Hepatitis E outbreak response in Fangak, South Sudan: coverage and acceptance of a campaign targeting women of reproductive age

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INTRODUCTION

- Hepatitis E is a common cause of viral hepatitis globally. Genotypes 1 and 2 of hepatitis E virus (HEV) cause outbreaks in situations with poor water and sanitation (Li et al., 2020).
- Overall case fatality ratios (CFR) during HEV outbreaks usually <4% in the general population, **pregnant women at high risk of mortality and fetal loss, with CFR reaching over 30%.**
- HEV vaccination recently recommended to protect pregnant women affected by an outbreak of HEV in health resource-constrained settings (Lynch et al., 2023; WHO SAGE, 2024).
- Hecolin® (HEV239, Innovax, China, a recombinant three-dose schedule vaccine) is the only licensed HEV vaccine for use among people aged ≥16 years; high efficacy (90.6%) shown in a phase 3 trial (Huang et al., 2024), 100% efficacy with a 2-dose regimen in a cohort study (Zhu et al., 2010).
- On 26 September 2023, the **South Sudan Ministry of Health declared an HEV outbreak in the county of Fangak**, Jonglei State and greater Pibor administrative area.
- Epidemiological week 16 to week 47 in 2023: 172 hepatitis E Immunoglobulin (Ig)M rapid test positive cases reported, 27% of these pregnant women. High CRF (16.7%) at Old Fangak Hospital (where > 66% of positive cases were admitted), eight of 19 deaths were pregnant women.
- MSF together with MoH implemented case management in Old Fangak hospital and conducted a reactive vaccination campaign with Hecolin vaccine in three rounds, targeting exclusively women aged 16-45 in five Payams of Fangak County, Jonglei State, South Sudan.
- A mixed-methods vaccination coverage study was conducted in 3 of the 5 Payams to assess coverage and acceptance of the vaccination strategy from February-March 2024.Epidemiological week 16 to week 47 2023, 172 hepatitis E IgM rapid test positive cases were reported, among them 27% pregnant women.

METHODS

Main objective

- Estimate vaccine coverage of first two rounds of HEV vaccination campaign in Fangak County in 2023-24

Specific objectives

- Understand the acceptance of the hepatitis E vaccine as a prevention method against hepatitis E, and the vaccination strategy targeting cisgender women aged 16 to 45 years only among the community residing in Old Fangak and Mareang Payams
- Detect and document adverse events following heptatits E vaccination
- Describe hepatitis E outbreak in terms of person, place and time.

Study Design: Mixed methods, cross-sectional

Study Site: Old Fangak, Mareang and Toch Payams, Jonglei State

Survey population: women aged 16-45 residing in Old Fangak or Mareang/Toch Payams

Eligibility criteria

Vaccination coverage survey:
- Women aged 16-45 years
- Living in randomly selected household

Focused group discussions and interviews:
- Member of the community, vaccination teams or healthcare workers
- 18 years or older willing to give informed consent
- Willing to give consent for audio recording

Study sample size 1,054

Sampling Methods: two-stage cluster, non-probability

Study period February – March 2024

Data collection tools Kobo collect survey forms (tablet) & audio recordings (translated & transcribed)

Data analysis R for statistical computing 4.3, ArcGIS, Excel

Ethics
- Individual verbal consent; assent for <18 years
- South Sudan Ministry of Health's Research Ethics Review Board (Ref.: MOH/RERB/A-01/2024)
- MSF Ethic Review Board (12 January 2024, Ref. ID: 2379.

RESULTS

Table 1: Vaccine coverage in Old Fangak, Mareang/Toch Payams

	Coverage, % (n)	95 % CI	Design effect
One or two doses (recall or card)	95% (1,102)	[91-98]	7.1
Two doses (recall or card)	76% (914)	[67-86]	14.4
One or two doses (by card)	74% (793)	[61-86]	23.3
Two doses (by card)	57% (630)	[50-64]	5.8

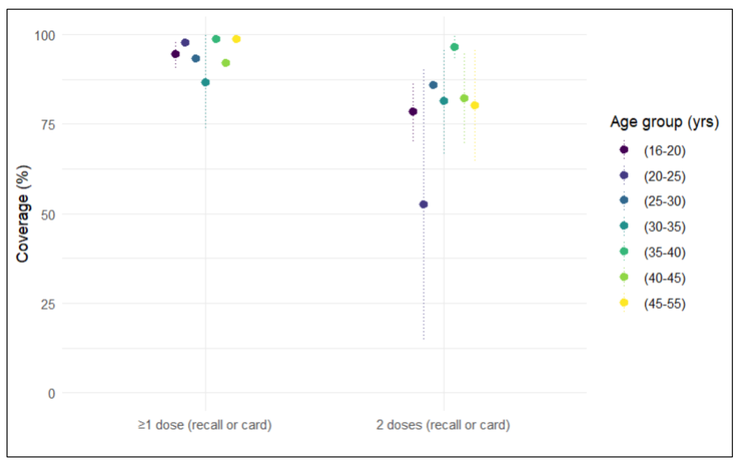
- 1,194 individuals surveyed (113.3% of survey target)
- 46% of responses were made by the intended respondent
- 2 household heads and 2 individual women refused the survey
- Average household size observed was 6 people per structure.
- 114 pregnant women were included in the survey results

Table 2: Reasons respondents not vaccinated against HEV

Reason not vaccinated	Observations
Away from home during the vaccination	59 (80%)
Away from home during the vaccination & Other (not specified by respondent)	1 (1.4%)
Away from home during the vaccination & Vaccination team ran out of vaccines	1 (1.4%)
Husband refused to allow	1 (1.4%)
Not available during the vaccination hours	1 (1.4%)
Not available during the vaccination hours & Away from home during the vaccination	1 (1.4%)
Other (not specified by respondent)	4 (5.4%)
Think the vaccine is dangerous	3 (4.1%)
Unaware of vaccination	1 (1.4%)
Vaccination team ran out of vaccines	2 (2.7%)
Total	**74 (100%)**

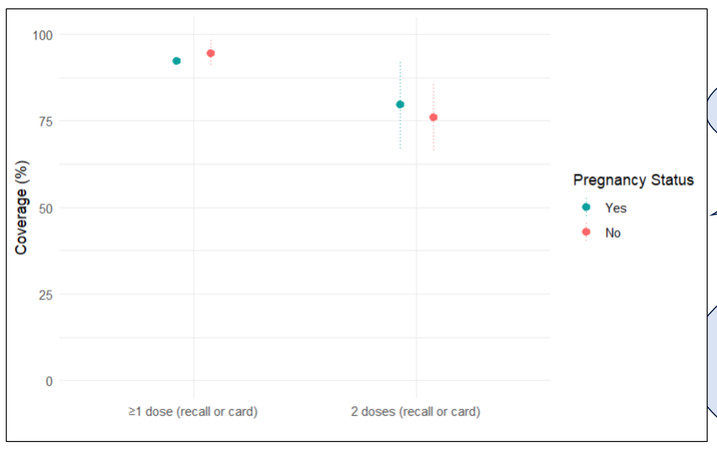
- 74 of all participants were unvaccinated against HEV
- 80% of unvaccinated due to being away during vaccination
- 18 additional participants vaccination status was unknown by family members answering on their behalf

Figure 1: Vaccination coverage by age group



- 1-dose coverage lowest in the 30-35 age group
- 2-dose coverage lowest in 20-25 age group

Figure 2: Vaccination coverage by pregnancy status



- Similar vaccination coverage by pregnancy status

Table 3: Interviews and group discussions

	FGDs		IDIs		Total
	Women	Men	Women	Men	
Community					42
Community Leaders	8	8	-	-	
Youth Leaders	-	7	-	-	
Unvaccinated community members	5	8	-	-	
Vaccinated community members	6	-	-	-	
HCW	-	-	-	-	13
Vax team	-	-	-	5	
PHCU/C staff	-	-	-	4	
TBA/Midwives	-	-	4	-	

- High acceptance of vaccine
- Low acceptance of vaccination strategy

"With the 2nd dose, people have realized that the spreading of hepatitis E has reduced and is no longer a threat to the community. It was killing people before."
Vaccinated woman, Hai Matar

"We [are] happy with the decision to first help women and pregnant women. And don't forget that we need the vaccine too" - ***Male, Midwife***

"If the vaccination campaign continues like this, not vaccinating children, and men, we will not appreciate that much because our children are our future. It will be better to stop the vaccination campaign. All people in the community should be vaccinated."
Woman community leader, Hai Matar

CONCLUSIONS

- Despite some criticism of the vaccination campaign strategy targeting women only, 95% of women surveyed were vaccinated with at least 1 dose of the vaccine.
- Participants in the qualitative component of the study expressed high acceptance of the MSF HEV vaccination campaign.
- Some community members were critical of the vaccination strategy, as it was perceived to conflict with observed cases of HEV among men and children.
- Findings highlight importance of aligning vaccination strategies with community values and priorities, ensuring inclusive decision-making processes, and maintaining robust outreach and sensitization activities adapted to local realities.
- Addressing these challenges will be crucial for maintaining and enhancing the overall acceptance and effectiveness of the hepatitis E vaccination campaign as part of the MSF outbreak response in Fangak country.