Evaluation of Haematological Parameters of Hypertensive Patients Based on Gender in Federal Medical Center, Owo, Ondo State

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Hypertension is a major health issue that affects people all over the world. It can cause cardiovascular disease as well as functional issues, such as changes in haematological parameters. This study aimed to assess some haematological parameters of hypertensive individuals at Federal Medical Centre, Owo, Ondo State, Nigeria. All participants after taking informed consent were interviewed for a detailed history and 5 ml of blood was collected for haematological test analysis using ADVIA® 2120i Haematology system (SIEMENS). "Data were presented in tables and shown as mean ± standard deviation and added using statistical packages for social sciences" (SPSS, Version 20.0) with the level of significance set at p≤ 0.05. One hundred (100) hypertensive individuals based on gender were enrolled in this study. There was also observed a statistically significant difference in lymphocyte and WBC count of the study participants based on sex.

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1. INTRODUCTION

"Cardiovascular disease is a major cause of premature death and disability in sub-Saharan Africa" [1]. "High blood pressure is known to be the main cause and is itself the result of increased urbanization, increased obesity, increased salt intake and increased Western lifestyles such as sedentary lifestyles. Another factor that contributes to high blood pressure may be blood viscosity. Plasma and whole blood viscosity have been shown to be important determinants of arterial blood pressure in both normotensive and untreated hypertensive subjects" [1,2,3,4,5].

"High blood pressure, also known as high blood pressure, is a global public health problem. It contributes to the burden of heart disease, stroke, renal failure, and early mortality and disability" [6]. "Many patients also have other health risk factors such as tobacco use, obesity, high cholesterol, and diabetes, further exacerbating the adverse health effects of high blood pressure" [6]. "In addition to these traditional factors, there is much controversy in various studies on the variability of hematological parameters in patients with hypertension and normotension. Disturbances in hematological parameters can be a strong sign of hypertensive terminal organ damage, especially renal failure" [3]. Specifically, elevated hemoglobin (Hb) levels can cause left ventricular hypertrophy, and decreased Hb levels can cause anemia and heart failure [7]. "Arterial hypertension is a major cause of morbidity and mortality because it is associated with coronary artery disease, cerebrovascular disease, and renal disease. The degree of involvement of the target organ (ie, heart, brain, kidneys) determines the outcome. According to a North American study, hypertension is the leading cause of 500,000 strokes (250,000 deaths) and 1,000,000 myocardial infarctions (500,000 deaths) each year" [8]. "Over the last decade, hypertension management has changed to, and we have found that there are no thresholds where hypertension is not a health concern. Recent guidelines, including those of the British Society of Hypertension, show that treatment of isolated systolic hypertension is as important as treatment of both systolic and diastolic hypertension. The threshold for treatment of hypertension to avoid secondary illness is currently 140/90 mmHg. In fact, for stage 1 hypertension, treatment of more than 37% isolated systolic hypertension (systolic 140159 mm Hg, diastolic 140 /> 90 mm Hg) is 65 years or older" [8]. Blood cell components contribute to viscosity and blood volume, which play an important role in blood pressure regulation [3]. "Many hematologic parameters are understood by hypertension compared to normal blood biopsy. This provides insights into the association between blood cell defects and blood pressure" [9]. "There are some discrepancies in various studies of the variability of hematological parameters in hypertension and standard problems. Therefore, this study aims to fill such gaps. The pathophysiology of hypertension is multifactorial and is affected by sympathetic hyperactivity. This contributes to changes in hematological parameters such as hematocrit, blood viscosity, and hypercoagulation. These factors alter blood flow dynamics and serve as risk factors for coronary artery disease, stroke, and thromboembolism" [10]. Therefore, hematological parameters also provide information about the prognosis of the disease. Therefore, this study was conducted to estimate hematological parameters as an indicator of the health of hypertensive patients.

2. MATERIALS AND METHODS

2.1 Research Design

The study is a hospital-based cross-sectional study among Hypertensive and non-hypertensive individuals. The subjects were selected using a well-structured questionnaire who were age and sex-matched. Informed consent was obtained from subjects.

2.2 Study Area

This study was carried out at the Federal Medical Centre, Owo, Ondo State, Nigeria.

2.3 Target Population

This study was conducted at Federal Medical Centre, Owo Ondo State, Nigeria. Fifty (50) hypertensive individuals and 50 apparently non-hypertensive individuals were used as controls and enrolled in this study.

2.4 Blood Collection

Five (5 ml) blood sample was collected from prominent vein within the antecubital fossa and dispensed into a dipotassium ethylene-diaminetetra-acetic acid (K2EDTA) container, for haematological analyses.

2.5 Validation of Instruments

The subject's haematological parameters status was validated by thin-film technique and Patients that are non-hypertensive were used as control samples.

2.6 Method of the Test

This was carried out using an automated analyser; KX-2IN (Sysmex Corporation, Kobe, Japan) Haematology analyser.

2.7 Method of Data Analysis

"The data were presented in tables and also as mean $\pm$ standard deviation and analyzed using the IBM statistical packages for social sciences (IBMSPSS), Version 20.0" (IBM Corp. Released 2011). IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp) and the level of significance was set at p≤ 0.05.

3. RESULTS

Table 1. Mean ± standard deviation of haematological parameters of hypertensive patients based on sex

Parameter	Male	Female	t-value	p-value
PVC(%)	37.36±5.72	36.08±4.24	.89	.37
WBC(10^3/UL)	10.91±2.65	9.38±2.27	-2.28	.04
LYM(%)	37.63±10.03	32.81±13.02	1.46	.15
GRAN(%%)	49.78±19.60	54.99±18.32	-.97	.33
MID(%)	12.62±15.44	8.63±6.60	1.19	.24
LYM(10^3/UL)	2.87±2.19	5.03±4.80	-2.04	.05*
RBC(10^3/UL)	4.67±.91	4.38±.73	1.18	.24
HBC(g/dl)	11.93±2.39	10.37±3.73	1.75	.09
HCT(%)	37.38±5.77	35.95±4.25	.99	.32
MCV(Fl)	79.24±8.38	79.03±12.23	.072	.94
MCH(Pg)	27.56±4.61	25.74±2.78	1.69	.09
MCHC(g/dL)	32.18±2.39	32.23±1.58	-.09	.92
RDW_CV(%)	15.91±3.67	15.99±3.49	-.08	.93
RDW_SD(fL)	47.69±7.65	49.02±8.44	-.58	.56
PLT(10^3/UL)	172.75±66.20	174.28±77.54	-.07	.94
MPV(fL)	6.9880±3.53946	6.54±.71	.62	.538
PDW	8.2840±1.72063	11.24±13.87	-1.06	.294
P_LCR(%)	5.6240±3.41910	6.10±4.14	-.44	.660

The table above shows a significant difference in Lymphocytes (10^3/UL) and WBC of hypertensive patient subjects when compared with the control group Lymph (-2.039, .047*) based on sex. While other parameters show no significant difference.

4. DISCUSSION

The results of this report are consistent with those reported by Azuonwu et al., Observing statistically significant differences in lymphocyte counts based on gender. We conducted a survey (2018). Nonetheless, in relation to the gender of the subjects; affected male and female results showed a significant increase in WBC, and the results obtained in this study appear to be similar regardless of age or gender. Is consistent with the study by Azuonwu et al. [11].

5. CONCLUSION

Statistically significant differences in lymphocyte counts were also observed among study participants with increased WBC based on gender.

DISCLAIMER

The products used for this research are commonly and predominantly used products in our area of research and country. There is

absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by the personal efforts of the authors.

ETHICAL CLEARANCE AND CONSENT

Ethical approval was obtained from Achievers University's ethical committee, after submitting a detailed project proposal, an introduction letter from the supervisor, questionnaires and informed consent. Confidentiality was assured to the subjects, participation in the study was voluntary and a subject not willing to continue was free to withdraw at any stage.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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