

Healthcare cost and access to care for viral hepatitis in Ethiopia

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ABSTRACT: *Introduction:* Viral hepatitis is an emerging threat. The economic impact of these infections is immense since liver cancer has a high fatality rate in Africa and usually affects economically productive age groups. However, little is known of the state of healthcare cost and access to care for such infections in the region (and especially in Ethiopia).

Objective and Study design: the present study investigated the current status of healthcare access in Ethiopia for patients with hepatitis B (HBV) and C (HCV) through expert surveys using a pre-defined questionnaire.

Principal findings: The survey results showed a heavy burden of HBV and HCV in Ethiopia, mostly affecting the economically productive age group in the middle and lower economic classes. Unfortunately, the diagnosis rates for both HBV and HCV cases are very low. Moreover, the treatment rates are also low due lack of access and affordability. There is no well-established health insurance system in Ethiopia. The cost of healthcare is mainly borne out-of-pocket by patients.

Conclusions: There is a need to increase hepatitis awareness among the general public and healthcare workers. Subsidies for diagnosis and treatment are also urgently needed. Vaccination needs to be extended to at-risk populations.

KEYWORDS: Hepatitis, Ethiopia, Cost of care, Health access, Awareness, HBV, HCV.

1 INTRODUCTION

Hepatitis is inflammation of the liver, generally caused by infection with five different types of hepatitis viruses: hepatitis A (HAV), hepatitis B (HBV), hepatitis C (HCV), hepatitis D (HDV), and hepatitis E (HEV). HAV and HEV are transmitted primarily through contaminated food and water, while, HBV and HCV are primarily transmitted via the muco-cutaneous route: infected blood transfusion, unprotected sex (although less common with HCV), and the use of non-sterilized needles and syringes (especially in injection drug use, tattooing, scarification, and nosocomial transmission). While most patients recover from acute hepatitis conditions, many progress to the chronic stage, in which liver damage becomes permanent and continuous. Chronic hepatitis if uncontrolled can often lead to life-threatening conditions such as cirrhosis, upper gastro-intestinal bleeding, hepatocellular carcinoma, hepato-renal syndrome, and bacterial peritonitis.

The World Health Organization (WHO) and the U.S. Centers for Disease Control (CDC) estimate that over 500 million people are currently living with chronic viral hepatitis. Nearly 1 million die every year of the consequences of hepatitis, especially cirrhosis and liver cancer. An estimated 57% of liver cirrhosis and 78% primary liver cancer cases are believed to result from HBV or HCV infections [1, 2]. In Africa, the burden of viral hepatitis is believed to be significantly high. The prevalence of HBV is estimated to be 8% in West Africa, and 5%–7% in Central, Eastern, and Southern Africa [2]. Approximately 70%–95% of the adult population in Africa show evidence of past exposure to HBV infection, with an

estimated hepatitis B surface antigen (HBsAg) sero-prevalence of 6%–20% [3]. The WHO estimates the prevalence of HCV in the African continent at 5.3% [4], it is markedly higher in some areas, particularly Egypt (17.5%) [4].

Ethiopia is one of the fast growing economies in Africa with 50% of its population being under the age of 18, indicating the hidden potential of the country in terms of a future productive work force. However, the risk posed by viral hepatitis could greatly affect the future of this nation. In Kenya and Ethiopia it is estimated that more than 60% of chronic liver disease and up to 80% of hepatocellular cancers are due to chronic hepatitis B and C viral infections [5]. A press report published on March, 28, 2013, claimed that over 10 million Ethiopians are infected with HBV [6]. Yet the majority of the infected population is unaware of their disease status. This is most likely a result of a general lack of awareness. Transmission of these viruses in areas of endemicity is mainly horizontal during childhood, probably through saliva, traces of blood, unsterile needles, scarification, etc [7, 8]. Indeed, there is very limited knowledge on hepatitis prevalence in Ethiopia, which has resulted in minimal awareness of the disease as well as insufficient budgetary and organizational focus [9].

As one step toward better information on the burden of viral hepatitis in Ethiopia, the present study investigated the current status of healthcare access in Ethiopia for patients with HBV and HCV infection through expert surveys using a pre-defined questionnaire.

2 METHODS

In order to understand the burden of viral hepatitis and the on-ground situation regarding policy, awareness, and access to care, we conducted a structured expert survey with key national experts in Ethiopia. To begin with, a literature review was conducted of scientific articles on HBV and HCV specific to Ethiopia from indexed and non-indexed journals and reports. Several data gaps were discovered in the literature review. To address these data gaps, an expert survey was conducted with hepatitis clinical stakeholders. The survey was conducted with a standard questionnaire. The questionnaire was designed based on FSRC's proprietary "CA²RE" (Collaboration, Awareness, Access to health, Research and Epidemiology) methodology which is aimed at providing solutions to healthcare scenarios in emerging economies. FSRC's theoretical and in-field experience in these environments means "CA²RE" has been designed such that the majority of both the problems and solutions to healthcare and pharmaceutical market access scenarios of emerging economies can be "bucketed" into CA²RE.

3 RESULTS

3.1 SOCIO-EPIDEMIOLOGY

The published literature on viral hepatitis in Ethiopia is very limited. Structured nation-wide surveillance studies on viral hepatitis in Ethiopia have not been conducted recently. The expert survey suggests that the prevalence of HBV in Ethiopia is approximately 10%–15% and that of HCV is approximately 2%–5% [10]. However, the incidence rates of HBV and HCV have not been studied, and hence there is no clarity on this.

The main modes of transmission in Ethiopia are similar for both HBV and HCV; apart from usual routes of transmission (like sexual, vertical, and reuse of needles and syringes), tattooing, scarification, nosocomial and horizontal transmission (only for HBV) also contribute to the spread [10]. As shown in Table 1, the prevalent genotype for HCV in Ethiopia is mainly genotype 4 (G-4; accounting for 40%–60% of HCV infections), followed by genotype 1 (G-1; accounting for 20%–30% of HCV infections) [10]. While HBV and HCV affect people from all socioeconomic strata, they are relatively more common in the middle and lower socioeconomic strata (Table 1). Both HBV and HCV are relatively more common among men than women, and in the economically productive age group of 18–60 years (Table 1).

3.2 DIAGNOSIS AND TREATMENT

Diagnosis of HBV and HCV cases is usually incidental, (e.g. on donating blood, antenatal visits (antenatal screening for HBV and HCV is not mandatory in the country, although many tertiary hospitals and private hospitals do screen pregnant women for viral hepatitis), pre-employment screening for emigration requirements, and at HIV clinics (Table 2) [10]). Although there are no clear data, available information on the diagnosis rate, treatment rate, and treatment completion rate do not seem to be encouraging (Table 2) [10]. Of those who initiate and complete treatment, nearly 60% of HCV cases attain sustained virological response, whereas hardly 10%–20% of HBV cases respond to treatment [10]. The choice of treatment for HCV infection is ribavirin with interferon, whereas that for HBV involves tenofovir, lamivudine, and interferon (Table 2).

3.3 COST OF MANAGEMENT

Since there is no public funding/subsidy for diagnosis and treatment of HBV and HCV infections in Ethiopia, payment is generally out-of-pocket by the individual (Tables 3 and 4). Some anti-retroviral drugs given for HIV act against HBV, because of which, government policy in Ethiopia restricts the use of these drugs for the treatment of HBV for fear of the emergence of drug resistance. Hence, for mono-infected cases of chronic HBV, the drugs (tenofovir, lamivudine) are not readily available either in the public or private sectors in Ethiopia. Interestingly, HIV–HBV co-infected patients receive free treatment at HIV clinics. However, HIV–HCV co-infected patients currently receive only anti-retroviral therapy and no anti-HCV therapy (Tables 3 and 4).

A majority of the infected are unaware of their disease status, most likely due to the general lack of awareness among the Ethiopian population. The expert survey findings suggest low public awareness of viral hepatitis in Ethiopia; patients generally do not even suspect their positive infection status until they are diagnosed [9]. Lack of awareness and the silent nature of hepatitis leads to late presentation, generally with severe complications [9]. The cost of treatment with repeated complications could be daunting to the average patient in Ethiopia, as shown in Table 4. Awareness among healthcare workers also seems to be lacking; hardly 20%–30% of physicians have clarity on the management of viral hepatitis cases [10].

To prevent the spread of hepatitis, the government of Ethiopia has taken up an initiative to immunize children against HBV as a part of its national Expanded Program on Immunization. The vaccination is provided at the expense of the state to all infants as early as 6 weeks. However, the national coverage of three doses of this vaccination in infants seems to be low (~50%–60%) [10]. Moreover, while the HBV vaccine has been made available free of cost to infants, no such options exist for adults and high-risk groups [9]. The cost of a complete HBV vaccination course at a private center can be as high as US\$60 [10].

4 DISCUSSION

As stated earlier, data on viral hepatitis in Ethiopia is limited as no recent prevalence studies have been conducted to assess the disease burden. The one study conducted in the late 1980s [11] may not represent the true national burden, as the study was conducted in a limited number of subjects ($n = 5270$) and only in young males. Nevertheless, the experts' opinion on the burden of HBV and HCV is also in alignment with earlier published literature and projected estimates [11]. Studies have been conducted with limited scope and in specialized groups such as blood donors, pregnant women, HIV clinic attendees, and prison inmates, but such study results may not represent the true national burden of viral hepatitis.

Though Ethiopia is estimated to have a huge burden of viral hepatitis [6], most of the infected population are unaware of their disease status most likely as a consequence of a general lack of awareness concerning hepatitis. By contrast, awareness among the general public on issues related to HIV seems to be sufficient [9]. This is due to intense public awareness campaigns conducted by national and international organizations. Of course, awareness is key to the success of any venture. Thus, there is a need for hepatitis awareness campaigns similar to those for HIV.

Alongside raising awareness, there is a need to protect the rights of infected individuals through legislation. This would encourage patients to shed guilt and approach healthcare openly. Moreover, there is a need for continuous educational programs for healthcare workers from all sectors (doctors, nurses, ancillary staff, laboratory technicians, etc.). These activities would also enhance advocacy for the management and control of the disease.

The high cost of diagnosis is also another contributing factor to the poor diagnosis rate (Table 3) [9]. Current hepatitis diagnostics and medications are not affordable to the majority of the population [9]. Hence, there is a need to initiate policies to make them affordable or subsidize them. This would improve the diagnosis rate and also enable diagnosis at an early uncomplicated stage of hepatitis. Subsidizing diagnosis would encourage more patients to seek healthcare.

There is also a lack of access to medications for HBV treatment [10]. Since every patient has a natural right to treatment, there is a need to change national policy to make the anti-retroviral drugs freely available to patients. The drugs used for the treatment of HCV patients are beyond the reach of most of the population [10]. Considering the total population of Ethiopia (94.1 million) [12] and the current prevalence of chronic hepatitis (HBV and HCV combined) of 15%, the total patient population in need of effective medication is 14.1 million. From the point of view of economics treating such a huge population may seem to be a heavy burden on the state, especially when the GDP per capita of the country is around 1,300 USD [13]. However, not treating or facilitating access to treatment is an even greater risk, as the cost of treating the eventual complications of hepatitis would far exceed the cost of treatment. Furthermore, the country does not have an established public health insurance system. However, in view of new and more effective treatments becoming available at more

affordable rate it is wise to initiate steps towards public funding for treating hepatitis infections [14]. Hence, there is a necessity to develop strategies for public subsidy for the treatment of viral hepatitis.

HBV, HCV, and HIV share several epidemiological characteristics such as their at-risk populations and transmission routes, which puts HIV-positive individuals at high risk of co-infection with HBV and HCV. This is significant as HIV-hepatitis co-infected individuals show an accelerated course of liver disease, with faster progression to cirrhosis. This scenario is more relevant in Sub-Saharan Africa, which has two-thirds of all of the world's cases of HIV. Researchers who analyzed data on HIV and hepatitis from 20 Sub-Saharan African countries have found a mean prevalence for HBsAg of 15% among people living with HIV, while that of antibodies to HCV was 7% [15]. Hence, it would be prudent to integrate the viral hepatitis program with the existing HIV prevention/control programs and other related healthcare programs.

Furthermore, viral hepatitis patients are diagnosed at several points: in hospitals, HIV clinics, blood banks, antenatal clinics, etc. It would be advisable to integrate these diagnosis points and related health programs with the viral hepatitis program. This would ensure that the patients are not lost to follow-up. However, this sort of integration is complex and care needs to be taken to ensure that the existing programs are not hampered or overburdened.

There are no nationally endorsed guidelines for the management of viral hepatitis [9]. The lack of data on the burden of viral hepatitis in Ethiopia seems to have resulted in inaction at the policy level. Currently, there is no framed hepatitis policy from the Government of Ethiopia. Any strategy to combat viral hepatitis must be multi-pronged: including aspects such as universal vaccination against HBV, creating awareness among the public and healthcare workers, providing access to subsidized diagnosis and treatment, protection of the rights of infected individuals, and mandatory screening of high-risk individuals. To initiate these activities, there is a need for a well-defined national strategy and plan with clearly demarcated goals. As of now, there seems to be only three major programs currently operating that might have an influence on combating the spread of viral hepatitis: screening of blood and blood products (for infectious diseases such as HIV, syphilis, HBV, and HCV is mandatory as per National Blood Transfusion Services guidelines), vaccination program for infants (part of the Expanded Program on Immunization), and injection safety practices in healthcare settings (disposable/auto-disable needles and syringes are recommended) [9]. However, vaccination of high-risk groups such as healthcare workers, community social workers, men who have sex with men, prison inmates, and the armed forces is not yet mandatory [9]. Since HBV can infect any person at any age, state-funded vaccination needs to be made available and accessible to every person.

The Ethiopian Ministry of Health (MoH) has a well-established healthcare delivery system and is the principal authority that regulates and delivers healthcare in the country. Thus, the implementation and penetration of viral hepatitis programs depends exclusively on the MoH's network. Of course, there are several national and international players also operating in the health sector in Ethiopia. For viral hepatitis programs, these existing players provide the simplest avenues for partnership.

Table 1: Socio-epidemiological data of HBV and HCV in Ethiopia

Parameter	HBV	HCV
Prevalence	10%–15%	2%–5%
Transmission	sexual, vertical, blood transfusion, reuse of needles and syringes, tattooing, scarification, nosocomial and horizontal	sexual, vertical, blood transfusion, reuse of needles and syringes, tattooing, scarification, and nosocomial
Genotype prevalence	NA	G-1: 20%–30%; G-2: 5%–20%; G-3: 5%–10%; G-4: 40%–60%; G-5: 1%–5%; G-6: 1%–5%
Male: Female ratio	60:40	
Age distribution		
<18 y	10%–20%	
18-60 y	60%–80%	
>60 y	10%–30%	
Socioeconomic distribution		
Upper	5%–30%	
Middle	30%–80%	
Lower	15%–70%	

Table 2: Diagnosis and treatment parameters for hepatitis patients in Ethiopia

Parameter	HBV	HCV
Diagnosis rate	10%-15%	5%-10%
First time diagnosis	Blood donation, antenatal clinic, dialysis center, medical check-up for emigration	
Treatment rate	<5%	~5%
Treatment completion rate	~50%	~60%
Treatment response rate	10%–20%	~60%
Treatment options/preference	tenofovir, lamivudine, interferon	ribavirin, interferon

Table 3: Cost of diagnosis and treatment for hepatitis infections in Ethiopia

Parameter	HBV (in US\$)	HCV (in US\$)
ELISA	10–15 per test	10–15 per test
PCR	200–300 per test	250–350 per test
Rapid test	5–10 per test	5–10 per test
Other tests	10–30 for other routine tests	30–60 for other routine tests
Ribavirin	NA	Not available in open market
Tenofovir	Not available in open market	NA
Interferon	14 400 for full course of treatment	14 400 for full course of treatment
Lamivudine	Not available in open market	NA

Table 4: Consolidated cost of treatment of HBV and HCV infections, and cost of management of complications in Ethiopia

Consolidated cost of management	HBV (in US\$)	HCV (in US\$)
Chronic infection	10 000–20 000	15 000–18 000
Compensated liver cirrhosis	15 000–18 000	
Decompensated liver cirrhosis	1100–3200	
Hepatocellular carcinoma	1300–5500	
Ascites	1000–2700	
Spontaneous bacterial peritonitis	1200–3000	
Variceal bleeding	2000	
Hepatic encephalopathy	600	

5 CONCLUSIONS

The data on viral hepatitis in Ethiopia is limited. There is a need to conduct systematic studies in this regard. There is lack of awareness among public and healthcare professionals on the current burden of hepatitis in the country. Hence there is a need for educational campaigns. High cost of diagnosis and lack of access to HBV medications have resulted in poor access to care. Hence the diagnostics and medications need to be subsidized to improve access. There is a need to integrate different health services to combat viral hepatitis as the patients are diagnosed at different departments within a hospital. There is need to develop indigenous guidelines to diagnose and treat hepatitis.

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