Molecular Characterization of Hepatocyte Nuclear Factor 1 alpha Gene in Diabetic Patients in Lagos State, Nigeria

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In Partial Fulfilment of the Requirements for the Award of Master of Science Degree (MSc) in Molecular Biology and Genomics

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Certification

This is to certify, that this thesis titled 'Molecular Characterization of Hepatocyte Nuclear Factor 1 alpha Gene in Diabetic Patients in Lagos State, Nigeria' was carried out by Makinde Arinola Ibilola with the matriculation number LCU/PG/002811 in the Department of Biological Sciences, Faculty of Natural and Applied Sciences, Lead City University, Ibadan, Oyo State, for the Award of the Master's Degree in Molecular Biology and Genomics, and that this work has not been previously submitted.

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Dedication

This thesis is dedicated to the Lord Almighty, my family, friends, and colleagues who made significant contribution to the success of this study.

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Acknowledgement

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

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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

Diabetes mellitus (DM) is one of the most pressing public health challenges globally, characterized by chronic hyperglycemia due to either insulin deficiency or resistance. This study investigates prevalence and molecular characterization of HNF1A gene variants among diabetic patients in Lagos, Nigeria, highlighting non-genetic risk factors such as age, gender, and body mass index (BMI). A cross-sectional study involving 100 participants was conducted, demographics, biochemical analyses, fasting blood glucose, HbA1c, and the presence of specific HNF1A gene variants using PCR were carried out. 47 of the 100 study participants (47%) were males while 53% were females. Mean age of participants was 46.45 years while 40% of the participants were aged 51-70 years. Also, 63% of study participants had normal BMI of 24.3 while 37% were obese. The mean values showed significant difference for both age and sex with $p < 0.000$ and 0.003 respectively. The mean values showed significant difference for age but no within sex and BMI at 95% confidence level ($p < 0.05$). The parameters tested for showed no significant difference for age, sex and BMI with respect to the genetic variants at 95% confidence level ($p < 0.05$). The overall percentage of PCR shows 60% positive and 40% negative. In addition, 51.7% of male are positive and 48.3% are negative, but 65% of female are positive and 35% are negative. The findings revealed a higher prevalence of diabetes among older participants with increased BMI, emphasizing their role as significant risk factors. Notably, the HNF1A gene showed variations, yet no statistically significant association between these variants and diabetes status was found. This suggests HNF1A mutations might influence glycemic control, other factors such as lifestyle and environmental factors may also play roles in diabetes pathogenesis. Therefore, early screening and identifies genetic screening as a potential tool for precise diabetic care.

Keywords: Prevalence, Diabetes Mellitus, Hepatocyte Nuclear Factor 1 alpha, Glycated Hemoglobin, Polymerase Chain Reaction.

Word Count: 298 words

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List Of Acronyms

HNF1A	Hepatocyte Nuclear Factor 1 Alpha
Type 2 DM	Type 2 Diabetes Mellitus
MODY	Maturity Onset Diabetes of the Young
GDM	Gestational Diabetes Melitus
NDM -	Neonatal Diabetes Melitus
DNA	Deoxyribonuclei Acid
GO	Gene Ontology
CRP	C-Reactive Protein
SNP	Single-nucleotide Polymorphism
mRNA	Messenger Ribonuclei Acid
G6P	Glucose-6-Phosphate
G6Pt `	Glucose-6-Phosphate Translocas

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