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State of the HIV, Hepatitis B and C Virus Pandemic from 2003 to 2022 in Burkina Faso: Evolution of Prevalence Trends and Strategic Recommendations to Achieve the WHO's Goal for Their Eradication by 2030

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Abstract

Background: The World Health Organization (WHO) has set a goal to eradicate or at least significantly reduce the prevalence the human immunodeficiency virus (HIV), hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) by 2030. The main objective was to provide an evolving overview of the prevalence of HIV, HBV and HCV infection between 2003 and 2022 in Burkina Faso. **Methods:** It was a retrospective cross-sectional study based on data from 2003 to 2022. The data were collected using information available in the databases of the HOSCO and CERBA laboratories and included all individuals who underwent HIV and/or HBV and/or HCV testing. Data analysis was performed using SPSS version 20.0, EpiInfo 7, and R version 4.1.0. Results were considered statistically significant if $p < 0.05$. **Results:** The study recorded 7432 samples and the mean age of the subjects was 27.98 ± 8.50 years. During this period, the respective prevalence of HIV, HBV, and HCV were 4.66% (346/7432), 8.77% (582/6636) and 5.54% (322/5816). However, from 2003 to 2022, there was a significant decrease ($P < 0.0001$) in HIV-seroprevalence, dropping from 9.60% in 2003 to 2.16% in 2022. On the other hand, there was

no significant difference in the prevalence of HBV (P = 0.282) and HCV (P = 0.861). The prevalence of HIV, HBV, and HCV were described by the following linear equations, respectively: $y = -1.75x + 12.59$; $y = -0.24x + 10.01$ and $y = -0.11x + 6.02$, with "y" corresponding to prevalence and "x" to the years. **Conclusion:** Burkina Faso needs to rigorously apply prevention and control strategies recommended by the WHO by 2030.

Keywords

HIV, Viral Hepatitis B and C, WHO's 2030 Goal, Burkina Faso

1. Introduction

Every year, human immunodeficiency virus (HIV) infection, viral hepatitis, and sexually transmitted infections collectively account for 2.3 million deaths and 1.2 million cases of cancer and continue to have a significant impact on public health worldwide [1]-[3]. Emerging in the early 1980s, HIV experienced an exponential epidemiological spread worldwide [4] and, particularly in the sub-Saharan African region. According to UNAIDS in 2021, 38.4 million people were living with HIV, two-thirds of whom were in sub-Saharan Africa. Among the individuals infected with HIV, there were 680,000 deaths in 2020 [1] [5], 36.7 million were individuals over the age of 15, while 1.7 million were children under the age of 14. Additionally, 54% of all people living with HIV (PLHIV) were female [5]. However, in 2021, only 75% of all PLHIV had access to treatment [3], in 2019, globally, 296 million people were living with chronic hepatitis B, and the hepatitis B virus caused 820,000 deaths, mainly from cirrhosis or hepatocellular carcinoma (HCC), and resulted in 1.5 million new infections [6]. As for the hepatitis C virus, globally, it has already infected 71 million people [7]. Furthermore, it is estimated that 3.26 million children and adolescents worldwide have chronic hepatitis C infection [8] and 1.5 million new cases of hepatitis C infection occur each year. Despite the prevention efforts provided by African governments, it is evident that the pandemic of these three viruses is characterized by high prevalence of HIV (25.6 million) concentrated in sub-Saharan Africa [9], as well as those of HBV (60 million people) [10] and HCV (11 million) [11]. Located in a high-endemicity area for these three infections, the population of Burkina Faso pays a heavy toll each year due to these viruses [12]. Indeed, 2 million people in Burkina Faso are chronically infected with HBV, and 720,000 with HCV. These infections cause nearly 900 deaths per year in the country [1]. Furthermore, studies conducted in Burkina Faso from 2003 to 2022 have reported seroprevalence rates ranging from 1.8% [13] to 10.6% [12] for HIV, between 7.28% [14] and 13.4% [15] for HBV, and between 2.14% [16] and 6.1% [17] or HCV. According to Coilly (2014) [18], nearly 30% of HIV-infected patients are co-infected with HBV and/or HCV. There is a synergistic action of infection triangulation between HIV, HBV, and HCV. Consequently, the hepatitis B and

C viruses would mutually facilitate their co-infection, which would explain the strong correlation between these two oncogenic viruses. This co-infection would also reinforce the co-infection with HIV, and in turn, HIV would promote the co-infection of the oncogenic HBV and HCV viruses. Furthermore, HIV and the hepatitis B and C viruses can be transmitted through blood, such as blood transfusion, sharing of injection equipment, tattooing, scarification, excision with contaminated blades and occupational exposure to blood [13] [15]; through sexual intercourse, including semen and secretions [19] [20]; as well as through vertical transmission from mother to child, involving blood and breastfeeding [21] [22].

Prevention would be the public health intervention with the greatest impact on the elimination of viral hepatitis [23]. In light of this context, the World Health Organization (WHO) has announced its strategy, prioritizing actions to eliminate HIV and viral hepatitis B and C in most regions of the world and to control them in other regions, such as sub-Saharan Africa by 2030 [24]. In line with this, the WHO has set targets to be achieved by 2030, namely: the eradication of HIV [1], a 90% reduction in new cases of chronic hepatitis B and C, and a 65% reduction in mortality due to these infections [25]. The objective of this study was to provide an overview of the trends in HIV, HBV, and HCV prevalence from 2003 to 2022 in Burkina Faso. This could help promote strategic actions to combat their infections.

1.1. Study Type and Population

It was a retrospective cross-sectional study of data from the laboratories of Saint Camille Hospital in Ouagadougou (HOSCO) and the Centre de Recherche Biomoléculaire Pietro Annigoni (CERBA) from 2003 to 2022. This study included individuals who underwent testing for HIV and/or HBV and/or HCV during the study period, regardless of gender, status, or diagnostic circumstances. Among these individuals were pregnant women attending the "Prevention of Mother-to-Child Transmission of HIV" (PMTCT) service, individuals seeking general medical consultations at HOSCO or CERBA, individuals who underwent screenings during World Hepatitis Days, and individuals seeking their serological status for hepatitis B vaccination or prenuptial or prenatal assessments.

1.2. Data Collection

The data were collected using information available in the databases of the HOSCO and CERBA laboratories. The variables of interest included gender, age, and serological results for HIV, HBV, and HCV.

1.3. Laboratory Analyses: Serological and Molecular Diagnosis of HIV, HBV, and HCV

A venous blood sample was collected from each subject, and five milliliters of venous blood were respectively collected in a dry tube and an EDTA tube. The plasma or serum obtained after centrifugation of the samples at 3000 rpm for 10

minutes was used for laboratory analyses. When the analyses were not performed on the same day, the samples were stored at −20˚C or −80˚C. Whole blood spots on dry blood spot (DBS) paper were prepared and kept at room temperature. Similarly, whole blood was stored at −80˚C for future molecular biology research analyses. From 2003 to 2022, numerous immunology reagents and automated systems have evolved and improved. As a result, many diagnostic test reagents used in 2003 are no longer in use today.

1.4. HIV Screening

Serological testing for HIV among patients was conducted using two rapid tests: Determine® (Abbott Laboratories, Tokyo, Japan) and SD Bioline (Standard Diagnostics, Inc., Korea). In cases where the two tests yielded inconsistent results for an individual, an immediate third confirmatory test was recommended following the national algorithm. Another kit, such as Immunocombs (Immuno-Comb®II HIV-1&2 Bispot, Orgenics, Yavne, Israel), was used for confirmation [26]. Nowadays, if doubts persist after employing these three tests, the sample with discordant results is sent to either the Cobas 6000 analyzer for the "Elecsys HIV combi PT" test, which simultaneously detects HIV-1 p24 antigen, anti-HIV-1, and anti-HIV-2 antibodies in a single determination (Roche Diagnostics GmbH, Sandhofer Strasse 116, D-68305 Mannheim, https://www.roche.com/), or a qualitative polymerase chain reaction (PCR) test is performed. DNA extraction from dried blood spots (DBS) was carried out using the QIAamp DNA Blood Mini Kit (QIAGEN, Hilden, Germany) following the manufacturer's instructions. Detection of HIV-1 proviral DNA was performed using the Applied Biosystems Gene Amp® PCR System 9700 with the "Generic HIV DNA Cell" kit (Biocentric, Bandol, France) following the manufacturer's protocol.

1.5. Hepatitis B and C screening

For the rapid diagnosis of HBsAg, rapid test reagents for hepatitis B virus (HBV) were used, which have a sensitivity greater than 99.0%, a specificity of 96.8%, and an accuracy of 98.3% [27] [28]. HBV serological markers (HbsAg, HbsAb, HbeAg, HbeAb, and HbcAb) and anti-HCV were detected using the Enzyme Immuno Assay (EIA) technique with commercial diagnostic kits (ACON Laboratories, Inc., USA). Nowadays, in case of an indeterminate result, the HBV sample was analyzed using an immunology analyzer, the Cobas 6000, for the Elecsys HBsAg II test (Roche Diagnostics GmbH, Sandhofer Strasse 116, D-68305 Mannheim, https://www.roche.com/). For HCV testing, the Elecsys Anti-HCV II kit (Roche Diagnostics GmbH, Sandhofer Strasse 116, D-68305 Mannheim, https://www.roche.com/) was used. If necessary, a qualitative PCR test was performed.

1.6. Data Analysis

The data was collected using Microsoft Excel 2016 software. Data analysis was

performed using SPSS version 20.0, EpiInfo 7, and R version 4.1.0. Results were considered statistically significant if $p < 0.05$.

1.7. Ethical Considerations

The Institutional Ethics Committee of HOSCO/CERBA, through Deliberation No. 2023-02-09 dated February 15, 2023, provided a favorable opinion for this study. Confidentiality and anonymity regarding the information obtained from the various registries and patient records were strictly maintained.

2. Results

2.1. Sociodemographic Characteristics

The study included 7432 individuals, of which 6636, 5816, and 7432 subjects underwent testing for HBV and HVC and HIV respectively. The study population consisted of 60.10% (4467/7432) females and 39.90% (2965/7432) males. The age of the subjects ranged from 15 to 59 years, with a mean age of 26.91 ± 8.50 years. The age group of 20 to 29 years was the most represented, accounting for 47.91% (3561/7432) (Table 1).

Table 1. Demographic characteristics of patients.

Age groups (years)	N	%	Mean age	Female*	%	Male°	%	*----->°: P-value
<20	1721	23.16	18.86 ± 1.02	1,093	63.51	628	36.49	<0.0001
20 – 29	3561	47.91	24.05 ± 2.46	2127	59.73	1434	40.27	<0.0001
30 – 39	1397	18.80	33.74 ± 2.85	793	56.76	604	43.24	<0.0001
40 – 49	553	7.44	43.57 ± 2.67	321	58.05	232	41.95	0.637
>49	200	2.69	53.21 ± 2.47	133	65.50	67	34.50	0.475
Total	7432	100.00	26.91 ± 8.50	4467	60.1	2965	39.9	<0.0001
Sex								
Female	4467		26.70 ± 8.59					P < 0.0001
Male	2965		27.21 ± 8.37					
Total	7432		26.91 ± 8.50					

2.2. HIV, HVB, HCV Burden

Among the 7432 individuals who underwent HIV testing, 4.66% (346/7432) were diagnosed as HIV-positive, with a mean age of 26.66 ± 8.83 years. On the other hand, the prevalence of HBV-positive and HCV-positive individuals was 8.77% (583/6636) and 5.54% (322/5816), respectively, with mean ages of 27.92 ± 8.65 years and 28.65 ± 9.36 years. No significant difference was found between HIV-positive and HIV-negative individuals (p-value = 0.579). However, significant differences were observed between HBV-positive and HBV-negative individuals (p-value = 0.038), as well as between HCV-positive and HCV-negative individuals (p-value = 0.007) (Table 2).

Table 2. Results of HIV, HBV, and HCV tests according to the mean ages of the patients.

	N	%	Mean age	P-value
HIV				
Negative	7086	95.34	26.92 ± 8.49	0.871
Positive	346	4.66	26.66 ± 8.83	
Total	7432	100.00	26.91 ± 8.50	
HBV				
Negative	6054	91.23	27.15 ± 8.53	0.091
Positive	582	8.77	27.92 ± 8.65	
Total	6636	100.00	27.53 ± 8.50	
HCV				
Negative	5494	94.46	27.32 ± 8.56	0.511
Positive	322	5.54	28.65 ± 9.36	
Total	5816	100.00	27.98 ± 8.50	

It is worth noting that a high and low prevalence of HIV infection were observed in individuals aged 30 to 39 years (5.73%) and those under 20 years (4.30%), respectively. Similarly, a high and low prevalence of HBV infection was observed in individuals aged 40 to 49 years and those under 15 years, with rates of 11.02% and 6.96% (P = 0.004), respectively. Finally, high and low prevalence of HCV were observed in individuals over 49 years old and those under 20 years old, with rates of 10.43% and 4.41% (P = 0.001), respectively (Table 3).

Table 3. Prevalence of HIV, HCV, and HBV according to age groups and gender.

Age groups (years)	**Sex**	Sample size	HIV				HBV					HCV				
		Total	Neg	Pos		P	Total	Neg	Pos		P	Total	Neg	Pos		P-value
			N	N	%			N	N	%			N	N	%	
<20	F	1093	1036	57	3.31	0.014	794	740	54	6.80	0.789	697	662	35	6.97	0.009
	M	628	611	17	0.99		628	583	45	7.17		550	530	20	3.64	
	Total	**172**	**1647**	**74**	**4.30***		**1422**	**1323**	**99**	**6.96€**		1247	1192	**55**	**4.41€**	
20 – 29	F	2127	2007	120	3.37	<0.0001	1764	1623	141	7.99	<0.016	1470	1388	82	5.58	0.975
	M	1434	1400	34	0.95		1433	1283	150	10.47		1261	1191	70	5.55	
	Total	3561	3407	154	4.32		3197	2906	291	9.10		2731	2579	152	5.57	
30 – 39	F	793	724	69	4.94	<0.0001	718	660	58	8.08	0.139	650	615	35	5.38	0.366
	M	604	593	11	0.79		604	541	63	10.43		559	522	37	6.62	
	Total	**1397**	**1317**	**80**	**5.73°**		1322	1201	121	9.15		1209	1137	72	5.95	
40 – 49	F	321	296	25	4.52	0.002	276	241	35	12.68	0.193	252	237	15	5.95	0.703
	M	232	228	4	0.72		232	211	21	9.05		214	203	11	5.14	
	Total	553	524	29	5.24		**508**	**452**	**56**	**11.02¥**		466	440	26	5.58	

Continued

>49	F	133	125	8	6.01	0.146	120	112	8	6.67	<0.361	101	96	5	4.95	0.003
	M	67	66	1	1.49		67	60	7	10.45		62	50	12	19.35	
	Total	200	191	9	4.50		187	172	15	8.02		**163**	**146**	**17**	**10.43**¥	
Total	F	4467	4188	279	6.25	<0.0001	3672	3376	296	8.06	0984	3170	2998	172	5.43	0.686
	M	2965	2898	67	2.26		2964	2678	286	9.65		2646	2496	150	5.67	
	Total	7432	7086	346	4.66		6636	6054	582	8.77		5816	5494	322	5.54	

€ → ¥: P= 0.001, * → °: P= 0.067, £ → Ψ: P< 0.004.

Regarding the rate of co-infection, a total of 5816 individuals who underwent all three tests (HIV, HBV, and HCV) were considered. The rates of coinfection among HIV+/HBV+; HIV+/HCV+; HBV+/HCV+; and HIV+/HBV+/HCV+ individuals were 0.34%, 0.27%, 0.36%, and 0.05%, respectively (Table 4).

Table 4. Co-infection rate among 5816 subjects in the study population.

Co-Infection	Count	Percentage
HIV+/HBV+	20/5816	0.34
HIV+/HVC+	16/5816	0.27
HIV+/HBV+/HCV+	3/5816	0.05
HBV+/HCV+	21/5816	0.36

From 2003 to 2022, there was a significant decline in HIV seroprevalence rates, from 9.60% in 2003 to 2.16% in 2022 with P < 0.0001 (Table 5).

Table 5. Evolution of HIV, HBV, and HCV prevalence from 2003 to 2022.

	2003 - 2004		2005 - 2006		2007 - 2010		2011 - 2012		2013 - 2014		2015 - 2019		2020 - 2022		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
HIV*	38/396	9.60	143/1224	1.68	26/336	7.74	69/1428	4.83	11/630	1.75	33/2216	1.49	26/1202	2.16	346/7432	4.66
HBV¥	41/396	10.35	40/429	9.32	30/336	8.93	122/1427	8.55	57/630	9.05	189/2216	8.53	103/1202	8.57	582/6636	8.77
HCV€	23/396	5.81	26/429	6.06	18/336	5.36	40/607	6.59	27/630	4.29	121/2216	5.46	67/1202	5.57	322/5816	5.54

*2003 – 2004 → 2020 - 2022: HIV: P < 0.0001;
¥2003 – 2004 → 2020 - 2022: HBV: P = 0.282 (NS);
€2003 – 2004 → 2020 - 2022: HCV: P = 0.861 (NS).

The trends in HIV and viral hepatitis B and C prevalence rates in this study were represented by three straight-line equations in Figure 1.

During the same period, two upward variations occurred in 2005 and 2019, but these fluctuations were not statistically significant (P > 0.05). As for hepatitis B and C infections, over the past twenty years, their prevalence rates did not show a statistically significant regression. In 2003 and 2022, the prevalence rates of HBV were 10.35% and 8.57%, respectively (p-value = 0.282); similarly, during the same years, HCV had prevalence rates of 5.81% and 5.57%, respectively

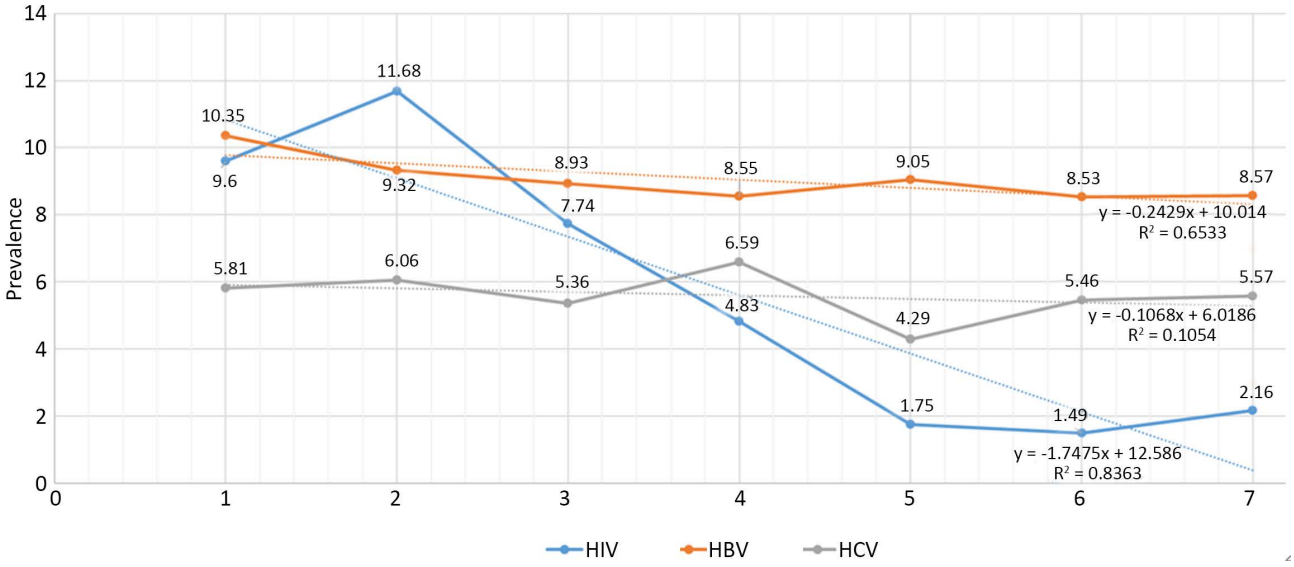

Figure 1. Graph representing the evolution of HIV, HBV, and HCV prevalence rates from 2003 to 2022.

(p-value = 0.861).

A very weak correlation was found between the prevalence of HIV and HBV (r = 0.1451) and between the prevalence of HIV and HCV (r = 0.1451), as shown in **Figure 2(a)** and **Figure 2(b)**. However, a very strong correlation (r = 1) was identified between the prevalence of HBV and HCV, as shown in **Figure 2(c)**.

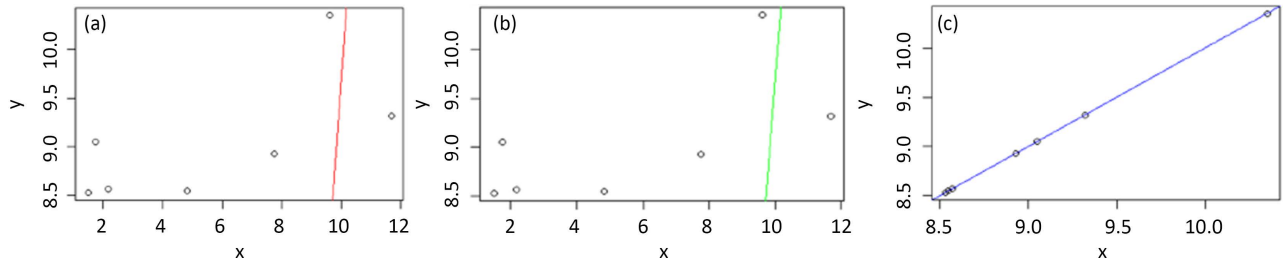

Figure 2. (a) - (c): Correlation of HIV, HBV, and HCV prevalence.

3. Discussion

The global health sector strategies for 2022 - 2030 recommended by the WHO for HIV and viral hepatitis B and C encourage nations to implement targeted strategic responses to eradicate or at least reduce the prevalence rates of these viruses by 2030 [1]. In this context, the present study aimed to assess the epidemiology of HIV, HBV, and HCV in order to contribute to the eradication or significant reduction of their prevalence.

3.1. The Prevalence Rate of HIV

It can be observed that the prevalence rate of HIV in this study, after analysis, shows a decline over the years: in 2003 it was 9.60%; in 2007 it was 7.74%; in 2012 it was 4.83%; in 2014 it was 1.75%; in 2019 it was 1.49%; and in 2022 it was 2.16%. This results in a linear equation of $y = -1.75x + 12.59$ (**Figure 1**) and a

high coefficient of determination (R2 = 0.8363), which quantifies the strength of the linear relationship between the prevalence rates of HIV. Other previous studies conducted in Burkina Faso between 2003 and 2022 have reported similar HIV prevalence rates: 7.9% [29]; 7.6% [30]; 5,2% [31]; 5.4% [32]; 4.9% [33]; 1.8% [13] and 2.6% [34]. However, the different prevalence rates found during the same period, such as 12.7% [35] and 10.6% [17], are significantly higher than those reported in this study. On the other hand, a lower prevalence rate was found compared to ours, with a prevalence rate of 1.50% compared to the prevalence rate of 2.6% in this study [36].

Several factors can explain these differences in the results obtained: the location where the sampling was conducted, the target population, the number of samples analyzed, the reagents and laboratory equipment used, and so on.

3.2. The Prevalence of HBV

The prevalence rate of HBV in this study showed a slight decrease over the years from 2003 to 2022: 2003-2004 (10.5%); 2005-2006 (9.32%); 2007-2010 (8.93%); 2015-2019 (8.53%); and 2020-2022 (8.57%). However, this decrease in HBV prevalence rates is not statistically significant (p = 0.282). Data from several other studies conducted on HBV prevalence rates from 2003 to 2022 support the findings of this present study, with reported prevalence rates of 10.44% [37]; 9,3% [38]; 9.8% [22]; 9.1% [39]; 9.1% [40]; 9.8% [36]; 8.57% [15] [41]. However, the different prevalence rates found during the same period, such as 12.04% [29]; 14.96% [15]; 12.17% [32] and 14.47% [42], are significantly higher than those in this study. The trend of HBV prevalence rates in this study is depicted by the linear equation in **Figure 1**. The differences in results obtained compared to other studies can be explained by variations in target populations, analytical methods, and sample sizes.

3.3. The Prevalence of HCV

Just like the prevalence rate of HBV, the prevalence rate of HCV did not show a significant decline over the years from 2003 to 2022: 2003-2004 (5.81%); 2005-2006 (6.06%); 2007-2010 (5.36%); 2015-2019 (5.46%); and 2020-2022 (5.57%). Therefore, this decrease in HCV prevalence rates is not statistically significant (P = 0.861). The findings of other studies conducted on HCV prevalence rates from 2003 to 2022 are consistent with the results of this present study: 6.1% [30] and 6,84% [20]. While prevalence rates of 3.3% [17]; 3.6% [40]; 2.8% [34] and 4.40% [43] have been found by other authors for HCV, which are lower than the results of this study. On the other hand, other authors have found prevalence of 8.5% [38] and 8.69% [15], which are higher than those of this study. Similarly, just like for HBV, the study population, sample size, test kits, and laboratory techniques used may partially explain these differences in results.

The equation of the line generated by the prevalence rates of HCV is as follows: $y = -0.11x + 6.02$ (**Figure 1**), where "x" represents the years and "y" corresponds to the HCV prevalence rates. If "x = 0", then "y = 6.02", indicating an

HCV prevalence rate of 6.02%. Furthermore, if "y = 0", it implies that "x" (representing the years) = 6.02/0.11 = 54.73 years. If the implementation of action plans and strategies for prevention and control of HCV is not effective and continuous in Burkina Faso, it would take about fifty more years for the curve to intersect the x-axis and become zero. The equation of the line for HBV was established as follows: $y = -0.24x + 10.01$. If "x = 0", then "y" = 10.01. And if "y = 0", it implies that "x" = 10.01/0.24 = 41.71 years. If human societies do not strategically act against HBV, it would take more than 39 years to hope for its eradication. Regarding HIV, the following equation is derived from the evolution of its prevalence rates: $y = -1.75x + 12.59$. If "x = 0", then "y" = 12.59. And if "y = 0", it implies that "x" = 12.59/1.75 = 7.19 years. There is a very weak correlation between HIV and HBV prevalence rates (r = 0.1451), as well as between HIV and HCV prevalence rates (r = 0.1451).

3.4. The HIV, HVB, HVC Impact

While HIV shares almost the same transmission routes as HBV and HCV, the HIV prevalence rate is now tending towards zero and no longer shows a correlation with these two oncogenic viruses. However, there still exists a very strong correlation between HBV and HCV prevalence rates, and vice versa. This would explain their relatively high co-infection rate (0.36%) compared to other co-infection rates found in this study (**Table 4**). These two viruses share almost the same transmission routes. Therefore, strategies to combat HBV should also consistently take HCV into account. In addition, factors such as genetic mutations that confer resistance to antiretroviral drugs (ARVs) and the phenomenon of HIV and HBV sanctuary sites in certain tissues of the body modulate these curves and prevent them from reaching the x-axis to become null.

Indeed, the current antiretroviral therapy (ART) effectively suppresses human immunodeficiency virus type 1 (HIV-1) in infected individuals when there are no viral mutations that induce resistance to ARVs [44]. Beyond these mutations and recombination events, in the long term, ART does not eliminate HIV-1-infected cells, and the virus persists in cellular reservoirs. In addition to memory CD4+ T cells, cells of the myeloid lineage, particularly macrophages, are considered an important sanctuary for HIV-1 [44]. Moreover, macrophages are considered to have a long lifespan, resistant to cytopathic effects induced by the virus, and can reside in anatomical sanctuaries with limited penetration of ART, which promotes viral persistence even during ART [45]. Indeed, the persistence of HIV in lifelong infected cells and anatomical sanctuaries represents a major obstacle to HIV eradication.

In order to achieve the 95-95-95 testing and treatment targets among people living with HIV within all sub-populations and age groups by 2025 [46] and the main objective of the Global Health Sector Strategy (GHSS) to eliminate viral hepatitis by 2030, which includes a 90% reduction in new infections and a 65% reduction in mortality [47] [48]. It is crucial and urgent to strengthen prevention measures by consolidating the following actions: information, education, and

communication for social and behavioral change; prevention of mother-to-child transmission of HIV (PMTCT); vaccination against hepatitis B virus (HBV); ensuring the safety of injections, blood products, and surgical interventions; promoting hygiene practices in relation to tattooing, scarification, and circumcision; banning female genital mutilation (FGM), levirate, and "*sororate*"; including HIV, HBV, and HCV testing in premarital and prenatal examinations. It is also necessary to facilitate the strengthening of partnerships, coordination, and resource mobilization. Additionally, there is a need to enhance the surveillance of the epidemic, viral mutations, and ARV/antiviral resistance, as well as promote scientific research. Furthermore, it is important to sustain the reinforcement of protection and support for individuals infected and affected by HIV/AIDS and viral hepatitis B and C through psychological and social care, and to promote universal health insurance coverage in Burkina Faso. Lastly, it is crucial to enhance access to care and medical and community-based management through screening and treatment, including antiretroviral therapy (ART) for HIV and pan-genotypic direct-acting antiviral (DAA) treatments for HCV, as well as hepatitis B vaccination.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

DAAs	Direct-acting antivirals
Anti-HB core	Anti-Hepatitis B core antibody
Anti-HBs	Anti-Hepatitis B surface antibodies
Anti-HCV	Anti-Hepatitis C virus
Anti-HIV P24	Anti-Human Immunodeficiency Virus antibodie
ART	Anti-retroviral therapy
ARVs	Antiretrovirals
CERBA	Centre de Recherche Biomoléculaire Pietro Annigoni
GHSS	Global Health Sector Strategy
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HIV	Human immunodeficiency virus
HOSCO	Hôpital Saint Camille de Ouagadougou
PCR	Polymerase chain reaction
PLWH	People living with HIV
PMTCT	Prevention of mother-to-child transmission of HIV
SPSS	Statistical Package for the Social Sciences
UNAIDS	United Nations Programme on HIV/AIDS
WHO	World Health Organization.