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Some Haematological Parameters of Symptomatic and Asymptomatic Hepatitis B Positive Patients Attending a Nigerian Tertiary Hospital

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Authors' contributions

This work was carried out in collaboration between all authors. Author AOA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Author TAE managed the literature searches, analyses of the study. Author DCU managed the experimental process. Author TCA identified and screened the patients and performed statistical analyses. All authors read and approved the final manuscript.

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ABSTRACT

Hepatitis B virus is a deadly viral infection that kills slowly if not treated and could be the underlying cause of liver cirrhosis and liver cancer. Some Hepatitis B positive patients may present with symptoms while some others maybe asymptomatic hence, the need to assess their haematological indices. Twenty-five Hepatitis B positive patients (male and female) attending Madonna University Teaching Hospital (MUTH) Elele Nigeria were used as subjects while another twenty five Hepatitis B negative apparently healthy individuals (males and females) served as controls. The positive patients were further divided into symptomatic and non-symptomatic groups. Verbal consent was obtained prior to sample collection. The samples were analyzed using standard manual methods. The research was approved by Madonna University Ethical Committee (MUEC). There was

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significant ($p<0.05$) decrease in PCV and Hb and while ESR had significant increase. Most of the Hepatitis B positive patients (17) were asymptomatic while others (8) showed symptoms. When the asymptomatic and symptomatic groups were compared, there was no significant ($p>0.05$) difference in all the parameters. Hepatitis B positive patients could be at risk of developing anaemia. Management and treatment could be better handled before the onset of symptoms associated with Hepatitis B infection.

Keywords: Hepatitis B; symptomatic; haematological; anaemia; liver cirrhosis.

1. INTRODUCTION

Hepatitis means inflammation of the liver. The most common cause of the infection is one of the 5 viruses, called hepatitis A, B, C, D and E. All of these viruses can cause an acute disease with symptoms lasting several weeks including yellowing of the skin and eyes (jaundice). Of all these viruses, hepatitis B is the most common and fatal. Hepatitis B virus can cause chronic infection in which the patient never get rid of the virus and many years later develop cirrhosis of the liver [1]. In Nigeria, Hepatitis B virus infection is a major health problem, especially considering its complications and fatality.

Like HIV, hepatitis virus has the same route of transmission such as contact with infected bodily fluids and sexual intercourse with infected partner. Hepatitis B is sometimes asymptomatic but in cases where symptoms do occur, they appear between six weeks and six months after infection [2]. The virus is highly contagious to all group of persons (infants and adults).

Hepatitis B virus (HBV) infection has a high incidence among injection drug users (IDUs). Several important behavioural risk factors influence transmission of HBV in this group. The evaluated risk factors were age, gender, sexual behaviour, shared syringe use, duration of addiction, imprisonment, tattooing, past history of surgery, dental procedures, blood transfusion, jaundice, type of illicit drug use and level of education. Amongst men, the most frequent means of transmission are those men who have sex with men [3].

Hepatitis B virus can be prevented with the use of its vaccine which is very effective at three intramuscular doses and also safe. Differences between genotypes affect the disease severity, course and likelihood of complication and response to treatment and possible vaccination [4]. Following vaccination, hepatitis B surface antigen may be detected in serum for several days. This is known as vaccine antigenaemia [5].

Due to its high level of transmission, it tends to be one of the major diseases of mankind and a serious global public health problem. The “surface antigen” is part of the hepatitis B virus that is found in the blood of someone who is infected. If this test is positive, then hepatitis B virus is present [6].

Some individuals with Hepatitis B Virus (HBV) may not show any signs and symptoms associated with the virus (asymptomatic) and may pose serious health challenge. We therefore set out to compare some haematological parameters in symptomatic and asymptomatic HBV positive individuals.

2. MATERIALS AND METHODS

2.1 Subjects

Twenty-five Hepatitis B positive patients (male and female) attending Madonna University Teaching Hospital (MUTH) Elele Nigeria were used as subjects while another twenty five Hepatitis B negative apparently healthy individuals (males and females) served as controls. The positive patients were further divided into symptomatic and non-symptomatic groups.

2.2 Exclusion and Inclusion Criteria

Subjects that are HBsAg (+) with other underlying conditions were excluded from the study. Controls that had previously tested positive were also excluded. Only subjects that had HBsAg (+) as their only medical condition were used.

2.3 Sample Collection and Analysis

Five milliliters of blood samples were aseptically collected from both test and control subjects, out of which 3 mls was transferred into EDTA bottles and the remaining 2 mls into plain bottle and serum was recovered and used for Hepatitis test. Hepatitis B surface Antigen (HBsAg) was

screened with the HBs-Antigen Latex Slide screening technique while other haematological parameters were performed using standard manual methods [7]. Haaematological parameters performed include Packed cell volume (PCV), Haemoglobin concentration, Total White cell count and Erythrocyte sedimentation rate. Data were analyzed and Student's t-test was used to compare variables. Significance in the difference between results was inferred at $p<0.05$ [8]. Results were presented using appropriate models and attached as appendix.

3. RESULTS

There were significant ($p<0.05$) decrease in PCV and Hb while ESR had significant increase. Most of the Hepatitis B positive patients (17) were asymptomatic while others (8) showed symptoms. When the asymptomatic and symptomatic groups were compared, there was no significant ($p>0.05$) difference in all the parameters as seen in Table 2.

4. DISCUSSION

Impairment of immune response in hepatitis B virus infected patients can affect the clinical, serological and haematological outcome of the patient as the severity of the viral disease depends mainly on the immune system's ability to attack infected hepatocytes. The incidence of HBV infection is probably related to both immunosuppressant and frequent transfusions of blood and blood products which were inadequately screened [9].

From the results of the study (see Table 1), there was a significant decrease ($p<0.05$) in the PCV and Hb, which may be due to malnutrition, infections, and probable loss of blood. Similar findings have been documented [10]. Pregnant HBV positive patients have also shown reduced PCV and Hb [11].

A highly significant increase in ESR was observed in the HBV patients with a marked variation between the control group and test group. Though ESR is a non-specific diagnostic test, such increase is abnormal considering the reference range of ESR in healthy subjects [7].

The information obtained from the clinical assessment of hepatitis B virus positive patients showed that majority of them (68%) had no symptom (asymptomatic patients) while few of them (32%) had symptoms (symptomatic patients) such as abdominal pain, jaundice, pale dark urine, nausea, loss of appetite and body ache. Fever may be absent or mild [12]. These symptoms may be attributed to the hepatitis B viral infection.

When the symptomatic and asymptomatic groups were compared, no significant difference ($p>0.05$) was noted in all the parameters. It therefore shows that in Hepatitis B positive subjects, both symptomatic and asymptomatic groups have similar changes. Hence, early detection of the virus still remains paramount in its management.

Table 1. Mean±SD of some haematological parameters for hepatitis B positive (Test) and negative (Control) subjects

Parameters	Test	Control	p value
PCV (%)	37.2±9.3	45.0±5.6	P<0.05
Hb (g/dl)	12.4±3.4	15.4±2.0	P<0.05
ESR (mm/hr)	84.5±47.3	10.6±3.5	P<0.05
TWBC ($x10^9$/l)	5.9±1.8	6.8±1.5	P>0.05

PCV-Packed Cell Volume, Hb-Haemoglobin concentration, ESR-Erythrocyte Sedimentation rate, TWBC-Total White blood cell count

Table 2. Mean±SD of some haematological parameters for symptomatic and asymptomatic patients

Parameters	Asymptomatic	Symptomatic	p value
PCV(%)	39.5±7.1	35.0±8.8	P>0.05
Hb(g/dl)	13.5±2.7	11.0±3.3	P>0.05
ESR(mm/hr)	62.0±35.4	89.5±47.6	P>0.05
TWBC($x10^9$/l)	6.0±1.7	5.8±2.2	p>0.05

PCV-Packed Cell Volume, Hb-Haemoglobin concentration, ESR-Erythrocyte Sedimentation rate, TWBC-Total White blood cell count

5. CONCLUSION

Hepatitis B positive patients could be at risk of developing anaemia. Management and treatment could be better handled before the onset of symptoms associated with Hepatitis B infection hence early diagnosis is advocated.

ETHICAL APPROVAL

This research was approved by the ethical committee of the institution and was monitored during the duration of the research. Rules and guidelines governing sample collection from humans and processing for research purposes were strictly adhered to. All the subjects in the research gave their approval for participation after proper explanations.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX- Statistical Analysis of the Data

Paired samples statistics

		Mean	N	Std. deviation	Std. error mean
Pair 1	test PCV	37.1600	25	9.30358	1.86072
	cont PCV	45.0000	25	5.57524	1.11505
Pair 2	test Hb	12.3800	25	3.39080	.67816
	cont Hb	15.3560	25	1.96619	.39324
Pair 3	test ESR	84.4800	25	47.30937	9.46187
	cont ESR	10.6000	25	3.53553	.70711
Pair 4	test WBC	5.7720	25	1.80613	.36123
	cont WBC	6.8320	25	1.53208	.30642
Pair 5	asy PCV	39.5000	8	7.15142	2.52841
	sym PCV	34.7500	8	8.81152	3.11534
Pair 6	asy Hb	13.4750	8	2.72855	.96469
	sym Hb	11.0750	8	3.29794	1.16600
Pair 7	asy ESR	62.0000	8	35.39976	12.51570
	sym ESR	89.5000	8	47.59052	16.82579
Pair 8	asy WBC	6.0500	8	1.68438	.59552
	sym WBC	5.7875	8	2.23443	.78999

Paired samples correlations

		N	Correlation	Sig.
Pair 1	test PCV & cont PCV	25	.192	.358
Pair 2	test Hb & cont Hb	25	-.124	.555
Pair 3	test ESR & cont ESR	25	-.257	.215
Pair 4	test WBC & cont WBC	25	.093	.659
Pair 5	asy PCV & sym PCV	8	.125	.769
Pair 6	asy Hb & sym Hb	8	.247	.556
Pair 7	asy ESR & sym ESR	8	.050	.906
Pair 8	asy WBC & sym WBC	8	.094	.824

Paired samples test

		Paired differences					t	df	Sig. (2-tailed)
		Mean	Std. deviation	Std. error mean	95% confidence interval of the difference				
					Lower	Upper			
Pair 1	test PCV - cont PCV	-7.84000	9.88551	1.97710	-11.92054	-3.75946	-3.965	24	.001
Pair 2	test Hb - cont Hb	-2.97600	4.12505	.82501	-4.67874	-1.27326	-3.607	24	.001
Pair 3	test ESR – cont ESR	73.88000	48.33936	9.66787	53.92649	93.83351	7.642	24	.000
Pair 4	test WBC - cont WBC	-1.06000	2.25740	.45148	-1.99181	-.12819	-2.348	24	.027
Pair 5	asy PCV – sym PCV	4.75000	10.63350	3.75951	-4.13983	13.63983	1.263	7	.247
Pair 6	asy Hb - sym Hb	2.40000	3.72597	1.31733	-.71499	5.51499	1.822	7	.111
Pair 7	asy ESR – sym ESR	-27.50000	57.86931	20.45989	-75.87995	20.87995	-1.344	7	.221
Pair 8	asy WBC - sym WBC	.26250	2.66830	.94339	-1.96825	2.49325	.278	7	.789

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