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Original Research Article

Nutritional and Health Assessment of Diabetic Patients in Outpatient Clinic of Federal Teaching Hospital Owerri

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Abstract

This study aims to evaluate the nutritional status of diabetic patients who visit the Federal Teaching Hospital's outpatient clinic in Owerri, Imo State, Nigeria. Respondents who visited the Federal Teaching Hospital's Out-Patients Clinic made up the study population, and a sample size of 120 was employed. One hundred and twenty (120) diabetes patients were asked to complete a well-structured questionnaire that asked about their sociodemographic information, food consumption habits, health condition, alcohol or tobacco usage, vitamin intake, and exercise. Data from biochemical tests and anthropometric measurements, including height and weight, were gathered to ascertain the respondents' nutritional health, and a food frequency questionnaire was employed to evaluate their food consumption habits. SPSS version 17 was used to analyse the data, and the results were presented as percentages and frequencies. Significant differences were evaluated using correlation. The majority (56%) were female, 56% had completed secondary school, 53% had no family history of diabetes, and 72% had not been ill in the previous two weeks, according to the results. Diet plus insulin were utilised by 85% of diabetics, while diet alone was used by 15%. Anthropometry analysis reveals that the patients' mean height and weight did not differ significantly (P > 0.05$). In contrast, women were more likely than men to be obese (56% vs. 44%). According to BMI, 41.7% of people were overweight and 30% were obese, and both sexes' fasting blood glucose levels were higher above the typical range of 70–100 mg/dl. The serum iron reserve was depleted in thirty (30%) of the responders. 38.4% of people had hypertension, according to their systolic blood pressure. The respondents' consumption pattern for non-starchy vegetables was low; they consumed them four times a week (37%) compared to the minimum recommended consumption of five servings per day. Additionally, their daily intake of fat was marginally higher than the dietary requirement. For diabetics to maintain appropriate glycaemic control, they require specialised nutrition education to enhance their diets. The respondents' systolic blood pressure and meal skipping had a negative significant link (r=-0.313; p=0.015), while their snack consumption and meal skipping had a positive significant correlation (r=0.504; p>0.000). The respondents' systolic blood pressure and snack consumption were significantly correlated negatively (r=-0.300; p=0.020); their idea of diabetes and fasting blood sugar were significantly correlated negatively (r=-0.397; p>0.002); their idea of diabetes and serum ferritin were significantly correlated negatively (r=-0.315; p=0.014); and their idea of diabetes and diastolic blood pressure were significantly correlated positively (r= 0.257; p=0.047).

Keywords: *nutritional, health assessment, diabetic, Owerri.*

Introduction

A chronic metabolic disease that affects millions of people worldwide, diabetes mellitus is a significant global health concern. About 537 million persons worldwide had diabetes as of 2021, demonstrating the disease's growing prevalence and serious public health consequences [1]. The illness affects people of all ages, races, and ethnicities and is linked to serious but mostly avoidable consequences. Diabetes can lead to renal failure, myocardial infarction, and other cardiovascular problems if it is not properly treated; Nigerians are increasingly reporting these results. With an estimated

1.7 million people with type 2 diabetes mellitus (T2DM) in 2006, Nigeria has the largest diabetes burden in Africa. By 2030, that number is expected to increase to 4.8 million [2].

Glycaemic control in people with type 2 diabetes is known to be significantly influenced by nutritional status, which includes dietary consumption and body composition. Diets high in fruits, vegetables, whole grains, and lean meats were linked to lower levels of glycated haemoglobin (HbA1c), according to a systematic review and meta-analysis. In a similar vein, better glycaemic control and fewer complications from diabetes were achieved by consuming more plant-based foods and fewer animal-based products [3].

Poor glycaemic control has been connected in Africa in a number of cross-sectional studies to low educational attainment, inconsistent medication adherence, and restricted access to healthcare. Research conducted in Nigeria also shows that poor glycaemic outcomes are significantly predicted by suboptimal nutritional status, which might show up as underweight or overweight/obesity [4].

There have been reports of widespread poor glycaemic management among T2DM patients in Nigeria, which has been linked to low socioeconomic position, a lack of nutritional awareness, and limited access to treatment. To enhance metabolic outcomes for Nigerians with diabetes, more data points to the necessity of multidisciplinary treatment models and culturally relevant nutritional interventions [5].

In order to effectively manage diabetes, metabolic syndrome, and cardiovascular disease, glucose management is crucial. Fasting blood glucose (FBG) offers important information about short-term glucose regulation, even if HbA1c is frequently used to evaluate long-term glycaemic control. Glycaemic outcomes and metabolic health are strongly associated with nutritional markers including body mass index (BMI) and waist-hip ratio (WHR). Even in people without diabetes, elevated FBG levels have been linked to an increased risk of cardiovascular disease and are a reliable indicator of the onset of type 2 diabetes in the future. [6]

One important aspect affecting glycaemic regulation is obesity. Obese people are much more likely than those with normal BMI to develop type 2 diabetes, according to a systematic review. On the other hand, people with a healthy BMI have better glycaemic control and fewer problems. Insulin resistance, poor glucose tolerance, and type 2 diabetes are also predicted by central obesity as determined by WHR (Dada & Igbe, 2020). Elevated FBG and a higher risk of undiagnosed diabetes are consistently linked to high WHR [7].

These trends are supported by recent research from Nigeria. Along with high FBG levels (42.9%), diabetic patients have high rates of obesity (76.9%), overweight (62.6%), and higher WHR. a 6.5% prevalence of diabetes and highlighted the significant roles played by growing obesity, demographic changes, urbanisation, and physical inactivity. Preventive measures and knowledge are still insufficient. For example, low levels of physical exercise, frequent consumption of high-carb diets, and patients' lack of information about diabetes. In a similar vein, research from Abuja and Lagos indicates that a large percentage of diabetics are obese and that there is no information or guidance regarding diet [8].

Another prevalent metabolic problem in people with type 2 diabetes is dyslipidaemia. It has been found that 63% of Nigerian diabetics have dyslipidaemia, which includes significantly raised triglycerides (88%), low HDL (47%), and high cholesterol (33%). Diabetic dyslipidaemia, which is defined by elevated triglycerides and low HDL, may develop even in prediabetes, according to previous publications, highlighting the significance of early identification and treatment [9].

An estimated 347 million people worldwide suffered from diabetes in 2012, with more than 80% of those affected living in low- and middle-income nations like Nigeria. According to WHO (2013), the number of deaths from diabetes was expected to quadruple between 2005 and 2030. The most prevalent type, type 2 diabetes, is caused by both insufficient insulin production and impaired insulin action. With 463 million cases in 2019 and a predicted 51% growth by 2045—rising to 143% in Africa—diabetes was named the fastest-growing global health issue by the International Diabetes Federation. Every year, diabetes and its consequences cause about 1.5 million fatalities [10].

Diabetes outcomes in Nigeria continue to deteriorate due to non-adherence to treatment and incorrect dietary practices, which are exacerbated by lifestyle changes, westernised meals, low physical activity, socioeconomic constraints, and a lack of information about nutrition. The eyes, kidneys, nerves, heart, and blood vessels are among the organ systems that gradually suffer harm from uncontrolled hyperglycemia. Consequently, diabetes lowers quality of life, raises morbidity, and drastically shortens life expectancy [11].

Because it raises healthcare expenses, lowers worker productivity, and increases adult morbidity and death, diabetes's expanding prevalence in Nigeria poses a serious danger to the country's progress. The attainment of sustainable development goals is also at risk due to the rising prevalence of diabetes. These difficulties highlight how important it is

to evaluate the glycaemic control and nutritional status of diabetic patients who visit the Federal Teaching Hospital in Owerri, Imo State, for outpatient clinics.

Materials and Methods

Study Area

The study was conducted at the Federal Teaching Hospital (FTH), Owerri, Imo State, Nigeria. The hospital, located along Orlu Road by Amakohia in Owerri Municipal, is a major specialist and referral centre in the South-East region.

Study Population

The study population comprised all patients with type 2 diabetes mellitus (T2DM) attending the Endocrinology Clinic of the Medical Outpatient Department, FTH Owerri. Patients attend the clinic weekly and represent diverse age groups and socioeconomic backgrounds.

Inclusion Criteria

Participants were eligible if they met the following conditions:

- Physician-diagnosed type 2 diabetes mellitus
- Aged 20 years and above
- Regular attendees of the diabetes clinic

Exclusion Criteria

Individuals were excluded if they:

- Did not provide informed consent
- Were hospitalized or receiving emergency medical care

Study Design

A descriptive cross-sectional study design was employed. This design allowed recruitment of a representative sample of T2DM patients to assess nutritional status, dietary practices, and glycemic control.

Sampling Procedure

A purposive sampling technique was used to select 120 physician-diagnosed T2DM patients (54 males and 66 females) attending the diabetes clinic during the study period. Eligible individuals were approached, the purpose of the study was explained, and written informed consent was obtained. Ethical approval was granted by the Research and Ethics Committee of FTH Owerri.

Participants were aged 20–70 years and had no severe diabetic complications at the time of recruitment.

Data Collection Procedures

Questionnaire Administration

A structured and validated questionnaire, developed by the Department of Nutrition and Dietetics, Imo State University, was used to collect data on:

- Socio-demographic characteristics
- Dietary habits and feeding patterns
- Nutritional knowledge
- Health and disease history

Anthropometric Measurements

Anthropometric assessments followed standard procedures

Height Measurement

Height was measured using a stadiometer with participants standing erect, barefoot, heels together, and arms hanging by the sides. The headpiece was lowered to rest on the crown of the head, and height was recorded to the nearest 0.05 cm.

Weight Measurement

Body weight was measured using a calibrated bathroom weighing scale. Participants wore light clothing without shoes. Readings were taken to the nearest 0.5 kg.

Body Mass Index (BMI)

BMI was calculated using:

BMI=weight (kg)height (m)2BMI = \frac{\text{weight (kg)}}{\text{height (m)}^2}BMI=height (m)2weight (kg)

Waist Circumference

Waist circumference was measured at the midpoint between the lower rib and iliac crest, recorded to the nearest 0.1 cm. WHO cutoff values:

Biochemical Assessments

Blood Sample Collection

Following an overnight fast, 5 mL of venous blood was collected from each participant using sterile procedures. Samples were placed in labeled tubes, stored in insulated ice packs, and transported to the laboratory. Serum and plasma were obtained via centrifugation and stored at –80°C until analysis.

Serum Cholesterol Determination

Total cholesterol was measured using the enzymatic CHOD-PAP method.

Serum Ferritin Determination

Serum ferritin was analyzed using an enzyme-linked immunosorbent assay (ELISA).

Fasting Blood Glucose Measurement

Fasting blood glucose (FBG) was measured using a FineTest glucometer (Infopia Co. Ltd, Korea). After cleaning the fingertip with methylated spirit, capillary blood was obtained using a sterile lancet, and measurements were recorded in mmol/L.

Blood Pressure Measurement

Blood pressure was measured using a mercury sphygmomanometer and stethoscope following standardized procedures. Systolic and diastolic pressures were recorded based on Korotkoff sounds.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0. Descriptive statistics were presented as means, frequencies, and percentages.An independent samples t-test was used to compare BMI across sex. Pearson's correlation analysis assessed associations between dietary practices, age, socioeconomic factors, and glycemic indicators. Statistical significance was set at $p < 0.05$.

RESULT

Demographic and Socio-Economic Characteristics of the Respondent.

A total of 120 subjects were used.

Table 4.1 shows the demographics and socio-economic characteristics of the Respondents. More than half (55.0%) of the respondents were female and 45.0% were male. More than one third (35.0%) of the respondents were aged 35 - 44 years, 56.7% were married, 36.7% were civil servants, 56.7% had post-secondary school, 41.7% earned less than N7,500 as a monthly allowance, and 71.7% of the households had 4-7 persons per household.

Table 4.1: Demographics and Socio-Economic Characteristics of the Respondents

Variables	Frequency	Percent
Sex		
Male	54	45.0
Female	66	55.0
Total	120	100.0
Age (Year)		
20 - 34 Yrs	28	23.3
35 - 44 Yrs	42	21.7
45 - 54 Yrs	24	20.0
55 - 64 Yrs	26	35.0
Total	120	100.0
Marital Status		
Single	52	43.3
Married	68	56.7
Total	120	100.0
Occupation		
Artisan	4	3.3
Student	24	20.0
Unemployed	28	21.7

Apprentice	6	5.0
Trader	16	13.3
Civil Servant	44	36.7
Total	120	100.0
Education Qualification		
No Formal Education	2	1.7
Primary School	2	1.7
Secondary School	48	40.0
Post Secondary School	68	56.7
Total	120	100.0
Monthly Allowance		
Less Than N7,500	50	41.7
N7,500-N10,000	16	13.3
N11,000-N25,000	24	20.0
N26,000-N50,000	10	8.3
Above N50,000	20	16.7
Total	120	100.0
Household Size		
1-3	18	15.0
4-7	86	71.7
Above 7	16	13.3
Total	120	100.0

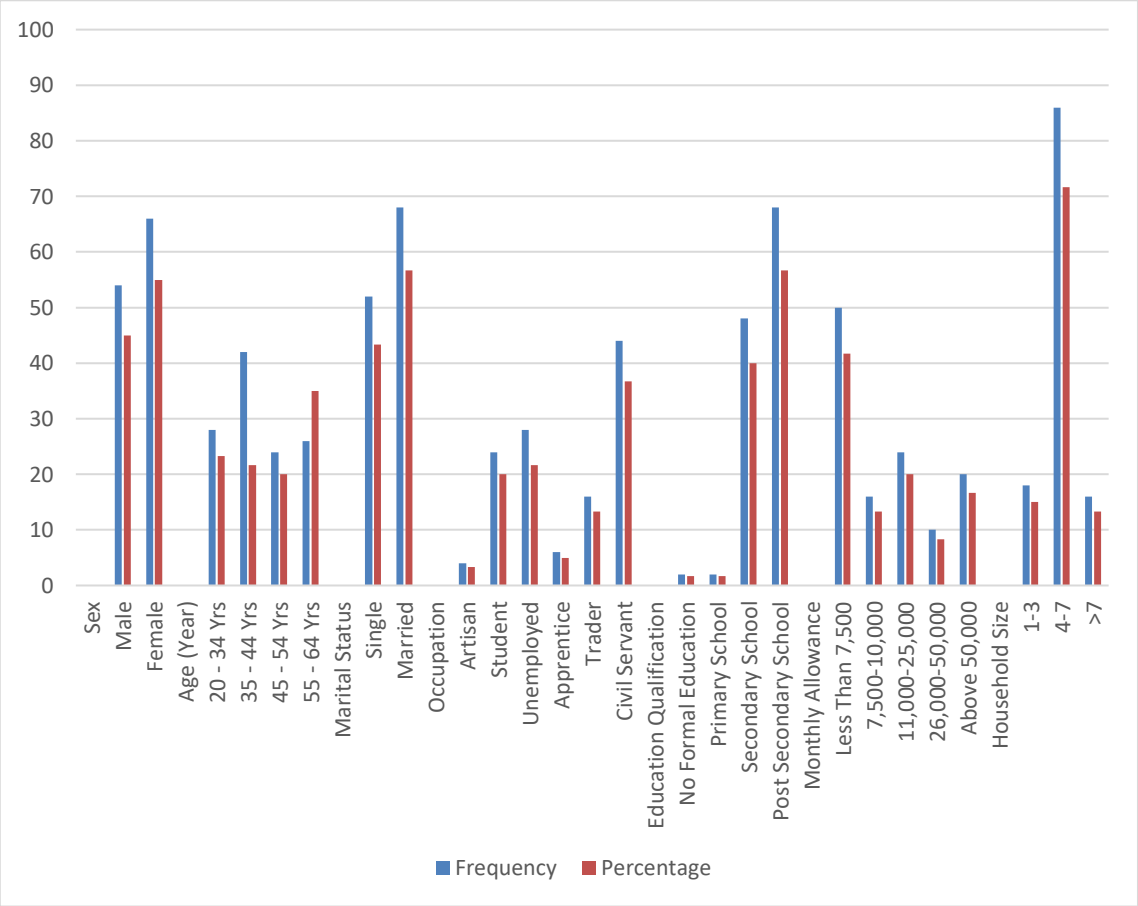

Fig 4.1: Demographics and Socio-Economic Characteristics of the Respondents

Dietary Habits and Patterns of the Respondent

Table 4.2: Shows the dietary habits and patterns of the respondents. More than one quarter (30%) and 1.7% of the respondents ate twice and once respectively per day, 35% of the subjects foods were prepared by house help in the household, 48.3% of the respondents takes snacks, 40% skips meal, 30.0% has no appetite for food, and more than half (51.7%) of the respondents ate with family and friends daily.

Table 4.2: Dietary habits and patterns of the respondents

Variables	Frequency	Percent
Number of times you eat food per day		
Once	2	1.7
Twice	36	30.0
3 times	82	68.3
Total	120	100.0
Who prepare the food		
House-help	42	35.0
Mother	38	31.7
Children	38	31.7
Yourself	2	1.7
Total	120	100.0
Intake of snacks		
Yes	58	48.3
No	62	51.7
Total	120	100.0
Skip of meal		
Yes	48	40.0
No	72	60.0
Total	120	100.0
Appetite for food		
Yes	84	70.0
No	36	30.0
Total	120	100.0
Frequency at which one eat with family and friends		
Daily	62	51.7
Once/twice a week	34	28.3
Once a month	24	20.0
Total	120	100.0

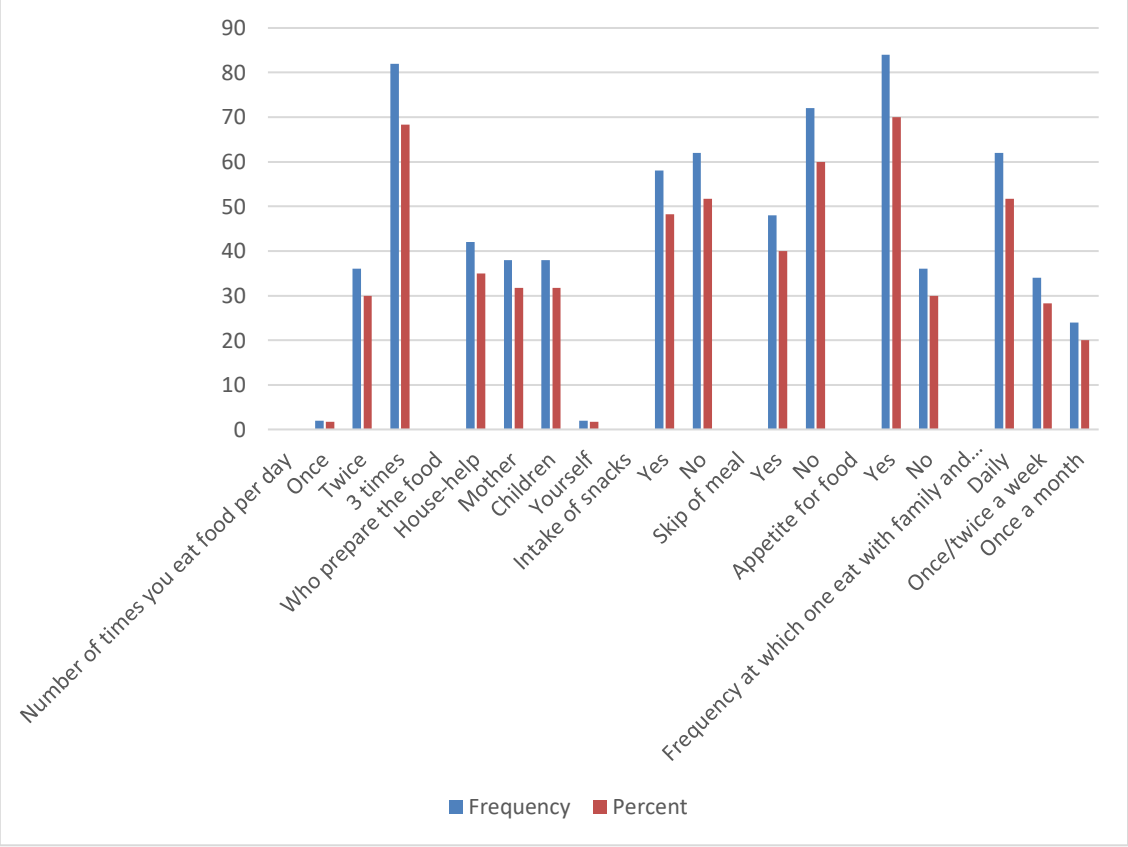

Fig 4.2: Dietary habits and patterns of the respondents

Table 4.3: Shows the intake of tobacco or alcohol, vitamins and exercise of the respondents. Less than one quarter (23.3%) of the respondents takes tobacco or alcohol, 85.0% takes vitamins, 39.2% takes vitamin C, and 86.7% of the respondents engaged in exercise.

Table 4.3: Intake of Tobacco or Alcohol, Vitamins and Exercise of the Respondents.

Variables	Frequency	Percent
Intake of Tobacco or Alcohol		
Yes	28	23.3
No	92	76.7
Total	120	100.0
Intake of Vitamins		
Yes	102	85.0
No	18	15.0
Total	120	100.0
Which of the Vitamins Taken		
Vitamin A	14	13.7
Vitamin B	3	5.9
Vitamin C	40	39.2
Vitamin D	12	11.8
Vitamin E	6	5.9
Multivitamins	12	11.8
Fruits	12	11.8
Total	120	100.0
Do You Exercise		
Yes	104	86.7
No	16	13.3
Total	120	100.0

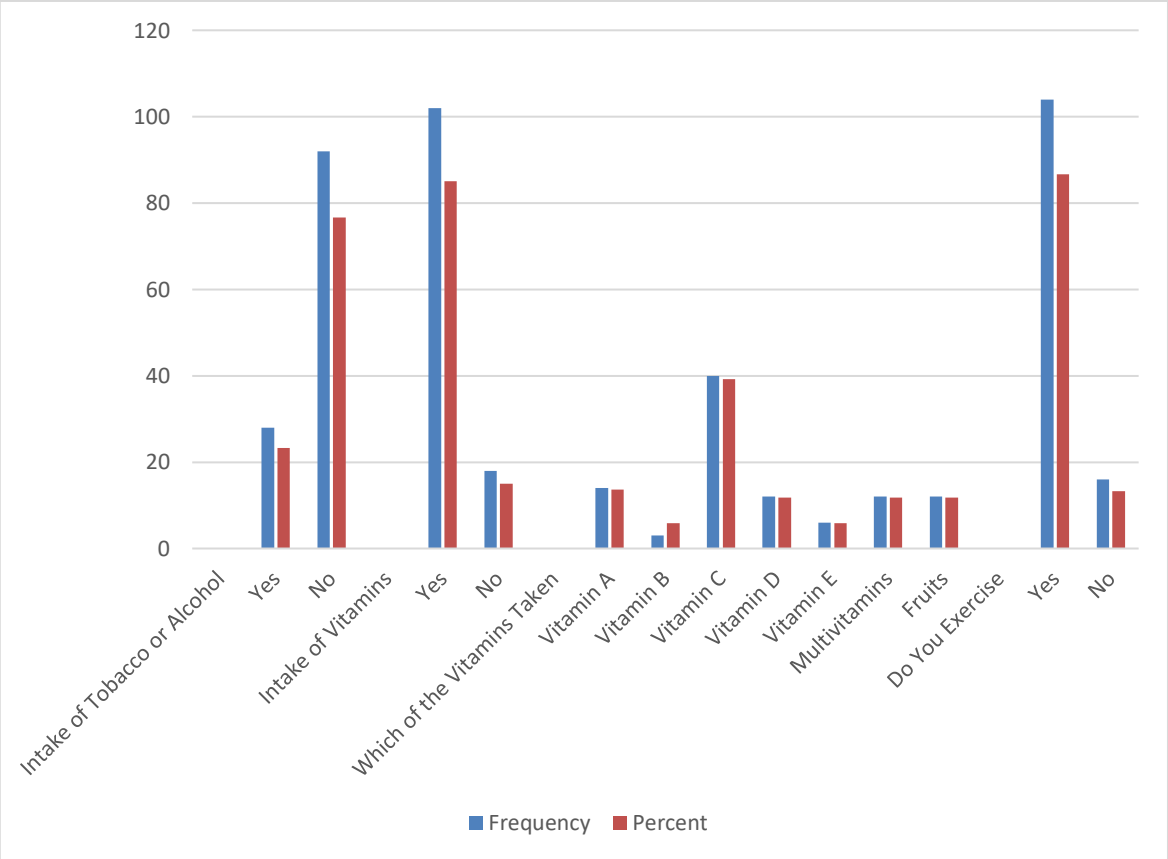

Table 4.3: Intake of Tobacco or Alcohol, Vitamins and Exercise of the Respondents.

Health Status of the Respondent

Table 4.4 shows the health status of the Respondents. About (18.3%) of the respondents had been sick in the last 2 weeks, 43.3% of the respondents had diabetes mellitus, and with 18.3% of them suffered from heart diseases, 71.7% had knowledge of diabetes mellitus, 35% had family history of diabetes, 21.7% had 1-2 persons in the family suffering from diabetes. Most (63.3%) of the respondents use both diet and insulin to control diabetes, while 36.7% use diet alone, and 16.7% were admitted to hospital in the last two weeks.

Table 4.4: Health Status of the Respondents

Variables	Frequency	Percent
Sick in the last 2 weeks		
Yes	22	18.3
No	98	81.7
Total	120	100.0
Ailments suffered in the past		
Diabetes mellitus	52	43.3
Heart disease	22	18.3
Hypertension	2	1.7
No response	44	36.7
Total	120	100.0
Idea of diabetes		
Yes	86	71.7
No	34	28.3
Total	120	100.0
Family history of diabetes		
Yes	42	35.0
No	78	65.0
Total	120	100.0
Number of people suffering from diabetes in your family		
1-2	26	21.7
3-4	4	3.3
4-5	14	11.7
None of the above	76	63.3
Total	120	100.0
Control of diabetes		
Diet alone	36	36.7
Diet and insulin	62	51.7
Diet and OHD	22	11.6
Total	120	100.0
Admitted to Hospital in the Last Two Weeks		
Yes	20	16.7
No	100	83.3
Total	120	100.0

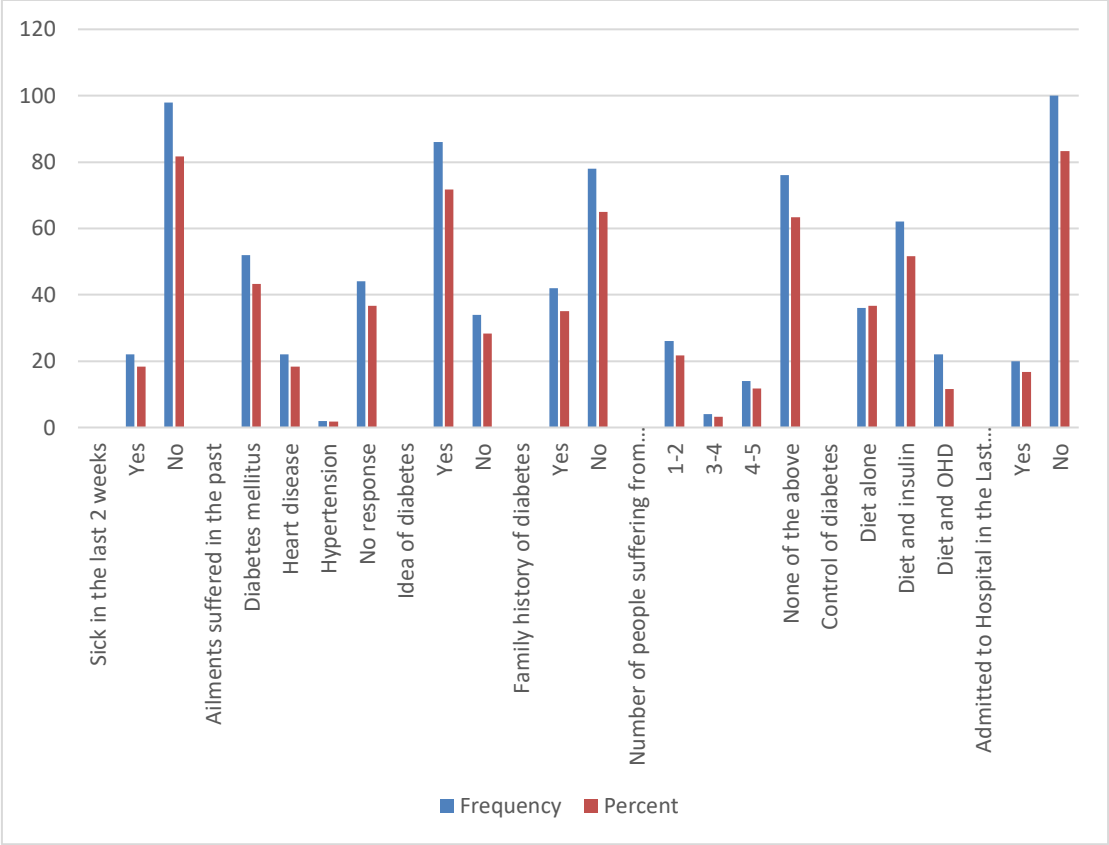

Fig 4.4: Health Status of the Respondents

Food consumption pattern of the respondent

Table 4.5 shows the food consumption frequency of the respondents. More than half (53.3%), 41.7%, 40%, 30% and 26.7% of the respondents consumes vegetables: such as garden egg, water leaf, carrots, bitter leaf, and cucumber respectively occasionally, 33.3% and 28.3% consumes pumpkin leaf and okro respectively four times or more per week. About 31.7% consumes orange daily, 45%, 36.7% and 33.3% consumes pineapple, paw-paw and water melon respectively occasionally, 45% and 28.3% consumes apple and guava respectively less than 4 times per week, while 68.3% never consumes mango. Less than half (33.3%) and 31.7% consumes bread and rice respectively daily, 43.3% consumes maize occasionally, 85% never consume millet. Approximately (31.7%) consumes beans less than four times per week, 38.3% consumes soya beans occasionally, 43.3% consumes groundnut four times and more per week, and 31.7% consumes bambara nut occasionally, 38.3% consumes cassava occasionally, 31.7% consumes garri less than 4 times per week. Less than half (43.3%), 40%, 40% and 30% consumes cocoyam, unripe plantain, irish potato and yam respectively occasionally, 26.7% consumes egg daily, 30% consumes meat four times and more per week, 28.3% each consumes fish daily and four times and more, 51.7% and 38.3% consumes ice cream and yoghurt respectively, 31.7% consumes milk four times and more, 26.7% takes coffee less than 4 times per week, 55% takes tea occasionally, 40% takes snacks daily, 46.7% and 43.3% consumes biscuit and meat pie occasionally with 38.3% consumption of crackers less than 4 times per week.

Table 4.5: Food Consumption Frequency of the Respondents

Variables	Daily High	4 – 6 x Per Week Moderate	< 4 x Per Week Low	Occasionally Very Low	Never	Total
Water Leaf	10 (8.3)	6 (10.0)	15 (25.0)	25 (41.7)	9 (15.0)	120 (100)
Bitter Leaf	2 (1.7)	13 (21.7)	18 (30.0)	18 (30.0)	10 (16.7)	120 (100)
Pumpkin Leaf	26 (21.7)	20 (33.3)	9 (15.0)	13 (21.7)	5 (8.3)	120 (100)
Okro	26 (21.7)	17 (28.3)	10 (16.7)	13 (21.7)	7 (11.7)	120 (100)
Cucumber	14 (11.7)	13 (21.7)	13 (21.7)	16 (26.7)	11 (18.3)	120 (100)
Garden Egg	16 (13.3)	6 (10.0)	7 (11.7)	32 (53.3)	7 (11.7)	120 (100)

Carrots	16 (13.3)	6 (10.0)	11 (18.3)	24 (40.0)	11 (18.3)	120 (100)
Cabbage	8 (6.7)	13 (21.7)	14 (23.3)	14 (23.3)	15 (25.0)	120 (100)
Mango	0 (0.0)	3 (5.0)	0 (0.0)	16 (26.7)	41 (68.3)	120 (100)
Paw-Paw	22 (18.3)	2 (3.3)	10 (16.7)	22 (36.7)	15 (25.0)	120 (100)
Orange	38 (31.7)	11 (18.3)	12 (20.0)	9 (15.0)	9 (15.0)	120 (100)
Guava	26 (21.7)	15 (25.0)	17 (28.3)	8 (13.3)	7 (11.7)	120 (100)
Pineapple	10 (8.3)	15 (25.0)	6 (10.0)	27 (45.0)	7 (11.7)	120 (100)
Apple	2 (1.7)	9 (15.0)	27 (45.0)	16 (26.7)	7 (11.7)	120 (100)
Water Melon	34 (28.3)	3 (5.0)	16 (26.7)	20 (33.3)	4 (6.7)	120 (100)
Maize	2 (1.7)	5 (8.3)	9 (15.0)	31 (51.7)	14 (23.3)	120 (100)
Rice	38 (31.7)	11 (18.3)	16 (26.7)	8 (13.3)	6 (10.0)	120 (100)
Millet	10 (8.3)	11 (18.3)	7 (11.7)	26 (43.3)	11 (18.3)	120 (100)
Bread	40 (33.3)	16 (26.7)	7 (11.7)	8 (13.3)	51 (85.0)	120 (100)
Beans	10 (8.3)	15 (25.0)	19 (31.7)	12 (20.0)	9 (15.0)	120 (100)
Soyabeans	14 (11.7)	6 (10.0)	17 (28.3)	23 (38.3)	7 (11.7)	120 (100)
Ground Nut	18 (15.0)	26 (43.3)	9 (15.0)	7 (11.7)	9 (15.0)	120 (100)
Bambara Nut	14 (11.7)	10 (16.7)	13 (21.7)	19 (31.7)	11 (18.3)	120 (100)
Cassava	6 (5.0)	17 (28.3)	3 (5.0)	23 (38.3)	14 (23.3)	120 (100)
Garri	20 (16.7)	19 (31.7)	19 (31.7)	5 (8.3)	7 (11.7)	120 (100)
Yam	6 (5.0)	15 (25.0)	14 (23.3)	18 (30.0)	10 (16.7)	120 (100)
Potato (Irish)	16 (13.3)	10 (16.7)	10 (16.7)	24 (40.0)	8 (13.3)	120 (100)
Cocoyam	6 (5.0)	17 (28.3)	3 (5.0)	26 (43.3)	11 (18.3)	120 (100)
Unripe Plantain	14 (11.7)	8 (13.3)	14 (23.3)	24 (40.0)	7 (11.7)	120 (100)
Egg	32 (26.7)	15 (25.0)	4 (6.7)	15 (25.0)	10 (16.7)	120 (100)
Meat	20 (16.7)	18 (30.0)	11 (18.3)	12 (20.0)	9 (15.0)	120 (100)
Fish	34 (28.3)	17 (28.3)	14 (23.3)	7 (11.7)	5 (8.3)	120 (100)
Ice Cream	22 (18.3)	3 (5.0)	11 (18.3)	31 (51.7)	4 (6.7)	120 (100)
Yoghurt	18 (15.0)	4 (6.7)	15 (25.0)	23 (38.3)	9 (15.0)	120 (100)
Milk	22 (18.3)	19 (31.7)	10 (16.7)	17 (28.3)	3 (5.0)	120 (100)
Coffee	18 (15.0)	13 (21.7)	16 (26.7)	12 (20.0)	10 (16.7)	120 (100)
Tea	14 (11.7)	1 (1.7)	1 (1.7)	33 (55.0)	18 (30.0)	120 (100)
Snacks	48 (40.0)	15 (25.0)	9 (15.0)	6 (10.0)	6 (10.0)	120 (100)
Biscuit	12 (10.0)	5 (8.3)	14 (23.3)	28 (46.7)	7 (11.7)	120 (100)
Crackers	22 (18.3)	11 (18.3)	23 (38.3)	6 (10.0)	9 (15.0)	120 (100)
Meat Pie	2 (1.7)	11 (18.3)	13 (21.7)	26 (43.3)	9 (15.0)	120 (100)

Table 4.5b: Food Consumption Frequency of the Respondents

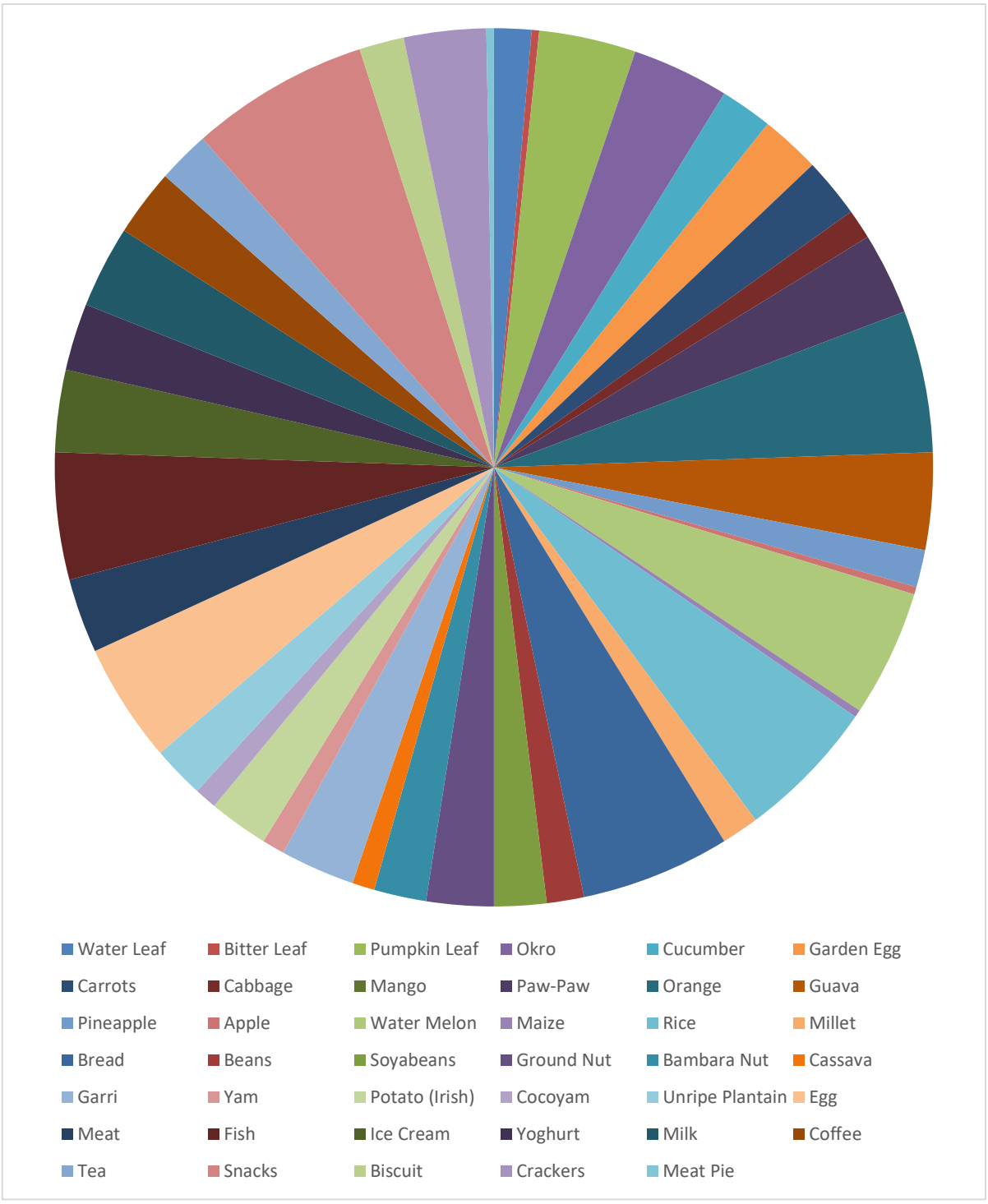

Fig 4.5: Food Consumption Frequency of the Respondents

Body mass index of the respondents

Table 4.6 shows distribution of body mass index of respondents. About (41.7%), 21.7%, 8.3% and 3.3% of the respondents were overweight, obese with grade I and II, morbid obese and underweight respectively.

Table 4.6: Distribution of Body Mass Index of Respondents

Variables	Frequency	Percent
Body Mass Index Classification		
Underweight (Less than 18.5)	4	3.3
Normal (18.5 and Less than 25)	30	25.0
Overweight (25 and less than 30)	50	41.7
Obesity Grade I & II (30 and less than 40)	26	21.7
Morbid Obesity or grade III obesity (40 and above)	10	8.3
Total	120	100.0

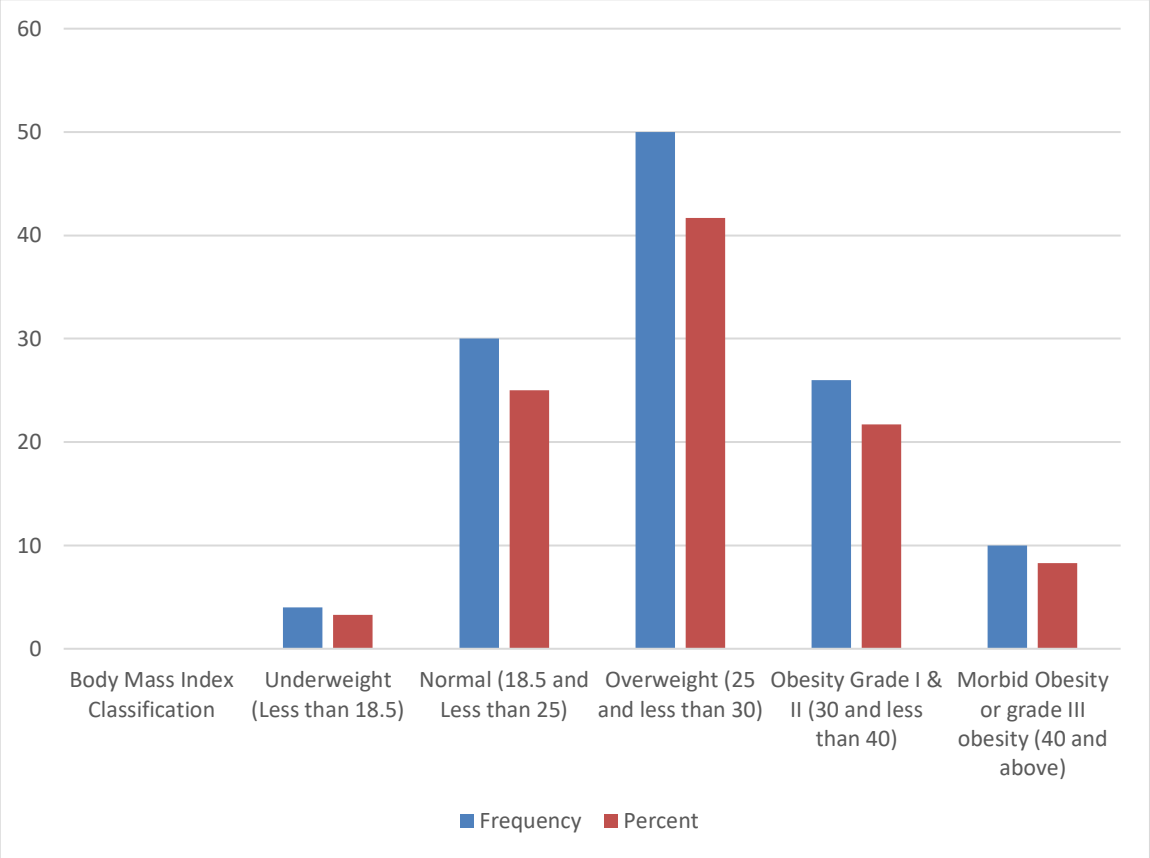

Fig 4.6: Distribution of Body Mass Index of Respondents

Biochemical Test of respondents

Table 4.7 shows the biochemical test and vital signs of respondents. Most (80.0%) of the respondents' fasting blood sugar test indicated diabetes, with few (5%) with normal fasting blood sugar, 30% had depleted iron store (serum ferritin), 35% had high cholesterol, 21.7%, 5.0%, and 11.7% had mild, moderate, and severe hypertension with systolic blood pressure respectively, 48%, 10% and 1.7% had mild, moderate, and severe hypertension with diastolic blood pressure respectively.

Table 4.7: Biochemical Test of Respondents

Variables	Frequency	Percent
Fasting Blood Sugar		
Normal (70 - 99 mg/dl)	6	5.0
Pre-diabetic (100 - 125 mg/dl)	18	15.0
Diabetic (125 mg/dl and above)	96	80.0
Total	120	100.0
Serum Ferritin (mg/dl)		
Depleted Iron Store (less than 15mg/dl)	36	30.0
Normal Iron Store (15mg/dl and above)	84	70.0

Total	120	100.0
Cholesterol (mg/dl)		
Normal (<200mg/dl)	40	33.3
Boarderline (200 - 239mg/dl)	38	31.7
High (>240mg/dl)	42	35.0
Total	120	100.0
Systolic Blood Pressure (mmHg)		
Normal (<120mmHg)	26	21.7
Normal Hypertension (120-139mmHg)	58	40.0
Mild Hypertension (140-159mmHg)	26	21.7
Moderate Hypertension (160-179mmHg)	6	5.0
Severe Hypertension (180mmHg and above)	14	11.7
Total	120	100.0
Diastolic Blood Pressure (mmHg)		
Normal (<80mmHg)	22	18.3
Normal Blood Pressure (80-89mmHg)	26	21.7
Mild Blood Pressure (90-99mmHg)	58	48.3
Moderate Hypertension (100-109mmHg)	12	10.0
Severe Hypertension (110mmHg and above)	2	1.7
Total	120	100.0

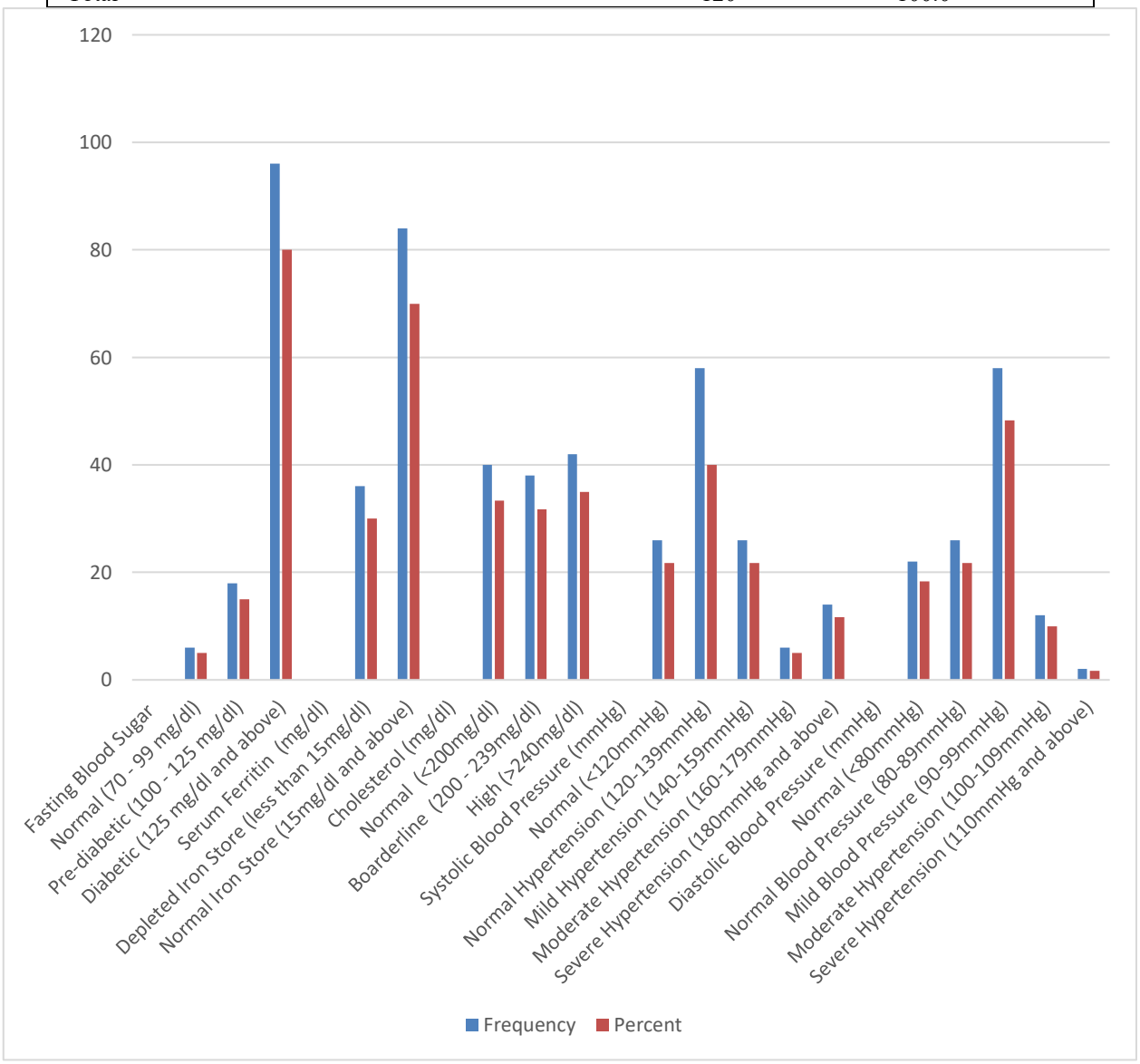

Fig 4.7: Biochemical Test of Respondents

Mean anthropometric and Biochemical Measurement of the respondents

Table 4.8 shows the mean anthropometric and biochemical measurement of the respondents by gender. The mean weight and BMI of the male respondents are significantly (P<0.05) higher than that of the female counterparts. The mean height of the both the male and female respondents was the same. There is no significant (P>0.05) difference in height of the male and female respondents. Female respondents have an elevated Fasting blood sugar and systolic blood pressure compared to the male counterparts. While the Diastolic blood pressure, serum ferritin and cholesterol of the male respondents is higher than that of female respondents, though there were no significant (P>0.05) difference in height, Fasting blood sugar, Systolic blood pressure, Diastolic blood pressure, serum ferritin and cholesterol between male and female respondents. The BMI of both male and female respondents indicated obesity and overweight respectively, Fasting blood sugar value indicated a hyperglycemia, and systolic blood pressure is raised indicating prevalence of high blood pressure in both male and female respondents.

Table 4.8: Mean Anthropometric and Biochemical Measurement of the Respondents

Variables	Male			Female			t-value	p-value
	n	x	sd	n	x	sd		
Weight (kg)	54	78.3	16.7	66	64.9	21.0	2.705	0.009
Height (m)	54	1.6	0.1	66	1.6	0.1	-0.144	0.886
Body Mass Index	54	30.0	6.2	66	26.8	5.7	2.091	0.041
Fasting Blood Sugar	54	169.1	57.3	66	199.2	75.7	-1.702	0.094
Systolic Blood Pressure	54	132.2	17.8	66	137.0	26.5	-0.794	0.430
Diastolic Blood Pressure	54	87.5	8.8	66	84.4	9.5	1.283	0.205
Serum Ferritin	54	241.1	114.1	66	215.3	89.9	0.977	0.333
Cholesterol	54	208.9	81.0	66	205.5	74.4	0.171	0.865

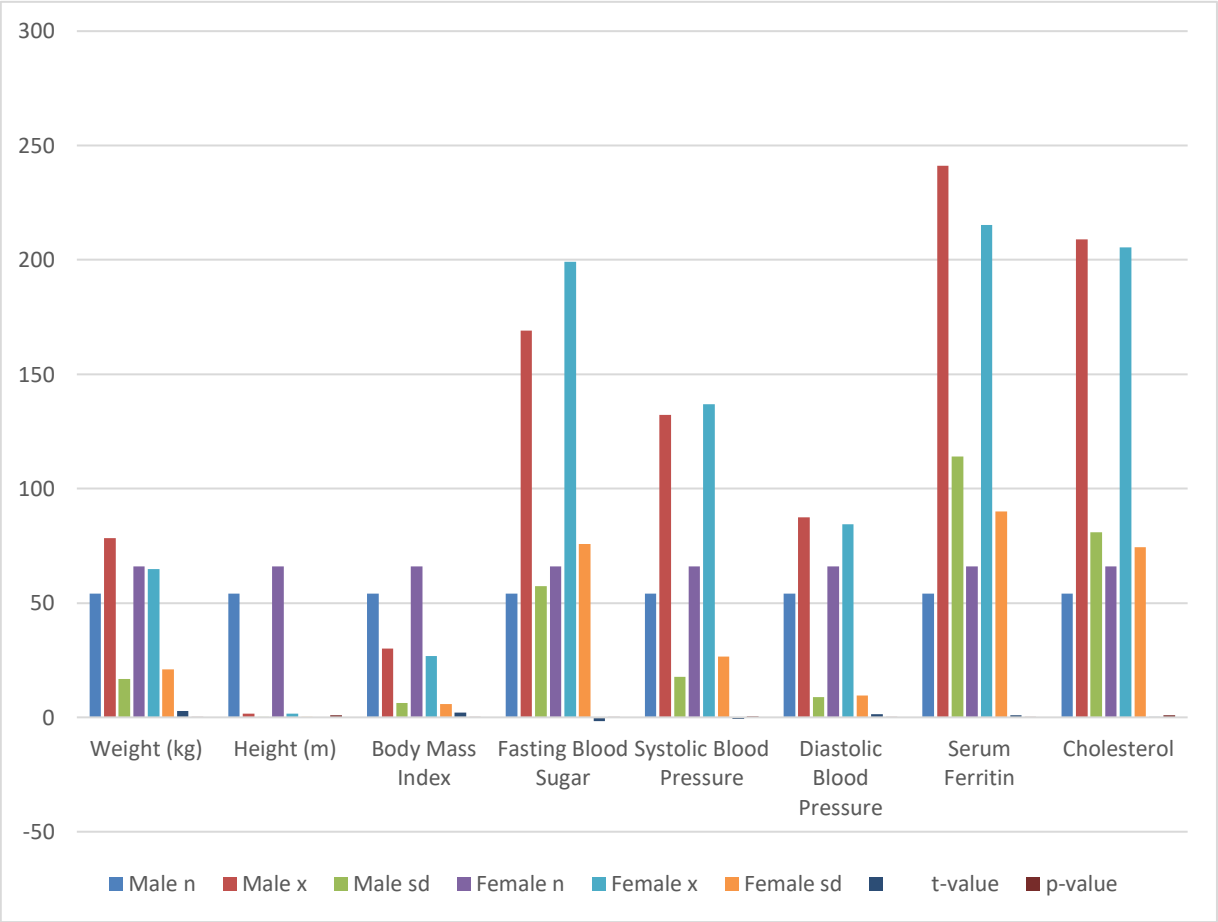

Fig 4.8: Mean Anthropometric and Biochemical Measurement of the Respondents

Discussion

The results of this study show that socioeconomic and demographic factors had a significant impact on the prevalence and pattern of diabetes mellitus among the participants. Although prior research frequently finds a higher frequency among males, a greater percentage of female respondents had diabetes at presentation [12]. Hormonal impacts, healthcare-seeking behaviour, or gender-specific lifestyle choices could all be contributing factors to the higher burden among females in this study.

Another important factor was age; the highest prevalence of diabetes mellitus was seen in responders between the ages of 45 and 64. This is consistent with the research by [13], which found that the prevalence of diabetes increased with age. Additionally, the prevalence was higher among low-income earners, civil servants, married people, and literate respondents. This pattern is probably influenced by rapid urbanisation and changes in lifestyle, which include a greater intake of refined foods, high-calorie diets, less consumption of fruits and vegetables, and sedentary living. These changes also increase the risk of chronic diseases like diabetes, hypertension, obesity, and cancer that are linked to diet.

In general, the respondents had poor dietary habits. A significant percentage said they were losing their appetite, eating snacks a lot, and skipping meals. Poor glycaemic outcomes could have been caused by compensatory consumption of nutrient-poor, high-energy snacks as a result of missing meals. This may help to explain why the study population had such high rates of iron-deficiency anaemia, hypercholesterolaemia, hypertension, and poor glycaemic control. Furthermore, the prevalence of these anomalies was probably increased because the subjects were recruited based on verified diabetes [14].

Meal preparation was frequently handled by housekeepers, spouses, or kids. This suggests that the food preparer's nutritional expertise may have a significant impact on the quality of the cuisine. Over 50% of those surveyed said they ate meals with friends or family. In addition to promoting social connection and lowering isolation, especially among the elderly, eating meals together may also increase appetite and food consumption.

This study's high incidence of overweight and obesity is in line with worldwide trends and is probably caused by a lack of physical exercise, a high consumption of processed and high-energy meals, and a poor intake of fruits and vegetables. Overweight and obesity are among the world's most urgent public health issues, according to the WHO. Three of the four diabetes participants in this study were obese or overweight. This result is consistent with [15], who noted the global increase in obesity and stated that around one in two adults in the US is overweight.

Reduced physical activity, high calorie intake, stress, anxiety, and urbanisation are some of the variables associated with obesity. Additionally, compared to men, women were more likely to be overweight or obese, which may be related to hormonal predispositions that put women at higher risk of gaining weight [16].

Two out of five people with diabetes reported skipping meals, indicating that this behaviour was widespread. Meal skipping frequently leads to overindulgence in calorie-dense meals later in the day. This result is consistent with [17], who pointed out that people frequently skip breakfast due to early departures for work or trading, which puts them at risk for vitamin deficiencies. The increased snack consumption may be linked to polyphagia and polydipsia, two frequent signs of type 2 diabetes. More than two-thirds of respondents reported having a high appetite, which is indicative of both cellular glucose depletion and urine glucose waste.

For the majority of respondents, fasting blood glucose levels were persistently higher than acceptable reference values, suggesting widespread inadequate glycaemic management. Cardiovascular disease, nephropathy, neuropathy, and other microvascular and macrovascular problems are all made more likely by persistent hyperglycemia. Glycaemic control was not ideal even though 85% of respondents used food and insulin for treatment.

With 38.4% of respondents having increased systolic blood pressure, hypertension was prevalent. Notably, skipping meals and eating snacks had a negative correlation with systolic blood pressure. This discovery defies the expected trend of diet-related blood pressure increases and calls for additional research. This observation may be explained by other factors, such as measurement intervals, medication use, and meal timing [18].

A substantial prevalence of iron-deficiency risk among diabetics is shown by the fact that 30% of respondents had reduced serum iron reserves. In diabetes individuals, iron deficiency may aggravate fatigue, lower work capacity, and further decrease immunological function [19].

Despite the lack of specific lipid levels in this passage, conversations suggest the existence of dyslipidaemia, which is linked to unhealthy eating habits including consuming too many refined meals and not enough vegetables. A number of respondents reported recent illness or hospitalisation, though these episodes may not always be directly related to diabetes but rather to complications or co-morbid conditions. Dyslipidaemia is a well-established metabolic abnormality in diabetes that raises the risk of cardiovascular disease [20]. A sample of respondents also reported drinking alcohol and smoking, two habits that are independently linked to poor glycaemic control, obesity, and hypertension.

The high vitamin intake and frequent exercise indicated by many respondents, despite the presence of unhealthy lifestyle choices, may be the result of health education messages that are regularly given to diabetic patients. Frequent exercise is still a crucial tactic for reducing obesity and enhancing glucose metabolism [21].

The respondents' dietary habits were typified by a high intake of starchy staples, processed foods, and snacks and a low intake of fruits and vegetables. Due to their accessibility and cost, pumpkin and okro were consumed in moderation. Chronic poor glycaemic control may be caused by a lack of consumption of root and tuber crops and sporadic ingestion of foods with a low glycaemic index, such as cocoyam, Irish potatoes, and unripe plantains [22].

Grain meals like bread and rice were staples, and animal protein sources like fish and eggs were frequently consumed. Nonetheless, the general trend indicates a shift in diet brought about by urbanisation, financial limitations, a lack of information about nutrition, and individual preferences [23].

The significant prevalence of overweight, obesity, diabetes, hypertension, anaemia, and hypercholesterolaemia seen in the study population was probably caused in part by this poor dietary profile. In order to address food insecurity, dietary transition, and the twin burden of malnutrition, the Standing Committee on Nutrition's global appeal to include indigenous foods in dietary regimens is still pertinent.

Conclusion

Among the diabetic responders in this study, poor glycaemic control, hypertension, iron-deficiency anaemia, hypercholesterolaemia, overweight, and obesity were shown to be highly prevalent. Poor eating habits, such as a lack of fruits and vegetables, missing meals frequently, and relying too much on high-energy snacks, were strongly linked to these problems. These health issues were made worse by lifestyle choices like smoking, drinking, and not exercising. The results highlight the critical necessity for regular blood glucose self-monitoring, early metabolic abnormality identification, and thorough nutrition education. To improve diabetes control and avoid complications, nutritional advice and lifestyle change measures must be strengthened. Healthcare professionals who play crucial roles in the multidisciplinary management of diabetes mellitus, such as nutritionists, dietitians, and endocrinologists, will find these findings to be practically significant.

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