

Research Article

# Profile of Homosexuals, Bisexuals, and Transgender People in Kinshasa, the Democratic Republic of the Congo: A Cross-Sectional Study

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## Abstract

**Introduction:** It has been established that homosexuality plays a considerable role in the persistence of the Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C Virus (HCV) infections, but data related to their extent remains paradoxically fragmentary. **Objectives:** This study aimed to determine the prevalence and determinants of viral infection (Human Immunodeficiency Virus and hepatic viral infections) among homosexuals, bisexuals, and transgenders in Kinshasa, Democratic Republic of the Congo. **Methods:** Between February 1 and March 30, 2022, an analytical cross-sectional study was conducted among Kinshasa's homosexual, bisexual, and transgender populations. The snowball method was used to choose participants from homosexuals' organisations. Sociodemographic information and the prevalence of viral infections (HIV, HBV, and HCV) were included as study parameters. The determinants of viral infections were found using multivariate logistic regression. **Results:** A total of 555 participants (mean age:  $28.5 \pm 7.8$  years, unmarried: 44.9%) were enrolled. Human immunodeficiency virus, hepatitis B, and hepatitis C infection rates were, respectively, 31.5%, 6.3%, and 9.7% prevalent. HIV-HCV, HIV-HBV, and HIV-HBV-HCV coinfection rates were 4.7%, 4.1%, and 0.7%, respectively. HIV and HBV infection had the same risk factors namely piercing, incarceration, prostitution, and non-condom usage. HCV infection was more pronounced among individuals with piercing, STIs and a previous occurrence of jaundice. **Conclusion:** In Kinshasa, HIV, HBV, and HCV infections were widespread among homosexuals, bisexuals, and transgender people. Actions targeting LBGTs are essential to reduce HIV, HCV and HBV infections transmission in the community.

## Keywords

Profile, HIV, Hepatitis, Homosexuality, Bisexuality, Transgender, Kinshasa

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## 1. Introduction

The topic of gender equality has consistently been a subject of discourse and contention, as perspectives continue to vary significantly between nations. The complexity of this discussion is further heightened when the subject of sexual minorities is introduced. Homosexuality has historically been stigmatised and surrounded by numerous superstitious beliefs. However, the presence of this phenomena has not impeded its continuous development, exhibiting a wide range of variations over the course of centuries and across different nations, thereby establishing firm foundations to assert its acknowledgment [1].

The frequency of homosexuality is notable, as it is observed in approximately 15% of legal marriages worldwide, suggesting a growing influence on a global scale. Apart from South Africa, where the decriminalisation of homosexuality has taken place, there is less knowledge regarding the extent of homosexuality throughout Africa. The situation is particularly serious in Democratic Republic of the Congo (DRC), as no statistics pertaining to this matter is currently accessible [2, 3].

Despite the implementation of legislative measures aimed at suppressing homosexuality, this phenomenon persists and continues to proliferate within families, leading to the formation of communities and the establishment of homosexual organisations. These organisations operate as barriers against the repression of homosexuality as well as promote its worldwide growth. Therefore, the prevalence of homosexuality in Western countries such as the United States of America (USA) and France has been estimated at 3.4% and 8.1% respectively [4, 5]. Furthermore, around 4% of individuals in the USA identify as bisexual [6]. In the region of Oceania, Australia accounted for 52% of people claiming as lesbians, according to a sample size of 272 participants [7]. The African continent has a shortage of studies relating to the epidemiology of people identifying as homosexual. Notably, South Africa stands out as the only country with available data, showing an estimated population of around 530,000 people identifying as homosexual [4].

To date, there is a dearth of study addressing the characteristics and prevalence of homosexuality in the DRC, despite the notable prevalence and widespread nature of this phenomenon. Although the frequency and sociodemographic, epidemiological, clinical, and biological characteristics of this worldwide phenomena have been extensively studied in numerous countries, there has been a dearth of information regarding the homosexual population in the DRC within the scientific and governmental spheres. This impedes the formulation of a strategy aimed at protecting those who identify as homosexuals from the risk of acquiring sexually transmitted diseases (STIs), including Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS). The epidemiology of people who identify as homosexual is a topic of interest. Specifically, South Africa has reported a significant population of over 530,000 people who identified as homosexual. The sociodemographic characterization of the lesbian, gay, bisexual, transgender, intersex,

queer/questioning, asexual (LGBTQIA) community has been a topic of controversy and debate in the scientific community, as evidenced by numerous studies and publications. Understanding the magnitude of this community is an invaluable resource that facilitates comprehensive examination through research investigations [8]. Furthermore, the trend of underreporting homosexuality among people surveyed results in a tendency to underestimate its prevalence. At currently, the proportion people engaging in homosexual marriage, especially those identifying as homosexual or lesbian, accounts for only 15% of the worldwide population [9, 10].

The incidence of homosexuality in Europe exhibits significant variation in terms of regional dispersion. In Germany, the estimated prevalence of individuals identifying as bisexual is 1% for both males and females, while the proportion of those identifying as exclusively homosexual is 1.5%. In contrast, Great Britain has reported a higher prevalence of individuals identifying as exclusively homosexual, with a rate of 7% [11-13]. The prevalence of bisexual individuals in France in 1991 was observed to be 21%, whereas in Belgium in 1993 it was found to be 35%, and in the Netherlands in 1989 it was recorded as 29% [11, 12, 14].

The distribution of individuals identifying as homosexual, bisexual, or transgender is characterised by significant disparities, both in terms of overall prevalence and across various sociodemographic factors. In relation to religious affiliations, the findings indicate that 57.9% ( $n = 1,550$ ) of the participants identify themselves as adherents of the Catholic faith. Additionally, 6.0% ( $n = 161$ ) of the respondents associate themselves with the Protestant denomination, while 3.8% ( $n = 103$ ) profess the Muslim religion. Furthermore, 8.1% ( $n = 216$ ) of the individuals adhere to various other religious beliefs. Lastly, 24.2% ( $n = 648$ ) of the participants indicate that they do not align with any particular religion [15, 16].

The level of educational achievement among those who identify as homosexual is distributed as follows: 4% have completed secondary education, 15% have pursued professional education, 24.3% have obtained a college education, and 56.3% have completed a university education [16, 17].

Homosexuality has been identified as a risk and exposure factor for sexually transmitted diseases (STDs), especially HIV/AIDS and hepatitis. Statistical justification has been evident from the onset of the AIDS epidemic. In France, the prevalence of HIV cases recorded until 1988 was predominantly observed among male individuals identifying as homosexual or bisexual, accounting for a significant majority (ranging from 52% to 66%). Subsequently, individuals with close relationships to those within the aforementioned groups (ranging from 45% to 49%) also exhibited a notable representation in the recorded HIV cases [6, 18].

During the period from 2002 to 2007, within the context of the Enhanced Hepatitis Strain Surveillance System in Canada, a total of 8,389 male patients who were either infected with the Hepati-

tis C Virus (HCV) or were subjects of interviews conducted by the aforementioned system were included in the study. Among these individuals, 707 patients (8%) self-reported engaging in sexual activity with other men at some point in their lives. In addition, coinfection with HIV is observed due to the shared transmission channels of these diseases [6, 18].

The aim of this study was to describe the prevalence and determinants of viral infection (HIV, Hepatitis B Virus (HBV), and HCV) among homosexuals, bisexuals, and transgender in Kinshasa.

## 2. Materials and Methods

### 2.1. Study Design

A cross-sectional study was conducted among individuals identifying as homosexual, bisexual, and transgender, living in the city of Kinshasa.

### 2.2. Study Setting

The present investigation was conducted in Kinshasa, the political and administrative centre of DRC. The Democratic Republic of the Congo does not acknowledge the legal status or rights of those who identify as homosexual, bisexual, or transgender. However, in Kinshasa and other regions of the country, there exist organisations that are committed to protecting and providing healthcare services to those who identify as homosexual, bisexual, and transgender. Indeed, individuals of this nature seldom disclose their societal standing and lead covert lifestyles. There exist four prominent associations, namely Edith Cavel, Oasis-ONG, PASCO, and Jeunialisme, each boasting a membership above 1,000 individuals.

### 2.3. Study Population and Sampling Strategy

The study sample consisted of individuals who identified as homosexual, bisexual, and transgender, and were linked with associations located in Kinshasa, DRC. This study encompasses individuals within the age range of 15 to 69 who identify as sexual minorities and possess a clearly established sexual orientation, namely homosexuality, bisexuality, or transgender. Furthermore, participation in this study is contingent upon providing informed consent. The study removed questionnaires that were incomplete.

The sample size for our study was determined using Fischer's formula:  $n \geq Z^2 * P * (1-P) / d^2$ , where the population size is unknown. In this case, it was assumed a prevalence of 0.5 for HIV and hepatitis among homosexuals, as there is no known prevalence. A Z-value of 1.96 and a margin of error (d) of 0.05 were considered. By conducting the aforementioned numerical computation, the value of n as 384 was obtained. Considering the sampling design, the value of 384 was multiplied by 1.3, which represented the assumed design effect. This calculation

gave 499 individuals. Upon accounting for a non-response rate of 10%, the corrected value obtained was 555.

The participants were recruited from organisations dedicated to supporting individuals who identified themselves as homosexual, through a snowball sampling technique. Participants were chosen from the entirety of the 24 health districts in Kinshasa.

### 2.4. Data Collection

The participants were recruited from organisations dedicated to supporting individuals who identify as homosexual, through a snowball sampling technique. Participants have been selected from the entirety of the 24 health districts in Kinshasa.

Age, marital status, education level, occupation, area of residence, ethnic group, and religion were the variables of interest for sociodemographic data, in addition to the prevalence of HIV infection and hepatitis among homosexual, bisexual, and transgender populations.

### 2.5. Data Analysis

Data entry and analysis were carried out using Excel 2013 and Statistical Package for Social Sciences (SPSS) version 24 respectively. The mean and standard deviations were determined for continuous variables. Relative (%) and/or absolute (n) frequency were determined for qualitative variables. Chi-square test was used to compare the proportions.

Multivariate logistic regression analysis was used to identify the factors that contribute to HIV and/or hepatitis infection. The OR and its 95% confidence interval (CI) were calculated to determine the degree of correlation between HIV infection and/or hepatitis and the independent variables in both univariate and multivariate analyses. The level of statistical significance was consequently set at p 0.05.

### 2.6. Ethical Considerations

The Protestant University of Congo's (PUC) ethics and research committee provided its approval and authorization to the study, which was carried out with the identification CEUPC 0088. Additionally, permission was secured by Kinshasa City's Provincial Division of Health to carry out the study. The Provincial Health Division was contacted in advance to obtain permission to perform the study within the city of Kinshasa's health zones.

After being informed of the study's aims and purposes, each participant signed the consent form. He could possibly then drop the study without giving a justification. The data was handled with confidentiality and the questionnaire was anonymous.

## 3. Results

The main sociodemographic characteristics of our study population are listed in [Table 1](#).

**Table 1.** Sociodemographic characteristics of the study population.

	All n=555	Born in Kinshasa n=207	Born outside Kinshasa n=348	p
Age (mean±sd)	28,5 ±7,8	27,1 ±7,0	29,3 ±8,1	0,002
Age group (years)				0,001
13–19	80 (14,4)	32 (15,5)	48 (13,8)	
20–29	235 (42,3)	97 (46,9)	138 (39,7)	
30–39	188 (33,9)	72 (34,8)	116 (33,3)	
40–49	52 (9,4)	6 (2,9)	46 (13,2)	
Marital status				0,748
Married	49 (8,8)	22 (10,6)	27 (7,8)	
Single	249 (44,9)	88 (42,5)	161 (46,3)	
Civil union	56 (10,1)	20 (9,7)	36 (10,3)	
Cohabitation	175 (31,5)	68 (32,9)	107 (30,7)	
Homosexual couple	26 (4,7)	9 (4,3)	17 (4,9)	
Education				0,221
Primary school	48 (8,6)	21 (10,1)	27 (7,8)	
Secondary school	407 (73,3)	143 (69,1)	264 (75,9)	
University	100 (18,0)	43 (20,8)	57 (16,4)	
Occupation				0,730
Unemployed	115 (20,7)	46 (22,2)	69 (19,8)	
Sex workers	110 (19,8)	39 (18,8)	71 (20,4)	
Private employee	245 (44,1)	94 (45,4)	151 (43,4)	
Government employee	85 (15,3)	28 (13,5)	57 (16,4)	
Religion				0,188
Catholic	96 (17,3)	25 (12,1)	71 (20,4)	
Protestant	54 (9,7)	18 (8,7)	36 (10,3)	
Kimbanguist	59 (10,6)	20 (9,7)	39 (11,2)	
Pentecostal Church	270 (48,6)	118 (57,0)	152 (43,7)	
Islamic	11 (2,0)	4 (1,9)	7 (2,0)	
Buddhist	13 (2,3)	8 (3,9)	5 (1,4)	
Atheist	37 (6,7)	11 (5,3)	26 (7,5)	
Other	15 (2,7)	3 (1,4)	12 (3,4)	

The respondents were 28.5±7.8 years old on average. The majority of respondents (73.2%) were between the ages of 20 and 39, single or cohabiting, and holding a secondary education. A little under half of those surveyed practised a liberal profession (44.1%) or attended Pentecostal churches for prayer (48.6%). Outside of Kinshasa, respondents were noticeably older than those who resided there (p 0.001).

### 3.1. Prevalence of HIV, HBV, and HCV Infections Among Homosexuals, Bisexuals, and Transgender People

Of the 555 respondents, 37.3% were infected by at least one

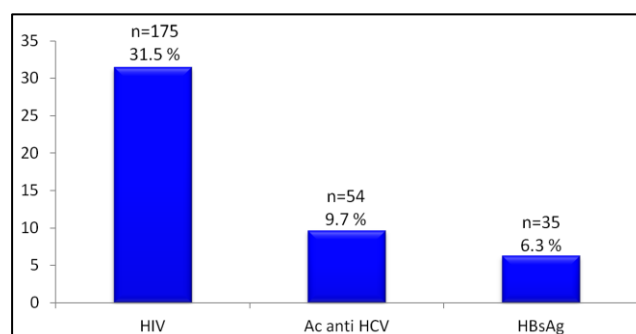
of the three viruses (HIV, HBV, HCV) (Table 2).

**Table 2.** Distribution of participants according to infection profile (n=555).

Infection profile	Number	%
Not infected	348	62,7
Infected with at least one virus	207	37,3
Mono infected	154	27,8
HIV-HCV	26	4,7
HIV-HBV	23	4,1
HIV-HBV-HCV	4	0,7

### 3.2. Prevalence of HIV, HBV, and HCV Infections

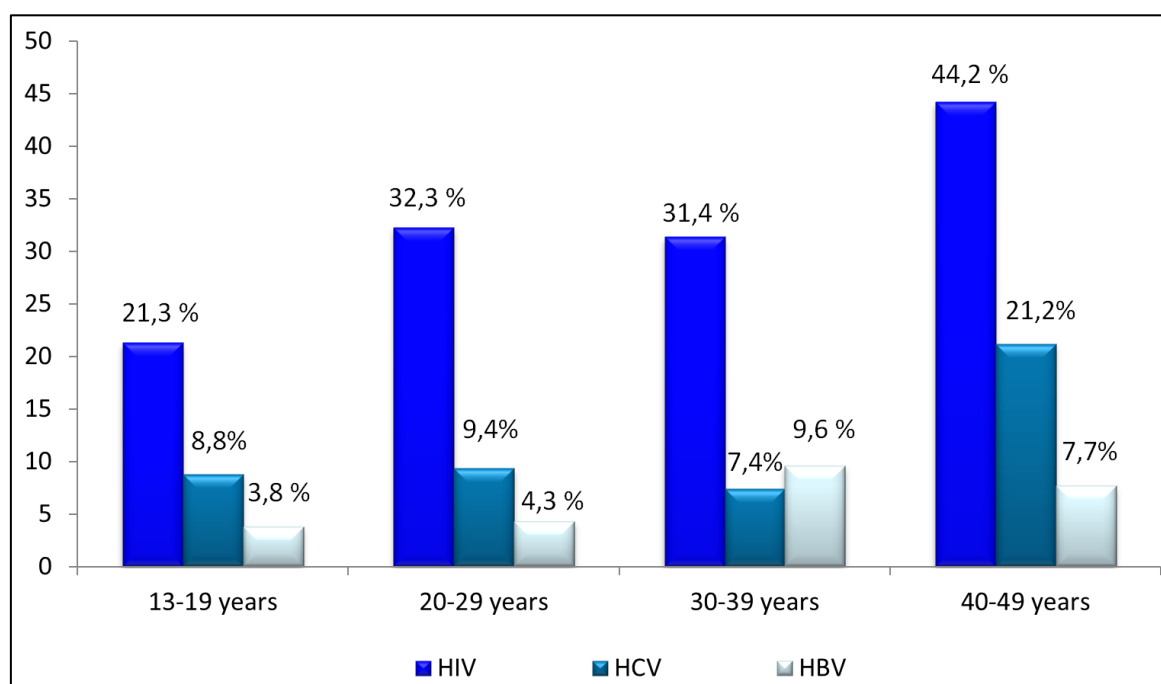
According to Figure 1, the prevalence of HIV, HBV, and HCV among homosexuals, bisexuals and transgender was 31.5%, 9.7%, and 6.3%, respectively.



**Figure 1.** Prevalence HIV, HBV, and HCV infections among homosexuals, bisexuals, and transgender communities in Kinshasa.

#### 3.2.1. Prevalence of HIV, HBV, and HCV Infections According to Age

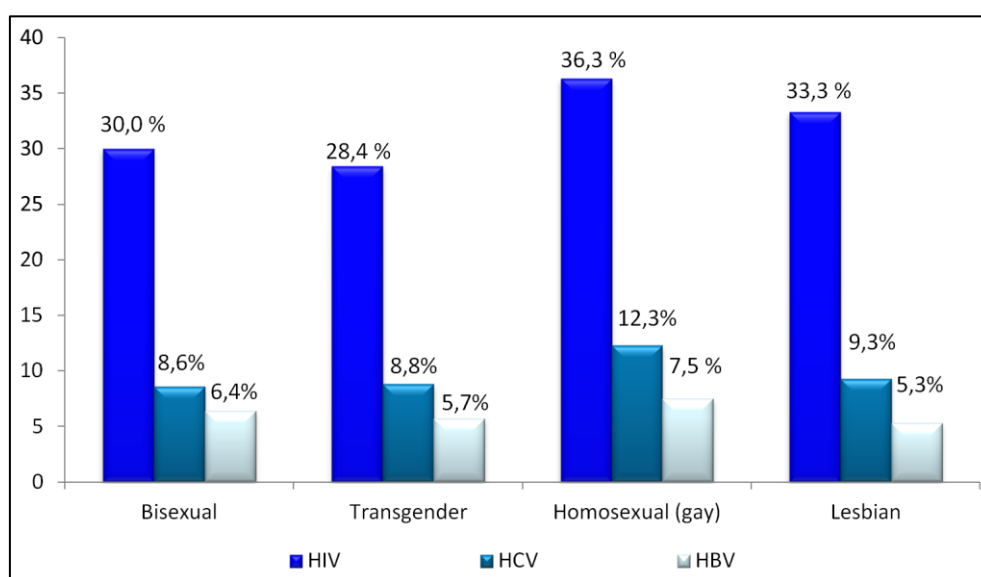
The specific frequency of HIV, HBV, and HCV among homosexuals, bisexuals, and transgender communities according to age is shown in Figure 2. In all age groups, the HIV rate was preponderant, particularly in the 40–49 age group (44.2%).



**Figure 2.** Frequency of HIV, HBV, and HCV infections among homosexuals, bisexuals, and transgender communities according to age.

#### 3.2.2. Frequency of HIV, HBV, and HCV According to Sexual Orientation

The figure 3 illustrates the frequency of HIV, HBV, and HCV infections according to sexual orientation.



**Figure 3.** Frequency of HIV, HBV, and HCV infections according to sexual orientation.

HIV was predominant in all sexual orientations but more marked among homosexuals (36.3%).

### 3.3. Determinants of HIV, HBV and HCV Infections

#### 3.3.1. Determinants of HIV Infection

Table 3 presents the determinants of HIV infection among the participants.

**Table 3.** Determinants of HIV infection in univariate and multivariate analysis.

	Univariate analysis		Multivariate analysis	
	p	OR (IC95%)	p	QRa (IC95%)
Piercing				
No		1		1
Yes	0,005	3,69 (1,70-4,45)	0,007	3,56 (1,52-4,32)
Incarceration				
No		1		1
Yes	0,016	1,95 (1,01-2,86)	0,012	2,06 (1,14-2,57)
STI				
No		1		1
Yes	0,012	2,41 (1,12-3,18)	0,356	1,24 (0,78-1,98)
Prostitution				
No		1		1
Yes	0,025	2,23 (1,86-3,77)	0,044	1,97 (1,29-2,63)
No-use of condom				
No		1		1
Yes	0,002	3,21 (1,83-5,75)	0,002	3,09 (1,73-4,60)

In the univariate analysis, the primary risk variables for HIV infection were piercing, incarceration, sexual transmitted infections, prostitution, and non-condom usage. At multivariate analysis, only sexual transmitted infections was drop out as being not associated with HIV infection.

### 3.3.2. Determinants of HCV Infection

The determinants of HCV infection in univariate and multivariate analyses are presented in [Table 4](#).

**Table 4.** Determinants of HCV infection in univariate and multivariate analysis.

	Univariate analysis		Multivariate analysis	
	p	OR (IC95%)	p	QRa (IC95%)
Piercing				
No		1		1
Yes	0,002	2,72 (1,42-5,20)	0,005	2,59 (1,34-5,00)
Surgery				
No		1		1
Yes	0,005	2,88 (1,66-4,50)	0,779	1,10 (0,56-2,17)
STI				
No		1		1
Yes	0,012	2,45 (1,71-3,96)	0,017	2,17 (1,56-3,45)
Jaundice				
No		1		1
Yes	0,027	2,80 (1,75-4,81)	0,030	2,24 (1,63-4,46)

The univariate logistic regression analysis revealed that piercing, surgery, sexual transmitted infections, and jaundice were identified as the four main risk factors associated with HCV infection. After accounting for important risk variables in a multivariate analysis, it was found that piercing, sexual transmitted infections and a previous occurrence of jaundice were substantial factors that remained independently related with hepatitis C virus (HCV) infection.

### 3.3.3. Determinants of HBV Infection

The determinants of HBV in univariate and multivariate analyses are listed in [Table 5](#).

**Table 5.** Determinants of HBV infection in univariate and multivariate analysis.

	Univariate analysis		Multivariate analysis	
	p	OR (IC95%)	p	QRa (IC95%)
Piercing				
No		1		1
Yes	0,006	3,06 (1,97-4,38)	0,025	2,61 (1,71-3,62)
Incarceration				
No		1		1



	Univariate analysis		Multivariate analysis	
	p	OR (IC95%)	p	QRa (IC95%)
Yes	0,006	2,92 (1,96-3,384)	0,022	2,56 (1,74-3,29)
STI				
No		1		1
Yes	0,032	1,82 (1,41-3,89)	0,781	1,15 (0,44-2,98)
Prostitution				
No		1		1
Yes	0,016	2,26 (1,32-4,49)	0,015	2,09 (1,54-3,23)
No-use condom				
No		1		1
Yes	0,002	3,56 (1,74-5,32)	0,014	3,39 (1,63-5,02)
Alcohol intake				
No		1		1
Yes	0,042	1,57 (1,04-4,52)	0,536	1,41 (0,48-4,15)

The univariate analysis demonstrated that alcohol intake, sex worker, STIs, body piercing, non-use of condom, and incarceration were the top risk factors for HVB infection. Body piercing, being incarcerated, being a sex worker, and not using condoms remained significant independent risk factors for HVB infection at multivariate analysis.

## 4. Discussion

The aim of this study was to determine the prevalence and associated factors of viral infection within the population of individuals who identify as homosexual, bisexual, or transgender in Kinshasa, DRC. The majority of the participants were of the age group of 20-39 years, reached high school, and were either single or in a cohabiting relationship. About half of the participants had a liberal activity or participated in religious activities. A slightly more than third of the participants were infected by one of the viral of interested in this study. HIV infection was the most prominent followed far by HCV and HBV infections.

### 4.1. Sociodemographic Characteristics of Homosexuals, Bisexuals, and Transgenders

A few less than half of the participants in this study were of the 20-29 age group. Our finding was similar to that of Loukabo et al. in the Republic of Congo [19], who reported that 48.9% of the participants were aged between 18 and 24 years. The existence of cultural similarities provides some explanation for the resemblance observed between our study

and the one conducted in Congo-Brazzaville.

The majority of individuals in our sample were single, far less than the 80% found in a study in Senegal [20], but more than the rate of 19.8% among homosexual and lesbian individuals in the United States [20]. The disparity in rates between the United States and DRC could perhaps be attributed to the legal recognition and acceptance of homosexuality, as well as the legalisation of various forms of marital unions in the former. However, it is likely that the disparity observed in Senegal can be attributed to cultural and methodological factors.

A slightly less than three quarter of the participants had a secondary level of education, which represented 73.3% of the total participants. These findings align with the outcomes documented by Wade et al. in their study conducted in Senegal [21]. The aforementioned proportion exceeds the rate of 26.8% reported in the United States by Brigitte and Stuart [20]. The aforementioned variance in results may be attributed to methodological and cultural variations.

A few less than half of the participants had a higher prevalence of occupations associated with liberal professions. In contrast with our finding, Wade et al. in Senegal revealed that a significant proportion (45%) of their sample population was consisted of individuals who were enrolled as pupils or students rather than being employed as workers [21]. The prevalence of liberal professions and unemployment among individuals in the DRC and Senegal might perhaps be attributed to the significant overall unemployment rates in both countries. Moreover, this situation is further exacerbated by the discriminatory practises against LGBTQIA individuals in the



African employment sector. Conversely, the relatively low unemployment rate in France, along with the presence of legislation safeguarding the rights of lesbian, gay, bisexual, transgender (LGBT) individuals, contributes to the limited prevalence of liberal professions.

## 4.2. Prevalence and Associated Factors of HIV Infection

A few less than one third of the participants had HIV infection. This prevalence is far more than that of 7.5% estimated in a 2018-2019 national survey [22]. In Kinshasa, gays, bisexual, or transgender could be considered as being like a reservoir of HIV. Indeed, the Centers for Diseases Control (CDC) estimated that in the US, Gay and bisexual men account for about two-thirds (66%) of new HIV infections each year [23].

Our prevalence estimate of HIV was more than that found by Wade et al. in Senegal (21.5%) [21], but was few than that found in several studies in sub-Saharan Africa [19, 24, 25]. These differences could be explained by methodological differences in the estimations.

HIV infection has been found to be significantly linked with piercing, incarceration, prostitution, and non-condom usage. Body piercing has been increasingly recognized as being a possible route for HIV transmission among LGBTs [26]. Studies have shown that in prisons the prevalence of HIV is higher among LGBT than the cisgender individuals. Also, LGBT people were more exposed to sexual assaults [27]. Prostitution has been linked to HIV/AIDS for decades and no control of HIV infection could be obtained without controlling also for prostitution [28]. No use of condom is recognized as a risk sexual behaviour favouring the transmission of HIV. The gay, bisexual and transgender were involved in activities or usages or conditions exposing them to HIV.

## 4.3. Prevalence and Risk Factors of HCV Infection

The study found that about one over ten participants had HCV infection. This was about three fold than a recent estimate of in DRC general population [29]. Our prevalence estimate was similar to that found in a systematic review and metaanalysis of HBV infection among LGBTs (9%) [30].

The factors associated with this infection were piercing, STIs and a previous occurrence of jaundice. A review found that the risk of HCV infection is significant, especially among high-risk groups when tattoos were applied in prison settings or by friends in contrast when received in professional parlors [31]. STI were also mentioned as being a risk factor for HCV infection among homosexuals in an Italian study [32]. Jaundice could be a sign of acute HCV infection [33]. A World Health Organization (WHO) commissioned systematic review found the risk of HCV infection among men who have sex with men increased in HIV-positive men who have sex

with men and injecting drug use [34].

## 4.4. Prevalence and Associated Factors of HBV Infection

HBV infection was the least prominent in our sample. Our prevalence estimate was slightly elevated than that of the general population of 4.9% (95%CI: 4.2-5.0) [35]. Our prevalence estimate was lower than that found in a global estimate of HBV infection among LGBTs (11%) [30]. It was similar with that found in Togo by Sadio et al. (7.1%) [36]. HBV infection had the same risk factors than that of HIV infection.

## 4.5. Co-infections

Coinfection concerned 12.6% of these respondents, for HIV-HCV coinfection, 11.1% of respondents for HIV-HBV coinfection, and only 1.9% for HIV-HBV-HCV coinfection. Semaille et al. in France showed in the 2004 national hospital survey that the prevalence of hepatitis B and C virus infections in the population affected by HIV, showed that the prevalence of HIV-HCV coinfection in homosexuals was low (3%) [37]. Our results differ from those found in France, probably due to the divergence in the organization of the health system (prevention, screening, and early care) between Western countries and developing countries such as the DRC, where the system is still rudimentary. In addition, the Non-Governmental Organizations that support the Congolese LGBTQ community are all working on the fight against HIV, forgetting hepatitis (and other coinfections) for lack of funding.

## 4.6. Strengths and Limitations of the Study

This study was the first to our knowledge to having determined the magnitude and factors associated with HIV and Hepatitis viral B and C infections among LGBTs. The collected data has the potential to inform the development of a comprehensive nationwide programme aimed at preventing and promptly identifying viral infections among the sexual minority community.

Nevertheless, the absence of a comparison between the sociodemographic and serological characteristics with heterosexual individuals was a limitation for this study. The cross-sectional nature of the study precluded the study of risk variables associated with the transmission of the viruses under examination. Ultimately, the majority of the parameters examined in the quest for determinants (or factors related with) were derived from the self-reported accounts of the respondents, lacking verification or validation of the participants' claims.

## 5. Conclusion

The majority of LGBTs individuals were young with average level of education and exercising liberal profession. The

prevalence of HIV, HBV, and HCV infections were far more elevated than in the general population. The factors associated with HIV, HBV, and HCV infections in these populations require actions for successfully decreasing their incidence in our setting.

## Acknowledgments

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## Author Contributions

MKK conceived the idea, carried out the study, and wrote the first draft of the manuscript; ESK supervised the thesis and the production of this article; J-PFL co-supervised the thesis and the production of the article; ANN contributed by performing the statistical analyses; PNM edited the manuscript and PLN coordinated the whole process of writing the article.

## Conflicts of Interest

The authors declare no conflicts of interest.

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