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Determinants of Hepatitis B and C Viral Infections in Ante-Natal Women in Dalhatu Araf Specialist Hospital, Lafia: Making A Case for Routine Ante-Natal Screening.

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Abstract:

Background: Viral hepatitis infection during pregnancy is associated with high risk of maternal complications and is increasingly becoming a leading cause of foetal death however hepatitis B and C viruses that are mostly implicated are not routinely screened for in antenatal women in most centres. This study was aimed at determining the prevalence and risk factors of hepatitis B and C viral infections among pregnant women at the booking antenatal clinic of Dalhatu Araf Specialist Hospital (DASH), Lafia Nasarawa State.

Methods: This was a hospital based cross sectional study that included 310 pregnant women who booked for ante-natal care at the hospital between June and December,2018. Relevant data were collected using interviewer administered structured questionnaires, 2mls of blood sample obtained by vene-puncture and rapid diagnostic test kits were used to screen for hepatitis B surface antigen (HBsAg) and anti-hepatitis C virus(HCV) antibodies. \the data was cleaned and analyzes using SPSS version 23.0 and level of statistical significance was taken at $P<0.05$.

Results: Out of the 310 respondents, 29 (9.3%) of them tested positive for HBsAg. Another 8 (2.6%) respondents tested positive for Hepatitis C. Thus, giving the prevalence of Hepatitis B and C among our study

population as 9.3% and 2.6% respectively The determinants of HBV infections were increased level of education (x^2=1.765, p=0.047), previous knowledge of Hepatitis B and C (x^2=4.480, p=0.029), while for HCV infection were women who had previously changed husbands (x^2=6.598, p=0.012) and having been immunized against hepatitis B (x^2=5.823, p=0.018).

Conclusion: The findings from this study are in consonance with the findings from many other similar studies in the past, that also reported high prevalence of hepatitis B and C in pregnancy. It is therefore recommended that a policy of routine screening for viral hepatitis in our antenatal clinics be established.

Keywords; *DASH, Determinants, Hepatitis, Infection, Pregnancy, Prevalence*.

I. Introduction

Hepatitis B and Hepatitis C viral infections are currently among the most challenging global health problems affecting not only pregnant women, but accounting for more than 400 million infections worldwide[1]. Hepatitis can be defined as an inflammation of the liver characterized by the presence of inflammatory cells in the tissue of the organ[1,2]. It may occur with limited or no symptoms, but often leads to jaundice and anorexia[1,2]. Hepatitis is acute when it lasts less than six months and chronic when it persists longer[3]. Hepatitis can be of various aetiology including; the hepatitis viruses, toxins (eg. alcohol, some medications and some plants), autoimmune diseases and some other infections[4]. Among the hepatitis group of viruses, Hepatitis B virus (HBV) and Hepatitis C virus (HCV) infections are amongst the commonest worldwide[4]. Thus, this study will be focused on HBV and HCV.

In an infected person, HBV and HCV are found in the blood and other body fluids. The common routes of transmission of these viruses are through transfusion of blood and blood products which have not been adequately screened for blood borne viruses[5,6,7]. In addition, medical interventions with unsterilized equipment, mother to child transmission during pregnancy, sexual transmission, sharing sharp instruments (eg. injections, razors etc), tattooing and other body piercing, can be avenues of transmission of these viruses[5,6]. HCV on its own is mostly spread through direct contact with infected blood and rarely transmitted through other means[5,6,7].

The prevalence of hepatitis virus infection according to the geographical area, may be high (≥8%), intermediate (2-7%), or low (≤2%).[5] Nigeria is classified among the countries that are highly endemic for viral hepatitis[5]. The prevalence of Hepatitis B surface antigen (HBsAg) in Nigeria ranges from 2.7% to 13.3%[6].

During pregnancy there is a higher risk of maternal complications of the disease, and also transmission of these hepatitis viruses to the offspring of an infected mother[8,9]. Hepatitis in pregnancy is said to be the most common cause of jaundice during pregnancy[9]. Children born to infected mothers can have congenital infection with the viruses and thus they can develop severe complications in the perinatal period and also later in life[8,9]. Perinatal transmission of HBV occurs if the mother has had an acute HBV infection during late pregnancy, in the postpartum period or if the mother is a chronic HBsAg carrier[10]. HCV transmission occurs predominantly around the time of delivery and pregnancy[11].

Studies bordering on the prevalence and determinants of viral hepatitis in pregnancy are few in this environment. We therefore deployed observational research methodology to measure the prevalence on the one hand, and then assess the determinants of the viral hepatitis B and C in pregnant women at the booking clinic in DASH, on the other hand.\apart from adding to the current body of knowledge, the findings from this study may act as a nidus for further research in this realm and will be presented to relevant stakeholders with the hope that it may influence policy decisions appropriately.

II. Methods

2.1 Study Area

The study was conducted at Dalhatu Araf Specialist Hospital (DASH) located at the center of Lafia, the capital city of Nasarawa State. DASH is the only tertiary health institution located in the State capital. It therefore receives referrals from the secondary, primary and private health facilities in the State. It also receives referrals from the neighboring states of Benue, Kogi, Taraba, Plateau and the FCT. Nasarawa State has over 29 different major ethnic groups. The 2006 Nigerian provisional census put the population of Nasarawa State at 1,863,275 with 925,576 females. Nasarawa State lies between latitude 8^{o} 32' and 8.533^{o} North and longitude 8^{o} 18' and 8.300^{o} East. The capital city has a total land area of about 27,137.8km^2.

2.2 Study Population

This included all pregnant women who presented for antenatal care booking in Dalhatu Araf Specialist Hospital, Lafia, between June and December, 2018 and met the criteria for the study.

2.3 Study design

The study was a hospital-based cross sectional descriptive study of women who attended the booking visit of the antenatal clinic of DASH.

2.4 Sampling Method

This was a non-probability consecutive sampling of 310 pregnant women who came for booking at the antenatal clinic, and met the criteria for the study.

2.5Inclusion Criteria

All pregnant women who booked for antenatal care services in DASH.

2.6 Exclusion Criteria

1. Women with previous history of liver disease or on treatment for liver pathology were excluded from the study.
2. Women who were on treatment for Hepatitis B or C.
3. Women with bleeding disorders.

2.7 Data and sample collection

An interviewer administered structured questionnaire (pretested) was used to obtain socio-demographic information and data about the potential risk factors from consenting participants.

Blood sample of about 2mls was obtained by vene-puncture from each participant, and serum separated and stored in a refrigerator. Each serum was brought out of the refrigerator for it to equilibrate with room temperature before testing. After centrifugation, the sera were tested for HBsAg and anti-HCV using ELISA kit (AccuDiag Diagnostics, USA). Positive and negative control serum samples were run alongside the test.

2.8 Data Analysis

Data was cleaned and analyzed using SPSS version 23.0 and regression analysis was carried out to describe the variables and the association between the variables and hepatitis B and C viral infections. Level of statistical significance was taken at $P < 0.05$.

2.9 Ethical Consideration

Ethical clearance was applied for and obtained from the ethical committee of Dalhatu Araf Specialist Hospital (DASH), Lafia. Women participating in the study were counselled and educated on the purpose of the research and its benefit for pregnant women. Written consents were obtained and the participants informed that participation is voluntary without any form of coercion and their declining will not affect their care in the antenatal clinic. They were also informed that they will be bearing no cost of the tests.

III. Results

A total of 310 women were recruited for the study. An objectively structured questionnaire was administered to each of the women, and blood samples taken for HBsAg and Anti-HCV tests to be run. The tables and figure below sets out the results thus obtained.

Table 1: Socio-demographic information of the research participants

Categories	Frequencies(n)	Percentage(%)
Age (Mean ± SD)	27.36 ± 5.56	
Educational level		
None	59	19.5
Primary	39	12.9
Secondary	96	31.7
Tertiary	116	35.9
Occupation		
Housewife	141	45.6
Student	9	2.9
Trader	20	6.5
Business women	48	15.5
Civil servant	47	15.2
Farmer	1	0.3
Artisans	23	7.4
Corper	3	1.0
Others	18	5.6
Marital Status		
Single	1	0.3
Married	307	99.0
Divorced	2	0.6
Parity		
0	52	16.8
1-4	180	58.0
≥ 5	78	25.2

Table 1 above showed mean age of participants in the study to be 27.36 years ± 5.56 years. Majority of the participants, 116(35.9%) had tertiary education. . Most of the respondents, 307(99.0%) were married, 1(0.3%) was single and 2(0.6%) were divorced.

Figure 1: Prevalence of HBV and HCV

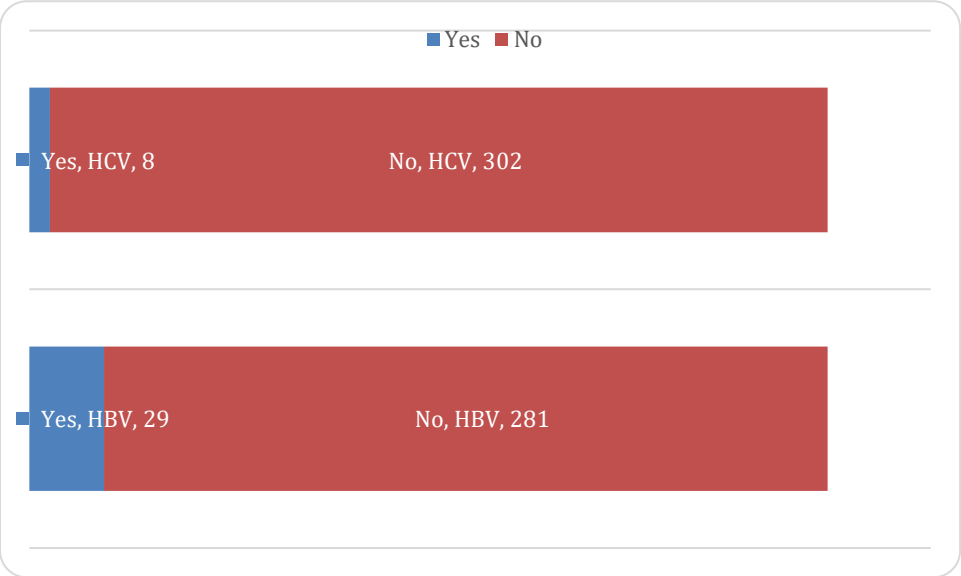

Fig1 above showed that out of the 310 respondents, 29 (9.3%) of them tested positive for HBsAg. Another 8 (2.6%) respondents tested positive for Hepatitis C. Thus, the prevalence of Hepatitis B in this study population was 9.3%, and of Hepatitis C was 2.6%.

Table 2: Determinants of Hepatitis B virus infection

	Hepatitis B			Fisher's exact test	Df	P-value
Educational status	Negative	Positive	Total	1.765	4	0.047
None	53(94.6%)	3(5.4%)	56(100.0%)			
Primary	36(92.3%)	3(7.7%)	39(100.0%)			
Secondary	85(88.5%)	11(11.5%)	96(100.0%)			
Tertiary	98(89.9%)	11(10.1%)	109(100.0%)			
Others	9(90.0%)	1(10%)	10(100%)			
Total	282(90.9)	29(9.1)	310(100.0%)			
Have you had home deliveries?						

Yes	74(91.4%)	7(8.6%)	81(100.0%)	1.000	1	0.498
No	207(90.4%)	22(9.6%)	229(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Have you changed husband?						
Yes	19(90.5%)	2(9.5%)	21(100.0%)	1.000	1	0.606
No	262(90.7%)	27(9.3%)	289(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Does Husband have other wife/wives?						
Yes	53(89.8%)	6(10.2%)	59(100.0%)	0.057	1	0.487
No	228(90.8%)	23(9.2%)	251(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Knowledge of Hepatitis B and C						
Yes	99(86.1%)	16(13.9%)	115(100.0%)	4.480	1	0.029
No	182(93.3%)	13(6.7%)	195(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Have you been immunized against Hepatitis B?						
Yes	41(91.1%)	4(8.9%)	45(100.0%)	1.000	1	0.584
No	240(90.6%)	25(9.4%)	265(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Previous blood transfusion						
Yes	42(87.5%)	6(12.5%)	48(100.0%)	0.409	1	0.367

No	239(91.2%)	23(8.8%)	262(100.0%)			
Total	281(90.9%)	29(9.1%)	310(100.0%)			
Tribal scarification						
Yes	125(91.2%)	12(8.8%)	137(100.0%)	0.103	1	0.749
No	156(90.2%)	17(9.8%)	173(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			
Have you had home deliveries?						
Yes	74(91.4%)	7(8.6%)	81(100.0%)	0.066	1	0.831
No	207(90.4%)	22(9.6%)	229(100.0%)			
Total	281(90.6%)	29(9.4%)	310(100.0%)			

The table above assesses associated factors of Hepatitis B among women in the study. The factors were found to be associated with hepatitis B among women attending antenatal clinic in the study centre using chi-square test of association at 95% confidence were educational status of women (X^2=1.765, p=0.047), previous knowledge of hepatitis B and C (X^2=4.480, p=0.029). However, having home delivery (X^2=1.000, p=0.498, having changed husband or being married previously (X^2=1.000, p=0.606), husband have other wife or wives (Fishers'=0.057, p=0.487), immunization against hepatitis B (Fisher's=1.000, p=0.584), previous blood transfusion (X^2=0.409, p=0.367), tribal scarification (X^2=0.103, p=0.749) and having home delivery (X^2=0.066, p=0.831) were not statistically significant.

Table 3 Determinants of Hepatitis C virus infection

	Hepatitis C			Fisher's exact test	Df	P-value
Educational status	Negative	Positive	Total	7.596	4	0.067
None	52(92.9%)	4(7.1%)	56(100.0%)			
Primary	39(100.0%)	0(0.0%)	39(100.0%)			
Secondary	96(100.0%)	0(0.0%)	96(100.0%)			
Tertiary	106(96.4%)	4(3.6%)	110(100.0%)			
Others	9(100.0%)	0(0%)	3(100.00%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			

Have you changed husband?						
Yes	18(85.7%)	3(14.3%)	21(100.0%)	6.598	1	0.012
No	284(98.3%)	5(1.7%)	289(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Does Husband have other wife/wives?						
Yes	57(96.6%)	2(3.4%)	59(100.0%)	0.177	1	0.650
No	245(97.6%)	6(2.4%)	251(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Knowledge of Hepatitis B and C						
Yes	110(95.7%)	5(4.3%)	115(100.0%)	2.172	1	0.152
No	192(98.5%)	3(1.5%)	195(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Have you been immunized against Hepatitis B?						
Yes	41(91.1%)	4(8.9%)	45(100.0%)	5.823	1	0.018
No	261(98.5%)	4(1.5%)	265(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Previous blood transfusion						
Yes	47(97.9%)	1(2.1%)	48(100.0%)	0.061	1	0.640
No	255(97.3%)	7(2.7%)	262(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Tribal scarification						

Yes	133(97.1%)	4(2.9%)	137(100.0%)	0.112	1	0.505
No	169(97.7%)	4(2.3%)	173(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			
Have you had home delivery?						
Yes	80(98.8%)	1(1.2%)	81(100.0%)	0.916	1	0.336
No	222(96.9%)	7(3.1%)	229(100.0%)			
Total	302(97.4%)	8(2.6%)	310(100.0%)			

Table 3 showed the factors associated with hepatitis C virus (HCV) infection which were women who had reported previously changing a husband (x^2=6.598, p=0.012) and having been immunized against hepatitis B (x^2=5.823, p=0.018).

IV. Discussion

The study had a total of 310 respondents. Out of the 310 respondents, 29 (9.3%) of them tested positive for HBsAg. Another 8 (2.6%) respondents tested positive for Hepatitis C. Thus, the prevalence of Hepatitis B among our study population was 9.3%, while the prevalence of Hepatitis C was 2.6%. These prevalence can therefore be categorized as high Hepatitis B prevalence (≥ 8%) and an intermediate Hepatitis C prevalence (2 – 7%).

Looking at the determinants associated with Hepatitis The determinants noted to be statistically significantly associated with Hepatitis B virus (HBV) infection in our study was Increased level of education, as those noted to have greater than or equal to a secondary school education tested positive when compared to those who had a primary education or no education (x^2=1.765, p=0.047). Another determinant noted to be associated with HBV infection was previous knowledge of Hepatitis B and C. Those who had previous knowledge of Hepatitis B and C were noted to have more infection with HBV when compared to those without previous knowledge (x^2=4.480, p=0.029).

Looking at the determinants associated with hepatitis C virus (HCV) infection, we noted that women who had reported previously changing a husband (x^2=6.598, p=0.012) and having been immunized against hepatitis (x^2=5.823, p=0.018) were found to be statistically significantly associated with being positive to HCV.

The prevalence of HBV and HCV in our study agreed with studies done in South-Western Nigeria by Atiola et al and another study done by Izevbuwa et al in Ilorin, Nigeria[12,13]. In a study involving pregnant women from 10 facilities in South-Western Nigeria, Atiola et al found a high prevalence of HBV of 10.5%[12]. Izevbuwa in Ilorin also found a high prevalence of HBV among pregnant women to be 11% and also an intermediate prevalence of HCV at 2%[13].

Other studies found an intermediate prevalence of HBV at 5.6% and a low prevalence of HCV at 1.1%[1]. Magaji et al in Jos and Mustapha et al in Bauchi found intermediate prevalence of HBV infections at 7.4% and 6.7% respectively[14,15].

As regards HCV infection among pregnant women our study agreed with the study done by Shittu et al which found an intermediate prevalence of 4.6% of HCV among pregnant women in Uyo, Nigeria[16]. However, Eleje et al conducted a national study across the six geo-political zones of Nigeria and reported a low

prevalence of 1.3% for HCV among pregnant women[17]. Interestingly, Olise et al reported a very high prevalence of 34.5% for HCV among pregnant women in Benin, Nigeria[18].

The determinants associated with HBV in our study were a higher level of education, and previous knowledge of hepatitis B and C. This is probably because those with a higher level of education and previous knowledge of these viruses would have been more willing to get tested for these infections than those who were not well educated or had not previously heard of the viruses. Also, the determinants associated with HCV infection in our study was a previous immunization to hepatitis - most likely the hepatitis B virus as there is no known immunization against HCV. Our results stand in contrast with other studies that put forth factors associated with HBV infection as; previous history of blood transfusion, absence of vaccination, presence of HIV infection, higher parity etc[12,14]. A national study put forth factors associated with HCV infection as multiple sexual partners, sharing of needles and blood transfusion[17]. More studies need to be done to find out how a higher educational level, previous knowledge of HBV and HCV and previous immunization to HBV affect the prevalence of HBV and HCV.

V. Conclusion

Overall, our study buttresses the point many other studies before us have made i.e that there is a high prevalence of HBV and also a high enough prevalence of HCV infection. Considering the potential complications that HBV and HCV can have on pregnant women and newborns, it is important to screen every pregnant woman at booking for these viruses so that appropriate management (when necessary) can be commenced to mitigate their effects.

VI. Recommendation

We recommend that all pregnant women in DASH and indeed in all health facilities in Nigeria and across endemic areas of the world should be screened at booking along with other diseases already being screened for like HIV and Syphilis. We also recommend that more studies should be done to ascertain the main determinants of HBV and HCV infection among the population and not just pregnant women so that appropriate measures can be taken to reduce the prevalence of these viruses and possibly eliminate these infections as soon as possible paving the way for a healthier population.

VII. Limitation

The fact that it was an institution-based study, coupled with the non-probability sampling technique used, may reduce the statistical power of the findings and hence, hamper the external validity. Meticulous attention was however, given to selection criteria against the background of the fact that the study setting is a reference facility.

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References

[1] Bankole HO, Richard O, Mitsan O: Hepatitis B and C Viral Infections among Pregnant Women in Rural Community of Nigeria. *Int.J.Basic & Appl. Virol 1(1)*,2013, 01-05

[2] World Health Organization: WHO. Hepatitis B [Internet]. Who.int. World Health Organization: WHO; 2019. Available from: https://www.who.int/en/news-room/fact-sheets/detail/hepatitis-b

[3] Ryder S, Beckingham I. ABC of diseases of liver, pancreas, and biliary system: Acute hepatitis. *Br Med J.322*,2001,151–153.

[4] Ahmedin J, Taylor M, Ram CT. A New Section in Cancer Offering Timely and Targeted information. *Can J Clin.54*,2004,23–25.

[5] Maddrey WC. Hepatitis B: an important public health issue. *J med virol.61(3),* 2000,362-6.

[6] Sirisena ND, Njoku MO, Idoko JA. HBsAg in patients with human immunodeficiency Virus1 (HIV-1) infection in Jos, Nigeria. *Nigerian Medical Practitioner 41*,2002,18-20

[7] Redmond WA. Liver Microsoft Student [DVD] *Microsoft Corporation.* 2007

[8] Elinav E, Ben-Dov IZ, Shapira Y. Acute hepatitis A infection in pregnancy is associated with high rates of gestational complications and preterm labor. *Gastroenterology,130,* 2006, 1129–1134.

[9] Hill J, Sheffield J, Kim J. Risk of hepatitis B transmission in breast-fed infants of chronic hepatitis B carriers. *Gynecol Obstet.99*,2002,1049–1052.

[10] Levy M, Koren G. Hepatitis B vaccine in pregnancy: Maternal and fetal safety. *Am J Perinatol.8,* 1991,:227–232.

[11] World Health Organization. Global surveillance and control of hepatitis C. Report of a WHO Consultation organized in collaboration with the Viral Hepatitis Prevention Board. *JVH.8*, 1999,35–47.

[12] Atilola G, Tomisin O, Randle M, Isaac KO, Odutolu G, Olomu J, et al. Epidemiology of HBV in Pregnant Women, South West Nigeria. *Journal of Epidemiology and Global Health,8(3-4),*2018,115.

[13] Izevbuwa O, Omosigho P, Osasona A. Seroprevalence of Hepatitis B and C Viruses among Pregnant Women in Ilorin, Kwara State, Nigeria. *Microbes and Infectious Diseases.3(3),* 2022, 566-577..

[14] Magaji FA, Okolo MO, Hassan Z, Shambe IH, Pam VC, Ocheke AN, et al. Prevalence of Hepatitis B Virus Infection among Pregnant Women in Jos, Nigeria. *Annals of African Medicine,19(3*), 2020,176–81.

[15] Mustapha GU, Ibrahim A, Balogun MS, Umeokonkwo CD, Mamman AI. Seroprevalence of Hepatitis B Virus among Antenatal Clinic Attendees in Gamawa Local Government Area, Bauchi State, Nigeria. *BMC Infectious Diseases,20(194).*06 March 2020

[16] Shittu GO, Abasiattai AM, Umoiyoho AJ, Onwuezobe IA. Prevalence and Predictors of Hepatitis C Infection among Antenatal Attendees in a Tertiary Hospital in Southern Nigeria. *African Health Sciences.23(3)* 2023.

[17] Eleje GU, Rabiu A, Mbachu II, Akaba GO, Loto OM, Usman HA, et al. Awareness and Prevalence of Hepatitis C Virus Infection among Pregnant Women in Nigeria: a National Pilot cross-sectional Study. *Women's Health. 2021;17,doi:10.1177/17455065211103171*8.

[18] Olise NA, Bilu M. Sero-prevalence of Hepatitis C Virus Infection in Pregnant Women in Benin-City, Edo-State, Nigeria. *Annals of Biomedical Sciences. ,22(1),*2023,16–21.