Science Journal of Clinical Medicine
2013; 2(3): 98-105
Published online June 20, 2013 (http://www.sciencepublishinggroup.com/j/sjcm)
doi: 10.11648/j.sjcm.20130203.17

Risk factors for hepatitis B virus infection among adult Nigerians with clinical features of liver diseases in a resource-constrained environment of a primary care clinic in Eastern Nigeria

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To cite this article:
Gabriel Uche Pascal Iloh, Abali Chuku, Agwu Nkwa Amadi, Nnadozie Paul Obiegbu. Risk Factors For Hepatitis B Virus Infection Among Adult Nigerians With Clinical Features Of Liver Diseases In A Resource-Constrained Environment Of A Primary Care Clinic In Eastern Nigeria. *Science Journal of Clinical Medicine.* Vol. 2, No. 3, 2013; pp. 98-105. doi: 10.11648/j.sjcm.20130203.17

Abstract: Background: Hepatitis B virus (HBV) infection is an important contributor to the burden of liver diseases in adult Nigerians and constitutes a threat to socio-economic development in the sub-region. Screening for its risk factors in patients with clinical features of liver diseases is an important primary care challenge that is often neglected. Aim: To determine the risk factors for HBV infection in adult Nigerians with clinical features of liver diseases in a resource-constrained environment of a primary care clinic in Eastern Nigeria**.** Materials and Methods: A cross sectional study was carried out on 140 adult Nigerians with clinical features of liver diseases at the primary care clinic of a tertiary hospital in Nigeria. Clinical features of liver diseases were based on the presence of some constitutional, hepatic and extra-hepatic features. Hepatitis B surface antigen (HBsAg) was assayed using immunochromatographic method. A pre-tested, structured interviewer-administered questionnaire was used to obtain socio-demographic variables and histories of HBV-related risk factors. Results: The HBV sero-prevalence was 50.7%. The age group 40 – 60 years (P=0.048) and artisans (P=0.019) were significantly infected. The behavioural risk factors significantly associated with HBV infection were histories of unprotected sexual exposures (P=0.001), blood transfusion (P=0.022) and non-hepatitis B vaccination (P=0.030). The most significant predictor of HBV infection was history of unprotected sexual exposures (OR=5.04, P=0.003). Conclusion: Risk factors of HBV infection exist in adult Nigerian patients with clinical features of liver diseases and HBV infection was significantly associated with age, occupation, unprotected sexual exposures, blood transfusion and non-hepatitis B vaccination.

Keywords: Hepatitis B Surface Antigen Sero-Marker, Liver Diseases, Nigeria, Primary Care Clinic, Risk Factors

1. Introduction

Globally, hepatitis B virus (HBV) - related liver diseases are recognized as an important public health problem particularly in high endemic regions of sub-Saharan Africa, China and South-East Asia. [1,2] The prevalence of HBV infection varies geographically throughout the world from high (>8%), intermediate (2-7%) to low (<2%) prevalence rates.[2] About 2 billion people have been infected whilst about 360 million people are chronic carriers, harbouring the virus in their liver and blood.[3] However, in sub-Saharan African countries, HBV infection has been one of the preventable causes of morbidity and mortality and a threat to socio-economic development in the sub-region.[4,5]

Variable frequencies of HBV-induced liver diseases have been reported throughout the world,[6-9] although higher in developing countries such as Nigeria where it is hyper endemic[4,5,10,11] In Nigeria, about 18 million people are infected chronically[12] and prevalence of HBsAg has been reported in various parts of the country: 10.3% was

reported in urban community in Jos, Nigeria[12], 12.6% was reported in rural community in Northern Nigeria[13] and 14.5% reported in hospital patients in Port Harcourt, Nigeria. [14] Research findings in Nigeria have also shown that HBV infection is one of the aetiological agents of liver diseases [10, 15-17] and liver diseases have also been found to be prevalent in HBV infection endemic areas of Nigeria. [18-21] In Maiduguri, Northern Nigeria, HBsAg prevalence of 49%, 56% and 50% were detected among patients with HBV-related hepatitis, liver cirrhosis and hepatocellular carcinoma respectively.[19] Similarly, in Lagos, Southern Nigeria, the reported frequencies were 14%, 30% and 56% for HBV-related hepatitis, liver cirrhosis and hepatocellular carcinoma respectively.[20] However in other parts of the world such as Bangladesh, HBsAg prevalence of 19% was reported among hepatitis patients [22] and 47% in hepatocellular carcinoma patients.[23]

The prevalence of HBV infection, human behaviour and socio-cultural practices conspire to mould geographical differences in the epidemiological pattern.[2]. Epidemiological studies in areas of high HBV endemicity have shown that perinatal transmission is reportedly the predominant route of transmission whereas in areas of low endemicity, sexual contact among high risk persons is the main route. [2, 24] However, HBV transmission in adults through sexual and percutaneous mechanism have been described in high endemic areas of Nigeria,[25,26] Egypt[27] and other parts of the world like Bangladesh[28] and Bucharest.[29]

In Nigeria, there is absence of research study on the relative distribution of risk factors of HBV infection and increasing number of adult Nigerians patients presenting with HBV-related hepatocellular cancers. [5,18-21] However, the vulnerable demographic and behavioural risk factors of these patients with clinical features of liver disease may have contributed to the acquisition of HBV infection. It is against this background that the authors aimed at determining the risk factors for HBV infection in adult Nigerians with clinical features of liver diseases in a resource-constrained environment of a primary care clinic in Eastern Nigeria.

2. Materials and Methods

2.1. Ethical Approval

Ethical certificate was obtained from the Ethics Committee of the hospital. Informed consent was obtained from patients.

2.2. Study Design

This was a clinic-based cross-sectional study on adult Nigerians with clinical features of liver diseases carried out from June 2006 and June 2007 at the department of Family Medicine of a tertiary hospital in Eastern, Nigeria. This study design didn't employ *apriori* separate control group. However, the authors controlled for the patients with risk factors of HBV infection using those without the risk factors of HBV infection within the study population.

2.3. Study Setting

Federal Medical Centre, Owerri is located in the municipal city of Owerri. It is a tertiary hospital established with the tripartite mandate of service delivery, training and research and serves as a referral centre for primary and secondary public health institutions as well as missionary and private hospitals in Imo State and neighbouring States of Abia, Ebonyi, Rivers and Akwa Ibom States of Nigeria.

The department of Family Medicine serves as a primary care clinic within the tertiary hospital setting of the Medical Centre. All patients excluding paediatric patients and antenatal women are first seen at the department of Family Medicine where diagnoses are made. Patients who need primary care are managed and followed up in the clinic while those who need other specialists care are referred to the respective core specialist clinics for further management. The clinic is run by Consultant Family Physicians and postgraduate resident doctors in Family Medicine.

2.4. Inclusion and Exclusion Criteria

The inclusion criteria were patients aged ≥ 15 years who gave informed consent and had clinical features of liver diseases. The exclusion criterion included pregnant patients and critically ill patients.

2.5. Sample Size Determination

The sample size (N) was calculated using the formula[30] $N= [(Z\alpha + Z\beta) \times 2pq]/d^2$ Where N = Desired sample size, Z= The standard normal deviate set at 1.96 which correspond to 95% confidence level P= Prevalence of the HBV infection, q= 1.0 – p, and d=degree of precision desired set at 0.05 The level of significance was set at 5%(α=0.05) while the power of the study(1-β) was set at 80%. A prevalence of 38% was used based on previous study in Maiduguri, Nigeria. [19] $N= [(1.96x0.05+1.96x0.20) x 2x0.38x0.62]/0.05^2$ N = 92

The calculated minimum sample size was 92. However, to improve the precision of the study, the estimated sample size=Ns was determined considering an anticipated response rate of 90 %(0.9). The estimated sample size (Ns) was determined by dividing the original calculated sample size (N) by the anticipated response rate[31] as follows, Ns= N/0.9, where N=Minimum calculated sample size, Ns=Selected sample size, anticipated response rate=0.9. Thus, the estimated sample size = 92/0.9= 102. However, a sample size of 140 patients was used based the proposed duration of the study.

2.6. Sampling Technique

The sample selection was done consecutively using

every adult patient who had clinical features of liver diseases. This sampling technique was judgmentally chosen by the authors. [31]

2.7. Methods

The demographic variables collected from the study population included age, sex, marital status, education and occupation. The social classification of patients was into lower, middle and upper occupational classes to suit Nigerian environment.[32]

A structured, pre-tested and interviewer administered questionnaire was use to obtain information on HBV-related risk factors. The risk factors included sexual factor (history of unprotected sexual exposures), parenteral factor (history of transfusion of infected blood), percutaneous factors (history of use of unsterilized sharp instruments for various purposes), family history of HBV infection and history of hepatitis B vaccination.

The pre-testing of the questionnaire was done internally at the tertiary hospital using five patients with clinical features of liver disease who met the selection criteria and externally at St Damian Hospital, a General Hospital in Orlu, Imo state, Nigeria using five patients with clinical features of liver diseases who met the selection criteria. The pre-testing of the questionnaire lasted for two weeks at the two hospitals respectively. The respondents for the pre-testing were selected haphazardly and those used from the study hospital were excluded from the main study. The pretesting was done to find out how the questionnaire would interact with the respondents and ensure that there were no ambiguities.

3. Diagnostic Procedures

Patients with clinical features of liver diseases were offered hepatitis B surface antigen test after informed verbal explanation and consent. Two milliliters of venous blood were collected from each patient from the ante-cubital fossa after thorough aseptic cleaning. The whole venous blood was tested for hepatitis B surface antigen using the commercially available rapid sero-diagnostic kits, one step test strip manufactured by ACON laboratories, Inc. 4108 Sorrento valley, San Diego, United State of America. The test strip uses whole blood, serum or plasma. The dipstick test strip is a rapid, qualitative, one step immunoassay based on the immunochromatographic principle (ICP). This method employs unique combinations of monoclonal dye conjugate (colloidal gold) and polyclonal solid phase antibodies to selectively identify hepatitis B surface antigen with high specificity and sensitivity. The test kit has sensitivity of 99.9% and specificity of 100%. Manufacturer's standard operating procedures were strictly followed.

3.1. Diagnostic Criteria

Patients with clinical features of liver disease present with constitutional, hepatic and extra-hepatic features [28, 29] which were grouped into three. Histopathological examination was not performed. The three groups were:

Group 1(Hepatitis patients): These were patients with hepatitis with the clinical features of fever, anorexia, nausea, malaise, fatigue, dark urine, pale stool, pruritus, joint pain, jaundice, right upper quadrant abdominal pain and tender hepatomegaly.

Group 2(Liver cirrhosis patients): This group was made up of patients with liver cirrhosis who had clinical features of fatigue, malaise, weight loss, abdominal swelling, pruritus, jaundice, reduced liver span, ascites, splenomegaly, pedal edema, muscle wasting, varicel bleeding, spider naevi, gynaecomastia and testicular atrophy in men.

Group 3(Hepatocellular carcinoma patients): This group consisted of patients with hepatocellular carcinoma who had clinical features of anorexia, nausea and vomiting, marked weight loss, marked abdominal swelling, jaundice, marked muscle wasting, irregular and hard liver, a bruit or friction rub over the liver on auscultation, marked ascites, hepatomegaly and marked pedal edema.

Operational definition of terms.

The authors defined risk factors of HBV infection as antecedent condition(s) whose presence is(are) positively associated with an increased probability that HBV-related disease will develop later or that the prognosis of an existing HBV-related liver disease will progressively worse. Behavioral risk factors of HBV infection refers to the activities which predispose a person to acquiring HBV infection including sexual activities with infected person, use of unsterilized and contaminated sharp instruments for various purposes, transfusion of infected blood and health services utilization behavior like hepatitis B vaccination. High endemicity of HBV infection means prevalence of HBsAg > 8%. Hepatitis B vaccination refers to the receival of complete doses of hepatitis B vaccine. Artisans refer to manual workers and include masons (bricklayers), fitter mechanics, electricians, tailors, seamstresses, hair dressers and carpenters.

3.2. Statistics

The results generated were analyzed using software Statistical Package for Social Sciences (SPSS) version 13.0, Microsoft coperation, Inc. Chicago, IL, USA for the calculation of percentages for categorical variables and mean for continuous data. Association between independent variables was assessed using Chi-square test and Fishers tests with appropriate Yates continuity correction. Simple logistic repression analysis was done for significantly associated variables. The reference categories for estimation of odd ratio were those patients without the risk factors of HBV infection with odd ratio of one. In all cases a p-value of <0.05 at 95% confidence interval was considered significant in statistical comparisons.

4. Results

The HBsAg sero-prevalence was 50.7%. Bivariate analysis of socio-demographic variables as related to HBsAg sero-positivity showed that socio-demographic risk factors such as age (X^2=29.7, df=2, P-value=0.048) and occupation (X^2=47.2, df=8, P-value=0.019) were statistically significant. The age group 40–60 years and artisans were significantly infected. The other socio-demographic variables such as sex, marital status, educational attainment and socio-economic class were not statistically significant. [Table1]

Table 1. *Socio-demographic characteristics as related to HBsAg sero-positivity*

Variables	HBsAg positive Number (%)	HBsAg negative Number (%)	P-value
Age(years)			
15 - 39	29(40.9)	27(39.1)	
40 – 60	40(56.3)	30(43.5)	
> 60	2(2.8)	12(17.4)	
Total	71(100.0)	69(100.0)	0.048*
Sex			
Male	47(66.2)	38(55.1)	
Female	24(33.8)	31(44.9)	
Total	71(100.0)	69(100.0)	0.096**
Marital status			
Single	18(25.4)	18(26.1)	
Married	39(54.9)	14(20.3)	
Separated/Divorced	9(12.7)	31(44.9)	
Widowed	5(7.0)	6(8.7)	
Total	71(100.0)	69(100.0)	0.220**
Educational status			
Primary	21(29.6)	5(7.2)	
Secondary	41(57.7)	55(79.8)	
Post-secondary	9(12.7)	9(13.0)	
Total	71(100.0)	69(100.0)	0.241**
Occupation			
Unemployed	6(8.5)	5(7.2)	
Students	2(2.8)	6(8.8)	
Farmers	2(2.8)	5(7.2)	
Traders	14(19.7)	16(23.2)	
Artisans	30(42.3)	21(30.4)	
Public servants	6(8.4)	12(17.4)	
Drivers	11(15.5)	4(5.8)	
Total	71(100.0)	69(100.0)	0.019*
Social class			
Lower	67(94.4)	67(97.1)	
Middle	3(4.2)	2(2.9)	
Upper	1(1.4)	0(0.0)	
Total	71(100.0)	69(100.0)	0.199**
Family history of HBV infection			
Yes	13(18.3)	8(11.6)	
No	58(81.7)	61(88.4)	
Total	71(100.0)	69(100.0)	0.190**

Remark: *=Significant; **=Not significant

Bivariate analysis of the independent behavioural risk factors as related to HBsAg sero-positivity showed that histories of blood transfusion (P=0.022), unprotected sexual exposures (P=0.001) and non-hepatitis B vaccination (P=0.030) were statistically significant. The other behavioural risk factors such as histories of previous surgery and use of percutaneous sharp instruments for various purposes were not statistically significant [Table 2]

Table 2. *Behavioural risk factors as related to HBsAg sero-positivity*

Variables	HBsAg positive Number (%)	HBsAg negative Number (%)	P-value
History of blood transfusion			
Yes	58(81.7)	3(4.4)	
No	13(18.3)	66(95.6)	
Total	71(100.0)	69(100.0)	0.022*
History of previous surgery			
Yes	18(25.4)	36(52.2)	
No	53(74.6)	33(47.8)	
Total	71(100.0)	69(100.0)	0.057**
History of unprotected sexual exposures			
Yes	53(74.7)	43(62.3)	
No	18(25.4)	26(37.7)	
Total	71(100.0)	69(100.0)	0.001*
History of use of percutaneous sharp instruments for various purposes			
Yes	69(97.2)	35(50.7)	
No	2(2.8)	34(49.3)	
Total	71(100.0)	69(100.0)	0.072**
History of hepatitis B vaccination			
Yes	1(1.4)	3(4.4)	
No	70(98.6)	66(95.6)	
Total	71(100.0)	69(100.0)	0.030*

Remark: *: Significant; **: Not significant

On simple logistic regression analysis of the statistically significant socio-demographic and behavioural independent risk factors showed that history of blood transfusion (OR=2.46, CI=1.05-2.89, P=0.046), history of unprotected sex (OR=5.04, CI=3.20-6.17, P=0.03) and history of non-hepatitis B vaccination (OR=2.86, CI=1.06-3.73, P=0.016 remained statistically significant while age and occupation were not statistically significant [Table 3].

Table 3. *Predictors of HBsAg sero-positivity among the study population.*

Risk factors	Odds ratio	CI (95%)	P-value
Age(40-60 years)	1.30	1.06-2.90	0.232**
Occupation(Artisans)	1.93	1.08-2.13	0.150**
History of blood transfusion	2.46	1.05-2.89	0.046*
History of unprotected sexual exposure	5.04	3.20-6.17	0.003*
History of non-hepatitis B vaccination	2.86	1.06-3.73	0.016*

Reference categories: Age<40 years, Occupation(unemployed), Patients without risk factors of blood transfusion, unprotected sexual exposures and patients with history of hepatitis B vaccination. Remark: *: Significant; **: Not significant

The most significant predictor of HBsAg sero-positivity was history of unprotected sexual exposures (OR=5.04, CI=3.20-6.17, P=0.003).[Table 3] A significantly higher proportion of patients with history of unprotected sexual exposures(74.7%) were HBsAg sero-positive compared to

those without history of unprotected sexual exposures(25.3%). Patients with history of unprotected sexual exposures were five times more likely to be HBsAg sero-positive compared to those without history of unprotected sexual exposures.

5. Discussion

The finding of HBsAg sero-prevalence of 50.7% in this study is higher than 38.0% reported in Maiduguri, Nigeria,[19] 19% reported in hepatitis patients in Bangladesh [22] and 47% reported in patients with hepatocellular carcinoma in Bangladesh.[23] However, the HBsAg sero-prevalence in this study is lower than 54.8% reported in Lagos, Nigeria by Ola *et al* in 2007[15] and 58.1% reported in another study in Lagos, Nigeria by Lesi *et al* in 2004. [20] This high prevalence of HBsAg in this study and other studies [15,19,20] is a reflection of the fact that these were patients who had liver diseases. The findings of this study corroborate previous reports that HBV infection exist in patients with liver diseases and may have significant relationship with liver diseases.[5,15,19-23] However, socio-demographic and other diverse risk factors may be contributory.[12-14] Of great concern is that HBV infection can be prevented with minimum input of resources.[33] In fact, the developed countries of the world have overcome many of the HBV infection and HBV-related liver diseases through preventive, promotional and risk reduction interventional measures.[7,33] When these measures are not adequately addressed in resource constrained Nigerian environment, morbidity and mortality from HBV related liver diseases may constitute an obstacle to the achievement of Millennium Development Goal as regards infectious diseases.

The finding of significantly higher sero-prevalence of HBV infection among patients aged 40-60 years is similar to the reports on the age predilection for HBV infection in Nigeria.[4,12,20] According to these reports, sero-prevalence of HBsAg increases with age suggesting that most infection occurs predominantly through horizontal transmission.[13,14] However, the pattern of age distribution in this study could be a reflection of the study population who were mainly patients with liver cirrhosis and hepatocellular carcinoma. Chronic HBV infection has been documented to usually precede liver cirrhosis and hepatocellular carcinoma by a decade.[11,12,18-21] This high sero-prevalence of HBsAg among this age group paints a gloomy picture in Nigeria, as this age group constitute the most economically biologically productive years in the Nigerian workforce who are expected to take active manpower and family responsibilities respectively. Major interventions for HBV related chronic liver diseases and promotion of appropriate health seeking behaviour for middle age patients with clinical features of liver diseases should be integrated as part of comprehensive health care protocol in primary care settings.

This study observed that artisans had significantly higher sero-prevalence of HBsAg compared with other occupational groups. This could be attributed to the clustering of risk factors among the artisans which were reported in previous studies. [19,34] Artisans are special occupational group and often experience frequent changes of job location and socialization.[12] The artisans are more likely to have clustering of risk factors such as history of unprotected sexual intercourse. [12,13] In addition, the significantly higher sero-prevalence among the artisans in this study could be a reflection of the male predominance of artisan occupation. The reported gender epidemiological pattern of HBV infection in endemic areas of sub-Sahara Africa was in favour of male sex.[18-20] Accordingly, there is a rapid decline in HBsAg titres in females resulting in a shorter duration of the carrier state. [35,36] More so, males have poorer handling of HBV infection than the females because of the presence of immune regulatory gene on X-chromosomes that determines susceptibility to infections. [35, 36]

This study has shown that transfusion of infected blood play a role in the transmission mechanism of HBV infection among the study population. Hospital-based cross sectional studies in Nigeria [25,26,34] and other parts of the world [6,37] have demonstrated that HBV infection can be transmitted through blood transfusion. More so, developed countries of the world have come to demand absolute freedom from transfusion transmissible infections like HBV while conceding that zero risk blood transfusion is unlikely to be achieved.[37] The finding of this study is therefore a call to evaluate the trend in blood donor HBV infectious disease rates in the study area. This is essential for monitoring safety of blood supply and donor screening effectiveness. However, the role of blood transfusion in the sero-epidemiology of HBV infection requires further investigation among these patients in the study area.

The result of this study has shown poor utilization of hepatitis B vaccination among the study population. Poor utilization of hepatitis B vaccination has been reported in Jos, Nigeria.[25] and Ile-Ife Nigeria. [26] The poor utilization of hepatitis B vaccine is a public health challenge especially in Nigeria where health promotional practices are not emphasized during clinical consultation in general practice settings.[38] Despite advances in antiviral or interferon therapy which is presently unaffordable in Nigeria, only a small percent of patients with chronic HBV infection have a sustained response to these drugs. [33,39] Thus, primary prevention strategies including hepatitis B vaccination to increases the immunity to HBV infection remain the main thrust in control of HBV infection in the study area.

The most significant predictor of HBV infection was sexual risk factor. History of unprotected sexual exposures in the transmission dynamics of HBV infection have been reported in different parts of Nigeria such as Ile-Ife, Nigeria where 20.0% of the respondents reported history of

unprotected sexual exposures, [26] and in Jos, Nigeria where prevalence of 46.5% was reported.[25] Similarly, various frequencies of HBV-related sexual risk factors have been reported in different parts of the world like in Egypt where 50.0% was reported,[27] in Bangladesh 9.7% was reported [28] and 51.0% was reported in Bucharest.[29] The finding of this study has suggested that the identified independent risk factor of unprotected sexual exposures could provide a direction and guide for health education, counselling and health promotion when consulting with patients with clinical features of liver diseases in primary care settings in the study area.

5.1. Study Implications

In resource-poor nations such as Nigeria, utilization of HBV screening tests such as HBsAg serological test for patients with clinical features of liver diseases is relatively poor and assessing for the socio-demographic and behavioural risk factors of HBV infection during clinical consultation with patients with clinical features of liver diseases in primary care setting is usually suboptimal. However, detection of HBsAg in the serum of patients with clinical features of liver diseases and obtaining relevant bio-social risk factors are usually informative and should provide direction for further diagnostic work-up, health education, risk reduction and health promotion in primary care. Although, the detection of serological bio-marker (HBsAg) of HBV infection bears little relation to the severity of clinical liver diseases, however, this research finding is important for clinical and public health practice in the study area. This study therefore envisaged the challenges of primary care delivery to adult patients with clinical features of liver diseases with implications for quality improvement in resource-constrained environment where HBV infection is endemic.

5.2. Study Limitations

The study had certain constraints which imposed some degree of limitations to the absolute validity of the results. This study was hospital-based, as only patients who presented to the hospital were studied. Some of the patients with HBV-related liver diseases patronize traditional and spiritual healing homes, patent medicine vendor stores and private clinics closer to their homes. However, because of the hospital-based nature of this study bias might have been introduced and might not be a true representative of what happens in the community; hence extrapolations to the communities should be done with caution.

The limitation imposed by the descriptive nature of the study is recognized by the researchers. However, this study stimulates the need for analytical and longitudinal studies in this area. This would enable a quasi cause-effect relationship to be drawn and also for a reliable and valid conclusion to be ascertained.

The sample size was relatively small, but this was more than the minimum estimated sample size for the study and was the number of patients seen within the study period.

This study was based on testing of sera samples for HBsAg only which doesn't fully reflect the epidemiology of HBV-related liver disease. [10,14] If other serologic markers of HBV infection such as HBeAg, anti-HBs, HBV DNA and anti-HBc were assayed, the actual prevalence would probably be much higher than the present reported figures.

More so, although rapid sero-diagnostic test kits based on immunochromatographic principles are very sensitive, not all infections in the acute phase were probably detected. It was also possible that an infectious individual early in the incubation phase would not have sero-converted when tested. Similarly, several types of immunological tests such as Western blot, enzyme linked immunosorbent assay (ELISA) method and PCR-DNA based assay are currently used for detection of HBV infection. In this study, the use of rapid sero-diagnostic tests based on chromatographic immunoassays technique, though found to be less sensitive than other counter immunoelectrophoretic principle (CIEP), can provide prompt epidemiological data for primary care physicians, community physicians and health authorities. It can also deliver an immediate useful feedback to research participants and the outcomes may assist in improving local understanding of HBV infection in resource-poor settings.

The case selection in this study was based on clinical parameters. However, histopathological studies were not done due to the objectives, setting and scope of the study. Despite this limitation, this study provides valuable information which can be utilized in primary care settings especially in resource constrained setting for adopting appropriate interventional measures.

6. Conclusion

Risk factors of hepatitis B virus infection exist in adult Nigerian patients with clinical features of liver diseases and HBV infection is associated with risk factors such as age, occupation and histories of unprotected sexual exposures, blood transfusion and non-hepatitis B vaccination. Screening adult Nigerians with clinical features of liver diseases for HBV infection and inquiring for its associated biosocial risk factors is recommended in primary care settings.

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