5 years and a sex ratio of 2.32, distributed as follows:

1) A group consisting of people with no signs suggestive of HEV, whose age ranges from 16 to 61 years, labeled (Group 1) that is 2303 people, including 677 (29.39%) women and 1626 (70.60%) men ( $p = 0.01$ ) and whose mean age was 38.5 years, the sex ratio was 2.40.

2) A group (Group 2) of 1268 people with jaundice associated with HEV, including 398 (31.38%) women and 870 (68.61%) men ( $p = 0.01$ , significant difference favoring males), aged 2 to 89 years, with a mean age of 45.5 years and a male-to-female ratio of 2.18. The two groups consisted of 657 participants who tested positive for IgM and negative for IgG for anti-HEV antibodies (characteristic of acute infection), 105 participants who tested positive for IgG and negative for IgM for anti-HEV antibodies, representing a previous HEV infection, and 2803 who were both negative for IgM and IgG anti-HEV.

### 2.3. Eligibility Criteria

#### Inclusion and Exclusion Criteria

1) Any Sudanese refugee or Chadian returnee who fled the war in Sudan and is residing in the refugee camps in the cities of Adré, Biltine, and Goz-Beida can participate in the study after obtaining their informed consent. For minors, we obtained parental consent.

2) Any Sudanese refugee or Chadian returnee who is immunocompromised (HIV-positive, diabetic, or pregnant). Each person included in the study had their blood drawn in a sterile tube. The following were excluded from our study:

- 1) Any Sudanese refugee or Chadian returnee living outside the refugee camp.
- 2) Failure to participate in the study or persistent refusal to do so.

### 2.4. Blood Collection and Analysis

Blood samples were collected in sterile 5 mL EDTAK3 tubes (Becton Dickinson) using 21G  $\times$  1<sup>1/2</sup> rf needles (SPECS) mounted on a collection sleeve.

The presence of IgM and IgG antibodies was detected by immunochromatographic (IC) testing; 50  $\mu$ L of whole blood or serum was applied to the IC test cassette (D-HEVD20 Rapid Labs). The tests were performed in the hospital laboratories of the Health Districts in each study city, following the manufacturer's instructions. According to the manufacturer's instructions, the rapid test has a sensitivity of 90.0% [95% CI: 68.3% - 98.8%: the test correctly detects approximately 90% of true cases], and a specificity of 98.7% [95% CI: 95.3% - 99.8%: good ability to exclude non-infected individuals]. The storage temperature range is 0°C to +30°C. The recommendations of the French National Authority for Health (HAS)

were taken into account in the event of a positive or negative test result [14]. The rapid test (D-HEVD20 Rapid Labs) is designed for the separate detection of IgM and IgG antibodies. In the field, the tests were performed using whole blood plasma collected in EDTAK3 tubes.

## 2.5. Study Limitations

This study was conducted in three cities hosting refugees in eastern Chad to determine the seroprevalence of HEV and identify factors promoting HEV transmission outside of epidemic periods. It is limited to a rapid test (D-HEVD20 Rapid Labs) detecting anti-HEV IgM and IgG antibodies. Given the environmental (e.g., temperature above 45°C) and experimental conditions (presence of heterophile antibodies or rheumatoid factors, particularly in subjects with autoimmune diseases, which can interfere with immunological detection; poor visual interpretation of faintly colored bands due to non-standardized reading conditions in the field; serological cross-reactions with other hepatotropic viruses (hepatitis A, CMV, EBV), resulting in non-specific antibody binding to the test antigens), and the resources used, the study has limitations. Given the complexity of the diseases and the various difficulties encountered during this study, the results of our work can only provide qualitative information as an illustration of HEV cases among refugees in eastern Chad.

## 2.6. Ethical Considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The protocol was approved by the National Ethics Committee for Health Research of Chad (ref. no. 066/MESRS/SE/SG/CNBT/SG/2025). Free, written, informed consent was obtained from each participant before sample collection.

All data were treated confidentially. The results of this work will be used solely for scientific purposes to improve patient care.

## 2.7. Statistical Analysis of Data

Results, including biological data on the hepatitis E virus (HEV) and data from information forms, were recorded in a spreadsheet using MS-Excel. Descriptive analysis consisted of describing the collected data as counts, percentages, and means. Statistical tests were performed using SPSS software. Specifically, the chi-square ( $\chi^2$ ) test was used to assess the association between HEV infection and exposure factors (age, presence or absence of the suggestive sign of jaundice, socioeconomic status, etc.). The *p*-value was used to indicate the significance level of the associations at a threshold of 0.05.

## 3. Results

### 3.1. Origin of Samples and Mapping of Surveyed Cities at Risk of Hepatitis E Virus

**Figure 1** shows the surveyed cities with the percentages of people's participation.

Overall, the percentages of survey participants in each of the three cities (Adré, Biltine, and Goz-Beida) were 2149/2571 (60.18%), 974/3571 (27.27%), and 448/3571 (12.54%), respectively. Chad is located between the 7th and 24th degrees of North latitude and the 13th and 24th degrees of East longitude. It covers an area of 1,284,000 km<sup>2</sup> and is the fifth largest country in Africa after Sudan, Algeria, Zaire, and Libya. From north to south, it stretches 1700 km and from east to west, 1000 km. It shares borders with Libya to the north, Sudan to the east, the Central African Republic to the south, and Cameroon, Nigeria, and Niger to the west. The city of Abéché, located 900 km north of N’Djamena, shares borders with Libya to the north and Sudan to the east. Politically and economically, the country belongs to Central Africa, but due to similar climatic conditions, it is also considered part of the Sahel region. Chad’s geographical location has likely contributed to the transmission of emerging and re-emerging diseases, particularly hepatitis E (Figure 1).

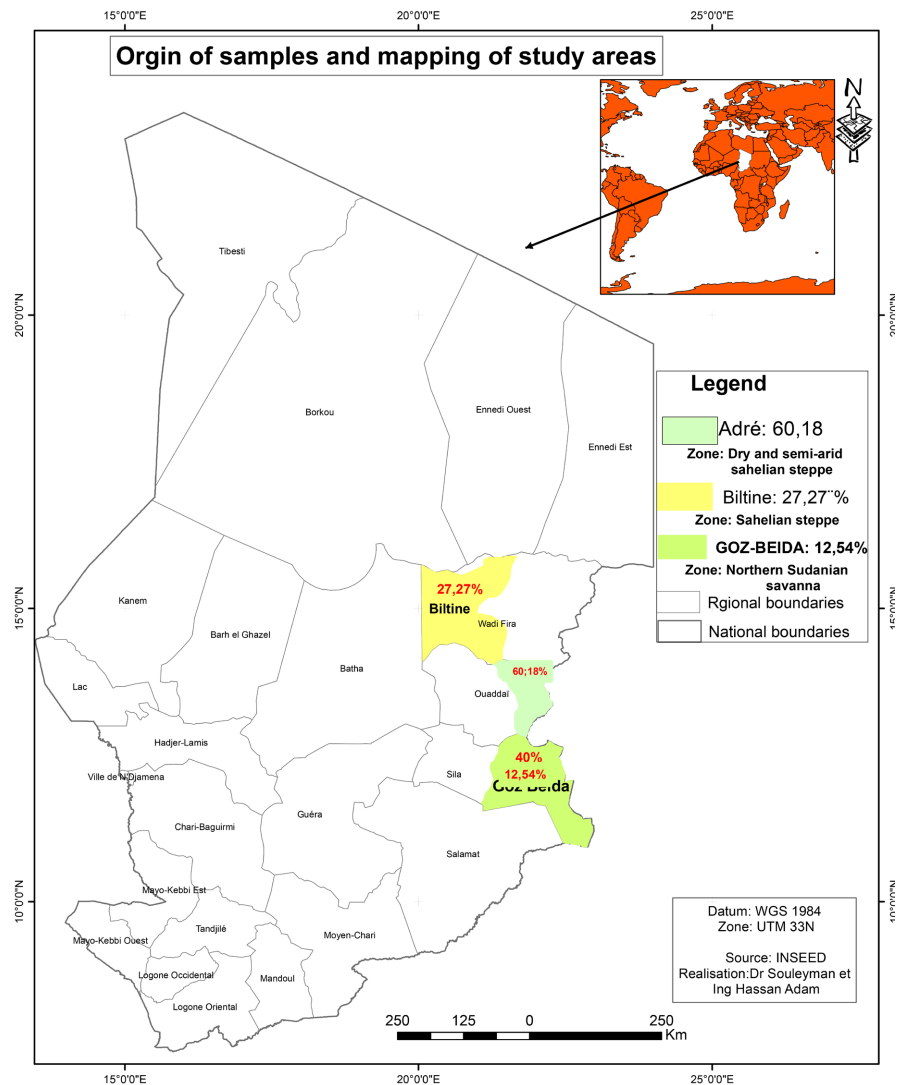


Figure 1. Mapping of the study area.

### 3.2. Socio-Demographic Characteristics of the Studied Population

**Table 1** shows the distribution of participants according to the socio-demographic and clinical-biological characteristics of the study population. All sexes were affected. Of the 3571 participants recruited from the different study areas, 2496/3571 (69.89%) were male and 1075/3571 (30.10%) were female ( $p = 0.01$ , a significant difference in favor of males). The sex ratio (male/female) in our study was 2.32 (2496/1075). All ages were equally affected, with extremes ranging from 2 to 89 years. The most affected age group was 2 - 11 years (38.38%), followed by 12 - 21 years (27.22%) (this is the vulnerable population, more active, more mobile, and certainly the most exposed). The results in **Table 1** also show that anti-HEV antibodies (IgM and IgG) were detected much more frequently in volunteers in Group 2 than in Group 1 ( $p = 0.001$ , significant difference for Group 2). There was a high participation rate of Sudanese refugees compared to Chadian returnees in the study ( $p = 0.001$ , significant difference) (**Table 1**).

**Table 1.** Socio-demographic characteristics of the studied population (N = n1 + n2 = 3571).

Parameters	Group 1 (n1 = 2303)	Group 2 (n2 = 1268)	p-value
Age (year)	38.5 ± 3.60	45.5 ± 1.41	0.10
2 - 11	722 (31.35)	361 (28.47)	0.00
12 - 21	577 (25.05)	303 (23.89)	0.00
22 - 31	315 (13.67)	180 (14.19)	0.00
32 - 41	140 (6.07)	143 (11.27)	0.00
42 - 51	144 (6.25)	72 (5.67)	0.00
52 - 61	126 (5.47)	63 (4.96)	0.00
62 - 71	102 (4.43)	51 (4.02)	0.00
72 - 81	93 (4.03)	53 (4.17)	0.00
82 - 89	84 (3.65)	42 (3.31)	0.00
<b>Total (%)</b>	<b>2303 (64.49)</b>	<b>1268 (35.51)</b>	<b>0.001</b>
Sex			
Male (%)	1626 (70.60)	870 (68.61)	0.00
Female (%)	677 (29.39)	398 (31.38)	0.00
Sex-ratio (H/F)	2.40	2.18	0.00
<b>Total (%)</b>	<b>2303 (64.49)</b>	<b>1268 (35.51)</b>	<b>0.001</b>
Locality			
Adré (%)	1386 (60.18)	805 (63.48)	0.00
Biltine (%)	628 (27.27)	240 (18.92)	0.01
Goz-Beida	289 (12.54)	223 (17.58)	0.00
<b>Total (%)</b>	<b>2303 (64.49)</b>	<b>1268 (35.51)</b>	<b>0.001</b>
Nationality			

**Continued**

Chadian (%)	818 (35.51)	446 (35.17)	0.00
Sudanese (%)	1485 (64.48)	822 (64.82)	0.00
<b>Total (%)</b>	<b>2303 (64.49)</b>	<b>1268 (35.51)</b>	<b>0.001</b>

Note: n = effective; (%) = percentage.

### 3.3. Distribution of Results According to Antibodies (Ab) Detected

**Table 2** shows the distribution of antibodies detected in Group 1 of participants, comprising people with no signs of jaundice, and Group 2 comprising people with symptoms (jaundice) (**Table 3: Image (b)**). Of the 3571 blood samples collected and tested for hepatitis E virus, 657 (18.4%) were positive for IgM (recent infection) and negative for IgG for anti-HEV antibodies, 105 (2.94%) participants tested positive for IgG and negative for IgM for anti-HEV antibodies, representing a previous HEV infection, 6 (0.17%) cases were indeterminate results, and 2803 (78.49%) participants tested negative for both anti-HEV IgM and IgG. The results in **Table 1** also showed that anti-HEV antibodies (IgM and IgG) were detected much more frequently in participants in Group 2 than in Group 1 ( $p = 0.001$ , significant difference for Group 2) (**Table 2**).

**Table 2.** Distribution of results according to the antibodies (Ab) detected.

Study Population	Rapid Labs D-HEVD20 Test Results				
	Number Detected	IgM+ IgG- (%)	IgG+ IgM- (%)	IgM- IgG- (%)	Id (%)
Group 1: No signs of jaundice	2303	166 (7.21)	71 (1.1)	2285 (99.21)	2 (0.08)
Group 2: Presence of jaundice	1268	491 (38.72)	34 (2.68)	518 (40.85)	4 (0.31)
Total	3571	657 (18.39)	105 (2.94)	2803 (78.49)	6 (0.17)

Note: (%) = percentage; (+) = positive; (-) = negative; Id = undetermined; Ig = immunoglobulin.

### 3.4. Quality of Life in Camps and Biotechnological Steps in IgM and IgG Screening

**Table 3**, with its various images, shows the quality of life in refugee camps and the biotechnological steps involved in detecting anti-HEV antibodies (IgM, IgG). Image (b) in **Table 3** illustrates the characteristics of a volunteer with jaundice. Our study also noted the prevalence of HEV in 17 (4%) pregnant women and 51 (12%) immunocompromised individuals, including 16 (4%) people living with HIV and 35 (8%) people with diabetes. It is important to note that HEV1, HEV2, HEV3, or HEV4 infections can be life-threatening in immunocompetent individuals, pregnant women, and immunocompromised patients. In immunocompromised patients, the infection can become chronic and promote the spread of HEV in a confined environment. Images ((e), (f) and (g)) in **Table 3** show how transmission could occur through routes (fecal, food, direct or indirect contact) of HEV in refugee communities in eastern Chad (**Table 3**).

**Table 3.** Photograph highlighting the precarious living conditions of refugees, exposing them to emerging and re-emerging diseases.

1	<p>(a) Sudanese refugees in a temporary camp around the town of Adré before their integration into the refugee camp set up by the UNHCR.</p> <p>(b) Yellow conjunctivae of a refugee under investigation.</p>		
2	<p>(c) Le camp de Farchana, à 110 km à l'est d'Abéché.</p> <p>(d) A collective meal service for students at the Gozmir refugee camp in eastern Chad.</p>		
3	<p>(e) An open-face latrine at the refugee camp in Adré.</p> <p>(f) A borehole at the refugee camp near Goz-Beida.</p>		
4	<p>(g) Preparation of blood serum samples for the test.</p> <p>(h) The test results.</p>		

## 4. Discussion

In summary, the following question should be answered: did the civil war in Sudan, or more generally, social unrest, contribute to the transmission of the hepatitis E virus (HEV) by Chadian returnees and Sudanese refugees or by the local population?

The answer to this question would certainly require comparing our results with those from before the civil war or during the war and social unrest, and those from after the war; however, very little up-to-date data exists on this subject.

The objective of this study was to determine the seroprevalence and identify the factors of exposure to the hepatitis virus within the population of Sudanese refugees and Chadian returnees who had fled the war in Sudan and who presented with signs suggestive (jaundice) or not of the hepatitis virus, and who were in the refugee camps of the towns of Adré, Biltine and Goz-Beida.

In our study, the prevalence of HEV was 18.4% among people who tested positive for IgM antibodies. Of these, 105 (2.94%) tested positive for IgG antibodies but

negative for IgM antibodies, indicating a prior HEV infection, there were 6 (0.17%) cases of indeterminate result, and 2803 (78.49%) tested negative for both IgM and IgG antibodies. There were 6 (0.17%) cases of indeterminate results (**Table 2**). Anti-HEV antibodies (IgM and IgG) were detected much more frequently in participants in Group 2 than in Group 1 ( $p = 0.001$ , significant difference for Group 2). All sexes were represented in this study. Of the 3571 participants recruited from the different study areas, 69.89% were men and 30.10% were women ( $p = 0.01$ , a significant difference favoring males). The sex ratio (male/female) in our study was 2.32 (2496/1075). All ages were represented, ranging from 2 to 89 years. The most represented age group was 2 - 11 years (38.38%), followed by 12 - 21 years (27.22%). There was a higher participation rate of Sudanese refugees than of Chadian returnees in the study ( $p = 0.001$ , a significant difference) (**Table 1**). Images ((e), (f) and (g)) in **Table 3** showed how transmission could occur via routes (fecal, food, direct or indirect contact (consumption of animal meat, etc.)).

In contrast to our various results mentioned above, a hepatitis E epidemic was reported in 2017 in the Am-Timan health district, and another study conducted in 19 provinces revealed an overall seroprevalence of 34.1% and more recently, in January 2024, an epidemic outbreak was reported in the Adré and Hadjer-Hadid health districts. This difference in the high rate of HEV compared to our study could be explained by the fact that these previous studies were conducted during the epidemic period and in 19 localities, whereas our study was carried out in the absence of the epidemic and in three refugee camps in confined environments where living conditions were precarious. The presence of suggestive signs as well as the massive infection of the populations (Sudanese refugees and Chadian returnees) could lead to the conclusion of autochthonous transmission of HEV in these towns in eastern Chad even before the Sudanese war [15]. Diseases that cause jaundice, such as viral hepatitis (A, B, C, E), could be highly contagious and transmitted through blood or bodily fluids, hence the importance of hygiene and vaccination, as well as a good source of drinking water and a healthy diet, would be assets for the effective protection of vulnerable populations [16]. The seroprevalence rate of anti-HEV antibodies could serve as a marker of current and past infections [17]. However, the use of different serological tests with varying sensitivity has led to considerable variability among seroprevalence estimation studies, making it difficult to estimate true seroprevalence. Newer, more sensitive tests generally produce higher estimates of anti-HEV immunoglobulin G (IgG) seroprevalence than older, commercially available tests, as highlighted in a meta-analysis. Nevertheless, the high clinical sensitivity of the most recent tests does not reflect low specificity [18]. In Europe, the prevalence of hepatitis E varies regionally. Although hepatitis E is hyperendemic in southwestern France, with seroprevalence rates exceeding 50%, it is endemic in northern France, the United Kingdom, Belgium, Netherlands, Luxembourg, and Germany, where 10% - 30% of individuals show serological evidence of prior HEV exposure. However, seroprev-

alence is only 2% among children aged 2 - 4 years living in southwestern France, despite this being a hyperendemic area. Adults in Scotland (as well as in Fiji and New Zealand) have very low seroprevalence (<5%) [19]. It is estimated that there are 68,000 HEV infections in France, 100,000 in the United Kingdom [20], and 300,000 in Germany each year [21]. A semi-structured survey conducted in 30 countries of the European Economic Area showed that the number of reported cases of HEV infection increased from 514 per year in 2005 to 5617 in 2015, with most infections being locally acquired [22]. Furthermore, 545 hospitalizations and 18 deaths occur annually in France due to HEV infection [23]. HEV infection became the most frequently diagnosed viral cause of acute hepatitis in Netherlands between 2013 and 2015. HEV seroprevalence increases with age, and symptomatic hepatitis E is primarily detected in men aged 50 years and older [24].

In the United States, studies conducted several years ago revealed surprisingly high levels of anti-HEV antibodies in historical blood samples from American blood donors and the general population [25]. Initial estimates, which reached 21%, have recently been revised downward, with a prevalence of 6% for anti-HEV IgG [26]. Analysis of HEV RNA in approximately 128,000 plasma samples collected from 96 centers across the United States showed that 0.002% were positive [27]. The surprising rarity of HEV infection could be explained by less frequent consumption of game or offal in the United States than in Europe. However, the continued lack of an FDA-approved test to confirm suspected HEV infections and the ongoing lack of knowledge about this virus among American clinicians could also play a role. Age, low socioeconomic status, foreign birth and consumption of processed meat have been identified as risk factors for seropositivity [28].

Our study also noted the prevalence of HEV in 17 (4%) pregnant women and 51 (12%) immunocompromised individuals, including 16 (4%) people living with HIV and 35 (8%) diabetics. HIV seropositivity is not associated with increased levels of anti-HEV antibodies or chronic HEV infections [29]. To avoid hepatitis E virus infection, good hygiene (frequent handwashing) and food precautions are necessary, especially thoroughly cooking pork and game meat (deer, wild boar), avoiding raw liver and uncooked deli meats, and favoring bottled or boiled water in at-risk areas, as transmission occurs primarily via the fecal-oral route through contaminated water or food.

## 5. Conclusion

This was the first screening operation dedicated to detecting IgM and IgG antibodies to the hepatitis E virus using the D-HEVD20 rapid test (Rapid Labs) in the absence of an epidemic outbreak, in refugee communities in eastern Chad. This operation allowed for the determination of the prevalence and risk factors associated with the transmission of the hepatitis E virus. Controlling these infections requires a concerted effort among the various stakeholders (governments, basic humanitarian services, and refugees).

## Authors' Contributions

CA and NB participated in the study design and provided supervision, as well as critical review and editing of the manuscript. AD contributed to data collection and laboratory analysis. All authors read and approved the final version of the manuscript.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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