

**CASE-CONTROL STUDY OF BUTYRYLCHOLINESTERASE ACTIVITY
IN NIGERIAN BREAST CANCER PATIENTS**

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF POST
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REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF
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BIOCHEMISTRY, COLLEGE OF SCIENCE AND TECHNOLOGY,
COVENANT UNIVERSITY**

JULY, 2022

ACCEPTANCE

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

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DECLARATION

I, SOKOYA, IBUKUNOLUWA ADEDOYINSOLA, hereby declare that this research work was carried out by me under the supervision of Prof. Emeka E.J. Iweala (Supervisor) of the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State. 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 were duly acknowledged.

SOKOYA, IBUKUNOLUWA ADEDOYINSOLA

Signature and Date

CERTIFICATION

We certify that the dissertation titled “**CASE-CONTROL STUDY OF BUTYRYLCHOLINESTERASE ACTIVITY IN NIGERIAN BREAST CANCER PATIENTS**” is an original work carried out by **SOKOYA, IBUKUNOLUWA ADEDOYINSOLA (20PCP02169)** in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria under the supervision of Prof. Emeka E.J. Iweala. We have examined and found this work acceptable as part of the requirement for the award of Master of Science (M. Sc.) degree in Biochemistry.

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DEDICATION

This dissertation is dedicated to God Almighty, who in his infinite mercies granted me intellectual and physical strength to complete this work.

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LIST OF ABBREVIATIONS

BC	Breast Cancer
BChE	Butyrylcholinesterase
AChE	Acetylcholinesterase
BMI	Body Mass Index
AJCC	American Joint Committee on Cancer
UICC	International Union for Cancer Control
FRP1	Wnt inhibitor frizzled-related protein 1
LRP5/6	Low-density Lipoprotein Receptor- related Proteins

ABSTRACT

One-fourth of all incidences of cancer in women today are breast cancer (BC), making it one of the most prevalent types of cancer. The global public health burden of BC seems insurmountable especially in the underdeveloped world. Innovative tactics and approaches are required to promote the management of BC in Nigeria despite existing and previous research. Butyrylcholinesterase (BChE) is a soluble enzyme majorly synthesized in the liver and mainly found in the plasma that hydrolyses cholinergic esters. The activity of the enzyme has been linked to metabolic diseases, neurological disorders, cell differentiation, proliferation, and death. However, existing studies haven't studied this enzyme in Nigerian BC patients. This study was done to inquire the activities of BChE in Nigerian BC patients (n = 100) and healthy control counterparts (n = 100) in relation with their ages (48 ± 12 yrs and 46 ± 15 yrs respectively), the stages of the cancer (Stages I – IV) and their body mass index (BMI) (28.1 ± 7.2 and 26.5 ± 6.8 respectively). The activity of BChE was determined by Ellman's spectrophotometric analysis. There was no significant difference in the activity of BChE in Nigerian breast cancer patients when compared to their healthy control counterparts. However, the activity was observed to be higher in the test patients with an average of $1.61 \mu\text{mol}/\text{min}/\text{ml}$. The changes in activity in comparison to the collective age groups, stages and BMI also did not show a significant change. However, the BChE activity was observed to be highest in age group 68-78yrs with an average activity of $2.18 \mu\text{mol}/\text{min}/\text{ml}$, at Stage III of the breast cancer with $1.72 \mu\text{mol}/\text{min}/\text{ml}$ average activity and in overweight participants with an average activity of $1.76 \mu\text{mol}/\text{min}/\text{ml}$. There is therefore only little prospect for the success of BChE as an appropriate biomarker for breast cancer management in Nigeria. However, the observed peculiarities can be further studied in conjunction with the genetic compositions of patients and enzyme.

Keywords: Breast cancer, Biomarker, Butyrylcholinesterase.