

*Original Research Article***Comparative analysis of diabetic patients
for their nutritional status****Vinod Jat¹ & Vishakha Singh²***College of Community & Applied Sciences,**Maharana Pratap University of Agriculture & Technology, Udaipur***Abstract**

Diabetes mellitus is a major concern today all over the world due to major health consequences. It has increased to 150% since 2010. Major contributory factors are ageing population, sedentary lifestyle and weight gain. Besides this, timely detection of the problem is not done.

In the present study, a collective data of 30 patients was taken and their anthropometry, biochemical data, clinical signs and symptoms and dietary recall was used to assess their nutritional status.

Diabetes was found to be associated with other co-morbidities also such as hypertension, anaemia, chronic kidney disease, and thrombocytopenia.

Besides delay in treatment outcome of other co-morbid conditions, Diabetes can also deteriorate the nutritional status of a person, their dietary intake and overall quality of life.

Keywords

Diabetes mellitus, hypoglycemia, hyperglycemia, ketosis, nutritional status, complex carbohydrates, high fibre

Introduction

Malnutrition covers a wide spectrum of health problems including both under-nutrition and over-nutrition. *Diabetes mellitus* is one of the most common disorders of over-nutrition. Management of hyperglycemia is a hallmark treatment in modern clinical approach. Diabetes is widely prevalent globally affecting over 382 million people of different ethnic groups. India is expected to have 100 million diabetic patients till 2030^[9]. Main cause of

this ever spreading magnitude is it remains undiagnosed for a long duration of life span and when diagnosed in late 60s, it has done its complications^[8]. This magnitude of the problem is partly due to genes and environment, but major risk factors are sedentary lifestyle and unhealthy eating habits due to urbanization^{[1][5]}.

Nutrition in *Diabetes Mellitus*

Diabetes Mellitus is characterized by high blood sugar levels as our cells are not able to utilize carbohydrates due to lack or efficient utilisation of pancreatic hormone insulin. The uncontrolled diabetes for long duration may bring irreversible changes in the blood vessels that in turn, may damage eyes, kidneys and nervous system^[2].

Types of Diabetes

The terms “insulin-dependent *diabetes mellitus* (IDDM)” and “non-insulin dependent *diabetes mellitus* (NIDDM)” were used to classify people with diabetes merely based on clinical characteristics, specific treatments and not based on aetiology or pathogenesis. Therefore, the American Diabetes Association (ADA) classification, further endorsed by World Health Organization (WHO), has recommended the following aetiological classification of *diabetes mellitus*:

Type 1 diabetes (absolute insulin deficiency)

- Immune-mediated diabetes
- Idiopathic diabetes

Type 2 diabetes (predominantly insulin resistance with relative insulin deficiency)

Other specific types of diabetes:

Gestational *diabetes mellitus* (GDM)

Type 1 diabetes

It was previously known as insulin-dependent *diabetes mellitus* (IDDM), where there is absolute insulin deficiency due to destruction of the pancreatic beta cells. It is due to cellular mediated autoimmune response. Majority of patients are undernourished in this. Insulin is mandatory for survival in these patients otherwise in uncontrolled condition, diabetic ketoacidosis occurs^[6]. Its onset is abrupt; therefore diagnosis occurs only when a patient develops ketoacidosis in most of the cases of T1DM.

Type 2 diabetes

It is known as adult onset or non-insulin dependent *diabetes mellitus* (NIDDM). In this type of diabetes, apart from defects in insulin secretion, insulin produced is not effectively used by the body due to a condition called insulin resistance. Ketoacidosis is not an issue in NIDDM as insulin levels are usually normal but this insulin is not utilized properly in the body, therefore hyperglycemia is a common sign. Diet, exercise and oral hypoglycaemic drugs are key components to manage Type 2 diabetes. Overweight and obese people or people with abdominal obesity are more prone for Type 2 diabetes.

Other specific types of diabetes:

Gestational Diabetes Mellitus

Carbohydrate intolerance may be seen for the first time during pregnancy as well. It may be due to impaired insulin action that results in shoot up blood sugar levels. This type of diabetes becomes normal after delivery.

Uncontrolled diabetes during the first trimester increases the risk of congenital malformation of foetus and abortions. Screening for gestational diabetes should be done at least by 12-16 weeks as it avoids risk to mother and foetus. It calls for very strict diabetes control through diet modifications (by adhering to staggered, small portion meals) and insulin treatment, if required, to prevent complications associated with diabetes during pregnancy.

Diagnosis

The general symptoms such as increased thirst (polydipsia), increased frequency of micturition (polyuria), increased appetite (polyphagia), slow or non-healing of ulcers, easy fatigability, loss of weight and recurrent infections suggest diabetes.

Diabetes can be diagnosed by following investigations^[7]:

- Random plasma glucose concentration 200 mg/dL;
- Fasting plasma glucose 126 mg/dL;
- 2-hr plasma glucose 200 mg/dL during a 75 g oral glucose tolerance test (OGTT).

Impaired glucose regulation

Normally, fasting & post prandial/ 2 hours post glucose load blood sugar levels should be <110 mg/dL and <140 mg/dL respectively. In an intermediate group of subjects, due to impaired glucose regulation, plasma levels in fasting or 2-hr post-glucose load are higher than normal, although it can not be diagnosed as diabetes. Persons with impaired glucose tolerance may exhibit glucose levels of ≥ 140 mg/dL but <200 mg/dL after oral glucose tolerance test.

Etiology

Etiologically diabetes is of two types - Primary or idiopathic and secondary.

Causes of Primary or idiopathic diabetes are heredity, age, gender, obesity and dietary factors

Secondary diabetes may occur due to abnormal growth hormone, adrenocortical hormones, thyroid hormone etc. Gestational diabetes also comes under this category [10].

Chemical Pathology

Normal blood glucose levels are 70 to 120 mg/100 ml. When this level is lowered, the cells starve and die due to lack of energy while in case of hyperglycemia, the body's life sustaining water, electrolyte and acid base balances are disturbed. To maintain a normal blood sugar level, a balanced diet and lifestyle plays a very important role.

Objective

- Comparative analysis of diabetic patients for their nutritional status

Research Methodology

A prospective observational study was conducted on 30 patients admitted in Mahatma Gandhi Medical College and Hospital, Jaipur. Purposive sampling technique was chosen for sample selection.

Inclusion criteria

- *Diabetes mellitus* patients without Dialysis
- Patients aged 25-80 years
- both male and female patients

Exclusion criteria

- Patients below 25 years and above 80 years
- Patients with Dialysis

Data collection:

Samples selected were studied for their nutritional status as per following details.

Part 1: General Information

Patient's general information was collected for the following details:

- Name of the Respondent
- Age/ sex
- Education: Illiterate/Primary/Metric/Graduate/ Post graduate
- Working Status of the Respondent: Working/ Non Working
- Type of Activity: Sedentary/Moderate/ Heavy Worker
- Economic status: LIG (<50,000/-) / MIG (50,000/ - 2,00,000/-) / HIG (>2,00,000/-)
- Marital Status: Married / Widow / Single / Unmarried

Part 2: Anthropometric Measurement

Patient's anthropometric data was collected for the following parameters as per standard procedures:

- Weight was taken using digital weighing balance by following standard guidelines of taking weight with minimum clothing and without shoes.
- Height: Height was taken using a heightometer. Patients were asked to stand without shoes/ foot wears and without any puffy hair style. It was done on a flat surface.
- Waist circumferences: It was done by a non-stretchable measuring tape, just above the iliac crest soon after expiration in fasting state.
- Hip circumferences: Non stretchable tape was used for this also.
- MUAC: Arm circumference was taken at the midpoint of olecranon process and acromion using non stretchable flexible measuring tape
- BMI was calculated as $\text{Weight (Kg)} / \text{Height (M}^2\text{)}$
- Waist / hip circumference ratio (WHR): After measuring waist and hip circumference, its ratio was calculated to find out type of fat distribution in body ^[3, 4]

3: Biochemical Data

Following biochemical parameters were taken to study *diabetes mellitus* patients

- Blood glucose test
- HbA1C
- Renal function test (RFT)
- Electrolyte report's
- Complete blood count (CBC)

Clinical Sign & Symptoms

Following clinical signs and symptoms were observed in patients to see the effect of disease on the body that may alter food intake also.

Anorexia, Nausea polyphagia, polyuria, hypoglycaemia, hyperglycemia, Anaemia, polydypsia, weight loss

Home diet recall

Patient's home diet recall was recorded by interview of patient or attendant for 3 consecutive days and then it was converted to nutrient intake. Then 3 day's average nutrient intake was compared to the requirements of the patients. Sample table for home diet recall and food frequency table for recording empty calorie intake have been shown below:

24 hrs. Home recall

Time	Meal	Menu	Household measurement

Table 1: Sample for 24 hours home diet recall

Empty Calories Intake through Food Frequency:

Food Item	Daily	Weekly	Monthly	Total Empty Calorie Intake
Oil				
Sugar				
Cold drink/ Sharbat/Juice				
Pickles/ Fried food/Junk food				
Alcohol				
Total				

Table 2: Sample Food Frequency Table

Nutritional Diagnosis

Patients were divided into following categories as per Subjective Global Assessment tool -

1. SGA rating A - Normally nourished/ Healthy
2. SGA rating B - Mildly malnourished (At risk of malnutrition)
3. SGA rating C - Malnourished

Results & Discussion

Results & Discussion part has been divided into following sub headings:

1. General information of the patients

Table 3 is showing that 70% patients were male and 30% were females. Majority of the patients were in the age group of 51-70 years. All patients were married. Most of the patients (43%) were engaged in sedentary activity. Forty percent of patients were from the middle income group. Educational status showed that all patients were literate although 23% of patients were found to have graduated.

Variable	Parameter	(N=30)	Percentage
Gender	Male	21	70
	Female	9	30
Age	30-50	5	16.6
	51-70	21	70
	71-90	4	13.3
Marital status	Married	30	100
	Unmarried	0	0
Type of activity	Heavy	8	26.6
	Moderate	9	30
	Sedentary	13	43.4
Economic status	HIG	8	26.6
	MIG	12	40
	LIG	10	33.7
Education status	Metric	13	4.33
	Primary	5	16.6
	Illiterate	5	16.6
	Graduate	7	23.4

Table 3: General information of the patients

2. Assessment of Nutritional status

2.1 Anthropometric measurements

Patients no.	Age/ gender	Height	Weight	BMI	WC	HC	WHR	MUAC
1	59/M	169	67	22	82	84	0.97	30
2	51/M	173	58	19	70	71	0.99	25
3	71/F	153	50	20.3	80	81	0.94	27
4	68/F	166	60	21.7	86	88	1	30
5	59/M	171	70	23	89	90	1	30
6	57/M	176	70	23	83	85	0.98	29
7	60/M	168	68	24.09	81	82	0.95	25
8	65/F	160	68	26.5	79	80	0.97	28
9	85/M	168	71	25.3	82	83	1	30

10	59/F	150	50	22.5	69	71	0.93	24
11	65/M	175	80	26.6	74	78	0.94	25
12	64/M	168	69	24.4	68	70	0.97	22.8
13	79/M	165	65	23.8	70	73	0.95	20
14	65/M	170	65	21.7	66	69	0.95	21.1
15	56/F	170	75	25	69	71	1	25
16	57/M	172	75	25.33	66	63	0.98	21.1
17	53/M	160	65	21.4	63	65	0.96	22.4
18	56/F	180	82	25	78	74	1	24.7
19	73/M	170	70	24.2	68	70	0.97	22.8
20	70/M	165	60	22	70	75	0.93	20
21	43/F	171	76	25.99	68	69	0.99	21.4
22	57/M	158	50	20	72	70	0.98	23
23	62/M	168	75	26.5	87	88	1	30
24	49/M	161	56	21.6	86	85	0.96	30
25	43/M	170	77	26.6	90	89	1	29
26	49/M	152	62	26.8	80	83	0.98	28
27	59/F	168	60	21.25	69	72	1.3	25
28	60/M	164	80	29.8	82	84	2	28
29	64/F	169	67	22	82	84	0.97	30
30	38/M	173	74	24.72	78	76	1	26

Table 4: anthropometric measurements

Table 4 is depicting patient wise anthropometric measurements. It was found that mean height for both males and females was 165 cm while mean weight for males was 65 kg and for females was 55 kg. Forty seven percent of males showed BMI in the range of obese category (between 24 - 29 kg/m²), while most of the females (55%) were found overweight. Mean waist circumference was 90 cm for males while it was 75% for females. Mean WHR for males was 1 and for females it was 1.01. Mean MUAC for males was 25.62 cm while for females; it was 26.11 kg/m².

2.2 Biochemical/ biomedical assessment

2.2.1 Electrolytes/RFT

Patients no.	Age	Sodium (Na) 137-145 mmol/l	Potassium (K) 3.5-5.1mmol/m	Creatinine (Cr) 0.6-1.2mg/dl
1	59	130	4.5	0.6
2	51	131	4.7	1.1
3	71	134	3.9	0.4
4	68	137	2.2	0.6
5	59	137	4.4	0.7
6	57	135	3.8	0.7
7	60	137	3.5	0.9
8	65	131	4.3	5.2
9	85	132	4.8	1.3
10	59	130	3.9	0.7
11	65	135	3.9	1.7
12	64	139	4.6	0.7
13	79	140	4.1	0.9

14	65	142	3.9	0.6
15	56	145	3.4	4.8
16	57	130	4.2	5.5
17	53	136	4.3	0.7
18	56	145	5	0.8
19	73	136	4.06	5
20	70	136	4.9	9
21	43	124	4	0.8
22	57	134	3.5	1.1
23	62	133	3.8	1.2
24	49	138	3.6	4.7
25	43	126	4	0.6
26	49	124.6	4	0.3
27	59	134.9	4	0.8
28	60	134.9	3.8	0.8
29	64	130	4.5	0.6
30	38	133	3.3	0.6

Table 5: Electrolytes and RFT

Table 5 shows that 35% patients have low sodium (males 14% & female 5%) and 65% patients showed normal range of sodium (males 21.3% & females 6.5%).

8% of patients had low potassium (males 2.6% & female 2.6%), 92% showed normal potassium range (males 66% & females 21%).

6% patients showed low Creatinine (males & females 33.4%), 21% patients have higher range of creatinine (males 75% & females 24%)

2.2.2 Complete blood count (CBC) & Random blood sugar (RBS)

Patients no	Age / gender	Haemoglobin (g/dL)	RBS (g/dL)	PLT
1	59/M	10.7	294	162
2	51/M	11.3	447	269
3	71/F	8.9	206	301
4	68/F	11.6	182	108
5	59/M	13.2	192	200
6	57/M	15.7	341	203
7	60/M	10.9	216	211
8	65/F	6.8	304	242
9	85/M	9.5	227	355
10	59/F	11.6	164	122
11	65/M	12.3	280	190
12	64/M	12.8	240	131
13	79/M	12.2	123	317
14	65/M	10.2	104	124
15	56/F	7.9	125	585
16	57/M	8.8	199	257
17	53/M	14.6	281	142
18	56/F	8.7	166	216
19	73/M	7.1	149	270
20	70/M	4.9	336	292

21	43/F	8.5	166	242
22	57/M	8.9	213	81
23	62/M	11.2	182	214
24	49/M	7.2	232	373
25	43/M	9.8	284	219
26	49/M	13.1	218	298
27	59/F	11.0	298	126
28	60/M	9.7	196	198
29	64/F	8.3	244	204
30	38/M	9.7	189	193

Table 6: Complete Blood Count (CBC)

33% patients have normal Hemoglobin level, 56.6% patients showed low Hb. 93% patients exhibited high RBS levels, while 7% patients showed normal range of RBS. Platelets of all the patients were in the normal range.

2.3 Clinical signs and symptoms

Patient No.	Age / Gender	Weakness	Weight loss	polydipsia	Hyperglycemia	Hypoglycemia	polyuria	polyphagia	Nausea	Anorexia	Anemia	HbA1c	Medical diagnosis
1	59/ Male	No	Yes	Yes	Yes	No	No	Yes	No	Yes	No	11.3	DM2, HTN, JAUNDICE, ASCITES
2	51/ Male	No	No	Yes	Yes	No	Yes	Yes	No	Yes	No	9	DM2, THROMBOCYT OPENIA
3	71/ Female	No	Yes	No	Yes	No	No	Yes	No	Yes	Yes	8	DM2, CA-LUNG, SOB
4	68/ Female	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	10.5	DM2, CA-OVARY, RHD, HTN
5	59/ Male	No	No	Yes	No	Yes	No	Yes	No	Yes	No	10.2	DM2, HTN, GBS
6	57/ Male	Yes	Yes	No	No	Yes	No	Yes	No	No	No	13.6	DM2, HTN, CA-COLON, CA-STOMACH
7	60/ Male	No	No	Yes	Yes	No	Yes	Yes	No	Yes	No	14.8	DM2, HTN, HYPOTHYROIDISM, PARKINSONISM, AC. PANCREATITIS
8	65/ Female	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	13.7	DM2, Htn,
9	85/ Male	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	11.9	DM2, HTN, COPD, ASTHMA, ASATIS

10	59/ Male	Yes	No	Yes	Yes	No	No	No	No	Yes	No	15	DM2,HTN,POST -RAR, ANEMIA PLASMOPOHORESIS
11	65/ Male	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No	12.2	DM2,HTN,POST -RAR,PLASMOPOHORESIS
12	64/ Male	No	No	No	Yes	No	No	Yes	No	Yes	No	13.1	DM2,HTN,COPD ,IWN
13	79/ Male	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	14.5	DM2,ACS,- CAD,IWN
14	65/ Male	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No	8.1	CAD-ACS,DM2
15	56/ Female	No	No	Yes	No	Yes	No	Yes	Yes	No	Yes	9.7	DM2,HTN,CAD ,P/PTCA
16	57/ Male	No	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	10.0	DM2,AKI,UTI, CHOLELITHIASIS
17	53/ Male	No	Yes	Yes	No	Yes	No	Yes	No	No	No	13.0	DM2,AKI,RENAL FAILURE
18	56/ Female	Yes	No	No	No	Yes	Yes	No	No	Yes	Yes	14.8	DM2,HTN,CAD,I WMI
19	73/ Female	No	No	Yes	Yes	No	Yes	No	No	Yes	Yes	11.7	DM2,HTN,CAD, SOB,IWMI
20	70/ Male	No	Yes	Yes	Yes	No	Yes	Yes	No	No	Yes	10.3	DM2,CKD ON MHD,BPH,SOB, AKI
21	43/ Female	No	No	Yes	Yes	No	No	Yes	No	Yes	No	8.4	DM2,HTN,CKD, ON MHD, ASCITES,SEV.A NEMIYA
22	57/ Male	Yes	No	No	Yes	No	No	Yes	No	Yes	No	11.8	DM2, HTN,CAD,PVD,S DH,LT.HEMEPE RESIS
23	62/ Male	No	No	Yes	Yes	No	No	Yes	No	Yes	No	14.3	DM2,HTN,CLD, JAUNDICE, THROMBOSIS,N ASH
24	49/ Male	No	No	No	Yes	No	Yes	Yes	Yes	No	Yes	12.7	DM2,CLD,AKI,U TI,HE(1)
25	43/ Male	No	No	Yes	Yes	No	No	Yes	Yes	No	Yes	13.9	DM2,HTN,CKD, NASH,CLD

26	49/ Male	Yes	Yes	Yes	Yes	No	No	No	No	Yes	No	10.1	DM2,CLD, ASCITES,HTN,H E-2, COAGULOPATHY
27	59/ Male	No	Yes	No	No	Yes	Yes	No	No	Yes	No	11.7	DM2,HTN,CLD,NASH, HYPOTHYROIDISM, ASCITES,HE-1, JAUNDICE
28	60/ Male	No	No	No	No	Yes	No	Yes	No	Yes	Yes	9.0	DM2,HTN,ILB,,T2RF,COPD
29	64/ Female	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	9.7	DM2,HTN, MEN-1-SYNDROME
30	38 / Male	Yes	No	No	No	Yes	No	Yes	Yes	No	Yes	8.3	DM2,HTN, CKD-ON-MHD, POST RAR 2023, PTCA

Table 7: Clinical signs and symptoms

Table 7 is showing that 7 out of 30 patients (23.33%) showed symptoms of fatigue. Thirteen patients (43.33%) showed symptoms of weight loss due to uncontrolled diabetes. Twenty out of 30 patients (66.66%) showed hyperglycemia while hypoglycemia was seen in 33% patients. Symptoms of polydipsia, polyphagia and polyuria were found in 60%, 83.33% and in 33% patients respectively.

2.4 Nutrient intake as per home diet recall

Patients no	Age / gender	Energy (%Intake)	Protein (%Intake)	Carbohydrates (%intake)	Fat (% intake)	Na intake mg	K intake mg	Empty calorie
1	59/M	62.27	35.62	53.80	75	2230	1730	350
2	51/M	94.38	53.62	91.66	55.88	2209	2370	315
3	71/F	90.31	46.15	55.45	102	2198	1930	295
4	68/F	129	64.38	94.64	61.11	2167	2700	280
5	59/M	90.76	48.52	81.87	57.14	2213	2460	330
6	57/M	98.36	86.88	98.65	57.14	2225	2850	365
7	60/M	79.74	72.54	123	138	2275	2245	290
8	65/F	117	57.14	117	94.87	2212	2790	340
9	85/M	118	84.75	118	113.79	2211	2560	350
10	59/F	120	73.33	120	91.17	2163	2975	370
11	65/M	86.43	86.3	78.59	68.42	2144	2865	280
12	64/M	66.42	66.17	56.99	72.97	2156	1689	320
13	79/M	64.83	62.29	96.46	115	2179	1570	340
14	65/M	99.47	95.58	107	106.66	2123.	2097	370
15	56/F	112	67.56	76.66	72.97	2110	1890	310
16	57/M	106	77.77	106	81.25	2178	1560	260
17	53/M	98.32	81.42	90.32	85.71	2189	2068	290
18	56/F	110	82.61	110	121.42	2205	2350	320
19	73/M	98.92	72.85	94.42	97.14	2195	2285	325
20	70/M	69.56	77.33	126	92.68	2222	3390	340
21	43/F	131	82.19	131	70.83	2201	2890	280
22	57/M	107	79.41	163	106.25	2215	3094	45

23	62/M	122	88.05	123	111.11	2198	2140	360
24	49/M	76	63.15	64.59	73.68	2142	1469	260
25	43/M	96.26	87.01	108	107	2169	2460	315
26	49/M	90.3	81.82	90.34	87.87	2176	2650	290
27	59/F	115	77.33	126	70.96	2222	3390	340
28	60/M	104	82.19	131	129	2201	2890	280
29	64/F	138	79.41	163	154	2215	3094	45
30	38/M	97.45	92.42	167	86.66	2275	2200	360

Table 8: Nutrient intake as per home diet recall (Intake of calorie, protein, carbohydrate and fat have been mentioned as percentage intake of requirements, while for sodium and potassium total intake taken

Empty calorie intake ranged from 280-370 Kcal for the majority of patients while 2 patients showed intake of 45 Kcal. Energy intake above requirements was seen in 43% patients while 40% patients consumed calories between 70-100% of the requirements. Protein intake of 66% patients was found in the range of 70-100% of the requirements. Less than 50% protein intake was seen in 16.66% of the patients. Carbohydrate intake of 28% patients was seen above their requirements while 33% patients showed intake between 70-100 % of their requirements. 9 out of 30 patients showed fat intake above requirements while 46.66% patients consumed fat ranging from 70-100 % of their requirements. Sodium intake ranged between 2000 mg to 2300 mg. Potassium intake was found between 1400-3390 mg when calculated from daily diet as can be seen from table 8.

2.5 Nutritional diagnosis

Parameters	Total male patients (N=21)	Percentage	Total females (N=9)	Percentage
SGA RATING A	13	75%	8	60%
SGA RATING B	3	15%	3	25%
SGA RATING C	2	10%	1	15%

Table 9: Nutritional diagnosis of the selected patients

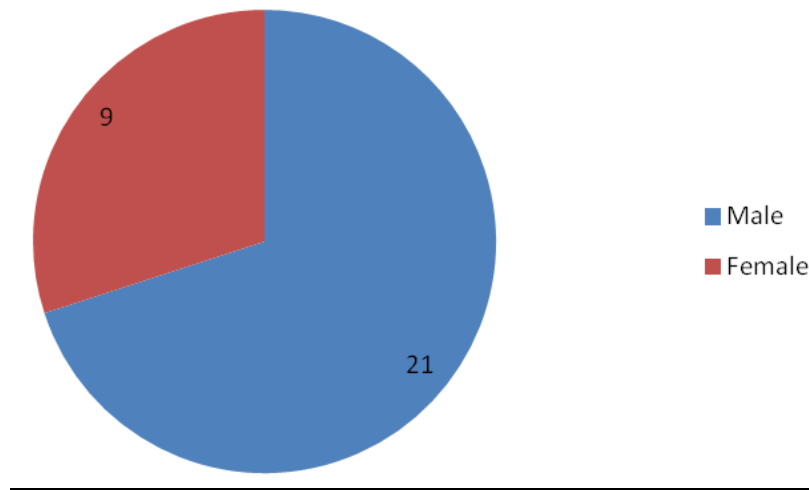
Table 9 showing that 75% male patients have SGA RATING A, 15% SGA RATING B and 10% SGA RATING C. i.e., Out of 30, 75% patients showed normal nutrition status, 5% were at risk of malnutrition while 10% patients were malnourished.

60% female patients have SGA RATING A, 25% have SGA RATING B and 15% SGA RATING C.

Comparative analysis

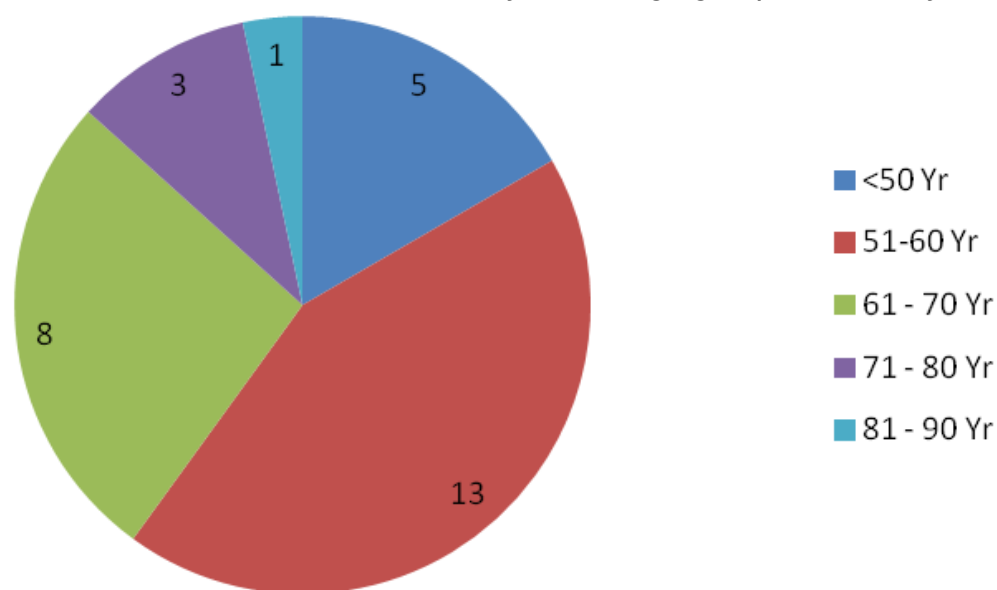
Gender

70% patients were males. It shows that males are more prone to this metabolic disorder.



Age

Type 2 diabetes was more observed in 51-60 years of age group followed by 51-60 years.



Comparison of patients for anthropometric measurements

It was found that patients who showed higher waist to hip ratio also showed higher BMI. While some patients showed symptoms of weight loss who had uncontrolled blood sugar levels.

Comparison of patients for biochemical profile

Biochemical investigations were found in similar trends, although RBS levels were found towards the higher side in males and females having higher BMI and body weight above normal.

Comparison of clinical signs and symptoms

Weakness was seen in 7 patients in whom 2 were female while 5 were males. 13 patients showed symptoms of weight loss out of which 11 were males. Symptoms of hyperglycemia and hypoglycemia were seen in nearly all patients that must be due to poor diet compliance.

Comparison of home diet recall

Patients who showed calorie intake above requirements also showed symptoms of polyphagia, polyurea and polydipsia. These were found overweight and obese also when correlated to their anthropometric measurements.

Conclusion

Diabetes mellitus is the worldwide continuously growing epidemic. In the present study, 30 patients were selected from a purposive random sampling method. These were scrutinized for their general information with nutritional status including anthropometric measurements, biochemical profile, clinical signs and symptoms and dietary recall. It was found that 70% males were found to have *diabetes mellitus* in the age group of 50 to 60 years of age. Mean height for males and females was observed as 165 cm while weight was found to be 65 kg for males and 55 kg for females. On the basis of BMI, it was found that 47% and 55% males and females were in the category of obesity. Biochemical investigations showed higher random blood sugar level in all patients but other parameters were normal. Clinical signs of fatigue, weight loss, hyperglycemia and occasional hypoglycemia, polydipsia, polyphagia and weakness were seen in nearly all patients. Dietary intake showed consumption status of calories above normal requirements.

Furthermore, knowledge about nutrition status and correlating factors may provide an insight to come out with more specific treatment to control diabetes and to prevent its future complications.

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