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Fasting lipid profile test in anaemic patients attending Madonna University Teaching Hospital (MUTH)

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Abstract:

Abnormalities in fasting lipid profile level on patients with anaemia is significant due the abnormal, rigid, shape of the blood cell (haemoglobin). This occurs as a result of the mutation of the haemoglobin gene, particularly due to iron deficiency during adolescence leading to impairment of physical, mental, behavioural and cognitive development. Anaemia is a global health issue and also undergraduate students come under vulnerable group that suffers this disease condition. This study is aimed on determining the lipid level in anaemic patients studying in Madonna University Teaching Hospital Rivers State. A total of 100 (one hundred) samples were collected from both anaemic and non-anaemic patients in both genders. There was significant positive strength of association of haemoglobin with the lipid, which included the total cholesterol, LDL, HDL, triglycerides. Thus, this study showed a significant strength of association between the haemoglobin level and the lipid profile parameters. Lipid profile was analysed using enzymatic methods. Results obtained were analyzed statically using statistical package for social sciences (SPSS) version 20 for windows 7. The results were expressed as mean ± S.D. Data obtained from this study were analyzed using independent sample t-test which was used to compare means, and values were considered significant at $p<0.05$ and non-significant at $p>0.05$. The result shows a significant increase ($P<0.05$) in the mean values between the test and the control in the TCH and LDL when compared between their groups (4.4±0.59-4.9±0.67) and (2.8±0.543.3±0.84) respectively. There was little or no significant ($p>0.05$) change in TG and HDL values between the test and the control (1.1±0.26-1.2±0.36) and (1.0±0.31-1.1±0.36) respectively. Patients with anaemia can develop liver disease as a result of intrahepatic sickling of erythrocytes, viral hepatitis and iron overload secondary to multiple blood transfusions and gallstone disease as a result of chronic haemolysis.

Keywords: lipid profile, anemic, patients.

Introduction

The World Health Organisation lists anaemia as one of the top ten most important health issues [1]. Anaemia is characterised as a low quantity of haemoglobin caused by either a low number of red blood cells or a low amount of haemoglobin in each cell. Anaemia is described as a decline in the blood's ability to carry oxygen. It can be brought on by a drop in the generation of red blood cells or a drop in the blood's normal haemoglobin level [2].

It is widespread in individuals at any stage of life, although pregnant-reproductive women and young children are most susceptible, which may increase the risk of impaired cognitive and physical development and increased mortality and morbidity rate [3]

The World Health Organization (WHO has suggested levels of haemoglobin below which anaemia is said to be present. These levels are < l1g/dL (110 g/L) in children aged 1-2 years and < 11.2g/dL (112g/L) in children aged 3-5 years and less than 13.5g/dl in children aged 6-12 years [4] Iron deficiency anaemia is considered the major public health problems and the most common nutritional deficiency around the world [5] The prevalence of anaemia in the world is 24.8% [6].

Furthermore, it is estimated that iron deficiency contributes towards 50% of the approximated 600 million global anaemia cases in preschool and school-aged children. This high rate of anaemia in developing countries is associated with poor sanitation conditions, low socio-economic conditions, restricted access to food and lack of knowledge for good dietary practices]7]

Anaemia has multiple consequences which can be extremely severe [8]. It effects the physical and mental development of an individual leading to decreased working capacity, which in turns affects the development of the country [9]

While the prevalence of anaemia characteristics is still significant in the African American population—1 in every 250 babies [10]. Nigeria has over 150,000 births a year, making it the country with the highest number of anaemia sufferers. Worldwide, more than 300,000 newborns are born with anaemia, primarily in low- and middle-income nations, with Africa accounting for the majority of these births [11]. In Nigeria, 25% of the afflicted kids receive a diagnosis prior to infancy, and 75% receive one before becoming three years old. Two to three percent of people are affected by anaemia [12]

Anaemia is one of the most important global health problems, and more than two billion people worldwide are estimated to have anaemia, with majority coming from the developing countries. Its adverse health consequences affect people of all age-groups and can result from non-nutritional and nutritional factors. There is scarcity of information with regards with to the concentration of fasting lipid profile in anaemic patients studying in university student. Hence, the need for this research.

Materials And Method

Study Area

This study was carried out in Madonna University Teaching Hospital Elele, Rivers state. The community situated in Ikwerre local government area of Rivers State. Elele is bounded by Isiokpo in the south. Umudioga in the north, Omerelu in the east, Elele-Alimini in the west in south- south geopolitical zone. The laboratory investigations was carried out in chemical pathology Laboratory of Madonna University Teaching Hospital (MUTI) Elele, Rivers State.

Study Population

The study was carried in adult males and females out between the age range of 16 to 38years who are anaemic serving as the test and the same age range who are apparently non-anaemic serving as the control.

Sample Size Calculation

The prevalence rate of anaemic patients attending Madonna University Teaching Hospital (M.U.T.H) in Rivers state is 7.4 cases, making the prevalence rate a total of 0.74%. Using the formula below, my sample size was calculated using Leslie Kish formula.

$N = Z^2 X p (1 – p) / d^2$

Where;

N = Minimum sample size

d = desired level of significance (0.05)

Z = confidence interval (1.96)

p = prevalence rate or proportion of occurrence = 0.74%

Therefore

N = 3.8416 X 0.74 (1 – 0.74) / 0.0025

N = 100 samples.

Inclusion Criteria

All proven cases of anaemia. Men: Hb < 13 g/dl Women: Hb < 12 g/dl. Subjects are between ages 16-38 years.

Exclusion Criteria

Subjects below 16 years and above 38 years were excluded from the study. Also subjects with known case of Hypertension, Alcoholics, Smokers, Known case of AIDS, History of recent blood loss were excluded.

Sample Collection

5ml blood sample was collected from each participant (test/control), under standard procedures and dispensed into ethylene diamine tetra acetic acid (EDTA) anticoagulant bottle for the estimation of haemoglobin concentration and lipid profile.

Research Design

This research is an experimental study to determine the level of Lipid profile parameters in anaemic patients studying in Madonna University Teaching Hospital Elele.

Ethical Approval/Consideration

Ethical approval was gotten from the ethical committee of Madonna University teaching hospital Elele. Rivers state. The study was carried out according to the Good Clinical Practice Guidelines of the modified Helsinki declaration.

Laboratory Assay

The determination of Haemoglobin estimation was done by cyanmethaemoglobin method [13]. While total cholesterol determination was by enzymatic method [14]

Determination of Triglycerides was done using enzymatic method [15] while determination of high-density lipoprotein was done Using Enzymatic method (HDL) [16]

Also, the determination of Low density lipo- protein was done using enzymatic method by [16]

Statistical analysis

Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 20 for windows 7. The results were

expressed as mean ± S.D. Data obtained from this study were analysed using independent sample t-test which was used to compare means, and values were considered significant at p<0.05 and non-significant at p>0.0

Results

Parameter	Test	Control	t-value	p-value
TCH (mmol/L)	4.4±0.59	4.9±0.67	0.000	P<0.05
TG (mmol/L)	1.1±0.26	1.2±0.36	0.000	P<0.05
HDL (mmol/L)	1.0±0.31	1.1±0.36	0.361	P>0.05
LDL (mmol/L)	2.8±0.54	3.3±0.84	0.001	P<0.05
HB(g/dl)	9.6±1.12	14.1±0.69	0.000	P<0.05

P<0.05 Significant p>0.05 Not significant

Table 4.1: Fasting lipid profile parameters on anaemic (Test) and non-anaemic (Control) subjects

From the results in table 4.1, there was a significant decrease in TCH (4.4±0.59 mmol/l), TG (1.1±0.26 mmol/L), and LDL (2.8±0.54 mmol/L) in anaemic (Test) subjects when compared with control TCH (4.9±0.67mmol/l), TG (1.2±0.36 mmol/L) and LDL (3.3±0.84 mmol/L) respectively at (p<0.05).. Meanwhile there was no significant (p>0.05) difference in the values HDL (1.0±0.31 mmol/L) in test subjects when compared with HDL (1.1±0.36 mmol/L) in control group at (p<0.05)

Groups	TCH	TG	HDL	LDL
Female Test	4.4±0.59	1.1±0.24	1.0±0.32	2.8±0.56
Male Test	4.3±0.6	1.2±0.31	0.95±0.29	2.9±0.51
Female Control	5.0±0.7	1.3±0.39	1.1±0.38	3.4±0.72
Male Control	4.7±0.63	1.2±0.33	1.1±0.36	3.3±0.93
p-value	P<0.05	P>0.05	P>0.05	P<0.05
Post hoc				
Female test vs Male test	P>0.05	P>0.05	P>0.05	P>0.05
Female test vs Female control	P<0.05	P>0.05	P>0.05	P<0.05
Female test vs Male control	P<0.05	P>0.05	P>0.05	P<0.05
Male test vs Female control	P<0.05	P>0.05	P>0.05	P<0.05
Male test vs Male control	P>0.05	P>0.05	P>0.05	P>0.05
Female control vs male control	P>0.05	P>0.05	P>0.05	P>0.05

P<0.05 Significant p>0.05 Not significant

Table 4.2: Gender group comparison of lipid profile parameters in different groups

The table 4.2 shows gender group comparison in different groups. The result shows that the female test subjects had mean values of TCH (4.4±0.59 mmol/L), TG (1.1±0.24 mmol/L), HDL (1.0±0.32 mmol/L), LDL (2.8±0.56 mmol/L). The male test subjects had mean values of TCH (4.3±0.6 mmol/L), TG (1.2±0.31 mmol/L), HDL (0.95±0.29 mmol/L), LDL (2.9±0.51 mmol/L). The female control subjects had mean values of TCH (5.0±0.7 mmol/L), TG(1.3±0.39 mmol/L), HDL(1.1±0.38 mmol/L), LDL(3.4±0.72 mmol/L).

The male control subjects had mean values of TCH (4.7±0.63 mmol/L), TG (1.2±0.33 mmol/L), HDL (1.1±0.36 mmol/L), LDL (3.3±0.93 mmol/L).

The result shows a significant ($P<0.05$) in the mean values of TCH and LDL when compared between their groups respectively. There was no significant ($p>0.05$) difference in the mean values of TG, HDL when compared between their groups respectively

Discussion

Anemia is a decrease in the total amount of red blood cells (RBCs) or hemoglobin in the blood, or a lowered ability of the blood to carry oxygen [17] When anemia comes on slowly, the symptoms are often vague and may include feeling tired, weakness, shortness of breath, and a poor ability to exercise [18]. The study was aimed at evaluating Total cholesterol,Triglycerides,Low Density protein and High Density protein and it shows that there was a significant increase ($p<0.05$) low values of TCH (4.4±0.59 mmol/l), TG (1.1±0.26 mmol/L), and LDL (2.8±0.54 mmol/L) in anaemic (Test) subjects when compared with TCH (4.9±0.67mmol/l), TG (1.2±0.36 mmol/L) and LDL (3.3±0.84 mmol/L) in control subjects respectively. Meanwhile there was no significant ($p>0.05$) difference in the values HDL (1.0±0.31 mmol/L) in test subjects when compared with HDL (1.1±0.36 mmol/L) and in control group. The result shows that the female test subjects had mean values of TCH (4.4±0.59 mmol/L), TG (1.1±0.24 mmol/L), HDL (1.0±0.32 mmol/L), LDL (2.8±0.56 mmol/L). The male test subjects had mean values of TCH (4.3±0.6 mmol/L), TG (1.2±0.31 mmol/L), HDL (0.95±0.29 mmol/L), LDL (2.9±0.51 mmol/L). The female control subjects had mean values of TCH (5.0±0.7 mmol/L), TG (1.3±0.39 mmol/L), HDL (1.1±0.38 mmol/L), LDL (3.4±0.72 mmol/L). The male control subjects had mean values of TCH (4.7±0.63 mmol/L), TG (1.2±0.33 mmol/L), HDL (1.1±0.36 mmol/L), LDL (3.3±0.93 mmol/L). The result shows a significant ($P<0.05$) in the mean values of TCH and LDL when compared between their groups respectively. There was no significant ($p>0.05$) difference in the mean values of TG, HDL when compared between their groups respectively. The work is in line with otherscholarly work [19,20,21]

Conclusion

The result of this research concluded that dyslipidemia is common among anaemic patients

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