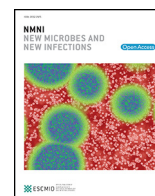


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# New Microbes and New Infections

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## Letter to the Editor

### Countering hepatitis E infection in South Sudan in the backdrop of recent outbreak

Dear Editor,

Hepatitis E outbreak has been reported since 2018 in the Bentiu camp, South Sudan. The camp is for the internally displaced persons (IDPs). There is seasonal upsurge especially during the rain every year, when drinking water gets easily contaminated due to flooding. However, outbreaks have occurred during the dry seasons too. The possibility of transborder spread of the disease remains high as South Sudan shares its borders with Ethiopia and Sudan with substantial traffic. The Ministry of Health (MoH) declared an outbreak in Wau city, South Sudan on 14<sup>th</sup> April 2023 with isolated instances of jaundice. Altogether 91 hepatitis E virus (HEV) suspected cases were reported in the city between 23<sup>rd</sup> March and 13<sup>th</sup> April 2023. In all, 35 infection cases and five deaths are confirmed (5.5% CFR; case fatality ratio) (<https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON466>).

Hepatitis E is a hepatic inflammation caused by HEV which has a minimum of four identified genotypes, 1, 2, 3 and 4. The virus belongs to the family Hepeviridae and genus Hepevirus. Genotypes 1 and 2 are reported in humans, whereas genotypes 3 and 4 are evident latently (without manifesting the disease) in pigs, wild boars and deer which occasionally infect humans. HEV transmission particularly in the epidemic region is primarily through faecal-contaminated drinking water. Human-human transmission has been evident during outbreaks. Whether such person to person transmission is comparable in terms of magnitude to hepatitis A infection is yet unclear. Isolated cases of nosocomial infection and also transmission related to blood transfusion are reported. Vertical transmission of HEV is well documented [1]. Genotypes 3 and 4 infections mainly occur through zoonotic transmission upon close contact with infected animals or consuming contaminated food products like raw or undercooked meat. The virus is detected in large number in the faecal remains of asymptomatic animals and the milk of infected cattle [2,3]. Contaminated vegetables and fruits could act as putative causes of HEV transmission.

The incubation period of HEV varied from 210 weeks post the exposure, average incubation period being 5–6 weeks. The infection occurs in young adults aged between 15 and 40 years most commonly in the endemic region. The typical signs and symptoms of HEV infection are an initial mild fever, reduced appetite, nausea and vomiting that could last for days. There may also be abdominal pain, rashes in skin, and itches or pain in joints. Jaundice characterised by yellow discoloration of the skin, dark urine and pale stool may as well be observed. Hepatomegaly is also commonly noticed. The disease may be severe in rare cases due to acute failure of the liver that could be fatal. The risks of acute failure of liver in the pregnant and neonatal death are high in case of infection during the second or third trimester of gestation. If contracted in the third trimester, 20–25% death in pregnant women is observed (<https://www.who.int/news-room/fact-sheets/detail/hepatitis-e>).

There is no specific treatment to alter the course of the acute form of

the disease. Hospitalisation of patient is seldom needed as the disease is self-limiting. Avoiding unnecessary medication is recommended with a cautionary and restricted use of paracetamol; acetaminophen and anti-emetics. Hospitalisation could be necessary for fulminant hepatitis and pregnant symptomatic women. Antiviral drug ribavirin therapy is beneficial for the immunosuppressed and the one suffering from chronic hepatitis E. Interferons administration has also been successful (<https://www.who.int/news-room/fact-sheets/detail/hepatitis-e>).

Enzyme immunoassay is the most widely accepted serological test to identify anti-HEV IgM and IgG antibodies. Not only anti-HEV antibodies but also the viral capsid antigen can be identified through this. Another diagnostic means for HEV infection is the detection of the viral RNA in blood or stool. Various nucleic acid amplification tests (NAATs) have varying sensitivity in detecting the viral RNA. Such NAATs that could be employed to detect HEV RNA in blood or stool include reverse transcription polymerase chain reaction (RT-PCR), real-time RT-PCR and reverse transcription loop mediated isothermal amplification (RT-LAMP). NAATs can detect especially the conserved domains of RNA target of HEV (the ORF2-ORF3 overlapping region) [2,4].

Crucial interventions at the community level as countermeasure to reduce HEV transmission are the provision of safe drinking water, maintaining the quality standards of public water supplies, and optimal sanitary measures. Human-human infection risk can be decreased by maintaining hygienic measures like hand-washing with soap and clean water especially before handling food, avoiding consumption of water or ice of unknown purity, and adhering to the hygiene practices as recommended from time-to-time by the World Health Organisation (WHO). Cooking the food properly before consuming it is recommended. HEV is inactivated by heating milk at 71 °C for 20 minutes [5]. Regular monitoring of the drinking water quality in the epidemic neighbourhoods may be done. Open defecation should be prevented by ensuring coverage of latrines. Water quality, sanitation and hygiene are three important aspects to curb viral spread. Ensuring early equitable appropriate health-care services particularly in resource-limited settings could help combat hepatitis E epidemic. A mechanism of antenatal diagnosis in pregnant women may be established and strengthened. The nation's capacity to diagnose and manage clinical cases may be revamped. Cross-border collaboration with neighboring countries is essential. The recombinant vaccine for Hepatitis E is Hecolin, developed and commercialised by Pakistan and China. However, WHO has not recommended its introduction as a part of the routine national immunisation programme although it recommends the emergency use by national authorities on the susceptible population (like the pregnant) in the outbreak location (<https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON466>). Further, genome sequencing of the samples collected earlier from the camp showed HEV genotype 1, closely related to the strains of Chad basin and Northern Uganda. Owing to the migrating

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population involving IDPs and refugees, as also the never-ending frequent civilian unrest, the potential human health and regional spread risks are high. The existing weak African healthcare infrastructure that was further dilapidated during the COVID pandemic, the logistics issues on medical interventions supply, lack of healthcare professionals with the required high-end skill-sets, civil-war like situations cropping-up every now-and-then, the prevalence of a multitude of endemic infectious diseases, and the political and economic disturbances are some of the critical factors that spoil the healthcare efforts by the national and international agencies there. Addressing these may pave a roadmap for a smooth transition of healthcare support in the African continent.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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