# LEVELS OF SOME HEAVY METALS AND ENZYME ACTIVITIES IN PRETERM INFANTS AND THEIR MOTHERS IN ABEOKUTA, OGUN STATE

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**University of Port Harcourt, Rivers State.**

**SEPTEMBER, 2021**

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**BY**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE (M.Sc) DEGREE IN THE DEPARTMENT OF BIOCHEMISTRY, COLLEGE OF SCIENCE AND TECHNOLOGY, COVENANT UNIVERSITY.**

**SEPTEMBER, 2021**

**ACCEPTANCE**

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of the degree of Master of Sciences in Biochemistry in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Nigeria.

**Mr. John A. Philip** **……..**

**(Secretary, School of Postgraduate Studies)** **Signature and Date**

**Prof. Akan B. Williams** **……..**

**(Dean, School of Postgraduate Studies)** **Signature and Date**

## DECLARATION

I, **ABIKPA, EDIOMO NTIENSE (19PCP02020)** declares that this research was carried out by me under the supervision of Dr. O. A. Rotimi, of the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Nigeria. I attest that the dissertation has not been presented either wholly or partially for the award of any degree elsewhere. All sources of data and scholarly information used in this dissertation are duly acknowledged.

**ABIKPA, EDIOMO NTIENSE** **……**

**Signature and Date**

## CERTIFICATION

We certify that this dissertation titled **"LEVELS OF SOME HEAVY METALS AND ENZYME ACTIVITIES IN PRETERM INFANTS AND THEIR MOTHERS IN ABEOKUTA, OGUN STATE"** is an original research work carried out **by ABIKPA, EDIOMO NTIENSE with the matriculation number 19PCPO2020** in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of **Dr. O. A. Rotimi**. We have examined and found this work acceptable as part of the requirements for the award of Master of Science in Biochemistry.

**Dr. O. A. Rotimi** **…….**
**(Supervisor)** **Signature and Date**

**Prof. I. S. Afolabi** **…….**
**(Head of Department)** **Signature and Date**

**Prof. Oluwatosin Adaramoye** **…….……**
**(External Examiner)** **Signature and Date**

**Prof. Akan B. Williams** **..…….……..**
**(Dean, School of Postgraduate Studies)** **Signature and Date**

## DEDICATION

I dedicate this research dissertation to the Almighty God, who makes all things beautiful in his time, and to my ever supportive and loving parents, Mr. and Mrs. Ntiense Abikpa.

## ACKNOWLEDGEMENTS

My sincere appreciation and thanks are to God almighty, the one who has shown me so much grace and favor throughout the duration of my master's degree.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| PTB | Preterm birth |
| PTD | Preterm deaths |
| Cd | Cadmium |
| Pb | Lead |
| WHO | World Health Organization |
| AChe | Acetylcholinesterase |
| GSH | Glutathione |
| GST | Glutathione-S-Transferase |
| SOD | Superoxide Dismutase |
| ED | Endocrine disruptor |
| GPx | Glutathione Peroxidase |
| DNA | Deoxyribonucleic acid |

## ABSTRACT

Preterm birth is a major reproductive health issue in the world; additionally, preterm birth has long-term financial and medical consequences. It can be defined as the birth of an infant before the $37^{th}$ week of pregnancy. An increasing body of evidence reveals that the mechanism by which preterm birth occurs still remains unknown; nonetheless, preterm birth is thought to be caused by a variety of factors including environmental factors. Toxic heavy metals such as cadmium and lead within the environment are well known factors that has been linked to premature birth around the globe. According to recent reports, these hazardous heavy metals could cause oxidative stress within the placenta by generating free radicals that disrupts antioxidant mechanisms and possibly resulting in premature birth. However, there are sparse data on the relationship between heavy metals and preterm births in Nigeria. This study measured Cadmium (Cd) and Lead (Pb) levels in 108 paired preterm maternal and newborn erythrocyte samples. The levels of the metals in mothers were significantly ($p<0.05$) higher than those in newborns. The mean (standard deviation) of lead in preterm mothers were 0.486 (0.5190) mg/l and that of preterm babies were 0.263 (0.4007) mg/l while cadmium was 0.658 (0.3948) mg/l in mothers and 0.378 (0.3225) mg/l in children. Activities of acetylcholinesterase, reduced glutathione (GSH), glutathione-s-transferase (GST) and superoxide dismutase (SOD) in mother-child pair were also determined using UV spectrophotometric methods. Mothers had higher GSH levels, GST, SOD and acetylcholinesterase activities than children, with p values of 0.0682, 0.008, 0.037, $3.183 \times 10^{-4}$, respectively. The results presented in this study showed that both Cd and Pb were present in mother-child pairs among women and children who had preterm birth and were admitted at the Federal medical center and Sacred Heart Hospital Abeokuta, Ogun State. Levels of these metals were above WHO recommended limits in humans. Future studies can be carried out to compare maternal, newborn, and postnatal levels of heavy metals and their possible effects.