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Factors Associated with Hepatitis B Surface Antigen Seropositivity among Pregnant Women in Kigali, Rwanda: A Cross Sectional Study

Mochama Monica Nyamusi[1], James Machoki M'Imunya[2], Claude Mambo Muvunyi[3] and Michael Habtu[1]*

[1]Department of Public Health, College of Health Sciences, Mount Kenya University, Kigali, Rwanda
[2]Department of Obstetrics/Gynaecology and Andrology, Institute of Tropical and Infectious Diseases, University of Nairobi, Nairobi, Kenya
[3]Department of Biomedical Laboratory Sciences, College of Medicine and Health Sciences, University of Rwanda, Kigali, Rwanda

Abstract

Background: Hepatitis B virus (HBV) is the commonest cause of chronic viral hepatitis which is responsible for up to 80% of primary liver cancers. Pregnant women who are carriers of the virus pose a significant risk to their health and unborn babies. Majority of countries in developing world have not yet adopted universal screening for pregnant women. Therefore, this study aimed at determining the prevalence and associated risk factors of hepatitis B surface antigen (HBsAg) among pregnant women in Kigali.

Methods: A multicenter, facility based cross-sectional study was conducted on 385 pregnant women visiting antenatal care between May and August 2013. Data on socio-demographic information and possible risk factors of HBV were collected using a pretested structured questionnaire. Blood samples were collected for the detection of HBsAg using a standard diagnostics INC Bioline HBsAg test device followed by confirmatory ELISA for the positive samples. The results were analyzed using descriptive statistics and binary logistic regression. Crude and adjusted odds ratios with corresponding 95% confidence interval (CI) were calculated. A p-value of less than 0.05 was considered significant.

Results: Of the 385 pregnant women enrolled in this study, 3.1% (95% CI=1.4% to 4.8%) were found to be seropositive for HBsAg. Pregnant women who ever worked in hospital (AOR=12.7; 95% CI=2.21-72.57; P=0.004) and had history of gestational diabetes (AOR=10.9; 95% CI=1.87-63.52; P=0.008) were independently associated with HBsAg seropositivity. Though, history of HBV infection in family member was significantly associated during bivariate analysis, it was insignificant in multivariable analysis.

Conclusion: This study indicates that Kigali has intermediate endemicity of HBV among pregnant women. Considering the severity of the infection, HBV is important public health issue in the study area that needs to be addressed. Universal and free ante-natal screening and/or vaccination should be adopted. Moreover, awareness and vaccination coverage to be expanded for healthcare staff, gestational diabetes and family contacts of infected individuals.

Keywords: Hepatitis B virus; Pregnant women; Seroprevalence; Surface antigen

Background

Viral hepatitis type B is a common, serious disease caused by the hepatitis B virus (HBV), a partially double-stranded DNA virus of the Hepadnaviridae family. Chronic active hepatitis B virus infection results in cirrhosis and hepatocellular carcinoma [1,2]. There are approximately 620 000 HBV related deaths each year. In addition, approximately 4.5 million new HBV infections occur worldwide each year [3]. The prevalence of chronic HBV infection is categorized as high (≥ 8%), intermediate (2-7%) and low (<2%) [4].

In high endemic areas, like Central Asian Republics, Southeast Asia, Sub-Saharan Africa and the Amazon basin, the HBV carrier rate is over 8%. In low endemic regions, like the United States, Northern Europe, Australia and parts of South America, HBsAg prevalence is less than 2% [3]. The Middle East, some Eastern European countries and the Mediterranean basin are considered areas of intermediate endemicity with a carrier rate between 2% and 8% [3]. Globally, perinatal HBV transmission accounts for an estimated 21% of HBV-related deaths, while regionally it ranges from 13% in the Eastern Mediterranean region to 26% in the Western Pacific region [5].

The prevalence of HBV among pregnant women in sub-Saharan Africa is moderate to high. In Nigeria, according to Mbamara and Ombiechina, the prevalence of HBV among pregnant women was 2.2% [6]. However, in Mali it was found to be 8% [7] and in Ghana among pregnant women during delivery it was demonstrated at 16% [8]. In Rwanda and Uganda, HBV among HIV positive pregnant women were shown to be 2.4% and 4.2%, respectively [9-11].

Associated risk factors for HBV in pregnancy have been investigated in various set-ups. For example in Singapore and India, it was found that gravida two or more, a history of blood transfusion and a history of HBV infection in family members, history of tattooing, previous surgical procures including dilatation and curettage for miscarriage were significant risk factors for HBV infection [12]. In 2006, Obi et al. in Nigeria found that increasing parity, higher number of sexual partners, polygamy and history of previous STIs were positively associated with HBV in pregnancy [13]. Tattooing/scarification, history of jaundice or contact with a patient with jaundice, contact with blood products or history of blood transfusion were not found to be predisposing factors. Five years later, in the same region, Eke et al. demonstrated a strong correlation between HBsAg positivity in pregnancy with tribal marks/

***Corresponding author:** Michael Habtu, MPH, Department of Public Health, College of Health Sciences, Mount Kenya University, Kigali, Rwanda, Tel: +250784460645; E-mail: mikel.habtu@gmail.com

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tattoos, history of contact with a HBV patient in the past and occupation of the women whereby all the healthcare workers who tested positive for HBsAg had a history of working in a maternity [14]. However the study did not demonstrate any correlation with history of multiple sexual partners, previous history of surgical/dental procedures, history of blood transfusion and circumcision. In a study done at the Muhimbili National Hospital in Tanzania, the seroprevalence of HBV showed no association with marital status, previous history of jaundice, history of blood transfusion and age [15].

Hepatitis B carriage in pregnancy is of great public health concern. This is because it is not only exposing their babies to vertical and early horizontal transmission but their close contacts and delivery care staff are at risk of horizontal transmission. Vertical transmission is thought to be a great risk in high prevalence regions [10]. It contributes significantly to the pool of chronic HBV carriers who act as a source of infection and it is suggested that transmission in sub-Saharan Africa occurs predominantly in childhood [16] hence the need to have control measures targeted at reducing this risk including mother to child transmission. Maternal HBV has been associated with adverse pregnancy and perinatal outcomes [17,18] making it important to screen and manage it effectively to prevent mother to child transmission and avert the adverse outcomes.

Universal antenatal screening coupled with passive-active immunoprophylaxis to neonates at birth has been shown to reduce risk of mother to child transmission by 95% [11]. In spite of this knowledge, universal ante-natal screening is not widely practiced in Africa, including Rwanda. This, combined with the fact that the current immunization for HBV starts at 6 weeks, possibly exposes a number of infants to the risk of perinatal transmission.

Rwanda introduced the HBV vaccine as the pentavalent vaccine in the childhood immunization program in 2006 [19]. According to the 2010 Rwanda Demography and Health Survey (RDHS), the pentavalent coverage stands at above 98.5% in Kigali city with modest variation across the provinces [20]. The universal HBV vaccination to all infant at six weeks will greatly lead to a reduction in the early childhood acquisition of HBV. This practice however will not effectively eliminate the risk of mother to child transmission for those infants born to HBV carrier mothers. For this, the vaccine is required to be given immediately after birth-within 12 h.

In Rwanda, information on the prevalence of Hepatitis B among pregnant women is limited. No recent studies have been done in the country and so the current burden of disease in this group is unknown. Knowledge of local prevalence among pregnant women is necessary for planning for interventional programs. The study therefore intended to assess the prevalence of HBV infection among pregnant women in Kigali as a way of elucidating the importance of mother to child transmission in the area. The information obtained can be useful in informing policy on transmission prevention programs.

Methods

Study design and setting

This was a multicenter, hospital-based, cross-sectional study. The study was conducted in Kigali province. It is the smallest of the five provinces in Rwanda. It is situated near the geographic centre of the nation. It covers a total area of 730 km^2 with an estimated total population of almost a million giving a population density of 1,165.8/km^2, among the highest in Africa. The city's urban area covers about 70% of the municipal boundaries.

Kigali province is divided into three administrative districts: Nyarugenge, Gasabo and Kicukiro. For each of these districts, the main government district hospital was selected as a study site. Study participants were sampled from each of the three district hospitals so as to ensure each administrative district is well represented in the study. The three hospitals where the study was carried out are as follows: Nyarugenge District (Muhima Hospital); Gasabo District (Kibagabaga Hospital) and Kicukiro District (Masaka Hospital).

The district hospitals serve people from Kigali city and its immediate environs. The population attending the ANC clinics are mostly middle and low income. Most of the women who seek ANC services are on the national social health insurance scheme 'mutuelle de santé' whereby the patient pays ten percent of the total cost of services received. The clinics run daily from Monday to Friday. They are manned by qualified nurses who do the normal ANC follow-up and care. Each of the hospitals has Obstetrician/Gynaecologist who follows up the women with any complications in pregnancy.

Sample size and sampling technique

The study population comprised all pregnant women receiving antenatal care at the selected hospitals (Mihima, Kibagabaga and Masaka). The sample size is calculated using the single population proportion formula ($(n=Z^2_{\alpha/2}\ pq/d^2)$ based on the following assumptions: prevalence of HBV was taken 50% (as there is great variation from country to country among developing countries); 95% level of confidence; 5% margin of error. Accordingly, a total of 385 study participants were included. The number of pregnant women in each selected hospitals were allocated proportionally based on the previous registered annual number of clients.

Consecutive sampling was used to recruit study participants until the required sample size was obtained. All the pregnant women who met the inclusion criteria were identified from the women attending ANC. After identification, the potential study participants were taken through the informed consent process whereby the study objectives, risks, benefits and study procedures were explained in the local dialect, Kinyarwanda. Only those who gave their consent were included in the study.

Data collection

After obtaining informed consent, the study participants were taken through an interview during which an anonymous questionnaire was used to obtain the socio-demographic information, obstetric history, past medical history as well as an assessment of chosen risk factors. Each participant was interviewed in private to promote confidentiality. Thereafter, each participant was escorted to the laboratory where a 2 ml sample of venous blood was obtained from the median vein in the antecubital fossa. Blood was collected using vacutainer needle gauge 21 into plain vacutainer clot activator tubes.

After clotting the serum was extracted and 20 µl was placed on the specimen well of the Standard Diagnostics INC Bioline HBsAg test device. (This is a highly sensitive and specific immunochromatographic point of care assay for HBsAg. It can use serum, plasma or whole blood with equal sensitivity of over 99 percent.) The result was read after 20 min. A positive result was indicated by appearance of two distinct red lines, one in the C (control region) and another on the T (test) region. A single red stripe on the test region meant it was a negative. There were no inconclusive/indeterminate results. The test result was communicated back to the study participants within a few hours and those who tested positive were referred to the obstetricians

using the existing referral system for proper follow-up. All the positive samples underwent a confirmatory ELISA test and there were no false positives.

Quality assurance

The questionnaire was pretested at Kimironko Health Centre ANC clinic before the actual data collection began. The information obtained was used to further fine-tune the questionnaire.

Three study assistants were recruited from qualified nurses working in the respective ANC clinics. This ensured minimum flow disruption, continuity of care and familiarity.

Specimen collection, labeling, processing, storage and testing were in accordance to the standard operating procedures of the laboratories and according to the manufacturer's recommendation. Moreover, trained and highly experienced laboratory technicians handled the entire specimen testing throughout the study period to ensure consistency. All the research staff were motivated and closely supervised by the principle investigator.

Data analysis

The data was entered into Microsoft excel after checking for completeness and consistency of the collected information. The data was analysed using Statistical package for social scientists (SPSS) (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). Descriptive statistic was performed to describe demographic profile of the study participants. Bivariate and multivariable logistic regressions were used to assess the association between the potential associated factors and HBV infection. Five variables with p value <0.20 during the bivariate analysis were entered together into multiple logistic regression by specifying 'backward Conditional' method with removal at p value <0.05.

Ethical Considerations

Ethical clearance was obtained from Kenyatta National Hospital/ University of Nairobi Ethics Review Committee and the Rwanda National Ethics Committee. Moreover, written informed consent was obtained from all study participants prior to interview and blood collection. The study participants were taken through a process of obtaining informed consent whereby the study objectives, process, risks and benefits were explained to them before being enrolled into the study. Confidentiality of the collected information and laboratory test results was maintained.

For those who tested positive for HBV were referred promptly to their respective hospital obstetricians for follow-up. They were also encouraged to ensure their babies receive Hepatitis B vaccination starting six weeks as per the Rwanda National Expanded Program of Immunization.

Results

Social demographic characteristics

A total of 385 pregnant women attending at Masaka Hospital (76), Kibagabaga Hospital (119) and Muhima hospital (191) consented and were recruited to participate in this study. The mean age of the participants was 28.03 years with a standard deviation of 5.6 years. The ages ranged between 15 and 46 years, dominantly within 26 to 35 years (56.4%). Of the women recruited, (65.2%) were residing in urban area. Most of the pregnant women (93.8%) were married monogamously. The majority of the women (61.3%) had attained primary level of education. 186 (48.3%) of the participants were housewives. More than half of the pregnant women (54.5%) were in their 2nd to 4th pregnancy and 13% of them had had more than 5 pregnancies while 32.5% were primigravida (Table 1).

Medical and sexual related factors

Regarding medical history of the study participants, 2.3% had history of gestational diabetes, 4.4% had history of jaundice in their lifetime, 4.2% had ever received blood transfusion, 20% ever had surgery, 4.9% were HIV positive, 6.5% had ever lived with someone diagnosed with Hepatitis B and 2.3% had ever worked in a hospital. About a third of the women (33.8%) had tribal marks and 43.9% had tattoos/body piercing (Table 2).

Concerning respondents' previous history of sexually transmitted disease (STD) signs and symptoms, 42.3%, 17.9% and 7.3% had vaginal discharge, genital ulcer and bleeding during/after sexual intercourse respectively. In this study, 9.3% pregnant women had history of multiple sexual partners over the preceding one year (Table 2).

Factors associated with hepatitis B virus infection

Of 385 pregnant women tested for HBsAg, 3.1% (95% CI: 2.2-6.9%) were found to be seropositive. After considering the five variables with p value less than 0.2 at bivariate analysis together in multivariable analysis by specifying 'backward Conditional' method with removal at p value <0.05, two variables retained at the last model which are history of gestational diabetes (AOR=10.9; 95% CI=1.87-63.52; P=0.008) and ever worked in hospital (AOR=12.7; 95% CI=2.21-72.57; P=0.004) (Table 3).

Variable	N=385	%
Age in years		
15-25	126	32.7
26-35	217	56.4
36-46	42	10.9
Mean (± standard deviation) 28.03 (± 5.64)		
Residential area		
Urban	251	65.2
Rural	134	34.8
Marital status		
Single	13	3.4
Married monogamous	361	93.8
Married polygamous	4	1.0
Widow/separated/divorced	7	1.8
Level of formal education		
None	23	6.0
Primary	236	61.3
Secondary	96	24.9
University/college	30	7.8
Occupation		
House wife	186	48.3
Employed	199	51.7
Gravida		
1st	125	32.5
2^{nd}-4^{th}	210	54.5
5 and above	50	13.0

Table 1: Social demographic characteristics of respondents.

Variable	N=385	%
History of gestational diabetes		
Yes	9	2.3
No	376	97.7
History of jaundice		
Yes	17	4.4
No	368	95.6
Ever received blood transfusion		
Yes	16	4.2
No	369	95.8
Ever had surgery		
Yes	77	20.0
No	308	80.0
HIV status		
Positive	19	4.9
Negative	331	86.0
Not done	35	9.1
Ever lived with someone diagnosed with Hepatitis B		
Yes	25	6.5
No	360	93.5
Ever worked in hospital		
Yes	9	2.3
No	376	97.7
Tribal marks		
Yes	130	33.8
No	255	66.2
History of tatoo or body piercing		
Yes	169	43.9
No	216	56.1
History of vaginal discharge		
Yes	163	42.3
No	222	57.7
History of genital ulcer		
Yes	69	17.9
No	316	82.1
Bleeding during/after sexual intercourse		
Yes	28	7.3
No	357	92.7
Sexual partners over the last one year		
One person	343	90.7
2 and more	35	9.3
[a]Missing 2 records		

Table 2: Medical and sexual related factors.

Discussion

To our knowledge this is among the first Hepatitis B prevalence studies among the pregnant women in Rwanda, hence it provides baseline data that can be useful in contributing to knowledge of the disease characteristics stimulate further research on the disease and also contribute to informing policy on control measures. The results of the study revealed that the prevalence of HBsAg among pregnant women attending antenatal care facilities was 3.1%. According to HBV prevalence classification of WHO, Kigali has intermediate endemicity of HBV infection (2-7%) [21] among pregnant women. This intermediate endemicity means that most infections could occur in infants and children as a result of maternal-neonatal transmission or close childhood contact, although percutaneous exposure with contaminated needles or following unsafe injections is also a possibility. This calls for more control measures in addition to the existing childhood vaccination offered from six weeks by the expanded program of immunization.

The prevalence HBsAg in this study was comparable with the findings of previous studies such as 3% in Addis Ababa Ethiopea [22], 3.8% in Abuja Nigeria [23], 3.9% in Dares Salaam in Tanzania [24] and 4.2% in Lagos Nigeria [25]. Contrary, it was higher than the study conducted in India (0.9%) [26] and Tripoli, Libya (1.5%) [27]. However, other several studies have been reported higher prevalence of HBV among pregnant women, for example 9.3% in Kenya [28], 5.6% in Sudan [5], 6.67%) in Keffi Nigeria [29] and 7.3% in Gondar Ethiopia [30], 8.0% in Mali [31], 9.5% in Gabon [32], 10.2% in Cameroon [33], 12.5% in Benin [34], 12.6% in Ghana [8] and 15.5% in Taiwan [35]. Geographical differences have been identified as the main reason for the variation of seroprevalence rates of HBV infection among pregnant women in different countries [36]. In addition, the lower prevalence in Kigali could be due to differences in sociocultural practices that have been linked to HBV transmission, most notably the absence of female genital mutilation in Rwanda that is practiced widely in some parts of Western and Eastern African communities. Also the majority of the study participants in this study were in monogamous marriages making them a low risk group.

The demographic characteristics of the study population are similar to other populations that have been studied elsewhere. Most of the studies report the mean age of the study subjects to be between 25 to 28 years [37,38]. This is expected because majority of women in the child bearing age are in their twenties. Of the women recruited about two thirds of them were residing in urban area while a third were from rural area. This is representative of Kigali province that has 70% urban area

Variables	HBsAg Serostatus		COR (95% CI)	p value	AOR (95% CI)	p value
	Positive n (%)	Negative n (%)				
Age in years						
15–25	4 (3.2%)	122 (96.8%)	1.3 (0.15-12.37)	0.794		
26–35	7 (3.2%)	210 (96.8%)	1.4 (0.16-11.41)	0.773		
36–46	1 (2.4%)	41 (97.6%)	Reference			
Residential area						
Urban	10 (4.0%)	241 (96.0%)	2.7 (0.59-12.69)	0.180	2.6 (0.52-13.35)	0.244
Rural	2 (1.5%)	132 (98.5%)	Reference			
Marital status						
Single	0 (0.0%)	13 (100.0%)				
Married monogamous	12 (3.3%)	349 (96.7%)	Not applicable	0.844		
Married polygamous	0 (0.0%)	4 (100.0%)				
Widow/separated/divorced	0 (0.0%)	7 (100.0%)				

Level of formal education						
None	1 (4.3%)	22 (95.7%)	0.6 (0.05-7.48)	0.719		
Primary	4 (1.7%)	232 (98.3%)	0.2 (0.04-1.38)	0.110		
Secondary	5 (5.2%)	91 (94.8%)	0.8 (0.14-4.18)	0.761		
University/college	2 (6.7%)	28 (93.3%)	Reference			
Occupation						
House wife	6 (3.2%)	180 (96.8%))	1.1 (0.34-3.39)	0.905		
Employed	6 (3.0%)	193 (97.0%)	Reference			
Gravidity						
1st	7 (5.6%)	118 (94.4%)	2.9 (0.35-24.26)	0.324		
2nd-4th	4 (1.9%)	206 (98.1%)	0.9 (0.10-8.70)	0.965		
5 and above	1 (2.0%)	49 (98.0%)	Reference			
History of gestational diabetes						
Yes	2 (22.2%)	7 (77.8%)	10.5 (1.93-56.81)	**0.001**	10.9 (1.87-63.52)	**0.008**
No	10 (2.7%)	366 (97.3%)	Reference			
History of jaundice						
Yes	1 (5.9%)	16 (94.1%)	2.0 (0.25-16.69)	0.502		
No	11 (3.0%)	357 (97.0%)	Reference			
Ever received blood transfusion						
Yes	1 (6.2%)	15 (93.8%)	2.2 (0.26-17.92)	0.461		
No	11 (3.0%)	358 (97.0%)	Reference			
Ever had surgery						
Yes	2 (2.6%)	75 (97.4%)	0.8 (0.17-3.70)	0.769		
No	10 (3.2%)	298 (96.8%)	Reference			
HIV status						
Not done	2 (5.7%)	33 (94.3%)	2.2 (0.45-10.46)	0.335		
Positive	1 (5.3%)	18 (94.7%)	2.0 (0.24-16.56)	0.525		
Negative	9 (2.7%)	322 (97.3%)	Reference			
Ever lived with someone diagnosed with Hepatitis B						
Yes	3 (12.0%)	22 (88.0%)	5.3 (1.34-21.05)	**0.008**	2.9 (0.62-13.79)	0.174
No	9 (2.5%)	351 (97.5%)	Reference			
Ever worked in hospital						
Yes	2 (22.2%)	7 (77.8%)	10.5 (1.93-56.81)	**0.001**	12.7 (2.21-72.57)	**0.004**
No	10 (2.7%)	366 (97.3%)	Reference			
Tribal marks						
Yes	2 (1.5%)	128 (98.5%)	0.4 (0.08-1.77)	0.203		
No	10 (3.9%)	245 (96.1%)	Reference			
History of tattoo or body piercing						
Yes	6 (3.6%)	163 (96.4%)	1.3 (0.41-4.07)	0.665		
No	6 (2.8%)	210 (97.2%)	Reference			
History of vaginal discharge						
Yes	4 (2.5%)	159 (97.5%)	0.7 (0.20-2.27)	0.521		
No	8 (3.6%)	214 (96.4%)	Reference			
History of genital ulcer						
Yes	2 (2.9%)	67 (97.1%)	0.9 (0.19-4.26)	0.908		
No	10 (3.2%)	306 (96.8%)	Reference			
Bleeding during/after sexual intercourse						
Yes	1 (3.6%)	27 (96.4%)	1.17 (0.15-9.36)	0.886		
No	11 (3.1%)	346 (96.9%)	Reference			
Sexual partners over the last one year (378)						
One person	9 (2.6%)	334 (97.4%)	Reference			
2 and more	3 (8.6%)	32 (91.4%)	3.5 (0.90-13.50)	0.072	2.5 (0.55-11.02)	0.239
Key: COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio						

Table 3: Factors associated with HBsAg seropositivity among pregnant women.

coverage and 30% rural area. Majority of the respondents had primary and above level of education but only 6% were without any formal education and this might increase the awareness of HBV susceptibility. Also the majority of the study participants in this study were in monogamous marriages making them a low risk group. However, in this study there was no any statistically significant association observed between the all the socio-demographic characteristic and HBV prevalence.

Pregnant women who had ever worked in a hospital were about 13 times more likely to be positive for HBsAg (AOR=12.7; 95% CI=2.21-72.57; P=0.004) compared to those who never worked in a hospital.

The prevalence of this infection among healthcare workers, a high risk group for acquiring blood borne infections following occupational exposure to with infectious body fluids, depends upon HBV prevalence in the general population. It has been previously demonstrated that in high endemicity areas, transmission of HBV to health care workers (HCWs) is of great public health concern [39-41]. Similarly in India, an intermediate endemic zone where the estimated prevalence rate of HBV in the healthy general population is around 4.7% and 5% HBsAg positivity among other HCWs, but alarmingly high seropositivity of around 40% among laboratory technicians [39]. With lack of universal pre-natal HBsAg screening in Rwanda, the health care workers especially the delivery and laboratory staff is also at increased risk of percutaneous infection.

The other factor independently associated with HBsAg in this study was history of gestational diabetes (AOR=10.9; 95% CI=1.87-63.52; P=0.008). Chronic hepatitis B infection is associated with insulin resistance (IR) [42], which implies that it may increase the risk of developing diabetes mellitus and/or gestational diabetes mellitus. However, the association between chronic hepatitis B infection and the risk of DM and/or GDM remains less convincing. Moreover, according to a recent meta-analysis, it was concluded that gestational diabetes mellitus is not attributable to CHB infection during pregnancy [43]. According to literature HBV can be a risk factor for diabetes mellitus and our finding could imply that the pregnant women positive for HBsAg are at a higher risk of developing gestational diabetes mellitus [17,18]. However, we cannot certify this as our study was cross sectional study.

Even though, history of HBV infection in family member was significantly associated with HBsAg at bivariate analysis, it was insignificant in multivariable analysis. It has been reported that HBV can be transmitted between family members within a household through sharing personal items such as, tooth brushes and shaving razors with an infected person and exposure to blood from needle sticks or other sharp instruments contaminated with HBsAg of chronically infected persons [44,45]. The role of family history as an important risk factor in acquiring HBV infection had been previously identified in other studies [12,14,46].

Contrary to the other studies [5,12,14,26,33,37,47-49], older age, gravida two or more, increasing parity, a history of blood transfusion, history of tattooing, previous surgical procures, higher number of sexual partners, polygamy and history of previous STIs did not show any statistically significant correlations with HBsAg positivity in this study.

The limitation of this study was that it did not measure the HBeAg positivity among the HBsAg positive cases as this would have given the actual risk of mother to child transmission among the study population. The study only focused on women attending government ANC clinics. Although majority of the women in Kigali attend ANC clinic in government facilities, the results are not readily generalizable to all pregnant women in Kigali as more women are now seeking ANC services in the upcoming private facilities. There is need to also study this group of women as far as HBV infection is concerned. Most of the private ANC facilities and the higher level referral hospitals do offer pre-natal screening services so such information may be easily available.

Conclusion

This study was set out to determine the factors associated with HBsAg seropositivity among pregnant women in Kigali. The findings indicate an intermediate endemicity of HBV among the pregnant women in Kigali at 3.1% prevalence, the lowest among the East African countries. The intermediate endemicity of Hepatitis B in Kigali will, together with other similar studies, contribute to advising policy and clinical practice in managing hepatitis B infection. Highlighting the burden of disease in this group will enhance training of clinicians who shall encounter and manage these patients in their practice.

Pregnant women who ever worked in hospital and had history of gestational diabetes were independently associated with HBV. In the long term, there may be need for additional control measures for example routine pre-natal screening for HBV infection and wider adoption of Hepatitis B vaccination to include people at risk like health care workers and family contacts of those who test positive during screening in order to reduce on transmission. This will depend on further understanding of the local dynamics of the disease. In addition, further investigations on the risk of mother to child transmission, clinical presentations and genotype of the virus are recommended.

Competing Interests

The authors declare that they have no competing interests.

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