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SEROPREVALENCE OF HEPATITIS B SURFACE ANTIGEN AND ITS ASSOCIATED FACTORS AMONG HIV POSITIVE PREGNANT WOMEN AT A HOSPITAL IN KENYA

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Introduction: Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) are among the leading causes of infectious disease deaths worldwide. In Sub Saharan Africa, the two viruses are highly endemic among pregnant women. With co-infection risk of perinatal transmission cannot be under-estimated.

Methods: This study utilized a descriptive cross sectional design that sought to establish the seroprevalence of HBsAg among HIV positive pregnant women at JOOTRH. Participants were recruited at the reproductive health department. Ethical approval was obtained from the joint Kenyatta National Hospital and University of Nairobi Ethics and Research Committee and ethical considerations were observed throughout the study. Standardized tools were used for data collection. SPSS was utilized in data entry and processing while descriptive statistics were used in data analysis.

Findings: A total of 125 study respondents participated in this study. The study established a co-infection rate of 1%. There was no correlation between demographic characteristics and risk factors for HBV and HIV co-infection. Majority (32.3 %, n=40) of the respondents were aged between 31 to 35 years followed by 27.7% (n=35) (26-30 years). Ages 16 to 20 constituted 12.3 %(n=15) while ages 21 to 25 accounted for 20 %(n=25). Most of the respondents were married (72%, n=90).

Conclusion: Sero-prevalence of HBsAg among the respondents was low. There is need to focus on similar studies in other parts of Nyanza region.

Keywords: Hepatitis B Virus, HIV, Pregnant women, Seroprevalence.

Introduction

Hepatitis B Virus (HBV) and Human Immunodeficiency Virus (HIV) co-infection represents a major global public health threat as each virus affects the other's natural history and response to therapy. HIV/HBV co-infection places patients at high risk of liver-related morbidity and mortality. HBV is associated with significant morbidity and mortality in patients with HIV infection. Piliero and Faragon (2002) state that pregnant women are especially at high risk for increased

morbidity and mortality since pregnancy suppresses immunity. Information about HIV/HBV co-infection in pregnant women is scanty. Both viruses share similar routes of transmission and risk factors. However, HBV is about 100 times more infectious (Torantola et al. 2006). Thio et al. (2002) asserts that in some settings up to two thirds of all HIV-infected people have a blood marker of past or present HBV infection.

HBV infection is a global health problem with an estimated 350 million people chronically infected (Lavanchy2004). According to McMahon (2005) and Custer et al. (2004) world prevalence of HBV ranges from 0.1% to 20 %. It is the leading cause of chronic liver disease and a leading cause of death, accounting for up to half of all cases of liver cirrhosis and hepato-cellular carcinoma (Hoffman & Thio, 2007). It is transmitted through blood or body fluids of an infected person, unprotected penetrative sexual contact, body tattoos, skin piercing, needle stick injuries, perinatal and vertical transmission among others. Viral hepatitis during pregnancy is associated with high risk of maternal complications, high rate of vertical transmission causing fetal and neonatal hepatitis and has been reported as a leading cause of maternal mortality (Elinav et al. 2006; Ornoy & Tenenbaum, 2006; Tse et al. 2005 and Dafalla et al, 2003). In settings of HIV co-infection, the mortality rate from chronic hepatitis B is increased compared to that of either infection (Lar et al, 2013). The prevalence of HBV among HIV infected pregnant women is widely varied and in some instances data is not available on the same. In Europe for instance, few studies have addressed co-infection of HIV and HBV in pregnant women. There are no data on the prevalence of HIV/Hepatitis C Virus (HCV) or HIV/HBV co-infection in antenatal populations in Europe (Santiago-Munoz et al. 2005). In India Mave et al. (2014) established a co-infection rate of 4.6% (32) of 689 HIV-infected pregnant women screened.

Sub-Saharan Africa carries high rates of HIV/HBV co-infection as it is home to about 29.4 million HIV infected people. In Uganda 4.9% of 164 HIV infected antenatal women were positive for HBsAg, in Rwanda 2.4% of 82 HIV-infected antenatal women were positive while in Zambia 31.3% co-infection of HIV and HBV was established in a sample of 214 HIV-infected pregnant women (Pirillo et al. 2007). In Nigeria (Ezegbudo et al. 2004) established a co-infection rate of 0.7% in a sample of 1120 pregnant women.

HIV epidemic in Kenya is diverse geographically. According to NASCOP (2014), Nyanza region is among the leading in HIV prevalence. Adult prevalence in Homa Bay County was 25.7%, 23.7% in Siaya, 19.3% in Kisumu and 14.7% in Migori Counties in the year 2013. North eastern region registered the lowest prevalence of 0.2%. With these statistics, the study sought to establish seroprevalence of HBsAg among HIV positive pregnant women at JOOTRH.

Studies have established that the rate of HIV infection is directly proportional to the rate of HBV infection due to their similar modes of transmission. According to NASCOP (2014) the current prevalence of HIV stands at 7% in women and 4% in men with varying rates of infection in different counties, with Nyanza region having the highest prevalence (NASCOP, 2014). In Kenya, screening for HBV infection is not done in pregnant women more so those with HIV infection. WHO recommends screening of pregnant women for HBV infection (Rashid, 2014). With the highest number of new HIV infections coupled with the highest number of people living with HIV/AIDS, Nyanza region is likely to have higher co-infection rates in women than in men.

This study set out to determine the seroprevalence of HBsAg and its associated factors among HIV positive pregnant women in JOOTRH.

Methods

A descriptive cross sectional design was used in this study. The calculated sample size was 139 potential study participants of which 125 consented to participate. Data was collected for a period of one month. Structured questionnaires were administered to the respondents who were also screened for HBsAg using *Onsite Rapid Test kit manufactured by CTK Biotec, Inc USA.* The study was approved by the joint KNH/UoN-ERC and JOOTRH administration. Study participants were recruited in the reproductive health department. All ethical considerations were observed. Informed consent was obtained and consent forms signed by study participants. Privacy was of high priority during collection of blood samples.

Purposive sampling (homogenous) was used in this study. Potential study participants who met the requirements in the inclusion criteria were selected by two mentor mothers who were introduced to the principal researcher by the reproductive health unit manager. The principal researcher discussed the aim of the study with them. Mentor mothers serve as peer counselors for PMTCT clients, provide guidance and support in keeping appointments and promoting antiretroviral adherence and retention-in-care.

Structured questionnaires were prepared and pre-tested for validity and reliability before data collection. Two research assistants were identified with the help of the unit manager and trained by the principal researcher. They were nurses working in the unit with minimum qualification of Bachelor of Science in Nursing (BScN). They administered the questionnaires to participants who were not able to read and write. Blood samples (2 milliliters) were collected aseptically from study respondents and put in red-topped vacutainer collection tubes where they were centrifuged for three minutes to separate serum from plasma. HBsAg status was established through laboratory screening of blood serum using the *Onsite Rapid Test kit manufactured by CTK Biotec, Inc USA.*

Results

One hundred and twenty five (125) respondents took part in the study. Majority of the respondents were aged between 31 to 35 years (32.3% n=40) followed by 27.7% (n=35) aged between 26-30 years. 20% (n=25) were aged between 21-25 years while 12.3% (n=15) were aged between 16-20 years. Only 7.7% (n=10) reported to be above 36 years. Most of the respondents were married (72% (n=90) while 21.6% (n=27) reported to be single. Only 1.6% (n=2) reported to be divorced. Majority of the respondents had either secondary or primary education i.e. 43% (n=54) and 42 %(n=52) respectively. University education constituted 6% (n=8). Most of the respondents were housewives (29.6% (n=37) followed by the unemployed and those in business at 16.8% (n=2)1 and 15.2% (n=19) respectively. Christianity was the main religion constituting 95.2% (n=119) with only 3.2% (4) reporting to be Muslims.

HBsAg Test Results

This study established a sero-prevalence rate of 1% (n=1) among the respondents. Majority were HBsAg negative (99% (n=124).

Demographic Characteristics Associated Test Results

Demographic characteristics i.e. age, marital status, level of education, religion and occupation were analyzed using Pearson correlation to determine association with HIV/HBV co-infection among respondents as follow sage p=0.979, marital status (p=0.804, level of education (p=0.348), religion (p=0.902) and occupation (p=0.513). With 95% and 99% confidence intervals the results were not significant at p>0.01 and p>0.05 as shown in table 1.

Table 1 *Demographic characteristics associated test results*

Demographic	Variable	Results	
Age	16-20	15	0.979
	21-25	25	
	26-30	35	
	31-35	40	
	>36	10	
Marital status	Single	27	0.804
	Married	90	
	Separated	6	
	Divorced	2	
Level of Education	Primary	52	0.348
	Secondary	54	
	College	11	
	University	8	
Religion	Christians	119	0.902
	Muslims	4	
	Atheists	2	
Occupation	Employed	17	0.513
	Unemployed	21	
	Housewife	37	
	Business/Casual	33	
	Self employed	15	
	Student	2	
	Total	**125**	

Risk Factors of HBV infection and results of HIV/HBV co-infection

Risk factors for HBV infection were explored among the respondents. Statistical analysis was done to establish associations between these factors and HIV/HBV co-infection.

The results were as follows; p=0.753 (blood transfusion), p=0.901 (multiple partners), p=0.859 (body tattooing), p=0.751 (body piercing), p=0.901 (circumcision) and p=0.673 (dental procedures). With 95% confidence interval (p>0.05) the results were not significant as shown in table 2. Therefore there was no association between the risk factors and HIV/HBV co-infection.

***Table 2**: Risk factors for HBV infection associated test results*

Factors	No. (%)	P Values
Blood transfusion	9 (7.2)	0.753
Multiple partners	0 (0.0)	0.901
Body tattooing	1 (0.8)	0.859
Body piercing	9 (7.2)	0.751
Circumcision	0 (0.0)	0.901
Dental Procedures	24 (19.2)	0.673

Discussion

This study aimed to determine seroprevalence of HBsAg and its associated factors among HIV pregnant women. Findings showed no correlation between age and HIV/HBV co-infection among the respondents. In a similar study in Nigeria, Lar et al. (2013) established that pregnant women between 36-40 years had the highest rate of co-infection while those between 16-20 years had no co-infection. This is not in agreement with finding of this study.

However, results in this study are supported by results from a similar study in Ethiopia which established no correlation between age and prevalence of HBsAg among pregnant women (Awole & Gabre-Selassie, 2005). Similarly, level of education showed no correlation with HIV/HBV co-infection. This contradicts findings by Lar et al. (2013) in Nigeria which established that pregnant women with only secondary education had the highest prevalence (4.4%) of HIV/HBV co-infection. Those with no formal education showed the lowest prevalence (0.7%). In the same study an association between occupation and HIV/HBV co-infection was established showing housewives having higher rate of co-infection (8.8%) than others with different occupations. Results in this study showed no such correlation though it established a majority of respondents being housewives (29.6%, n=37).It is likely that housewives in the study done in Nigeria may have engaged in more risky sexual behavior than their counterpart in this study. In terms of marital status, majority of the respondents were married though no correlation existed with HIV/HBV co-infection.

However in Anambra State of Nigeria (Ezegbudo et al. 2004) established a paltry 0.4% co-infection among married women which was not statistically significant. To some extend these two findings are similar. The study in Anambra State also revealed HIV/HBV co-infection being highest among the widowed/divorced at 11.1% followed by

the unmarried group. In this regard a conclusion can be made that the widowed/divorced women may have engaged in risky sexual behavior thus exposing them to dangers of HIV/HBV co-infection.

Findings of this study revealed a low sero-prevalence of only 1%. In other parts of the world different sero-prevalence rates have been reported. In India for instance Mave et al. (2014) studied 689 HIV infected pregnant women of which 4.6 % (n=32) had HIV/HBV co-infection. Compared to this study the results are not consistent despite the difference in sample sizes. In Uganda, Pirillo et al. (2007) established that in a sample of 164 HIV infected antenatal women screened for HBsAg 4.9% turned positive. This rate is higher compared to findings in this study though the settings are different. Similarly in Rwanda, of the 82 HIV infected pregnant women screened, 2.4% tested positive for HBsAg (Pirillo et al, 2007).

Though the sample size was smaller, the rate was still higher than seen in this study. Kosolo et al. (2003) established a 31.3% rate as having a marker for HBsAg in a sample of 214 HIV positive antenatal women. Lar et al. (2013), established that 11.8% (n=16) of pregnant women were seropositive for HIV/HBV co-infection. This does not support the low seroprevalence in this study regardless of the similar sample sizes. Similarly Ezegbudo et al. (2004), established a co-infection rate of 0.7 %(n=8) among 1120 pregnant women over a period of one year in Anambra State of Nigeria. Compared to findings in this study the results are similar though the study in Nigeria had a larger sample size and utilized a longer duration.

Risk factors including blood transfusion, multiple partners, tattooing, body piercing, circumcision, and dental procedures were not associated with HIV and HBV co-infection. This mirrors finding by Awole and Gabre-Selassie (2005) in a similar study in Jimma, Ethiopia that established no correlation between blood transfusion, liver disease, dental and surgical procedures and tattooing with HBV infection as a whole. However in the same study when pregnant women of Jimma town were separately analyzed, those who had a history of caesarian section, dental procedures and tattooing had association with HBV infection (Awole & Gabre-Selassie 2005).

Conclusion

There is low seroprevalencerate of HBsAg among HIV positive pregnant women in a setting with high prevalence of HIV infection. More studies should be focused in other parts of Nyanza region to determine overall prevalence so as to make informed decisions regarding policy on routine HBV screening.

Recommendations

With the low seroprevalence rate of HBsAg among study participants as determined in this study, the principal researcher recommends more attention to be focused by relevant authorities on screening for HBsAg

among HIV/AIDS cases in Nyanza region to identify demographics that show higher prevalence and to make informed decisions regarding policy on routine HBV screening.

Focused Antenatal Care (FANC) helps to prevent maternal morbidity and mortality thereby improving survival through prevention and management of pregnancy-related complications. Inclusion of hepatitis B screening in HIV infected pregnant women will go a long way in achieving the objectives of FANC.

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