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CO INFECTION OF HIV , HBV AND HCV AND THE ASSOCIATED RISK FACTORS AMONG PREGNANT WOMEN VISITING HEALTH CENTERS AT THE MIFI HEALTH DISTRICT WEST REGION OF CAMEROON

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Abstract

Their similar means of transmission increases the risk of contracting both HIV,HBV and HCV concurrently . Viral hepatitis is an acute or chronic inflammation of the liver caused by viral infection . HBV is globally the leading cause of death due to liver disease in people living with HIV/AIDS .

Aim : This study was aimed at assessing the Prevalence, co infections and risk factors of HIV, hepatitis B and C among pregnant women on prevention and transmission at the Mifi health district.

Methods : This study was a cross sectional study involving pregnant women who visited different health centers within the Mifi health district between the month of February to June 2023. Sampling technique was done by convenience and the Data was analysed using SPSS version 20.0.

Results : Out of the 467 participants who took part in this study , the overall prevalence of 8.6%(40) was recorded for HIV 1/2 , 2.4% (11) for HBV as well as 1.3% (6) for HCV . the bioline results of the 40 pregenant women who tested positive for HIV in this study, 87.5% were positive with HIV-1 meanwhile 7.5 % were co-infected by both HIV-1/ HIV-2 while only 5% of the total 40 HIV infected individuals were infected with HIV-2. After due laboratory investigations from pregnant women who took part in this study, there was a statistical significance (p= 0.05) between individuals who were both infected with HIV and HBV. A co-infection rate of 0.42%, when considering all the 467 pregnant women was as well recorded between patients suffering from HBV and HCV and again, these findings were statistically significant (p=0.007). men in their past. Furthermore, all the participants 467 (100%) had a history of sharing niddles and blade. This study equally reveals that most patients, 103(22.1%) had history of blood transfusion thus creating more chances for infections

Conclusion : The prevalence rate in this study was relatively high for individuals infected with HIV, compared to other studies conducted in other part of the country and again, high prevalence was as well recorded for HBV and HCV a clear indication that this study was a necessity at this particular point in time as it has shown that more sensitization campaignes need to be done to cub the spreed of this viruses from one person to anther and most especially from mother to their new born babies.

Key words: HIV, HBV , HCV, PREVALENCE,RISK FACTORS, PREGNANT WOMRN

INTRODUCTION

Blood borne viral infections such as Hepatitis B virus (HBV), Hepatitis C virus (HCV), and Human Immunodeficiency virus (HIV) cause substantial mortality and morbidity worldwide [1]. Co-infection of both HBV and HCV with HIV is associated with low CD4 count, accelerated liver disease progression, higher mortality, and Mother To Child Transmission of the viruses [2]. Thus making these infections a public health concern of interest, which explains the essential need for this particular project. Additionally, the progression rate and complications such as liver fibrosis, cirrhosis, end-stage liver disease, hepatocellular carcinoma (HCC), and mortality due to liver pathology arising from HBV infection are accelerated in patients with HIV co-infected patients than in patients with HBV infection alone [3]. Besides, the clinica2 management of individuals co-infected with those viruses is challenging [3].

Available data suggest that, in resource-rich settings, approximately 10% of the HIV infected population have chronic HBV infection and around a third have chronic HCV infection [4]. However, wide regional variations are observed with co-infection of HIV and HBV prevalence rates estimated to be 5–10% in areas such as North America, Europe and Australia compared to higher prevalence rates of 20–30% in areas such as Sub-Saharan Africa and Asia [4].

HBV/HIV co-infection rates of 12.9% [5] 16% [6] were reported in people living with HIV in Cameroon. Besides, HBV/HIV co-infection rates of 11.8% [7]and 3.1% [8] were reported in pregnant mothers in Nigeria and South Africa, respectively. HCV/HIV co-infection rates of 0–33% were also reported in pregnant mothers in Nigeria[9].

HBV/HIV co-infection rates of 19–40% were reported among pregnant mothers according to different studies conducted in Ethiopia [10]. One hundred percent of HCV positive pregnant mothers were also co-infected with HIV in Atat Hopsital, Southern, Ethiopia [11], and 2.9% of HCV/HIV co-infection was reported in pregnant mothers in East Wollega Zone, West Oromia, Ethiopia [12]. None of the pregnant mothers were co-infected with HBV and HCV. Several studies were conducted to determine co-infection of HBV/HIV, HBV/HCV, or HIV/HCV among the general population, general pregnant mothers, or HIV infected pregnant mothers [4] but only a few have been conducted to determine co-infection of HIV or HCV and related risk factors among HBsAg positive delivering mothers globally and particularly in the west region of Cameroon.

Human immunodeficiency virus (HIV) is a Lentivirus which belong to a member of the retrovirus family and causes the acquired immunodeficiency syndrome (AIDS) [13] a condition in humans in which progressive failure of the immune system allows life-threatening opportunistic infections as well as cancers. Infection with HIV occurs through blood, semen, vaginal fluid, or vertically (from mother-to-child) [13]. Within these body fluids, HIV is present as both free virus particles and virus within infected immune cells. Screening of blood products for HIV has largely eliminated transmission through blood transfusions or infected blood products [13]. Co-infection of HIV with Hepatitis B and C viruses is the subject of this study. One of the causative agents of serum hepatitis is hepatitis B virus (HBV) which is an enveloped DNA virus. During infection, HBV produces an excess of hepatitis B surface antigen (HBsAg), also known as Australia antigen, which can be detected in the blood of infected individuals [14]. HBsAg is the first serological marker after infection with HBV, appearing one to ten weeks after exposure and two to eight weeks before the onset of hepatitis. HBsAg persists during this acute phase and clears late in the convalescence period . Failure to clear HBsAg within six months indicates a chronic HBsAg carrier state. Blood from individuals in the acute and chronic state is potentially infectious and such blood should not be used for transfusion [15]. The above stated facts really necessitated this present study in the west region of Cameroon.

MATERIAL AND METHODS

1 Study setting

Bafoussam(Mifi) is the capital and largest city of the West Region of Cameroon, in the Bamboutos Mountains. Mifi health district is one of the 3 health districts in the Bafoussam health Zone. Bafoussam is the 3rd most important (financially) city in Cameroon, after Yaounde and Douala. The city was reported to have the highest prevalence of HIV infection among pregnant women attending ANC, which varied between 7.8%-8.0% in the years 2000,. The Urban Community of Bafoussam, is a decentralized territorial collectivity. Originally called Urban Commune of Bafoussam, the Urban Community of Bafoussam, was born after the Presidential Decree N ° 2008/022 of January 17, 2008 and composed of three communes, namely: the Commune of Bafoussam I (Bafoussam proper), the Commune of Bafoussam II (Baleng) and the Commune of Bafoussam III (Bamougoum).The Bafoussam regional hospital is located about 800meters away from the main road leading to Yaounde.

2. Study design

This was a descriptive hospital-based cross-sectional study composed of pregnant women visiting the various Antenatal Clinics (ANC) in Mifi health district from January to June 2023.

3. Study period

Data was collected for 6months (January 2023 to june 2023).

4. Study population

All pregnant women attending ANC in 5 most popular hospitals and clinics [Bafoussam regional hospital, Mifi district hospital, Clinic de louest, Mbingo annex clinic bafoussam and Clinic de soeur] in the Mifi health district were enrolled in the study.

4.1 Inclusion criteria

- All pregnant women attending ANC in the above mention health facilities of mifi, who gave their concern to participate in the study.

4.2 Non-inclusion criteria

- Pregnant women who were present in the hospital or clinic at the time of the study but refuse to feel the concern form.
- Pregnant women who initially were recruited, but for one reason or another change their mind about taking part in the study.

5. Sample size and sampling techniques

Convenience sampling method was applied in this study. Within the 6 months period that data was collected, participants were selected in the order they come and their consents were gotten after the study procedure had been explained to them.

5.1 Sample collection

This study was a descriptive cross sectional study were participants were enrolled as they give their contact and fill questionaires, given that all targeted health center and hospitals of Mifi were visited simultaneously on all working days as from 7:30am to 11am.. After explaining the procedure of the work to the participants, the following samples were collected from each participant: 10 ml of whole blood (5 ml was put in dry tubes to obtain serum while the remaining 5 ml was put in EDTA tubes to obtain plasma). The blood samples collected were later transported in safety flask to the clinical laboratory of the Bafoussam Regional Hospital., where all laboratory findings were done. Participants' results were returned and those of HIV-positive women after post-test counselling were directed into regular care at the hospital day clinics and the same was done for HBV and HCV respectively.

2.0 RESULT

2.1 Socio-demographic Characteristics.

A total of five hundred and twenty four pregnant women were actually contacted in this study but only 467 pregnant women gave their concent and completed their questionaires, giving a participation rate of 89.12% and a 100% response rate from the 467 pregnant women who completed their questionaires from the various ANC clinics in the Mifi health district. The mean age was 26.23 years (SD ± 4.92 and S.E.M ± 0.22), and the max age was 40 (R: 18 to 40) years. Majority of the participants were actually between the age range 26-30years, followered by those between the ages 21-25years(32.3%) and it is worth noting that 57 (12.2%) of the expecting mothers who took part in this study were between the ages 15-20years. The educational status tally showed that 22 (4.7%) were unable to read and write, while majority,53.3% attended secondary school as well as 150(32.1%) who had gone upto university level. 230 (49.3%) were married while 37.3% of the participants were single expecting mothers. On a general look, majority (74.4%) of the pregnant women who took part in this study were Christians. Details on table 2.1

2.2 Assessing The Prevalence Of HIV,HCV And HBV Infections Among Pregnant Women Visiting Health Centers At The Mifi Health District.

Out of the 467 participants who took part in this study , the overall prevalence of 8.6%(40) was recorded for HIV 1/2 , 2.4% (11) for HBV as well as 1.3% (6) for HCV as shown in figure 1.

2.2.2 Bioline results of participants who tested positive for HIV**.**

Regarding the bioline results of the 40 pregenant women who tested positive for HIV in this study, 87.5% were positive with HIV-1 meanwhile 7.5 % were co-infected by both HIV-1/ HIV-2 while only 5% of the total 40 HIV infected individuals were infected with HIV-2 . Detail findings are displayed in figure 2..

Table 2 presents the assessment on the prevalence of HIV, HBV and HCV with respect to socio demographic characteritic, the age group 26-30years was most affected with 11(5.8%) for HIV and this findings were statistically significant (p-value < 0.001), 8(4.2%) for HBV and 5(2.6%) for HCV although there was no statistical significance (p-value 0.2 and 0.3) respectively. There was equally a statistical significance difference when we compared the educational levels of the participating pregnant women with those positive for HIV (P=0.003) and HBV (P< 0.001). However pregnant women who had attended only primary school standard had significant high prevalence rate 8(17.4%) for HIV , 5(10.9%) for HBV and 2(4.3%) for HCV. Pregnant women who were not working equally had high prevalence looking at HIV, HBV and HCV with 19(12.3%), 3(1.9%) and 1(0.6%) respective. Moreover there was no statistical difference when we correlated marital status and religion with HIV, HBV and HCV positive participants in this study. Detailed findings are summarized on table 2 below.

2.3 HIV, HBV AND HCV CO-INFECTION AMONG PREGNANT WOMEN AT THE MIFI HEALTH DISTRICT.

After due laboratory investigations from samples of the 467 pregnant women who took part in this study, there was a statistical significance (p= 0.05) between individuals who were both infected with HIV and HBV (3 pregnant women with both infections) making up 0.64% of the total population under study and thus making up 5.88% of the 51 pregnant women who were infected with HIV and HBV all together. A co-infection rate of 2(0.42%), (when considering all the 467 pregnant women) was as well recorded between patients suffering from HBV and HCV and again, these findings were statistically significant (p=0.007) implying 11.76% of the 17 pregnant women who were suffering from either HBV or HCV. It is worth noting that none of the pregnant women was triple infected with both HIV,HBV,and HCV at the same time and as well, no patient was co-infected with HIV and HCV. Detail findings are presented on the table below(figure 3)

Risk factors associated with HIV,HBV and HCV among the study population

One of the objectives of this study was to identify risk factors predisposing the study population to HIV, HBV and HCV. Majority 432(92.5%) had a history of sleeping with two or more men in their past. Furthermore, all the participants 467 (100%) had a history of sharing niddles and blade. This study equally reveals that most patients, 103(22.1%) had history of blood transfusion thus creating more chances for infections. Table 2 present detail findings which sudgest the high prevalence of HIV infection recorded in this study.

DISCUSSION

Due of the high estimated numbers of pregnant women living with HIV, Cameroon is one of 22 priority countries identified in the World Health Organization's "Global Plan" as a key target for HIV control and interventions [16]. The South West represents one of the high HIV burden regions with an estimated 8% prevalence [17]. This study reveals an HIV prevalence of 8.1% in pregnant women attending ANC in measure health centers in the Mifi health district Cameroon. In 2007, Akenji et al.[18],reported that the prevalence of HIV among female students in the University of Buea, Cameroon was 3.9%. This relative low prevalence report by Akenji et al.[18],could be attributed to the proportion of female student who practice abstinence, the safest means of HIV prevention; a major prevention strategy rolled out in pregnancy and adding the fact that knowledge of HIV prevention and transmission is usally high among individuals who

have attended university level. Another study published by R. E.Tanjong et al in 2016 [19] on Sero prevalence of Human Immunodeficiency Virus and hepatitis viruses and their correlation with CD4 T-cell lymphocyte counts in pregnant women in the Buea Health District of Cameroon revealed an HIV sero prevalence of 8.37% , however, this prevalence was slightly higher than the prevalence recorded in our study which could be due to the fact that other studies have already indicated that the HIV prevalence in the south west region is very high in camerroon and equally , given that most participants in this study were married thus reducing rampant sex and multiple partners , which sometimes predispose people to HIV infections. The prevalence of 8.1% recorded in this study was however greater than the prevalence of 6.6% obtained from a similar study by Abongwa L. E. et al [20] on Sero-Prevalence of Human Immunodeficiency Virus (HIV) and Hepatitis B Virus (HBV) Co-Infection among Pregnant Women Residing in Bamenda Health District, Cameroon;And again, is higher compare to the national prevalence of 4.8% seen among women of child bearing age. However, it is lower than the 8.7% reported in Tanzania (Swai et al., 2006) and 10.2% in Nigeria (Bankole et al., 2011). On the contrary the HIV prevalence rate is higher than the 1.8% in Kenya (Harania et al., 2008) and 0.4% in South Africa (Hoffmann et al., 2008) recorded among pregnant women.

This study also revealed that HIV 1 is the main HIV subtype in circulation in the Mifi health district as 87.5% of the infected pregnant women tested positive for HIV-1, 5% tested positive for HIV-2 and 7.5 % tested positive for HIV-1/HIV-2 sub-types. These findings were in line to those of Nsagha et al. in 2012 [21] on HIV-1/HIV-2 co-infection among voluntary counseling and testing subjects at the regional hospital in Buea, who reported that amongst the positive individuals, 78.5% were HIV-1, 1.3% were HIV-2 and 19.2% were HIV-1 and HIV-2 co-infected.

HIV, HBV and HCV co-infection among pregnant women

After due laboratory investigations from pregnant women who took part in this study, there was a statistical significance (p= 0.05) between individuals who were both infected with HIV and HBV. A co-infection rate of 0.42%, when considering all the 467 pregnant women was as well recorded between patients suffering from HBV and HCV and again, these findings were statistically significant (p=0.007). This significant findings is the focal point of this study as it indicate the risk patients are exposed by being co-infected with two viral infections of medical interest with almost the highest rate of motality and mobidity rate worldwide and view that most of this patients were certainly not aware of their single infection status talkless of co-infection status, this pregnant mothers stood greater chances of passing the virus onto their unborn children and also serving as public health risk and hazard. This findings are similar although having low positive figures compared to the findings of Tesfu [22] on Co-infection of HIV or HCV among HBsAg positive delivering mothers and its associated factors in governmental hospitals in Addis Ababa, Ethiopia who found out that 3.4% and 1.1% of the HBsAg positive delivering mothers were co-infected with HIV and HCV, respectively. The 3.4% HIV co-infection prevalence in the study by Tesfu [22] study is far higher than the 0.62% co infection rate recorded in our present study in the Mifi health district Cameroon and it was again lower than the studies in South Africa (3.1%) Thumbiran [23] and Rwanda (4.1%) Mutagoma [24], it was further more smaller than HBV and HIV co-infection found among pregnant women in Europe (4.9%) Landes [3] , Nigeria (11.8%) Lar [7], Zenebe. .[10], Atat Hospital, Southern Ethiopia (40%) Bafa and Egata [11] and Addis Ababa, Ethiopia (22.2%). Desalegn [25]. In contrast it was in line with studies reported in Nigeria (0.24–1%) Ikeako [28]. Ethiopia (0.6%) Ramos J.M [26] and 0% in eastern Ethiopia by Umare [27] on Hepatitis B virus infections and associated factors among pregnant women attending antenatal care clinic at Deder

hospital,eastern Ethiopia Furthermore, the 0.42% HCV co-infection in this study is similar to the study in Pakistan (0.3%) .

Risk factors associated with HIV, HBV and HCV infections among pregnant women

One of the main points of this study was to identify risk factors predisposing the study population to HIV, HBV and HCV. It is worth noting that none of the pregnant women was triple infected with both HIV,HBV,and HCV at the same time and as well, no patient was co-infected with HIV and HCV. Although so co infections were identified between HIV and HBV as well as co infection with HBV and HCV. traditionally, many practices of women predispose them to this sexually transmitted infections (HIV, HBV and HCV), It was evident in this study among pregnant women in the mifi . Majority had a history of sleeping with two or more men in their past. Furthermore, all the participants (100%) had a history of sharing niddles and blade. This study equally reveals that most paticipants, about (103 pregnant women) had history of blood transfusion thus creating more chances for infections. Looking at the risk factors recorded in this study, we personally think that the minister of public health needs to do more again on his capacity to increase on public sensitization, an aprouch which will cub mother to child transmission of viral hepatitis and HIV infections which is fast spreading. The risk factors identified in this study were very severe and it could be because of the numerous crises facing the country Cameroon, including the Anglophone crises which is pushing stranded young ladies into sexual promiscuity and more. HCV co-infected study participants in our study, HIV being infectious than HBV and HCV. Participants with History of having STDs was significantly associated with HIV co-infection. This is in agreement with studies published by Mutagoma [24] on Hepatitis B virus and HIV co-infection among pregnant women in Rwanda. This might be due to STDs being able to increase the susceptibility to infection by both viruses through mucosal disruption, immune changes, and microenvironment effects on the genital tract. Participants with History of having multiple sexual partners was another significant risk factor for the HBV/HIV co-infection. This is in agreement with studies in Southern Ethiopia by Bafa, and Egata [11], in Rwanda by Mutagoma [24], and in Brazil by Flores.

Limitations of the study.

This study was a crossectional study and thus did not include people who could be infected but visited the health centers before or after the study period and again we had little literature concerning the study topic around the study area.

Conflict of interest.

We declare that we have no conflict of interest and that this project is the original project conducted in the Mifi health district.

Conclusion :

The prevalence rate in this study was relatively high for individuals infected with HIV, compared to other studies conducted in other part of the country and again, high prevalence was as well recorded for HBV and HCV a clear indication that this study was a necessity at this particular point in time as it has shown that more sensitization campaignes need to be done to cub the spreed of this viruses from one person to anther and most especially from mother to their new born babies

As suspected from conception of this study, co-infections were recorded between pregnant women infected with Hepatitis B Virus /Hepatitis C Virus and those infected with Human Immune Virus /Hepatis B Virus and it is worth noting that none of the pregnant women was triple infected with both HIV,HBV,and HCV at the same time . again none of the participating pregnant women was co-infected with HCV and HIV in this study.

RECOMMENDATIONS

1. We recommend that all pregnant women should be tested on their first visit for HIV, HBV and HCV

2. CD4+T cell counts and HIV viral load assays should be routinely carried out to

monitor HIV disease progression in HBV and HCV pregnant women.

3. WHO guildeline on measures to prevent mother to child HIV transmission should be implemented in all anteanatal clinic in Buea Cameroon to reduce mother to child HIV transmission

Sudgestion for further study

The study suggested the need to associate molecular tools in diagnostics to improve species detection.

What is known about the study

- It is known that HIV exist among pregnant women over many decade today.
- Studies in other Regions of the country have published prevalence statistics of HIV among pregnant women already but this study is new in this study area.
- It has been documented that HIV 1 is the dominant sub type of HIV in Cameroon

What the study added

- This study have saved as an eye opener in the Mifi health district to sudgest that all pregnant women should be tested upon arrival for ANC on HCV, which is not a regular practice in this Health district.
- This study have exposed the high prevalence of HIV,HBV and HCV in the mifi health district hence need for more education in relation to these infectious diseases
- Some risk factors for these highly infectious disease have been well understood by the participants thanks to this study.

Table 1 :Sociodemographic information among pregnant women visiting health centers in the mifi health district.

Categories		Frequency (n)	Percent (%)	C.Percent (%)
Age Ranges	15-20 Years	57	12.2	12.2
	21-25 years	151	32.3	44.5
	26-30years	191	40.9	85.4
	31-35years	39	8.4	93.8
	36-40years	29	6.2	100.0
Marital status	Single	174	37.3	37.3
	Married	230	49.3	86.5
	Divorced	36	7.7	94.2
	Widow	25	5.4	99.6
	No response	2	.4	100.0
Educational Level	Primary level	46	9.9	9.9
	Secondary level	249	53.3	63.2
	Tetiary level	150	32.1	95.3
	No former education	22	4.7	100.0
Religion	Christian	349	74.7	74.7
	Muslem	46	9.9	84.6
	Others	72	15.4	100.0
Employment	Government worker	68	14.6	14.6
	Private worker	89	19.1	33.6
	Self employed	127	27.2	60.8
	Not working	154	33.0	93.8
	House wife	29	6.2	100.0

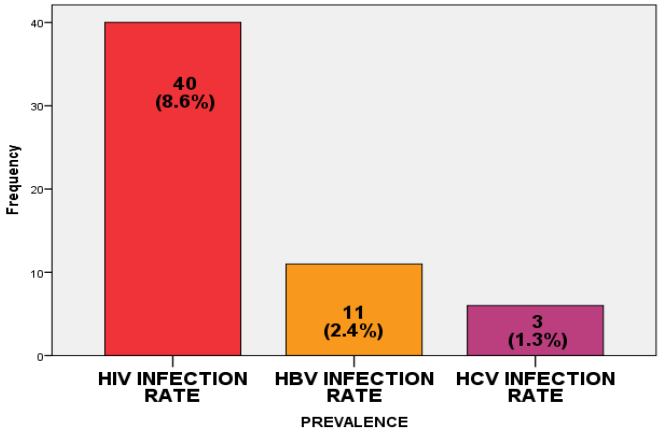

Figure 1: prevalence of HIV, HBV and HCV among the pregnant women

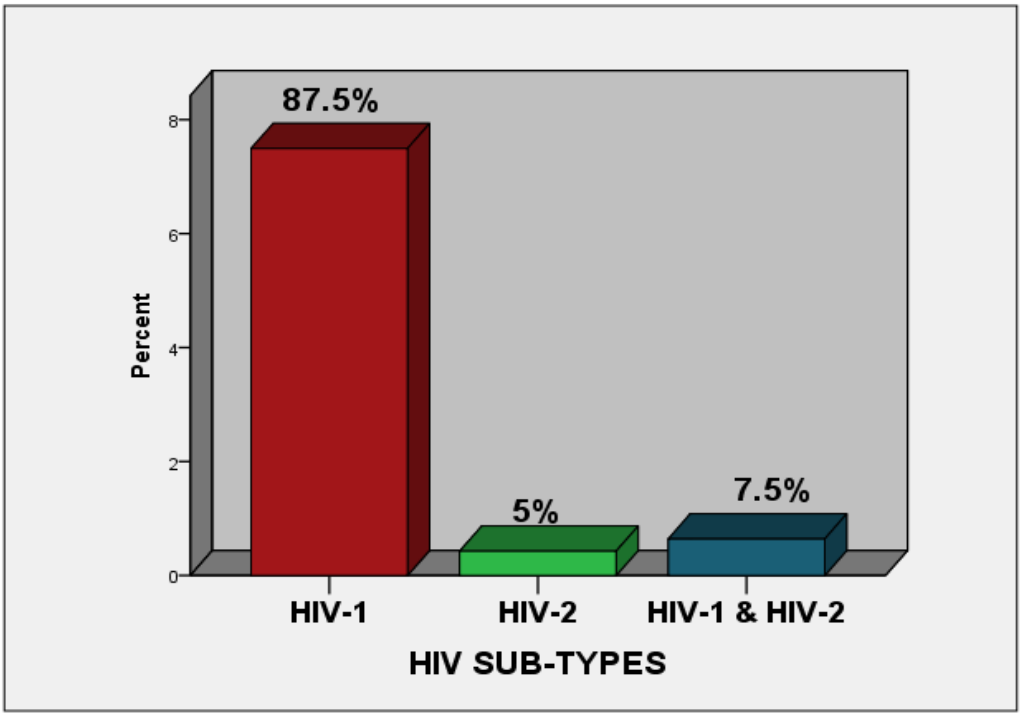

Figure 2:Bioline results of the participants who tested positive for HIV in the Mifi Health District.

Table 2: Prevalence of HIV,HCV and HBV infections among pregnant women visiting health centers at the Mifi health district with respect to socio demographic characteristics

AGE RANGES * HIV status		HIV status	p- value	HBV	p- value	HCV	p- value
		Positive N(%)		Positive N(%)		positive N(%)	
Age (years)	15-20	1(1.8)	< 0.001	0	0.2	0	0.3

	21-25	8(5.3)		3(2.0)		1(0.7)	
	26-30	11(5.8)		8(4.2)		5(2.6)	
	31-35	12(30.8)		0		0	
	36-40	8(27.6)		0		0	
Educational Level	Primary level	8(17.4)	0.003	5(10.9)	< 0.001	2(4.3)	0.2
	Secondary level	24(9.6)		0		2(0.8)	
	Tetiary level	4(2.7)		6(4.0)		2(1.3)	
	No former education	4(18.2)		0		0	
Marital status	Single	11(6.3)	0.394	0	0.06	1(0.6)	0.7
	Married	23(10.0)		10(4.3)		4(1.7)	
	Divorced	2(5.6)		1(2.8)		1(2.8)	
	Widow	4(16.0)		0		0	
	N o response	0(0.0)		0		0	
						1.3	
Employment	Government worker	5(7.4)		2(2.9)		1(1.5)	
	Private worker	5(5.6)	0.15	5(5.6)	0.17	2(2.2)	0.8
	Self employed	11(8.7)		1(0.8)		2(1.6)	
	Not working	19(12.3)		3(1.9)		1(0.6)	
	House wife			0		0	
Religion	Christian	25(7.2)		11(3.2)		5 (1.4)	0.7
	Muslem	7(15.2)	0.13	0	0.1	0	
	Others	8(11.1)		0		1(1.4)	

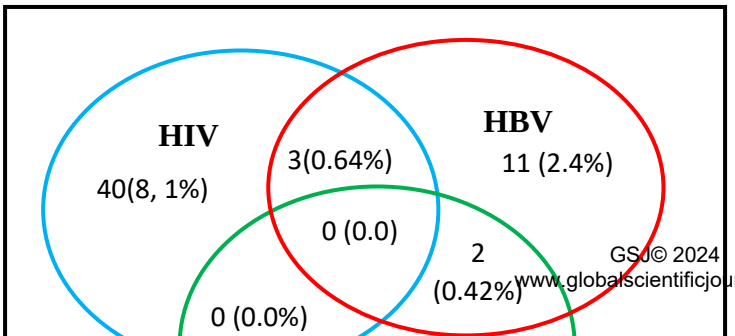

Figure 3: Co-infection of HIV, HBV and HCV among pregnant women at the Mifi health district

Risk factors associated with HIV, HBV and HCV infections

Table 3: Risk factors associated with HIV,HBV and HCV among the study population.

Categories of risk history associated with HIV, HBV and HCV		Frequency(N)	Percent(%)
Unprotected multiple sexual partners	Yes	432	92.5
	No	35	7.5
Unsafe injection of drugs	Yes	127	27.2
	No	340	72.8
Sharing sharp materials	Yes	467	100.0
Blood transfusions	Yes	103	22.1
	No	364	77.9
Dental extraction	Yes	81	17.3
	No	386	82.7
Surgical procedures	Yes	102	21.8
	No	365	78.2

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