Abbreviated Key Title: Int. J. Bacteriol. Virol. Immunol.
ISSN: 2384-5066 (Online) & Open Access
Vol. 10(7): Pp 011-020, July, 2022.

International Journal of Bacteriology, Virology and Immunology: ISSN-2384-5066 (Online) & Open Access
Volume-10 | Issue-7| July 2022 | *Medical Research*

Blood Glucose and Gamma Glutamyl Transferase Levels Among 400 Level Medical Laboratory Science Students of Abis State University Uturu

[1]Ikpeazu, V. O., [1]Offiah, S. A. U., [1] Chikezie J., [1] Chigbu L. N., [1]Offiah, S. O., [1]Smart-Ukonu, C. U. [1]Ekenjoku, A. J., and[1] Igboh N. M.

[1]College of Medicine Abia State University Uturu, Nigeria.
*corresponding Author' E-mail: drngomi@yahoo.co.uk .
Tel: 2348037057570

Corresponding author: Ikpeazu VO . :Received: 25/7/2022 | Accepted: 27/7/.2022 | Published:28/7/2022

Abstract: Glucose is the final absorptive sugar of the body which gets oxidized to general energy for the body. However, continuous increase in blood glucose levels just as in Diabetes Mellitus poses serious health challenge worldwide and this challenge becomes more cumbersome when evident amongst a dependent population like students. Therefore, this study is aimed at investigating the blood glucose levels and the gamma glutamyl transferase level in 400 level Medical Laboratory Science Students of Abia State University, Uturu. Hundred subjects comprising of fifty test subjects (students) and fifty controls (non-students) were selectively chosen for this study. Plasma glucose levels and gamma glutamyl transferase levels were measured using semi-auto analyzer. Data obtained were analyzed using Statistical Package for Social Sciences (SPSS version 25) and one-way analysis of variance (ANOVA), student t test and expressed as Mean standard deviation. Significant level for the analysis was set at P-value equal to or less than 0.05 (P-0.05) which was considered as being statistically significant. The percentage incidence of elevated random glucose in 400 level medical laboratory science students was significantly increased when compared with controls. There was no significant difference (P>0.05) in the gender and age difference among 400 level medical laboratory science students. This study has shown that random plasma glucose and gamma glutamyl transferase was significantly higher in 400 level medical laboratory science students compared to the controls. This suggests that 400 level medical laboratory science students may be predispose to having hyperglycaemia if they continue with their life style. Random blood glucose and gamma glutamyl transferase analysis should be a routine Laboratory test for students to enable early detection and identification of students at risk of developing diabetes Mellitus

Keywords: Blood Glucose, Gamma Glutamyl Transferase Level

Published by IJMBI

INTRODUCTION

Glucose is the most important carbohydrate fuel in the body which provides the body with energy. Glucose concentration is maintained by gluconeogenesis and glycogenolysis (Dietzlar *et. al.,* 2000(Stephen *et al.,* 2004).,).

The circulation glucose is regulated by an interplay of pathways modulated by several hormones. These pathways are the Glycolytic pathway, Gluconeogenesis pathway and Glycogenolysis pathway (Carl *et. al.,* 2008).

Furthermore, the organs like liver and skeletal muscle, store this glucose when excess is found in blood stream. This is made possible by the hormone insulin which also comes to play in cellular absorption. Glucagon is another hormone which stimulates the conversion of glycogen in the liver most particularly to glucose and releases it into the blood stream. (Dietzlar, 2008).

Fasting blood glucose levels gives vital clues about how the body is managing their blood glucose, whether diabetic or non-diabetic, the blood glucose tends to peak about an hour after feeding and tends to decline after that (Zawn, 2019). The concentration of glucose in the blood is maintained at a relatively stable

concentration from 80-120mg/dl at the random state. In fasting state for non-diabetics, a range between 70-100mg/dl (Dietzlar, 2008).

Blood glucose outside the normal range is an indicator of hypoglycemia or hyperglycemia. Where there is persistent hyperglycemia, it is an indicator of diabetes mellitus depending on the etiology, it can be type 1 0r the type 2 diabetes. Beforehand, the risk factors for developing type 2 diabetes includes family history in the first or second degree relative or in signs associated with insulin resistance or hypertension (Brink, 2014).

While liver is a major organ for glucose metabolism and regulation, Gamma Glutamyl Transferase (GGT) is a cell-surface protein contributing to the extracellular catabolism of glutathione (GSH). The enzyme is produced in many tissues, but most Gamma Glutamyl Transferase is carried primarily with lipoproteins and albumin (Whitefield, 2001). Serum level of gamma glutamyl transferase are determined be several factors: alcohol intake, body day content, plasma lipid/lipoproteins and glucose levels, and various medications. Gamma Glutamyl Transferase is an ectoplasmic enzyme that catalyzes the transfer of gamma glutamyl functional groups from glutathione to other accessories to regulate the redox status and is a marker of oxidative stress. (Rantala et al ,2017)

Increased oxidative stress, leads to beta cell dysfunction hence reducing or numbing the insulin action, causing increased glucose level; Therefore, serum gamma glutamyl transferase can reflect several different processes relevant to diabetes pathogenesis. Several studies such as Lee *et. al., (*2003, Damodaran, 2018) have reported that elevated baseline gamma glutamyl transferase even within normal range are strongly associated with increased risk of type 2 diabetes mellitus (Lee *et. al.,* 2003).

In relation to Students, the study conducted by Onyeiriuka *et al.,* (2013), explained that most students are a dependent population and development of diabetes mellitus will pose a burden to parents and the society, hence the need to continually access the blood glucose of students. Also, prompt commencement of treatment in with established diabetes will improve quality of life and prevent complications.

Series of epidemiological studies consistently suggest that early GGT increase outside the normal range might be an early and sensitive enzyme related to oxidative stress. However, elevated gamma glutamyl transferase can be linked to an increased risk to a multitude of diseases conditions including cardio-vascular disease, Diabetes, metabolic syndrome and all-cause mortality (Whitefield, 2001).

The study was therefore aimed at investigating the plasma glucose level (random and fasting) and plasma gamma glutamyl transferase level of 400 level medical laboratory science students of Abia State University, Uturu. This is to enable the early detection of young adults heading towards hyperglycemia, manage such conditions appropriately before they get into critical health conditions.

MATERIALS AND METHODS

This study was carried out in ABA metropolis, Abia State.One hundred male and female subjects participated in this study, Fifty 400 level medical laboratory science students were recruited as test subjects. Fifty apparently healthy non-students were randomly selected from the street of Abia State University Teaching Hospital as controls. The students were grouped based on their sex and age brackets. The study lasted for twelve weeks. Glucose and gamma glutamyl transferase were determined usingReitz, (1994) and Trindle,(1969) methods respectively .

Data was analyzed using the statistical package for social sciences (SPSS). The differences between the groups were compared using one-way analysis of variance (ANOVA) and Student t-test with a P value less than or equal to 0.05 (P=<0.05) which will be considered as being statistically significant. Results were expressed as mean **±** SD (standard deviation).

RESULTS AND DISCUSSION

Table 1: Comparison of Mean ± Standard Deviation of Fasting Blood Sugar, Random Blood Sugar and Gamma Glutamyl Transferase in 400 Level Medical Laboratory Science Students and Controls.

Parameters	Test (n=50)	Controls (n=50)	Calc. t	Crit. t	P (≤0.05)	Sign.
FBS (mmol/L)	5.51±1.43	5.29±0.55	1.023	1.98	0.3090	NS
RBS (mmol/L)	6.96±1.61	6.33±1.16	2.244	1.98	0.0271	Sig
GGT (IUl/L)	29.08±19.50	20.56±8.27	2.816	1.98	0.0059	Sig

KEYWORDS: The following abbreviations stands for:
Crit. t-Critical t value
Cal. t-Calculated t value
Sig-Significant
NS- Not Significant
FBS- Fasting Blood Sugar
RBS- Random Blood Sugar
GGT- Gamma Glutamyl Transferase

Table 2: Comparison of Mean ± Standard Deviation of Fasting Blood Sugar, Random Blood Sugar and Gamma Glutamyl Transferase in 400 Level Medical Laboratory Science Students by Gender.

Parameters	Test (n=25)	Controls (n=25)	Calc. t	Crit. t	P (≤0.05)	Sign.
FBS (mmol/L)	5.58±1.69	5.45±1.10	0.320	1.98	0.7504	NS
RBS (mmol/L)	7.11±1.86	6.82±1.29	0.632	1.98	0.5302	NS
GGT (IUl/L)	34.28±18.96	23.88±18.62	1.917	1.98	0.00612	Ns

KEYWORDS: The following abbreviations stands for:
Crit. t-Critical t value
Cal. t-Calculated t value
Sig-Significant
NS- Not Significant
FBS- Fasting Blood Sugar
RBS- Random Blood Sugar
GGT- Gamma Glutamyl Transferase

Table 3: Comparison of Mean ± Standard Deviation of Fasting Blood Sugar, Random Blood Sugar and Gamma Glutamyl Transferase in 400 Level Medical Laboratory Science Students by Age Groups

Parameters	20-22 Years (N=17)	23-26 Years (N=20)	27-29 Years (N=13)	Calc. F	Crit. F	P (⩽0.05)	Sign.
FBS (Mmol/L)	5.38±0.80	5.53±1.99	5.68±1.99	0.155	3.20	0.8572	NS
RBS (Mmol/L)	6.64±0.97	6.93±1.48	7.45±2.22	0.926	3.20	0.4034	NS
GGT (Iul/L)	28.0±18.55	26.45±20.40	34.54±18.17	0.694	3.20	0.5045	NS

KEYWORDS: The following abbreviations stands for:
Crit. F-Critical F value
Cal. F-Calculated F value
Sig-Significant
NS- Not Significant
FBS- Fasting Blood Sugar
RBS- Random Blood Sugar
GGT- Gamma Glutamyl Transferase

Table 4: Percentage Incidence Of Dysglycemia In 400 Level Medical Laboratory Science Students And Controls

Variables	Total % (n)	Test % (n)	Controls % (n)	P (≤0.05)	Sign.
Elevated FBS (mmol/L)	66 (33)	46 (23)	20 (10)	0.0721	NS
Elevated RBS (mmol/L)	4 (2)	4 (2)	0 (0)	0.00018	Sig
Elevated FBS (mmol/L)	0 (0)	0 (0)	0 (0)	-	-

DISCUSSION

In this study, the plasma glucose level, and gamma glutamyl transferase were assessed and compared among 400 level medical laboratory science students and controls. A significant increase in the values of random plasma glucose and gamma glutamyl Transferase and was found in Students when compared to controls. The elevations can be attributed to an increase in consumption of energy or carbohydrate drinks and junkie good which is popular among Students and this can lead to hyperglycaemia (Ma *et al.,* 2018).

A quick rise in blood glucose concentrations from high load of junky foods leads to high demand of insulin which place more demand on the pancreas leading to oxidative stress. This is responsible for the significant increase in the levels of plasma glucose and gamma glutamyl Transferase. This can result to developing metabolic diseases such as diabetes Mellitus among these apparently healthy students due to their dietary lifestyle. (Ludwig *et al.,* (2015).

There was no significant difference in the mean values of the fasting blood glucose, random blood glucose and gamma glutamyl transferase among 400 level medical laboratory science students when grouped based on their age groups. This conforms with the study of Savji *et al.,* (2013).

There was no significant difference in the mean values of fasting plans glucose, random plasma glucose and gamma glutamyl transferase among 400 level medical laboratory science students when compared based on gender. This nullifies gender as a risk factor of developing diabetes Mellitus. This is agreement with the study of Gale *et al.,* (2012).

A very high significant increase was found in random plasma glucose when the percentage incidence of glycemic index was compared between the 400-level medical laboratory science students and the control. This correlate with the study of Hanan *et al.,* (2020). Though the mean values of the fasting plasma glucose levels were not significantly different.

ACKNOWLEDGMENT

Authors are grateful to the staff of Department of Chemical Laboratory, Abia State University for their technical assistance.

REFERENCES

Damodaran, Be., Sreekumani, A. and Kannan, V. (2018). Regulation of Blood glucose; Insulin and Diabetes mellitus in: A textbook of Biochemistry. *Jaypee Brothers Medical Publishers,* **18**: 145

Hanan, J., Simian, We., Manal, My., Sugar, Be., Basmah, We., Jawaher, A. and Ghada, A. (2020). Dietary habits and Dysglycemia. *Nutrition and Metabolic Insight,* **13**: 1-15.

Ludwig, Do. A., Peterson, K. E. and Gortnarker, A. L. (2015). Relationships between consumption of sugar-sweetened and Diabetes mellitus, a prospective and observational analysis. *Diabetologia,* **387**: 505-508.

Ma, K. Jacques, P. F., Meiges, J. B., Fox, C. A., Rogers, G. T., Smith, C. E., Hruby, A. and McKeown, N. M. (2019). Sugar sweetened soda consumption is positively associated with progression of insulin resistance and Diabetes. *Journal of Nutrition,* **146**(12): 2544-2550.

Rantala,A.O.,Lilja,M,Kauma,H., Savolainen,M.J.,Reunanen .A and Kesaniemi,Y.A.(2017). Gamma glytamyl transferase and the metabolic syndrome.International Medical Journal, **248**: 230-238.

Savji, N., Rockman, C. B., Skolnick, A. H., Guo, Y., Adelman, Me. A., Roles, T. and Berger, J. S. (2013). Association between age and Valley disease in different arterial territories. *Journal of American College of Cardiology,* **61**: 1736-1743.

Stephen, L. A., Kathy, B. and Want, L. (2004). Glucose Metabolism and Regulation: *Insulin and Glucagon,* **13**(27): 173-175.

Whitefield, J. B. (2001). Gamma glutamyl transferase. *Critical review in clinical laboratory sciences,* **38**(4): 263-355.