



High Prevalence of Hepatitis B and C Virus Infections Among Rohingya Refugees in Bangladesh: A Growing Concern for the Refugees and the Host Communities

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Background

In 2017, over 740,000 Rohingya people fled Rakhine state, Myanmar, and are currently hosted in temporary shelters in Cox's Bazar district, Bangladesh.¹ The influx of refugees into Bangladesh, current Rohingya refugee population in Bangladesh estimated at 890,000, has

outnumbered the local population more than three-fold, resulting in massive strain in the scarce resources available in the host country including health care.^{2,3}

Chronic hepatitis B virus (HBV) and hepatitis C virus (HCV) infection carries long-term risk of cirrhosis and remains the main cause of the development of hepatocellular

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carcinoma worldwide.⁴ Little is known about the prevalence of HBV and HCV infections among the Rohingya refugees.

In 2017 and 2019, the National Liver Foundation of Bangladesh (NLFB) (<https://liver.org.bd/>), a philanthropic organization dedicated to preventing, treating and sharing knowledge on the best strategies to address liver diseases in Bangladesh, conducted an assessment to determine the burden of HBV and HCV among pregnant women and among the general population in the Rohingya refugee camp, Cox's Bazar district, Bangladesh.

METHODS

The Rohingya refugee camp is located in Cox's Bazar district, a small town in the southeast coast of Bangladesh (Fig. 1). The camp has two sections located at two different sub-districts (locally called "Upazila") of Cox's Bazar; Kutupalong camp located at Ukhiya Upazila and Nayapara camp located at Teknaf Upazila. The Kutupalong camp, the largest refugee camp in the world with an estimated population density of 120,000 people per square mile, is a cluster of 20 camps divided into individual blocks.^{5,6} In 2019, more than half of the Rohingya refugees were women and girls and over 50,000 were pregnant women.^{3,7}

In October 2017, NLFB conducted an assessment to determine the prevalence of HBV and HCV infection among Rohingya pregnant women. In February 2019, the survey was expanded to include the general population in the Rohingya refugee camp. In the first assessment, approval to conduct HBV and HCV screening was obtained from the refugee camp's health and administrative authority. Study volunteers capable of speaking the Rohingya language were engaged to mobilize pregnant women for screening at screening posts located within the camp. A convenient sample of pregnant women residing in Ukhiya Upozilla Health Complex, Balukhali and Ukhiya were approached and asked to provide verbal consent to participate in the screening.

In the second assessment, participants ≥ 7 years were recruited following a probability proportional population size sampling.⁸ Targeted blocks included Kutupalong, Modhursora and Ukhiya. Study volunteers mobilized participants and asked them to visit study designated local hospitals and medical facilities for enrollment and sample collection.

Blood specimens were collected and tested for hepatitis B surface antigen (HBsAg) and HCV antibodies (anti-HCV) using rapid test kits (HBsAg rapid test kits and anti-HCV rapid test kits respectively, ACON Laboratories,



FIG 1 Map showing Rakhine State in Myanmar and Cox's Bazar district in Bangladesh.

TABLE 1. DISTRIBUTION OF HEPATITIS B SURFACE ANTIGEN (HBsAg), HEPATITIS C VIRUS ANTIBODIES (ANTI-HCV), AND HEPATITIS B VIRUS (HBV) AND HEPATITIS C VIRUS (HCV) MAKERS AMONG THE GENERAL POPULATION OF ROHINGYA REFUGEES, COX'S BAZAR DISTRICT, BANGLADESH, FEBRUARY 2019

Description	HBsAg positive			Anti-HCV positive			HBV and HCV markers		
	n	%	<i>P</i> value*	n	%	<i>P</i> value*	n	%	<i>P</i> value*
Adult male >18 (n = 450)	39	9%	0.02	81	18%	<0.01	6	1%	n/a
Adult female >18 (n = 450)	21	5%	ref	119	26%	ref	0	0%	
Child male 7-17 (n = 550)	12	2%	0.67	8	1%	0.4	0	0%	n/a
Child female 7-18 (n = 550)	10	2%	ref	5	1%	ref	2	0%	
All adults (n = 900)	60	7%	<0.01	200	22%	<0.01	6	1%	0.09
All children (n = 1100)	22	2%	ref	13	1%	ref	2	0%	ref
All adults and children (n = 2000)	82	4%		213	11%		8	0%	

Abbreviations: n/a, not applicable.

*The *P*-value for test of proportion.

Incorporated San Diego, California, USA). Specimens that tested positive for HBsAg or anti-HCV were sent for confirmatory testing at the NLFB laboratory in Dhaka using enzyme-linked immunosorbent assay (ELISA) (antibody and antigen reagent, Autobio Diagnostics, China; micro plate reader (ELX 808 absorbance), Biotech, USA) for both HBV and HCV.

Participants were categorized by age group (7-17 and ≥18 years) and sex. Proportions were used to describe the prevalence of HBsAg, anti-HCV, and HBV and HCV markers co-detection among participants by age group and sex. Test of proportion was used to test differences in prevalence within age groups and sex categories.

In both assessments, participants who tested positive were referred to local medical facilities for care and treatment. Pregnant women who tested positive for HBsAg were encouraged to seek hepatitis B vaccination for their children.

RESULTS

During October 2017 and February 2019, a total of 300 pregnant Rohingya refugee women and 2,000 refugees in the general population of the Rohingya refugee camp, respectively, were screened for HBsAg and anti-HCV markers.

Data on age distribution among the 300 pregnant women were not available. However, among the 2000 refugees screened in February 2019, a total of 1,100 were children (7-17 years) and 900 were adults (≥18 years) (Table 1). Both categories of children and adults had an equal distribution of males and females.

Among the 300 pregnant women, 9 (3%) tested positive for HBsAg, 24 (8%) tested positive for anti-HCV

and 3 (1%) tested positive for both HBV and HCV makers (Figure 2). Among the survey participants from the general population, 82 (4%) tested positive for HBsAg, 213 (11%) tested positive for anti-HCV and 8 (0.4%) tested positive for both HBV and HCV markers (Table 1).

Adults compared to children had significantly higher proportions of positive HBsAg and anti-HCV tests (7% vs. 2%, $P < 0.01$) and (22% vs. 1%, $P < 0.01$) respectively (Table 1). HBsAg detection was highest for men compared to women (9% vs. 5%, $P = 0.02$). In contrast, anti-HCV prevalence was higher for adult females compared to adult males (26% vs. 18%, $P < 0.01$). There was no significant difference in distribution of positive HBsAg and anti-HCV tests among children by sex.

DISCUSSION

Based on the findings of this study, more than one in five adult Rohingya refugees have been infected with HCV; of particular concern, more than a quarter (26%) of adult females tested positive for anti-HCV. Pregnant women also had high prevalence of HBsAg and anti-HCV positive tests with potential for perinatal transmission to their infants.

High rates of HCV prevalence have been observed previously in a small survey of the Rohingya refugees conducted in Lambasia camp in Cox's Bazar district, where 13.2% of participants tested positive for HCV RNA.⁹ Compared to other refugees globally, data from the current study suggest HCV prevalence is more than double the highest estimate, 5.6%, among refugees and immigrant populations originating from high and intermediate HCV endemic countries.¹⁰ In contrast, the HCV prevalence is only an estimated 2.7% of the general population

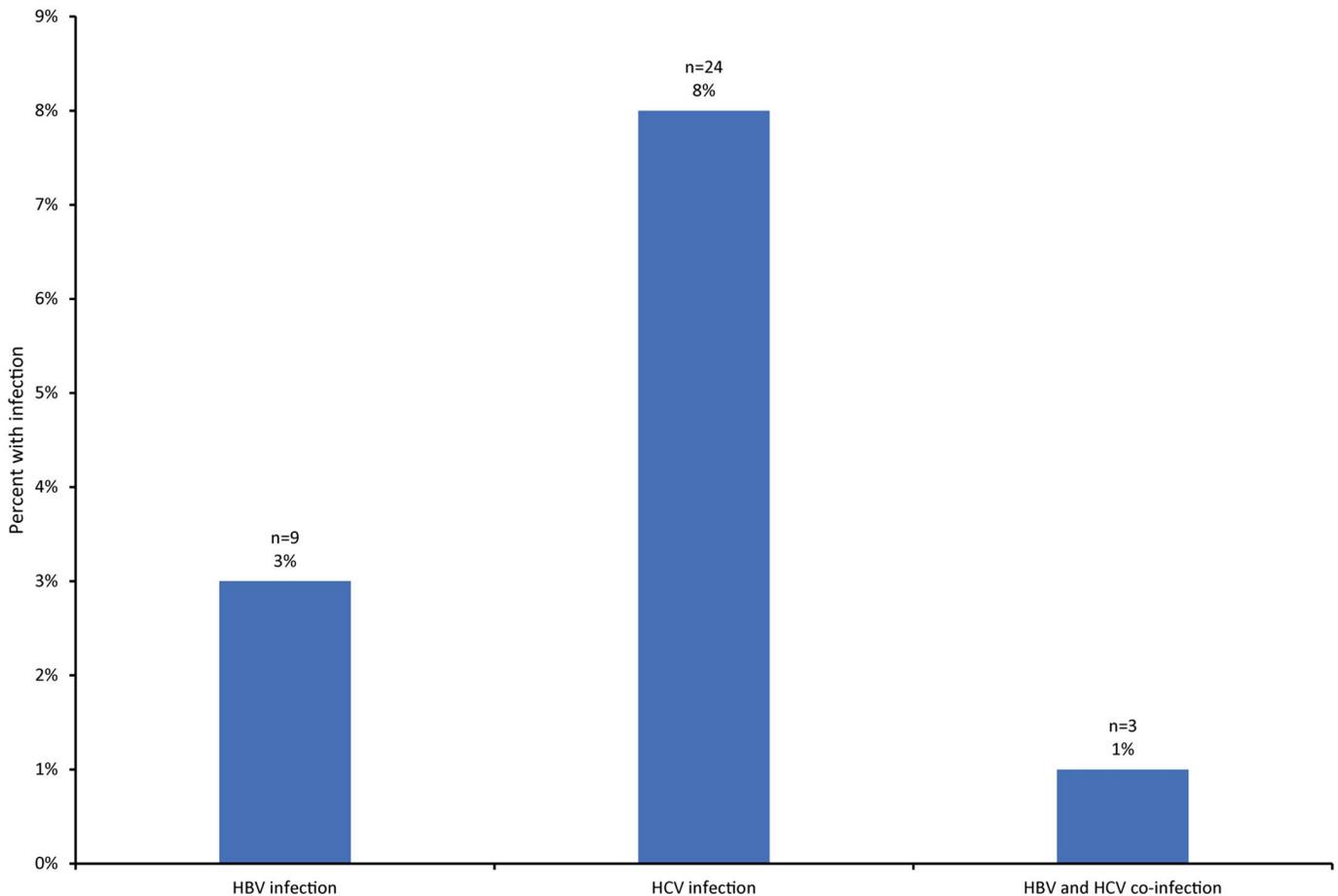


FIG 2 Frequency distribution of hepatitis B surface antigen (HBsAg), hepatitis C virus antibodies (anti-HCV), and hepatitis B virus (HBV) and hepatitis C virus (HCV) markers among 300 pregnant women in Rohingya refugee camp, October 2017.

of Myanmar where the refugees emigrated from and only 0.6% of the general population of Bangladesh, the host community.^{11,12} The high prevalence of HCV among the Rohingya, 18 times more than the prevalence in the general population of Bangladesh, is likely to pose challenges to the healthcare systems as observed in other studies.¹³

Adult males had the highest prevalence of HBV. High HBV prevalence rates have similarly been observed among Burmese refugees (from Myanmar) relocated to the United States during 2006 and 2011.¹⁴ In contrast to adults, children had a lower HBV prevalence likely due to increased hepatitis B vaccine access. This observation has been observed in other studies among refugees.^{15,16}

Future studies are needed to confirm trends in disease burden in the Rohingya populations and identify HBV and HCV transmission risk to guide prevention of transmission and disease. The Rohingya have faced decades-long human oppression, poor living conditions, and denial of basic health-care

services exposing them to numerous risks for HBV and HCV infection.¹⁷ Potential risk factors include exposure to non-sterile injection equipment by non-qualified health-care practitioners or during injection drug use; exposure to contaminated personal care items (e.g., instruments during shaving at barber shops); circumcision by traditional practitioners; and cosmetic procedures (e.g., ear and nose piercing). Females are also at an increased risk of exposure resulting from injuries from gender-based violence, and unsafe obstetric and gynecological procedures.¹⁸ There is also growing concern about the increased prevalence of commercial sex work and drug use, which is likely to fuel the spread of HIV, HBV, and HCV infections.¹⁹

The hepatitis B birth dose vaccine in addition to hepatitis B vaccine given to adults at high risk of HBV infection, are not available routinely. The World Health Organization (WHO) is committed to supporting the Government of Bangladesh in implementing and scale up routine immunization programs targeting Rohingya refugee camps.²⁰ For the Rohingya refugee population, there is need to

incorporate strategies to routinely provide hepatitis B birth dose vaccine and hepatitis B vaccine to adults at risk of HBV infection in a comprehensive hepatitis control plan, which should include additional priorities for hepatitis prevention, testing, and linkage to care and treatment.

The two studies have several limitations. First, the convenience sample of Rohingya pregnant women might not be representative of this Rohingya refugee population. Despite having similar estimates as those of other studies conducted within the camp, there is need to conduct well-structured prevalence studies to provide a more accurate estimate of the burden of HBV and HCV among the Rohingya refugees. Second, ELISA test was used to confirm presence of HCV antibodies for samples that tested positive for HCV using the rapid test kits. HCV RNA tests are recommended to assess the proportion of persons currently infected with HCV.^{21,22} Third, we did not capture data on risk factors for HBV and HCV infection. We are, therefore, not able to clearly characterize the risk factors for infection to inform specific intervention measures.

CONCLUSION

Based on study results, the Rohingya refugee population in Bangladesh have alarmingly high rates of HBV and HCV infection. There is an immediate need for well-organized studies to assess risk for viral transmission and the capacity of health systems in the camps to deliver preventive, care, and treatment services. The ultimate goal of disease elimination is health equity. International organizations together with the Government of Bangladesh can join forces to ensure the largest refugee population in the world has equitable access to hepatitis prevention, care, and treatment services. With only a few years remaining to achieve the 2030 WHO viral hepatitis elimination goals, there is urgent need to accelerate the implementation of hepatitis elimination strategies among the Rohingya and other marginalized populations.

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