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ORIGINAL ARTICLE

Impact of COVID-19 pandemic on HCV care cascade in Rwanda: Ecological study from July 2019 to June 2021

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BACKGROUND

Many services including those related to hepatitis C virus (HCV) care were disrupted during the coronavirus disease 2019 (COVID-19) pandemic globally. A study using mathematical modelling evaluated the impact of the COVID-19 pandemic on the global HCV elimination in 110 countries, and showed that a 1-year delay in hepatitis diagnosis and treatment could result in an additional 44,800 liver cancers and 72,300 deaths from HCV globally by 2030.[1] This is especially concerning as the COVID-19 pandemic has been disrupting healthcare services for over two years. In Africa, in addition to causing the deaths of at least 200,000 people, the COVID-19 pandemic disrupted critical health services and undermined years of progress fighting other deadly diseases, such as viral hepatitis, human immunodeficiency virus, tuberculosis, and malaria.[2] A survey conducted in 44 countries including 12 in Africa has shown more than a 50% decline in the screening and treatment volume for viral hepatitis.[3] In Rwanda, the first case of COVID-19 was confirmed on 14 March 2020, and cases increased daily, reaching a peak in October 2021 (Figure 1). Furthermore, from December 2020 to the end of June 2021, in Rwanda, the cumulative overall COVID-19 cases increased from 8383 to 39,047 cases, and an increased number of deaths were reported, from 92 to 438 deaths (WHO Africa 2021).

Starting from March 2020 different control measures including travel restrictions and quarantine were established; these measures included a complete nationwide lockdown from March to May 2020, and, another one-month lockdown was implemented in the Rwandan Capital (Kigali City) from January 18th, 2021.[4] Daily activities in different sectors such as retail, health, recreation for the population were disrupted as a result of these measures during the period of COVID-19 pandemic, including HCV services (Figure 2).

Disruption of services for HCV care including testing, treatment and post-treatment follow-up could negatively impact the HCV elimination plan launched in December 2018.[5] Rwanda was committed to screen seven million of its population aged 15 years and above by 2023, and treat 112,000 people with chronic HCV by May 2021.[6] With COVID-19, the completion of HCV elimination in Rwanda may be delayed. We assessed the impact of the COVID-19 pandemic on the HCV care cascade in Rwanda.

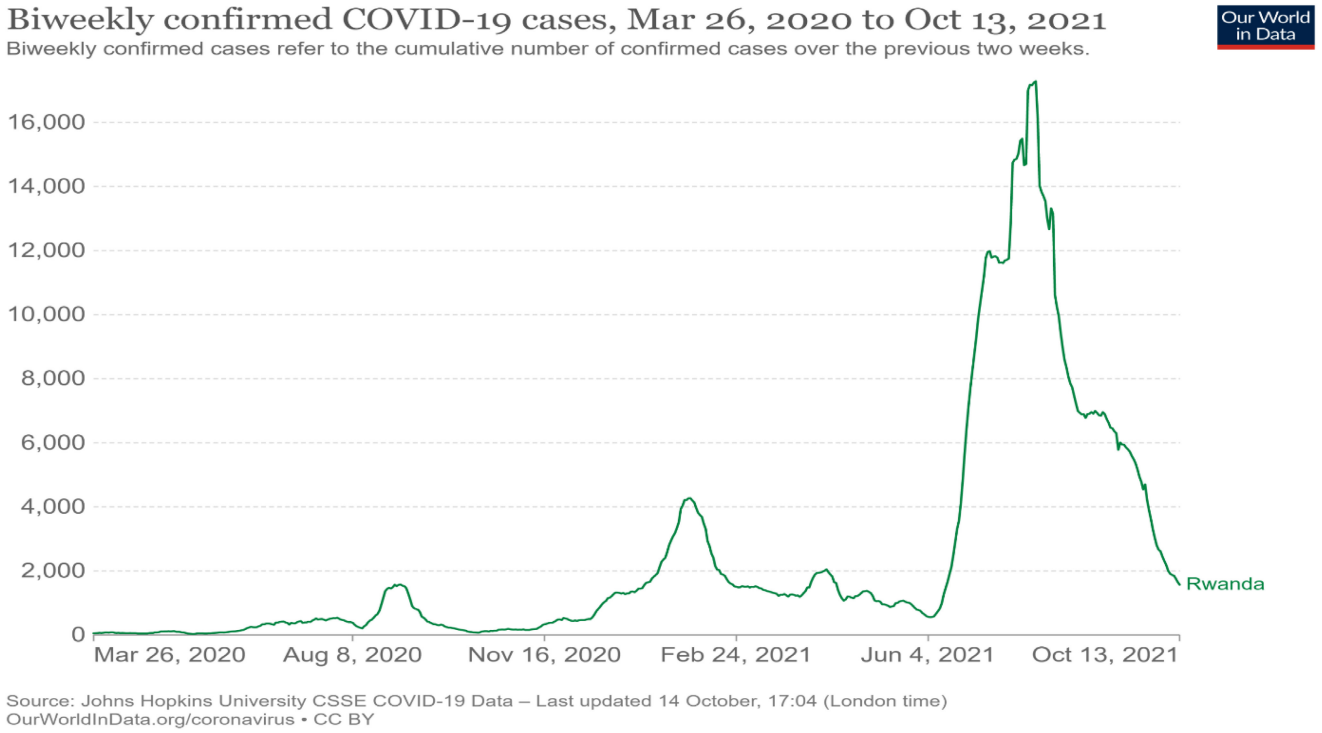

FIGURE 1 Biweekly confirmed COVID-19 cases from March 26, 2020, to October 13, 2021, in Rwanda

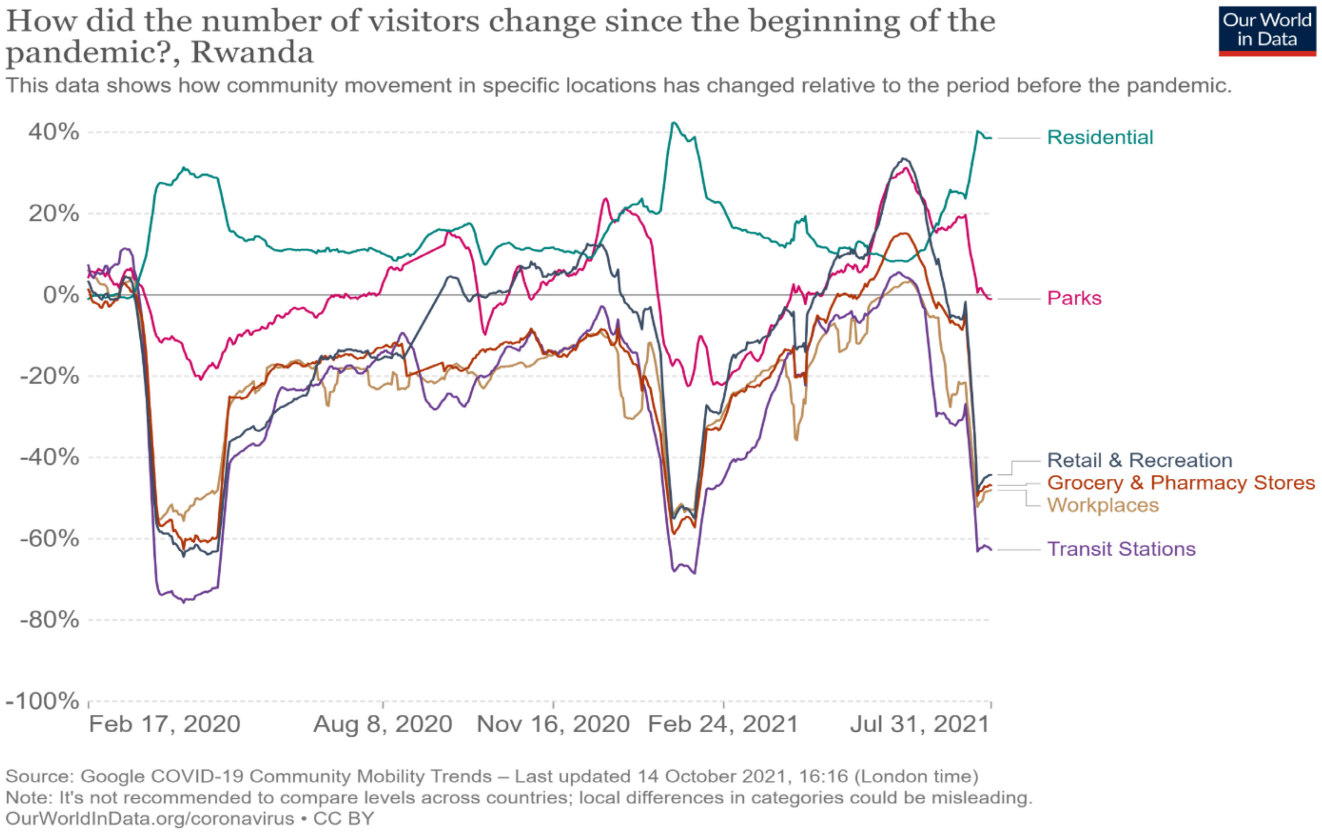

FIGURE 2 Visitor changes in different fields since the beginning of COVID-19 pandemic in Rwanda

METHOD

This study used data from the Rwanda Health Management Information System (HMIS). HMIS is a monthly reporting system to collect data for different diseases from community health workers (CHWs) in all health facilities, including public health centers, referral hospitals, and private clinics in Rwanda.[7] It was established in 1998 and upgraded to a web-based system known as the District Health Information System version 2 (DHIS2) for improving the quality of routinely corrected data in 2012 and indicators on HCV were introduced in HMIS in 2015.[8]

This analysis included data for all individuals who received HCV services from screening to treatment and care [sustained virologic response at week 12 (SVR12) post-treatment], from July 2019 to June 2021. We defined HCV care cascade as (1) individuals tested positive using HCV-antibody tests, (2) individuals tested for HCV RNA using polymerase chain reaction (PCR) tests, (3) individuals with HCV RNA or HCV viral loads detectable, (4) patients eligible for treatment: adults patients over 14 years old with HCV RNA detectable, non-pregnant and without hepatocellular carcinoma (HCC), (5) patients on treatment: patients confirmed positive for chronic HCV on direct-acting antivirals (DAAs) treatment, (6) assessed for SVR12: individuals tested for HCV RNA 12 weeks after DAAs treatment, (7) achieved SVR12: individuals treated and tested for HCV RNA 12 weeks after DAAs treatment showing non-detectable HCV RNA or HCV viral loads. The extraction and the use of data from the database was authorized by Rwanda Biomedical Center (No. 3310/RBC/2021).

RESULTS

In total, from July 2019 to June 2021, 2,983,440 people were screened for HCV. The period of pre-COVID-19 (July 2019–January 2020) was marked with relatively small number of people screened (in total 125,916 and a monthly average of 17,988 individuals) followed by an increase in screening during February 2020–June 2020. The monthly average number of individuals screened before and during COVID-19 were 36,062 and 168,435 respectively. The highest monthly number of people screened was recorded in May 2020 (n = 623,985) while the lowest number was seen in July 2019 (n = 7788). Overall, from July 2019 to June 2021, 82,998 people (2.8%) tested positive for anti-HCV, with the highest prevalence of anti-HCV positivity in November 2019 (11.9%), and the lowest in May 2021 (1.3%) (Figure 3).

Regarding HCV treatment and care, the number of anti-HCV positive patients who received HCV RNA testing was lowest in early 2020 and there was a gradual increase over the study period until June 2021. However, HCV treatment provision was scaled up significantly starting from June to December 2020. The number of individuals assessed for SVR12 fluctuated over the study period (Figure 4).

DISCUSSION

In Rwanda, the number of people screened for HCV increased between July 2019 and June 2020, particularly after March 2020. This increase of HCV screening during the lockdown period reflects the implementation of HCV elimination plan launched in early 2020. Under the leadership of Rwanda National HCV control program, every district committed to screen a fixed number of individuals until end of 2023. Therefore, screening for HCV continued for the first few months after the first cases of COVID-19 were detected in March 2020, in order to maintain the momentum towards the HCV elimination. However, the activities eventually slowed down as the COVID-19 pandemic continued. Although the HCV care services did not completely cease during the pandemic, the volume of screening began to decline after July 2020.

From July 2019 to January 2020, HCV screening was mainly administered among the high-risk population (over 45 years), which explains the high prevalence seen during this period. With the introduction of HCV elimination program in February 2020, universal HCV screening of the general population over 15 years of age was implemented, and every district in Rwanda committed to screen a targeted number of people for HCV, which is why the number of screened for HCV remained higher even during the lockdown period, until June 2020. The volume of people screened decreased from July to November 2020. During this period, health-care providers involved in the screening were also providing treatment to people who were diagnosed in the previous months, while additional number of health-care providers were being trained in HCV management. In the later months (December 2020–June 2021), testing volumes started to stabilize, as well as the proportions of HCV antibody positivity. Existing and newly trained health-care providers continued screening of general population aged 15 years and above, while providing treatment to those eligible to treatment.

Because of Rwanda's HCV elimination program implementation, our study findings are different from other studies that reported decreasing HCV program activities such as testing immediate after declaration of pandemic and imposition of measures to control spread of COVID-19.[3,9,10] The World Hepatitis Alliance survey conducted in 32 countries with 132 hepatitis service providers and civil society organizations has shown that 64% of respondents reported disrupted access to viral hepatitis testing among HCV-positive patients during the COVID-19 pandemic. In this survey, 52% of

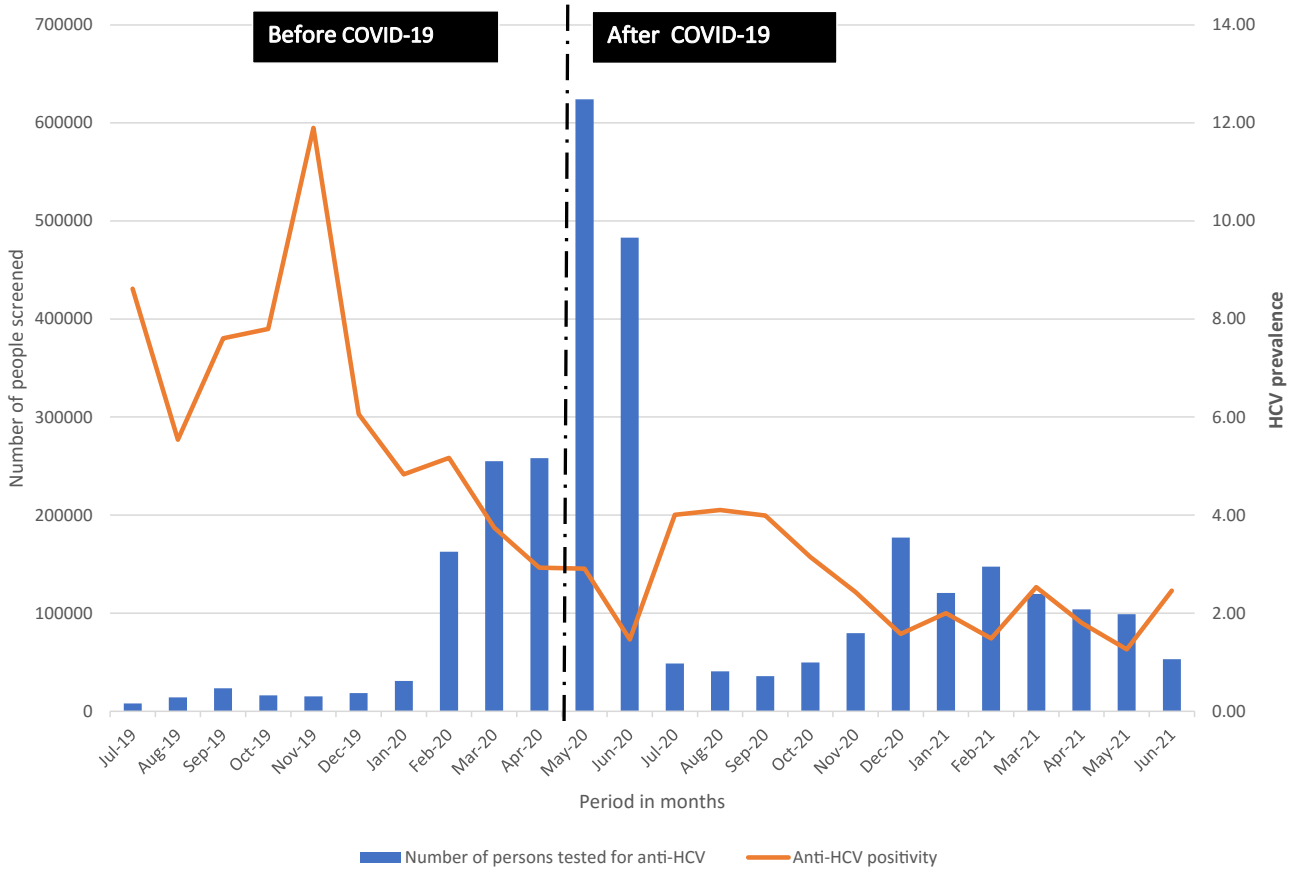

FIGURE 3 Trends of people screened for HCV and prevalence of anti-HCV positivity from July 2019 to June 2021

respondents from middle- and low-income countries reported that people were unable to access treatment.[10]

In terms of HCV treatment initiation, we found that during the first lockdown (March to May 2020), the number of patients eligible for treatment who received DAAs decreased, but then increased afterward, peaking in September 2020. Between August and November 2020, 561 nurses and physicians were trained with HCV treatment guidelines including prescription of DAAs for the majority of patients. As a result, all patients who had been waiting for treatment received HCV treatment and care services during that period of August to November 2020. This impact in increasing the number of patients who newly initiated HCV treatment among the monthly eligible ones and go over of the targeted number in July, and September 2020. However, such activities were still significantly lower than targets set in Rwanda's HCV elimination program. The disruption of HCV treatment services observed in our study was similar during the total lockdown as reported in other studies.[9,10] However, the majority of patients in Rwanda did receive the treatment and other HCV services despite the delays in the health-care services during the COVID-19 pandemic, although not up to the level aimed in the elimination plan.

It is important to note that our study period ended in June 2021, and Rwanda experienced the greatest increase in COVID-19 cases in October 2021, 4 months after our study period. It is expected that there may have been delays and disruptions in HCV care services following this peak in COVID-19 cases. Therefore, there is a need to continue monitoring whether disruptions in health services are returning, and this trend warrants continued surveillance of impact on HCV services, especially screening and treatment.

This study has strengths and limitations. The major strength of this study is the use of countrywide data and the big sample size. We were able to analyze the data including every person in Rwanda who received HCV care and treatment services; therefore, the results are representative of the national population. However, an ecological study such as this one is subject to several limitations including ecological fallacy where results from some health facilities could be attributed to the whole region. Other limitations include potential under-reporting in some health facilities and limited variables, such as sex and age, that could help explain which subgroups of the population were most affected by COVID-19. Fortunately, the quality of data from HMIS are audited and show

FIGURE 4 Trends in HCV RNA testing, treatment initiation, and SVR12 assessment

several indicators with high quality and consistency in reporting trends across districts (7). Finally, since we did not have data on the demographic and clinical characteristics of people, we are unable to assess whether certain subgroups of population were disproportionately affected by various pandemic disruptions, perhaps leading to further marginalization. Future studies would benefit from considering demographic and clinical characteristics to determine which groups of population may have faced unequal delays in accessing care and services, so that re-engagement planning and resource allocation may be tailored accordingly.

CONCLUSION

Overall, more people in Rwanda were screened in the early months of 2020 compared to the early months of 2021. However, the number of patients who received subsequent services in the HCV care cascade such as treatment and post-treatment follow-up remained low and decreased in 2020 and 2021 compared to 2019, likely due to the service disruptions caused by the COVID-19 pandemic. In order to achieve the hepatitis elimination goals, it is essential to plan for the re-engagement of persons who may have suffered delays in hepatitis care during the COVID-19 pandemic.

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CONFLICT OF INTEREST

This study used routine data collected by Rwanda Biomedical center through HMIS, there is no conflict of interest with any person except Dr. Naveed Z. Janjua consulted for AbbVie but not for this study. N.J. advises and is on the speaker's bureau of Abbvie. S.B. received grants from Gilead and Abbvie.

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