

**Assessment of Potentially Toxic Element in the Blood of Patients with Chronic
Illnesses Attending University College Hospital Ibadan, Oyo State**

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Natural and Applied Sciences, Lead City University,
Ibadan, Oyo State, Nigeria**

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Certification

This is to certify that **Adedunni Oluwabimpe Adegoke** with the matriculation number **LCU/PG/002460**, carried out this research work titled “Assessment of Potentially Toxic Elements in the Blood of Patients with Chronic Illnesses Attending University College Hospital, Ibadan, Oyo State” in the Department of Biological Sciences, Faculty of Natural and Applied Sciences, Lead City University Ibadan, Oyo State, for the award of Master Degree (MSc) in Environmental Management and Toxicology and this has not been previously submitted.

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Date

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(Head of Department)

Date

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Dedication

This thesis is dedicated to Almighty God and to my wonderful family.

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Acknowledgement

I want to acknowledge Leadcity University and members of A-library for their support and knowledgeable impact.

I sincerely appreciate the efforts and support of my supervisor Dr. Omotayo Sindiku, I am grateful for her corrections and scrutiny that made this research work worthwhile. I also acknowledge the effort and support of the Head of Biological Sciences Department, Dr (Mrs) Felicia Adesina, and other lecturers namely Dr. Tinuola Ekanade, Dr. Idowu Ologeh, Dr Bukola Bamkefa and just to mention a few.

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Even though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors, if any, found in the work.

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Abstract

Heavy metals are environmental pollutants that cause serious ill health which may be masked by other acute or chronic illnesses but exacerbating their effects in the patients. This study assessed the level of potentially toxic elements in the blood of Patients diagnosed with chronic illnesses attending University College Hospital (UCH), Ibadan. The participants were given structured questionnaire after which their blood samples were collected from the various phlebotomy units of UCH. Blood samples were collected by venous puncture using pyrogen-free sterile disposal syringes and put in ethylene-diamine tetra acetic acid bottles. Five heavy metals selected for the study; Cadmium (Cd), Lead (Pb), Mercury (Hg), Nickel (Ni) and Arsenic (As), were digested and analysed using Atomic Absorption Spectrophotometer (AAS). Data obtained were analysed using Statistical Package for Social Sciences (SPSS) 23.0 Version. Results showed that the average concentration of the metals were 16.03, 7.33, 1.15, 15.0 and 2.31 $\mu\text{g/dl}$ for Cd, Pb, Hg, Ni and As respectively in decreasing order of abundance ranked Cd > Ni > Pb > As > Hg. The levels of these metals were higher than the acceptable level of metals recommended, except for Arsenic which is within the permissible level by World Health Organization (WHO). Total heavy metals in the blood sample ranged from people diagnosed with Liver disease>Hypertension/Diabetes>Kidney diseases>Cancer>Infertility. The participants affirmed that they work and live in an area with high concentration of heavy metal are 48.8%. This study shows that there is high concentration of the selected heavy metals in the blood of the patients and the adverse effects of heavy metals in health may be contributing to the morbidity of the diseases.

Keywords: Disease, Heavy metals, Environmental Pollutants, Accumulation

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List of Acronyms

Abbreviation	Meaning
AAS	Atomic Absorption Spectroscopy
ANOVA	Analysis of Variance
Ag	Silver
As	Arsenic
Au	Gold
BLL	Blood Lead Level
BP	Blood Pressure
CAD	Coronary Artery Disorder
CCA	Copper Chromium Arsenic
Cd.	Cadmium
CDC	Center for Disease Control
Cr	Chromium
Cu	Copper
DNA	Deoxyribonucleic Acid
EEA	European Environmental Agency
EMA	European Medical Agency
Et-Hg	Ethyl Mercury
Hg	Mercury
Me-Hg.	Methyl Mercury
NAFLD	Non-Alcoholic Fatty Liver Diseases
NHANES	National Health and Nutrition Examination Survey
Ni	Nickel
Pb	Lead
ppb	Part Per Billion

ppm	Part Per Million
SPSS	Statistical Package for Social Sciences
UCH	University College University
UMTH	University of Maiduguri Teaching Hospital
USEPA	United States Environmental Protection Agency
WHO	World Health Organization

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