

EVALUATION OF HAEMATOLOGICAL PARAMETERS OF HYPERTENSIVE PATIENTS BASED ON GENDER IN FEDERAL MEDICAL CENTER, OWO, ONDO STATE

ABSTRACT

Hypertension is a major health problem worldwide. It can lead to cardiovascular disease and also leads to functional disturbances including hematological parameters. Therefore, the aim of this study was to assess some hematological parameters of hypertensive individuals at Federal Medical Centre, Owo, Ondo State. All participants after taking informed consent were interviewed for 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 \pm standard deviation and added using statistical packages for social sciences (SPSS, Version 20.0) with level of significance set at as $p \leq 0.05$. One hundred (100) hypertensive individuals based on gender were enrolled in this study. There was also observed statistical significant difference of lymphocyte and WBC count of the study participants based on sex.

INTRODUCTION

Cardiovascular disease has become an important cause of premature death and disability in Sub-Saharan Africa (Jacob *et al.*, 2017). Hypertension is known to be the major contributor and is itself a consequence of increasing urbanization and an increasingly western lifestyle, exemplified by increasing obesity, higher salt intake, and a sedentary lifestyle. Another contributory factor to hypertension may be blood viscosity. Plasma and whole blood viscosity have been suggested as important determinants of arterial blood pressure (Jacob *et al.*, 2017) both in normotensive

individuals and in those with untreated hypertension (Nwovu *et al.*, 2018; Obeagu *et al.*, 2016; Ozims *et al.*, 2017; Obeagu *et al.*, 2018).

Hypertension, also known as high blood pressure, is a global public health issue. It contributes to the burden of heart disease, stroke and kidney failure and premature mortality and disability (WHO, 2013). The adverse health consequences of hypertension are compounded because many affected people also have other health risk factors who include tobacco use, obesity, high cholesterol and diabetes mellitus (WHO, 2013). Besides these traditional factors, there is a number of disputes in various studies with respect to variability of hematological parameters in patients with hypertension and normotensive subjects. Impaired haematological parameters may strongly indicate hypertensive end-organ damage, specifically kidney failure. Specifically increased Haemoglobin (Hb) level may cause left ventricular hypertrophy while low Haemoglobin (Hb) levels causes anemia and heart failure (Hamza, 2019). Arterial hypertension is a major cause of morbidity and mortality because of its association with coronary heart disease, cerebrovascular disease and renal disease. The extent of target organ involvement (i.e. heart, brain and kidneys) determines outcome. North American studies have shown that hypertension is a major contributor to 500000 strokes (250000 deaths) and 1000000 myocardial infarctions (500000 deaths) per annum (Foe`x and Sear, 2015). Over the past decade the management of hypertension has changed with the recognition that there is no threshold below which elevated blood pressure causes no threat to health. Recent guidelines, including those of the British Hypertension Society, make it clear that treatment of isolated systolic hypertension is as important as that of systolic and diastolic hypertension. The threshold above which hypertension should be treated to prevent long-term complications is now 140/90 mm Hg. Indeed, in Stage 1 hypertension, treatment of isolated systolic hypertension (systolic 140– 159 mm Hg, diastolic

<90 mm Hg), reduces the prevalence of left ventricular hypertrophy, a predictor of future morbidity and mortality. There is also a 42% reduction of the risk of stroke and a reduction in the risk of dementia. The hypertension optimal treatment (HOT) study indicates that the treatment goal is to reduce blood pressure to 140/85 mm Hg. It is also established that high normal blood pressure (130–139/85–89 mm Hg) progresses to Stage 1 hypertension (>140/>90 mm Hg) in >37% of individuals <64 yr and >49% of those >65 yr (Foe`x and Sear, 2015).

The cellular components of blood contribute to the viscosity and volume of blood, thus playing a vital role in regulating blood pressure. It has been newly realized that many hematological parameters varies with hypertension in comparison with normotensives. This gives a vision into the connection between blood cell defects and blood pressure (Divya and Ashok, 2015). There are number of disputes in different studies with respect to variability of haematological parameters in hypertensive and normotensive subjects. Thus, this study is aimed at filling such gap difference. The pathophysiology of hypertension is multifactorial which is affected by sympathetic over activity contributing to alterations in haematological parameters like haematocrit, viscosity and hypercoagulability of blood. These factors change the kinetics of blood flow acting as contributory risk factor for coronary artery diseases, stroke and thromboembolism (Badaruddoza and Basanti, 2010). Thus the haematological parameters gives an insight to prognosis of disease also. So the present study was therefore undertaken to estimates the haematological parameters as an indicator in hypertensive patient.

MATERIALS AND METHOD

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.

Study Area

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

Target Population

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

Blood Collection

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

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.

Method of the Test

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

Method of Data Analysis

The data were presented in tables and were presented as mean \pm standard deviation and analyzed using statistical packages for social sciences (SPSS, Version 20.0) and level of significance set at as $p \leq 0.05$.

Ethical Clearance

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

RESULTS.

TABLE 1: Mean \pm standard deviation of haematological parameters of hypertensive patient based on sex

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

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

DISCUSSION

The findings of this report observed statistical significant difference of lymphocyte count based on sex which was in agreement with the study conducted by Azuonwu *et al.* (2018). Nonetheless, with respect to the subject's gender; the result amongst the subject male and female showed significant increase in WBC, the result obtained in this present study appeared similar irrespective of the age and sex differences which is in agreement with study by Azuonwu *et al.* (2018).

CONCLUSION

There was also observed statistical significant difference of lymphocyte count of the study participants with an increase in WBC based on sex.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use 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 personal efforts of the authors.

REFERENCES

- Azuonwu, O., Nnenna, I., and Iheanacho, L.N.(2018). Investigation of the Association of Blood Pressure with Some Haematological Parameters of University Students of Niger Delta Descendant, Nigeria. *Medical Journal of Clinical Trials and Case Stud.* **2**(1): 000125.
- Badaruddoza, N. K., and Basanti, B. (2010). Inter-relationship of waist-to-hip ratio (WHR), bodymass index (BMI) and subcutaneous fat with blood pressure among university-going Punjabi Sikh and Hindu females. *International Journal of Medicine and Medical Sciences.* **2**(1):5-11.
- Divya, R., and Ashok, V. (2016). A Study of Haematological Parameters And Anthropometric Indicators In Hypertensive And Normotensive Males. *International Journal of Current Research and Review.* **8**(4):6-10.
- Foe'x, P., and Sear, J.W. (2015). Hypertension: pathophysiology and treatment. *Continuing Education in Anaesthesia, Critical Care & Pain.* **4**(3):71-75.
- Hamza, N. M., Majda, D., Youcef, K., and Nouria, D. (2019). Hematologic disorders during essential hypertension. *Diabetes and Metabolic Syndrome: Clinical Research & Reviews.* 1575e1579.
- Jacob, P., Sally, M., John, B., Frank, B.M., Sampson, A., and Francesco, P.C. (2015). Blood Pressure and Haematological Indices in Twelve Communities in Ashanti, Ghana. *International Journal of Hypertension.* **5952021**: 2-7
- World Health Organization (2013). Geneva. A global brief on Hypertension. Silent killer, global public health crisis, 40; 2013.
- Nwovu, A.I., Obeagu, E.I., Obeagu, G.U. and Nnadiokwe, O.I. (2018). Evaluation of Platelet and Prothrombin Time in Hypertensive Patients Attending Clinic in Federal Teaching Hospital Abakaliki. *Open Acc Blood Res Transfus J.* **1**(5): 555571. DOI: [10.19080/OABTJ.2018.01.555571](https://doi.org/10.19080/OABTJ.2018.01.555571)
- Obeagu, E.I., Ezimah, A.C.U. and Obeagu, G.U. (2016). Erythropoietin in Hypertension: A Review. *J. Biol. Chem. Research.* **33** (1): 261-278.

Ozims, S.J., Eberendu, I.F., Amah, H.C., Nwosu, D.C., Obeagu, E.I., Ibanga, I.E., Agu, G.C., Uhegbu, U., Ihekaire, D.E., Amah, C.C., Obasi, C.C., Agwadike, E.O., and Obioma- Elemba, J.E. (2017). Prevalence of hypertension among adults aged 30- 69 years who used Imo state specialist hospital, Owerri, Nigeria from 2009-2013. *Int. J. Curr. Res. Med. Sci.* 3(11): 71-82.

Obeagu, E.I., Chijioke, U.O. and Ekelozie, I.S. (2018). Hypertension a great threat to human life. *Int. J. Adv. Res. Biol. Sci.* 5(10): 159-161. DOI: <http://dx.doi.org/10.22192/ijarbs.2018.05.10.017>