RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: TETFund/ESS/POLY/OWO/ARJ/1

# BLOOD SUGAR, HAEMOGLOBIN STATUS AND FEEDING HABIT OF MALE UNDERGRADUATE STUDENTS BEFORE AND DURING EXAMINATION IN RUFUS GIWA POLYTECHNIC, OWO, ONDO STATE

***[1]Mustapha, R. A,[2] Abdulwaliyu, I.,[1]Adedayo, E.O, [3]Mosimabale, M. M and [1]Shuaib, A. A.**
[*1]Department of Nutrition and Dietetics, Faculty of Applied Sciences, Rufus Giwa Polytechnic, Owo Ondo State Nigeria; [2]Scientific and Industrial Department, National Research Institute for Chemical Technology, Zaria, Nigeria; [3]Department of Nutrition and Dietetics, Federal Polytechnic Ede, Osun State
* Corresponding Author: musternd@gmail.com

**Abstract**
Blood sugar is an essential metabolic substrate for energy used in all of the minute-to-minute bodily functions of humans. This study assessed the haemoglobin and blood sugar status of male undergraduate students before and during the examination period in Rufus Giwa Polytechnic, Owo, Ondo State. This was a cross-sectional study that consisted of 120 students. A pretested semi-structured interviewer's administered questionnaire was used for data collection. Data were analysed using descriptive and inferential statistics. The result shows students between the ages of 18-20 years assessed during the exam and before the examination were 31.7 and 41.5% respectively. The majority of the students ate 3 times per day during the exam (81.7%) and 63.3% before an exam. More of the students (26.7%) eat okra with bolus food daily before the exam than during the exam (23.3%). About 73.3% have normal weight before the exam while 66.75% have normal weight during the examination. Also, 96.7% had normal haemoglobin levels before the exam compared to 55% during exams. Both groups of students had fasting blood glucose of 100% before the exam and 86.7% during the exam. In conclusion, this study established that the nutritional status, haemoglobin level and blood glucose level of the students are better before the exam than during the exam period. There was no significant relationship ($p<0.05$) between the nutritional status, haemoglobin level or blood sugar level of the students. Enlightenment on the importance of adequate diet at all times for cognitive activities and optimum body functioning should be given.

**Keywords***:* Blood Sugar, haemoglobin status, feeding habit, male students, examination

## Introduction

Glucose is an essential metabolic substrate of all mammalian cells. D-glucose is the major carbohydrate presented to the cell for energy production mitochondria and many other anabolic requirements (Szablewski, 2011; Giulia et al 2016). In humans, glucose is the primary source of energy and is critical for normal function. Most tissues and organs, such as the brain consume approximately 60% of blood glucose constantly as a source of energy (Wasserman, 2009). Blood sugar levels outside the normal range may be an indicator of a medical condition. Hypoglycaemia is a low blood concentration of glucose which can cause seizure, loss of consciousness, and even death. On the other hand, a persistent elevation of blood glucose concentrations can result in blindness, renal failure, vascular disease, and neuropathy (Szablewski, 2011). Diabetes mellitus is characterized by persistent hyperglycaemia from any of several causes and is the most prominent disease related to failure of blood glucose regulation (Goyal et al. 2023)

Shortly after eating, the blood glucose level may rise and in non-diabetics, temporarily up to 7.8 mmol/L (140 mg/dL) or slightly


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

more. The American Diabetes Association (2006) recommends post-meal glucose levels of less than 10 mmol/L (180 mg/dL) and fasting plasma glucose of 3.9 to 7.2 mmol/L (70-130 mg/dL). The actual amount of glucose in the blood and body fluids is very small. In a healthy adult male of 75kg with a blood volume of 5 litres, a blood glucose level of 5.5 mmol/L (100 mg/dL) amounts to 5g, equivalent to about a teaspoonful of sugar (Wasserman, 2009).

The haemoglobin which has a protein globin united with pigment haem is essential for the transport of oxygen from the lungs to tissues and transport of carbon dioxide ($CO_2$) in opposite directions and the regulation of blood pH. The requirement for the production of haemoglobin requires the provision of nutrients such as protein, vitamins, and minerals (especially iron) and the production takes place in the cytosol of erythrocytes. Thus, it seems that haemoglobin levels are determined and affected by the factors that are mainly related to the existence and bioavailability of iron in diets (Hurrell, 2007; Sirdah, 2008; McLaren et al., 2007). The present study assessed the blood sugar and haemoglobin status of male undergraduate students before and during the examination period in Rufus Giwa Polytechnic, Owo, Ondo State Nigeria to know if feeding habits and food consumption patterns of students affect blood sugar and haemoglobin status before and during an examination.

## Materials and Methods

### Study Design and Location

The study was a descriptive cross-sectional survey in design undertaken between November and December 2018 among undergraduate students of different academic departments in Rufus Giwa Polytechnic Owo, Ondo State.

### Sampling method

A total number of 120 students were randomly selected among the six faculties in the institution across the various academic departments. Sixty were randomly selected before and during an examination, which issolely available before and during the study were recognized and warmly accommodated. Students who were diabetic and were on anti-diabetes drugs, and students with medical conditions affecting glucose metabolism like uremia, and hemoglobinopathy were met with close rapport and excluded from the study.

### Informed consent and ethical consideration

The male undergraduates were educated about blood and haemoglobin, as well as its benefits to the body functions including its effect on academic activities and performance. Their permission was sought and a consent form was signed. Permission to obtain data and clearance was obtained from the Chief Medical Director of the institution.

### Data Collection Procedure

Structured and self-administered questionnaires were used to elicit information from the students. The study was done before and during an examination period. Information about their age, medical condition, consumption pattern of iron-rich foods, and feeding habits of all the respondents were obtained. Anthropometric data such as their weight and height were measured according to standard procedure. With the assistance of a medical laboratory scientist, a HemoCue Hb 301 haemoglobin analyser was used for haemoglobin concentration. A sample of blood was taken from the fingertip after swabbing with methylated spirit using cotton wool. The sample was introduced into the microcuvette, after a reaction with the reagents; the absorbance was read in the HemoCue photometer at 565 and 880nm.

RUGIPO Research & Technical Journal; Vol. 3, Issue 1:
Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: tetfund TERTIARY EDUCATION TRUST FUND
TETFund/ESS/POLY/OWO/ARJ/1

The haemoglobin concentration was taken in g/dL. Blood sugar was determined using a digital blood glucometer. The fingertip was pricked with a lancet and the blood on a testing strip. The strip is then inserted into a glucometer. The value was taken in mg/dL (Simmons and Gurney, 1982; Hudson-Thomas et al., 1994).

**Statistical analysis**

Descriptive statistics such as frequencies and percentages were used to present data while means and standard deviation were also calculated. Inferential statistics such as T-test and Chi-square were conducted to determine the relationship between nutritional status, haemoglobin level, and blood sugar level. All statistical analysis was done using SPSS (version 27.0).

## Results

**Age distribution and number of respondents by faculties**

Table 1 shows the age distribution and number of respondents by faculties. The result revealed that 31.7% and 41.5% of the respondents were between the age of 18 – 20 years during and before the examination period respectively while 5% of the respondents were above30years of age both before and during the examinations.

**Table 1: Age distribution and number of respondents by faculties**

| | During exam(n=60) | | Before exam(n=60) | |
|---|---|---|---|---|
| | N | % | N | % |
| **Age** | | | | |
| 18-20years | 19 | 31.70 | 25 | 41.70 |
| 21-23years | 11 | 18.30 | 8 | 13.30 |
| 24-26 years | 21 | 35.00 | 13 | 21.70 |
| 27-29 years | 6 | 10.00 | 11 | 18.30 |
| >30 years | 3 | 5.00 | 3 | 5.00 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Faculty** | | | | |
| Engineering | 10 | 16.70 | 10 | 16.70 |
| Social management. | 10 | 16.70 | 10 | 16.70 |
| Business | 10 | 16.70 | 10 | 16.70 |
| Applied sciences | 10 | 16.70 | 10 | 16.70 |
| Environmental | 10 | 16.70 | 10 | 16.70 |
| Agric tech | 10 | 16.70 | 10 | 16.70 |
| Total | 60 | 100.00 | 60 | 100.00 |

**Feeding Habit of the Respondents**

Table 2 shows the feeding habits of the respondents from the result. The majority of the respondents (81.7% during exams and 63.3% before exams) eat 2 to 3 times per day. The result also shows that 65.0% of the students eat snacks more during exams than before exams (58.3%), it further revealed that 28.3% of the respondents take folic acid before exams ( than during exams (25%). It further shows that 36.7% of the respondents take iron-rich food before exams and 28.3% of the respondents during exams.


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: tetfund TERTIARY EDUCATION TRUST FUND
TETFund/ESS/POLY/OWO/ARJ/1

**Table 2: Feeding Habit of the Respondents**

| Variables | During exam(n=60) | | Before exam(n=60) | |
|---|---|---|---|---|
| | N | % | N | % |
| **How many times do you feed daily?** | | | | |
| Twice | 10 | 16.70 | 4 | 6.70 |
| 2-3 times | 49 | 81.70 | 38 | 63.30 |
| ≥4 times | 1 | 1.70 | 18 | 30.00 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Do you have any food allergies?** | | | | |
| Yes | 21 | 35.00 | 28 | 46.70 |
| No | 38 | 63.30 | 30 | 50.00 |
| Not sure | 1 | 1.70 | 2 | 3.30 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Which mealtime do you like skipping?** | | | | |
| Breakfast | 18 | 30.00 | 12 | 20 |
| Brunch | 17 | 28.30 | 17 | 28.30 |
| Lunch | 14 | 23.30 | 19 | 31.7 |
| Supper | 6 | 10.00 | 3 | 5 |
| Dinner | 4 | 6.70 | 5 | 8.3 |
| No | 1 | 1.70 | 3 | 5 |
| Sometimes | 0 | 0.00 | 1 | 1.70 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **What time do you have dinner daily?** | | | | |
| 6pm-7pm | 4 | 6.70 | 7 | 11.70 |
| 7pm-8:30pm | 17 | 28.30 | 19 | 31.70 |
| 8:31pm-9:00pm | 13 | 21.70 | 10 | 16.70 |
| 9:01pm-9:30pm | 7 | 11.70 | 15 | 25.00 |
| 9:31pm-10:00pm | 8 | 13.30 | 2 | 3.30 |
| 10:01pm-10:30pm | 9 | 15.00 | 4 | 6.70 |
| 10:31pm-11:00pm | 2 | 3.30 | 2 | 3.30 |
| 11:01pm-11:30pm | 0 | 0.00 | 1 | 1.70 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Do you like eating outside?** | | | | |
| Yes | 23 | 38.30 | 25 | 41.70 |
| No | 25 | 41.70 | 27 | 45.00 |
| Sometimes | 12 | 20.00 | 8 | 13.30 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Do you like eating snacks?** | | | | |
| Yes | 39 | 65.00 | 35 | 58.30 |
| No | 8 | 13.30 | 18 | 30.00 |
| Sometimes | 13 | 21.70 | 7 | 11.70 |
| Total | 60 | 100.00 | 60 | 100.00 |
| **Do you take folic supplements?** | | | | |
| Yes | 15 | 25.00 | 17 | 28.30 |
| No | 26 | 43.30 | 31 | 51.70 |
| Sometimes | 10 | 16.70 | 5 | 8.30 |
| Not sure | 9 | 15.00 | 7 | 11.70 |
| Total | 60 | 100.00 | 60 | 100.00 |


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: TETFund/ESS/POLY/OWO/ARJ/1

| | | | | |
|---|---|---|---|---|
| **Do you take iron supplements?** | | | | |
| Yes | 17 | 28.30 | 22 | 36.70 |
| No | 24 | 40.00 | 26 | 43.30 |
| Sometimes | 12 | 20.00 | 4 | 6.70 |
| Not sure | 7 | 11.70 | 8 | 13.30 |
| Total | 60 | 100.00 | 60 | 100.00 |

**Nutritional Status of the Respondents**

Table 3 shows the nutritional status of the respondents. From the result, the majority of the respondents have normal weight both before exams (73.3%) and during exams (66.75%). The result revealed that 3.3%of the respondents were significantly obese before the exam. The result also revealed that 21.7%of the respondents were overweight before exams than during exams (5.0%).

**Table 3: Nutritional Status of the Respondents**

| **Nutritional Status** | **During exam(n=60)** | | **Before exam(n=60)** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| Underweight(<18.5kg/m$^2$) | 17 | 28.30 | 1 | 1.70 |
| Normal weight (18.5-24.9kg/m$^2$) | 40 | 66.70 | 44 | 73.30 |
| Overweight(25-29.9kg/m$^2$) | 3 | 5.00 | 13 | 21.70 |
| Obese(≥30kg/m$^2$) | 0 | 0.00 | 2 | 3.30 |
| Total | 60 | 100.00 | 60 | 100.00 |

**Hemoglobin Status of the Respondents**

Table 4 shows the haemoglobin status of the respondents. The result, it shows that more respondents (96.7%) have normal haemoglobin status before the exam than during exams (55%).

**Table 4:Hemoglobin Status of the Respondents**

| **Haemoglobin Range** | **During exam (n=60)** | | **Before exam(n=60)** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| Low haem. (<13.0g/dL) | 27 | 45.00 | 2 | 3.30 |
| Normal haem. (≥13.0g/dL) | 33 | 55.00 | 58 | 96.70 |
| Total | 60 | 100.00 | 60 | 100.00 |

**Blood Glucose Level of the Respondents**

Table 5 shows the blood glucose levels of the respondents. The result reveals that the majority of the respondents have normal fasting blood glucose levels both before exams (100.0%) and during exams (86.7%). However, 13.3% of the respondents recorded low fasting blood sugar while the majority of the respondents had low postprandial glucose levels during exams (100%) and before exams (83.3%).


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: tetfund TERTIARY EDUCATION TRUST FUND
TETFund/ESS/POLY/OWO/ARJ/1

**Table 5: Blood Glucose Level of the Respondents**

| Variable | During exam(n=60) N | % | Before exam(n=60) N | % | P-value |
|---|---|---|---|---|---|
| **Fasting blood glucose level** | | | | | |
| Low (<50-70mg/dL) | 8 | 13.30 | 0 | 0.00 | 0.003 |
| Normal(≥70-126mg/dL) | 52 | 86.70 | 60 | 100.00 | |
| Total | 60 | 100.00 | 60 | 100.00 | |
| **Post-prandial glucose level** | | | | | |
| Low (<125mg/dL) | 60 | 100.00 | 50 | 83.30 | 0.001 |
| Normal(≥126-180mg/dL) | 0 | 0.00 | 10 | 16.70 | |
| Total | 60 | 100.00 | 60 | 100.00 | |

PPG- Post Prandial Glucose Level.
FBG- Fasting Blood Glucose Level.

**Relationship between Nutritional Status, Haemoglobin Level, and Blood Sugar**

Table 8 shows the relationship between nutritional status, haemoglobin level, and blood sugar. From this result, the majority of the respondents with normal weight had normal fasting blood glucose levels and post-prandial glucose levels before and during the exam respectively, while 23.5% indicated low fasting blood glucose and the respondents with low post-prandial glucose levels were underweight during the examination. The majority (95.5%) of the respondents with normal weight had normal haemoglobin levels before exams compared to 65% that were recorded during exams, while low haemoglobin levels (47.1% and 100%) are viewed to be linked with being underweight and overweight respectively during and before the examination. There was no significant relationship ($p<0.05$) between the nutritional status, haemoglobin level, or blood sugar level of the respondents.

**Table 6: Relationship between Nutritional Status, Haemoglobin Level, and Blood Sugar Level**

| Nutritional Status | | Underweight N (%) | Normal weight N (%) | Overweight N (%) | Obese N (%) | P-value |
|---|---|---|---|---|---|---|
| **Fasting blood glucose level** | | | | | | |
| During exam | Low FBG level (mg/dL) | 4(23.5) | 4(10.0) | 0(0.0) | 0(0.0) | 0.581 |
| | Fast BG level(mg/dL) | 13(76.5) | 36(90.0) | 3(100.0) | 0(0.0) | |
| Before exam | Low FBG level (mg/dL) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | |
| | Fast BG level(mg/dL) | 0(0.0) | 2(45) | 3(23.1) | 0(0.0) | 0.187 |
| **Post-prandial glucose level** | | | | | | |
| During exam | Low PPG level (mg/dL) | 13(100.0) | 35(87.5) | 2(66.7) | 0(0.0) | 0.432 |


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology; Sept, 2024 Edition
https://elearning.rugipo.edu.ng/Rugipo_Tetfund_Journal_Research_Portal/
ISSN: 2714-3643 E-mail: rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com.
Proudly Sponsored by: TETFund/ESS/POLY/OWO/ARJ/1

| | | | | | | |
|---|---|---|---|---|---|---|
| | Post Prandial G(mg/dL) | 0(0.0) | 0(0.0) | 0(0.0) | 0(0.0) | |
| Before exam | Low PPG level (mg/dL) | 1(100.0) | 37(84.1) | 10(76.9) | 2(100.0) | 0.801 |
| | Post Prandial G (mg/dL) | 0(0.0) | 7(15.9) | 3(23.1) | 0(0.0) | |
| **Haemoglobin status** | | | | | | |
| During exam | Low haemoglobin (g/dL) | 8(47.1) | 16(40.0) | 3(100.0) | 0(0.0) | 0.129 |
| | Normal haemoglobin (g/dL) | 9(52.9) | 24(60.0) | 0(0.0) | 0(0.0) | |
| Before exam | Low haemoglobin (g/dL) | 0(0.0) | 2(4.5) | 0(0.0) | 0(0.0) | 0.861 |
| | Normal haemoglobin (g/dl) | 1(100.0) | 42(95.5) | 13(100.0) | 2(100.0) | |

PPG- Post Prandial Glucose Level.
FBG- Fasting Blood Glucose Level.

**Discussion**

This research was carried out to assess the blood sugar, haemoglobin status, and feeding habits of male undergraduate students before and during an examination**.** The age distribution of the majority in the two groups of students falls between 18-20 years during the exam (31.7 %) and before the (41.5%) examination period respectively. Jena *et al* (2016) reported similar age patterns in their study on the effect of examination stress on blood sugar in medical students of VIMSAR in India. The result also shows that the majority of the respondents feed between 2-4 times both before and during exams as those feeding beyond four times are more before the exam period (30%) compared to 1.7% during the exam period. This may probably be because the students are more buoyant before the exam period when newly resumed than during the exam period. Also, about 30 and 28% of the students from the result prefer to skip their breakfast and lunch during the examination. This habit and pattern of eating would probably have a serious effect on blood sugar levels and thereby affect their mental performance in the examination (Taylor and Rachman 1988; Bellisle, 2001).

Findings also revealed that the majority of the respondents neither had food allergies before nor during the examination. This could be a result of the fact that the majority of the students were adolescents and young adults whose body systems were at the peak of their functionality or maybe a result of their strong immune systems. The result also shows that more students eat outside during exams than before exams and more students snacks during exams than before exams. The reason for these actions cannot be farfetched as the students usually have more funds before exams than during exams which enables them to cook whatever they like before exams than during exams. As a form of coping strategy among the students, they normally resort to snacking and eating wherever they get food during examinations so as not to starve for the exams which may not be necessary before exams because they have money to get food. This is in line with the work of


RUGIPO Research & Technical Journal; Vol. 3, Issue 1: Issues in Science & Agricultural Technology is a Bi-annual Publication Series of Rufus Giwa Polytechnic, Owo (RUGIPO), Ondo State. All correspondence or submission of articles for scholarly publication in the next edition of this Journal should be mailed to rugipotechjournal@rugipo.edu.ng, or rugiporetechjournal@gmail.com. For further enquiries, please contact +234 803 385 8795 or +234 903 405 9787.

Kilbride *et al* (2000) who submitted that socio-economic factors are important determinants of the consumption pattern of food by an individual. This trend was also reported by Caso *et al* (2020) and Barker *et al* (2015) in their study among undergraduate Italian and French students. The result on nutritional status revealed that there is a significant difference between the nutritional status of the respondents before and during the exam period. The result (Table 3) shows that the nutritional status of the respondents was better before exams than during exams as more underweight students were observed during exams (28.3%) than before exams (1.7%) this is probably because they have better access to good diet before exams than during exams due to financial factor. However, Caso *et al* (2020) and Barker *et al* (2015) reported that anxiety, physical stress, and psychological stress as a result of the examination are some of the major factors for unhealthy eating habits, low nutrient, energy, and poor nutritional status among students.

The result shows that a greater percentage of the student's haemoglobin status was normal before the exam than during the exam. Only 3.3% of the students had low haemoglobin before the examination compared to 45% of them having low haemoglobin status during the examination. The low haemoglobin status among the students during their examination is a reflection of their inadequate nutrient intake and nutritional status before the examination period. There is no significant association ($P< 0.05$) between haemoglobin status and the nutritional status of the students before the exam and during the examination. The result also shows the respondents in both cases had better blood glucose levels before exams than during exams. About 13.3% of the students had fasting blood glucose (FBS) lower than normal during the examination while 83.3% of the students had low post-prandial glucose levels before the examination. There is also no significant relationship between fasting blood sugar, post-prandial glucose level, and the nutritional status of the students.

**Conclusion**

In conclusion, it was shown from the result that feeding habits as well as the consumption of foods by the respondents are better before exams than during examinations. It is also established that the nutritional status, haemoglobin and blood glucose status of the students are better before the exam period than during the exam period. This however had been traced to their financial status during the two periods of their stay in school. It was however concluded that there is no significant relationship between the nutritional status of the respondents and either their haemoglobin level or blood sugar level. Anxiety, physical, and psychological stress as a result of the examination hinder nutrient intake and appetite. Therefore, nutritional enlightenment should be given to the students on the importance of a balanced and adequate diet at all times for cognitive activities and optimum functioning of the body system.

**References**

American Diabetes Association (2008). Standards of medical care in diabetes. *Diabetes Care*, 31(Suppl 1): S12–S54.

Barker, M. E., Blain, R. D. and Russell, J. M. (2015): The influence of academic examinations on energy and nutrient intake in male university students. *Nutrition Journal, 14: 1-7.*

Bellisle, F. (2001). Invited commentary; Glucose and mental performance, *British Journal of Nutrition*. 86:117-118.

Caso, D., Miriam, C., Rosa, F. and Mark C.

(2020). Unhealthy eating and academic stress: The moderating effect of eating style and BMI. *Health Psychology Open*, 2020:27(2). doi:10.1177/2055102920975274

Diaz-Torreute, X., and Quintiliano-Scarpelli, D. (2020): Dietary patterns of breakfast consumption among Chilean University students. *Nutrients*, 12 (2):552

Giulia, S., Arianna, P., Sirio, D. (2016). Control of YAP/TAZ Activity by Metabolic and Nutrient-Sensing Pathways, Trends in Cell Biology. 26(4):289-299, ISSN 0962-8924, https://doi.org/10.1016/j.tcb.2015.11.004.

Goyal, R., Singhal, M. and Jialal, I. (2023). Type 2 Diabetes. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024. Available https://www.ncbi.nlm.nih.gov/books/NBK513253/

Hudson-Thomas, M., Bingham, K. C. and Simmons, W. K. (1994). An evaluation of the HemoCue for measuring haemoglobin in field studies in Jamaica. *Bulletin of the World Health Organization*, 72 (3): 423-426

Hurrel, L. R. (2007). Linking the bioavailability of iron compounds to the efficacy of iron-fortified foods. *International Journal Vitamim Nutrition Research, 77*: 166-73.ic1188.

Jena, S. K., Misra, A. K. and Mohanty, A. (2016): Effect of examination stress on blood sugar in medical students' *CHRISMED Journal of Health and Research, 3 (4):268-72.*

Kilbride, J., Baker, T., Parapia, L. A. and Khoury, S. A. (2000). Iron status, serum folate and B12 values in pregnancy and postpartum: report from a study in Jordan. *Annals Saudi Medical*,20: 3716.

McLaren, C.E, Barton, J.C., Gordeuk, V.R., Wu, L., Adams, P.C., Reboussin, D.M., Speechley, M., Chang,H., Acton, R.T., Harris, E.L., Ruggiero, A.M. and Castro, O. (2007). Determinants and characteristics of mean corpuscular volume and haemoglobin concentration in white HFE C282Y homozygotes in the hemochromatosis and iron overload screening study. *American Journal Hematology,82:* 898-905.

Simmons, W. K. and Gurney, J. M. (1982). Nutritional anaemia in the English-speaking Caribbean and Suriname. *American journal of clinical nutrition*, 35: 327-337.

Sirdah, M. (2008). Determinants of Haemoglobin Level in Adolescence Students at Gaza Strip, Palestine. *International Journal of Health Research*, 1(4): 225-234 (e145p36-48)

Szablewski, L. (2011). Glucose homeostasis and insulin resistance, Bentham E-Books, e-ISBN978-1-60805-189-2

Taylor, L. A. and Rachman, S. J. (1988). The effects of blood sugar level changes on cognitive function, affective state, and somatic symptoms. *Journal of Behaviour Medicine*.11 (3):279-291. doi:10.1007/BF00844433

Wasserman, D. H. (2009). Four grams of glucose. *American Journal of Physiology. Endocrinology and Metabolism*, 296(1): E11-21.