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Prevalence of hepatitis C virus infections among populations in Rohingya refugee camps, Cox's Bazar, Bangladesh

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Abstract
Purpose: Hepatitis C is a blood-borne virus that particularly affects the liver. The infection often gets early in life and remains an asymptomatic gradually progressive disease. In Bangladesh, the 8th most common cause of death is the liver disease and the age-adjusted death rate is 19.26% per 100,000 population. The hepatitis C virus can result in acute or chronic infections. The data on the prevalence of HCV in Bangladesh are limited.
Study Design: Our recent study is to undertake a pilot study among the general population in the Rohingya refugee camps in Cox's Bazar, Bangladesh. Our study was conducted with a total of 2,146 samples and tested for anti-HCV among the Rohingya general community in the Camps from January 2022 to December 2022.
Results: Out of 2,146 individuals, 35% were positive and 65% were negative. Among the total positive cases, 85% were female and 15% were male. Among all the individuals, the positive cases categorized into old adults, middle-aged adults, and young adults that corresponds to 8%, 33%, and 60%, respectively. The highest number of positive cases were found in June (9.43%), July (15.09%), and August (13.75%). The lowest number of positive cases was found in January (3.37%), April (3.91%), and September (6.60%).
Conclusions: Our study has resulted in increased knowledge about the prevalence of hepatitis C in the Rohingya community and there is an urgent need to accelerate the implementation of hepatitis elimination strategies among the Rohingya community and other marginalized populations in Bangladesh.

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Introduction

In 2017, over 7,40,000 Rohingya people fled from Rakhine State, Myanmar, and were hosted in temporary shelters in Cox's Bazar district, Bangladesh (UNHCR, 2017). Due to the influx, the current Rohingya refugee in Bangladesh evaluated at 8,90,000, has outnumbered the local population, resulting in massive strain on the limited resources available in the host country including health care.

Hepatitis C virus (HCV) is a blood-borne infection discovered in 1989. Since 1990, reliable diagnostic methods have been available. On January 1, 1992, blood donor screening for hepatitis C via antibody testing was introduced in Sweden. In countries where blood supply screening is or was suboptimal, the risk of transmission remains, and due to poor hygienic practices, there is still a risk for spread.

The hepatitis C virus is a small and enveloped RNA virus belonging to the family of Flaviviridae, and the genus Hepacivirus. This silent virus infects the hepatocytes and causes liver disease in humans such as acute or chronic hepatitis, and liver cirrhosis,

which are most prominent. Morbidity and mortality due to hepatitis C virus (HCV) infection continue to increase. Viral hepatitis, including hepatitis B and C, are the top leading causes of mortality in the world. More than 1.3 million individuals die every year due to viral hepatitis (UNHCR, 2017). The highest prevalence is in Eastern Europe and Central Asia (Polaris Observatory HCV Collaborators, 2017) [4]. Most recent calculations indicate that about 70 million individuals are infected with chronic hepatitis C in the world (Polaris Observatory HCV Collaborators, 2017) [4].

Bangladesh is a country of 160 million people and belongs to one of the developing countries with multiple constraints and limitations regarding the healthcare delivery system. Thus, the health impact is enormous for almost one million Rohingya refugees added within a short period; especially since the incidents and prevalence of communicable diseases may turn into epidemic parameters. In emergency and crisis settings, food and nutrition, water and sanitation, shelter and nonfood items, access to health services, and information are crucial domains required for the immediate management of suffering refugees (Mahtab *et al*., 2019) [5]. However, chronic infections and chronic diseases take their toll for a prolonged period and even paralyze the entire survival system of the refugees as well as their shelter providers (Mahtab *et al*., 2019) [5].

Bangladesh is endemic to the hepatitis B virus (HBV) and hepatitis C virus (HCV). In this Rohingya refugee crisis, national and international attention is prioritized mostly on shelter, food, and control of acute infections and epidemics. Finally, everyone remains busy to ensure the safe return of these refugees to their native countries. Thus, almost nothing is planned to control and containment of chronic infections; however, the prolonged effects of chronic infections are immense and may shatter all kinds of positive approaches to refugee handling (Mahtab *et al*., 2019) [5]. Therefore, these facts and realities led us to study the prevalence of hepatitis C among general population in the Rohingya refugee camps in Cox's Bazar, Bangladesh.

Materials and Methods

The Rohingya refugee camp is located in Cox's Bazar district, a small town on the southeast coast of Bangladesh (Figure 1). The camp has two sections located in two different sub-districts (locally called "Upazila") of Cox's Bazar, Bangladesh. Kutupalong camp located at Ukhia Upazila and Nayapara camp located at Teknaf Upazila. The Kutupalong camp with a people density of 1,20,000 per square mile is a cluster of 20 camps divided into individual blocks.

Fig 1: Map showing Rakhine State in Myanmar and Cox's Bazar district in Bangladesh

The study was carried out in a Primary Health Care Center namely Food for the Hungry (FH Association) funded by UNHCR, at camp-12, Thaingkhali, Ukhia, Cox's Bazar, Bangladesh. In this study, 2,146 individuals were tested for anti-HCV to determine the prevalence of HCV infection among the Rohingya general community in the Camps from January 2022 to December 2022.

Blood specimens were collected and tested for HCV antibodies (anti-HCV) using rapid test kits, ACRO BIOTECH, Inc, USA (Figure 2).

Fig 2: Rapid HCV Test Kit | Acro Biotech, Inc. | United States

Results

In this study, 2,146 samples were collected and tested for anti-HCV among the Rohingya general community in the Camps from January 2022 to December 2022. Out of 2,146 individuals, 35% were positive and 65% were negative. If we consider the total positive cases, 85% were female and 15% were male. Among the positive cases, the male and females.

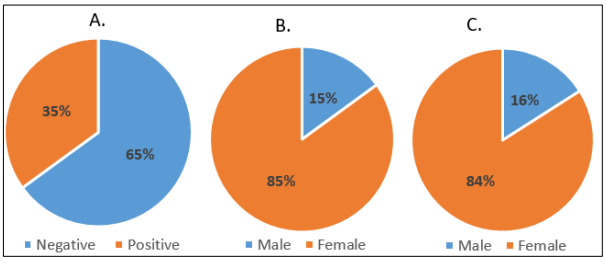

Fig 3: Distribution of HCV positive and negative cases among total patients (A). Frequency of male and female patients among total HCV cases (B). Percentage of male and female patients among total HCV positive patients (C).

All the suspected cases were categorized into different age groups (Table 1). Among all the individuals, the ages of babies, young adults, middle-aged adults and old adults were

grouped as 0-2, 3-39, 40-59 and ≥ 60, respectively.
Among all the individuals, a total of 121 were old adults, 57 were positive among them (~ 8% of total positive cases), 242 out of 500 middle-aged adults were positive (~ 33% of total positive cases). Young adults and babies were 1517, and 8, respectively and among them, 443 were positive for young adults (~ 60% of total positive cases) and no positive cases were found for all the babies (Table 1).

Table 1: Age and gender-wise distribution of Anti-HCV cases.

Categor y	Negative	Positive	Total	Positive (%)
Baby Male 0-2	3	0	3	0%
Baby Female 0-2	5	0	5	0%
All Baby	8	0	8	0%
Young adults Male 3-39	136	49	185	6.60%
Young adults Female 3-39	938	394	1332	53.10%
All Young adults	1074	443	1517	59.7%
Middle-aged adults Male 40-59	47	41	88	5.53%
Middle-aged adults Female 40-59	211	201	412	27.09%
All Middle-aged adults	258	242	500	32.62%
Old adults Male ≥ 60	33	25	58	3.37%
Old adults Female ≥ 60	31	32	63	4.31%
All Old adults	64	57	121	7.68%
Total	1404	742	2146	100%

The data were collected from the period of January 2022 to December 2022 in the different age groups. The highest number of positive cases were found in June (9.43%), July (15.09%) and August (13.75%). The lowest number of positive cases was found in January (3.37%), April (3.91%) and September (6.60%) (Table 2).

Table 2: Month-wise distribution of HCV positive male and female cases.

Months	Male	Female	Total	Positive (%)
January	4	21	25	3.37%
February	7	52	59	7.95%
March	8	49	57	7.68%
April	4	25	29	3.91%
May	9	47	56	7.55%
June	6	64	70	9.43%
July	17	95	112	15.09%
August	20	82	102	13.75%
September	6	43	49	6.60%
October	12	57	69	9.30%
November	13	49	62	8.36%
December	9	43	52	7.01%
	115	627	742	100%

Discussion

Based on our study findings, more than one in five adult Rohingya refugees were infected with HCV, of particular concern, almost two-thirds (84%) of adult females tested positive for anti-HCV.
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 (Mahtab *et al*., 2019) [5]. Compared to other refugees globally, data from the current study suggests, HCV prevalence is more than double that is around 5.6% in Rohingya refugees, among refugees and immigrant populations originating from high and intermediate HCV-endemic countries (Greenaway *et al*., 2015). In contrast, the HCV prevalence is only an estimated 2.7% of the general population of Myanmar where the refugees emigrated from, and only 0.6% of the general population of Bangladesh, the host community (Lwin *et al*., 2017; DGHS, 2019). The high prevalence of HCV among the Rohingya refugees, 18 times more than the general population of Bangladesh, is probable to pose demanding situations to the healthcare systems as observed in other studies (Sharma *et al*., 2015) [9]. Adult females had the highest prevalence of HCV. In contrast to adults, children had a lower HCV prevalence as the prevalence of the hepatitis C virus was found to increase with age.
Future studies are needed to confirm trends in disease burden in the Rohingya populations and identify HCV transmission risks to guide the prevention of transmission and disease. The Rohingya refugees have faced decades-long human oppression, poor living conditions, and denial of basic healthcare services exposing them to numerous risks for HBV and HCV infections. 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 barbershops), 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, unsafe obstetric and gynecological procedures (Stoken, 2020) [11]. 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 (Taufiq, 2019) [12]. There is no vaccine for hepatitis C. Avoiding behaviors that can spread the disease, especially injecting drugs is the best way to prevent hepatitis C. Another important element is getting tested for hepatitis C because treatments can cure most people with hepatitis C in 8 to 12 weeks of exposure.
For the Rohingya refugee population, there is a need to incorporate strategies to routinely provide awareness to adults at risk of HCV infection in a comprehensive hepatitis control plan including additional priorities for hepatitis prevention, testing, and linkage to care and treatment. This study has several limitations. First, the convenience sample of the Rohingya community might not be representative of this Rohingya refugee population. Despite having similar estimates to those of other studies conducted within the camp, there is a need to conduct well-structured prevalence studies to provide a more accurate estimate of the burden of HCV among the Rohingya refugees. Second, the ELISA test was

not used to confirm the presence of HCV antibodies for samples that tested positive for HCV. To assess the proportion of persons currently infected with HCV, HCV-RNA tests are recommended (CDC, 2013; Chou *et al*., 2013). Third, we did not capture data on risk factors for HCV infection. We are, therefore, not able to characterize the risk factors for infection to inform specific intervention measures, distinctly.

Conclusion

Based on study results, the Rohingya refugee population in Bangladesh has alarmingly high rates of HCV infection. There is a prompt need for well-organized studies to assess the risk for viral transmission and the capacity of health systems in the camps to deliver preventive, and treatment services. The ultimate goal of disease elimination is health equity. It seems that a more holistic view of HCV needs to be adopted to provide adequate care and support for people living with the virus. It appears that the physical symptoms of the virus itself and the potential decline in health are not necessarily perceived as the biggest impacts of HCV. In contrast, the most distressing impacts can arise from the psychological and social effects of living with a stigmatized, infectious illness and dealing with the subsequent attitudes and reactions within the immediate social environment and the wider community.

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 and treatment services with care. With only a few years remaining to achieve 2030 WHO viral hepatitis elimination goals, there is an urgent need to accelerate the implementation of hepatitis elimination strategies among the Rohingya and other marginalized populations.

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