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Original Research Article

Nutritional Status Assessment of Atherosclerosis patients

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Abstract

Heart is a very important organ of human body and health of heart really matters a lot for human life. One may pay heavy consequences for minute negligence. Atherosclerosis is plaque formation in the inner lumen of arteries of heart that may block blood flow and cause heart attack. Many causative factors behind it include genetics, stress, faulty food habits, sedentary lifestyle, unusual weight gain etc. In our present study 30 patients were studied for the nutritional status as very little work has been done in this direction. Patients Anthropometric data, biochemical reports, clinical signs and symptoms and dietary recall was studied. It was found that majority of patients were male in the age group of 55 - 70 years. Therefore there is a special need to pay attention on reducing risk factors of heart diseases. Mean weight and BMI of male patients was 72 kg and 26.47 kg/m2, while for females it was 62 kg and 25.83 kg/ m2. Majority of the patients showed signs of shortness of breath, fatigue and constipation. Significant number of patients showed intake of calories, fat and sodium towards higher end of the requirements. Nutritional diagnosis showed that 56% patients were overweight while 20% patients were in the category of obesity. This is a very alarming situation that should be treated timely by careful nutritional assessment and counselling.

Keywords

Heart, Atherosclerosis, cardiovascular diseases, Nutritional status, Lifestyle

Introduction

Atherosclerosis is a most prominent cause of mortality (nearly 50%) in Western world. It is also known as cardiovascular diseases where low density lipoproteins accumulate and make plaques at inner walls of arteries especially at branch points that cause hindrance in

blood flow to a part of the heart. It is a principal cause of heart attacks (Dichgans et al., 2019).

Atherosclerosis is a major cause of increased morbidity and mortality due to myocardial infarctions, stroke and peripheral artery disease. Main culprit behind it is low density lipoprotein circulating in the blood. Other risk factors include enhanced blood pressure, smoking and insulin resistance. There are many invasive and non-invasive methods that are used to diagnose the risk of cardiovascular disease. As per growth and newer innovations in the field of clinical research, there are so many good preventive techniques that are really very helpful in enhanced recovery and patient's quality of life (Libby et al., 2019).

The term atherosclerosis originated from the Greek language that means thickening of the inner lumen of the arterial wall and accumulation of fat particles that leads to plaque formation. Atherosis means accumulation of fat and sclerosis means conversion of smooth muscle cells into fibrosed tissue (Ross, 1999). Consequently, the plaque growth or proliferation leads to reduced blood flow. The process of fibroblasts and calcium deposition further cause hardening of the arteries. Ultimately clot formation occurs that causes a sudden obstruction of blood flow (Tavafi, 2013).

Thus atherosclerosis is not just a consequence of aging, but a chronic problem that can be proved a medical emergency in case of heart attack.

Some research work has been carried out to study different aspects in association with atherosclerosis on animal models. It was seen in a study that mice deficient in apolipoprotein E (apoE) or deficient in receptor of low-density lipoprotein (LDL) may develop more complicated lesions (Tamminen et al., 1999).

Atherosclerosis can affect any artery, but it mainly occurs in the larger, high pressure arteries.

Faulty dietary habits may also play as a risk factor. Orhan et al. (2015) reported a inverse correlation between consumption of plenty of fruits and vegetables with chances of developing atherosclerosis.

Research Methodology

Research design

A prospective observational study design was conducted for study on nutrition status of 30 patients admitted to the cardiac ward of Mahatma Gandhi Medical College and Hospital, Jaipur. Purposive sampling technique was used for sample selection until the sample size of 30 was not achieved.

Inclusion Criteria

- Patients between the age group of 40 - 80 years of age
- Both male and female patients
- Patients who are willing to cooperate

Exclusion Criteria

- Pediatric patients
- Critically ill patients
- Non cooperative patients

Data collection

To collect data on nutritional status various modes of data collection were used. For example, data was collected from patient's files or from interviewing their attendants. First of all general information of the patient such as name, age, education, work status, type of activity, economic status and marital status was collected.

In the 2nd part, the patient's anthropometric measurements were carried out in which weight in kg, height in cm, waist circumference (cm), hip circumference (cm), mid upper arm circumference (MUAC) were measured. Body mass index (BMI) and waist hip ratio (WHR) were calculated.

Under the 3rd part, the biochemical data of the patient was collected from the patient's indoor medical records, under which the electrolytes reports like Sodium, Potassium, HbA1c, Lipid Profile, Liver function test (LFT) and Renal function test (RFT) were taken. Apart from this, BP charting of the patients was also taken.

In the next part, the patient's clinical signs and symptoms were recorded by general observation or by patient's interview under which symptoms of weakness, nausea, vomiting, diarrhea, constipation, shoulder and back pain, fatigue etc were recorded.

Besides this, patient's 24 hour dietary recall was also noted by an interview of the patient or attendant. It was noted for 3 consecutive days including two general days and one weekend/ special day. This diet intake was converted into nutrient intake by decoding the amount of ingredients eaten in different recipes and then average nutrient intake of 3 days was taken into account to derive any conclusion on nutritional status by comparing the nutrient intake with the requirements. Empty calories intake was noted using 'Food Frequency Questionnaires'.

Finally, on the basis of data collected, patients were divided into various categories of nutritional diagnosis. Patients were classified as Obese, Overweight, Underweight, Malnourished and normal.

Results and Discussion

The data was collected for 30 patients to find out their nutritional status and presented under following sub heading:

1. Demographic Profile

Parameters		Total No. of patients	%
Age (years)	40 - 55	8	26.6
	55 - 70	12	40
	70 - 80	10	33.3
Educational status	Post graduate	10	33.33
	Graduate	11	36.66
	Metric	9	30
Working status	working	13	36.66
	Non working	17	63.33
Type of activity	Sedentary	2	6.66
	Moderate	23	76.66
	Heavy	5	16.66

Economic status	LIG	2	6.66
	MIG	19	63.33
	HIG	9	30
Marital status	Married	25	83.33
	Unmarried	5	16.66

Table 1: Demographic details of Atherosclerotic patients

Patient demographics profile include information regarding age, education, working status, economic status and marital status. It was found that the majority of the patients were in the age group of 55 - 70 years. Educational status showed that most of the patients (60%) were educated to graduate or postgraduate levels. Thirty six percent of patients were working and 63.33% of patients were non-working. When activity pattern was studied, it was found that 6.66 % of patients were sedentary workers, while 76.66% patients were moderate workers and 16.66% were heavy workers. Marital status showed that 83.33% patients were married, while 16.66% patients were unmarried

2. Assessment of Nutritional status

Nutritional status was assessed by recording the data on anthropometry, biochemical or biomedical measurements, clinical signs and symptoms and nutrient intake.

2.1 Anthropometric assessment

Parameter	Male N=20	Female N= 10
Mean Height (cm)	165	155
Mean Weight (kg)	72	62
Mean BMI (kg/m^2)	26.47	25.83
Mean Waist circumference (cm)	90	82
Mean Hip circumference (cm)	91	87

MUAC (cm)	28	26
Waist to Hip Ratio	0.98	0.94

Table 2: Anthropometric Measurements

It is evident from Table 2 that out of the total 30 patients, 20 were male and 10 were female patients. Mean height of male patients was 165 cm while for female patients it was 155 cm. Male patient's mean weight of the male patient was recorded as 72 kg. On the other hand their female counterparts showed a mean weight of 62 kg. BMI for male and female patients was 26.47 kg/m^2 and 25.83 kg/m^2 respectively. Mean waist and hip circumference for male patients was 90 cm and 91 cm respectively with a WHR of 0.98 while female patients showed 82 cm and 87 cm respectively with a waist to hip ratio of 0.94 that is much higher than the normal values. It shows that the majority of the patients were overweight and obese. Mid upper arm circumference was also noted on a higher side.

2.2 Biochemical Reports

Parameters		**Total no. of patients (N = 30)**	**%**
Sodium (mg/dL)	< 135	10	33.33
	135 - 145	16	53.33
	> 145	4	13.33
Potassium (mg/dL)	3.1 - 4	18	60
	4 - 5.5	12	40
Serum Creatinine (mg/dL)	0.4 - 2	28	93.33
	> 2	2	6.66
Serum uric acid	< 1	1	3.33
	1 - 10	22	73.33
	> 10	7	23.33

Blood sugar	60 - 140	24	80
	150 - 300	6	20
BP (mmHg)	Below normal	2	6.66
	120/80 mmHg	20	66.66
	Above normal	8	26.66

Table 3: Biochemical reports of atherosclerotic patients

It was seen that all biochemical reports were in the normal range. Twenty percent patients were found to have higher blood sugar levels, while other patients were found in the normal range of blood sugar levels.

2.3 Clinical sign and symptoms

Parameters		**Total no N=30**	**%**
Shoulder pain	Yes	4	13.33
	No	26	86.66
Nausea/ vomiting	Yes	2	6.66
	No	28	93.33
Weakness	Yes	3	10
	No	27	90
Anorexia	Yes	1	3.33
	No	29	96.66
Wasting	Yes	13	43.33
	No	17	56.66
Anemia	Yes	10	33.33
	No	20	66.66
Taste change	Yes	5	16.66

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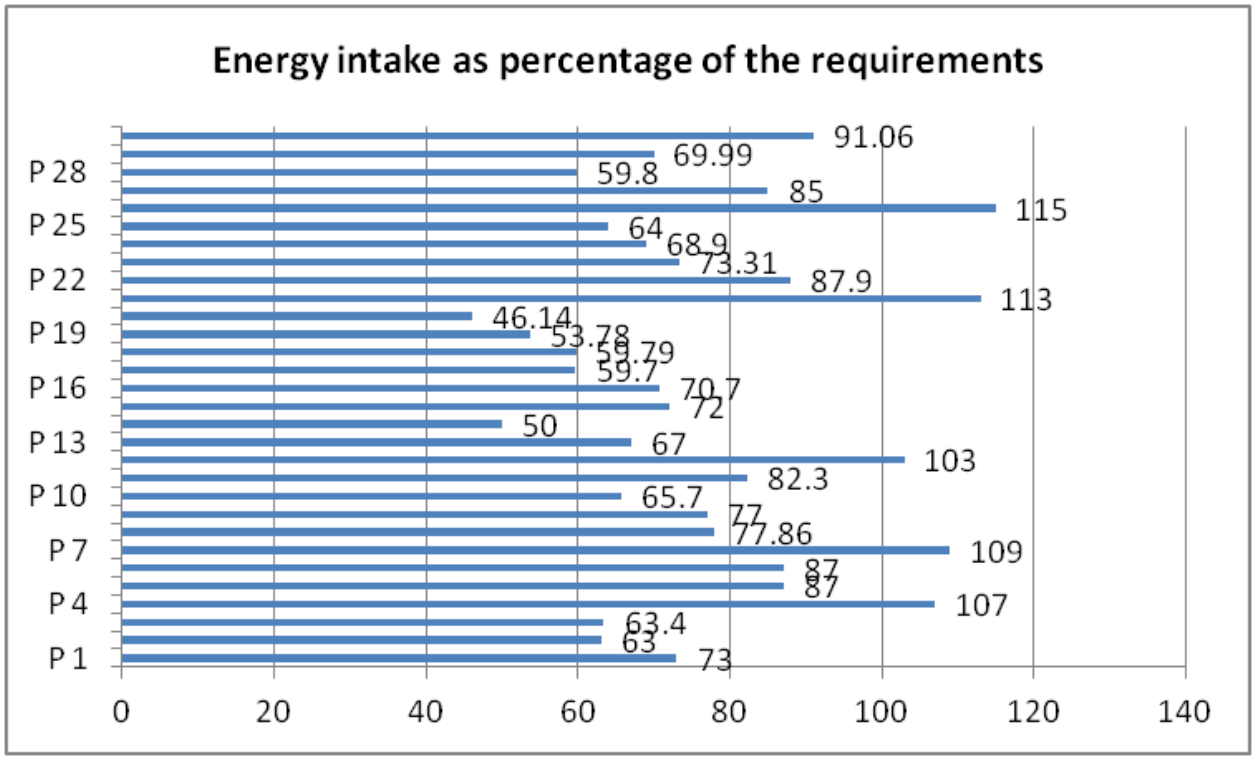
	No	25	83.33
Shortness of breath	Yes	20	66.66
	No	10	33.33
Fatigue	Yes	21	70
	No	9	30
Constipation	Yes	24	80
	No	6	20

Table 4: Clinical sign and symptoms of atherosclerotic patients

Above table 4 is depicting that the majority of patients didn't exhibit any signs and symptoms. Only signs of shortness of breath, fatigue and constipation were observed in 66.66%, 70% and 80% patients respectively.

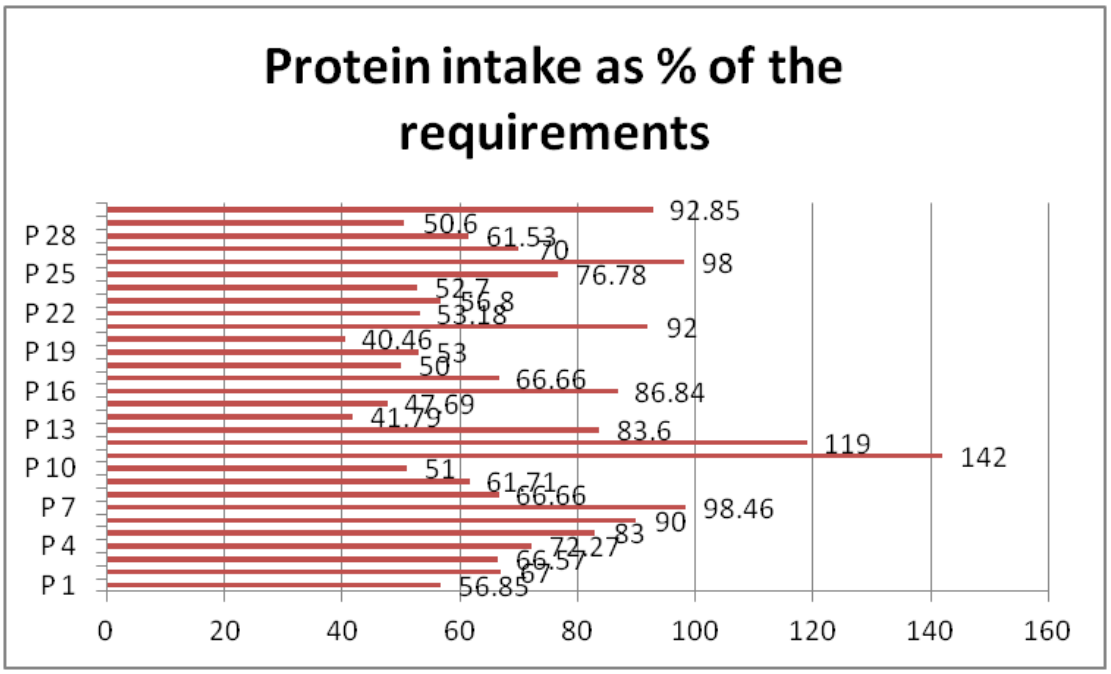
2.4 Nutrient intake from 24 hour dietary recall method



Graph 1: Energy intake as percentage of requirements

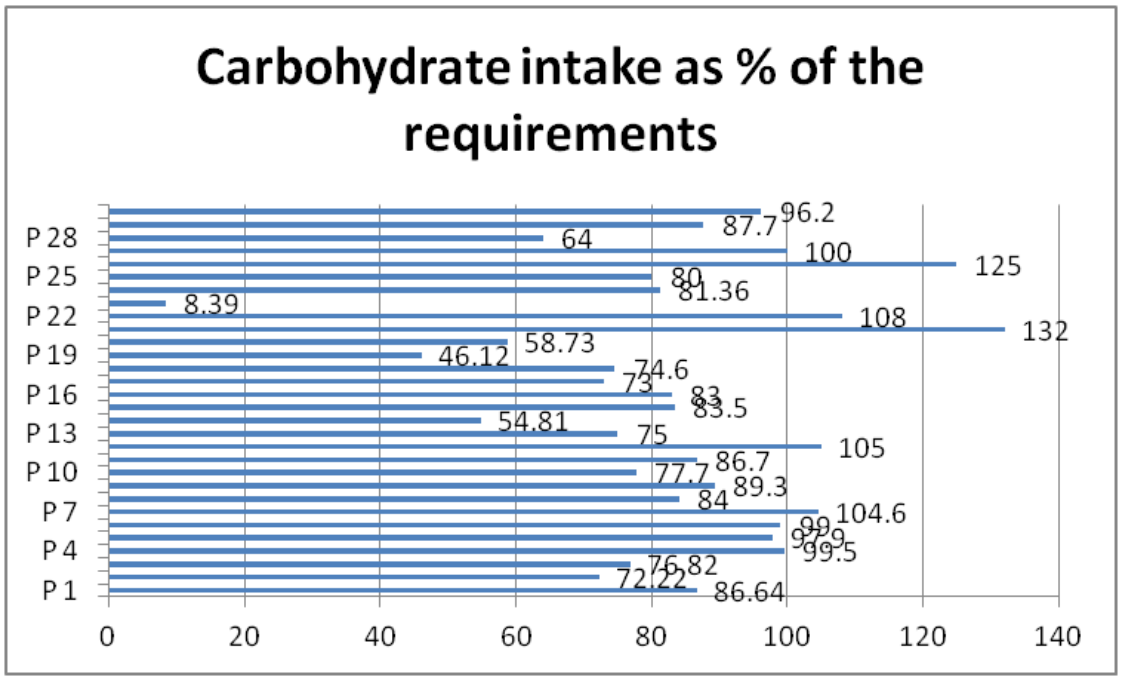
It is evident from the above graph that 60 - 80% calorie intake was seen as compared to their requirements. Only 5 out of 30 patients showed energy intake more than the

requirements. This amount of patients were found in the category of overweight or obesity. Empty calorie intake was found in the range of 175 - 300 Kcal per day.



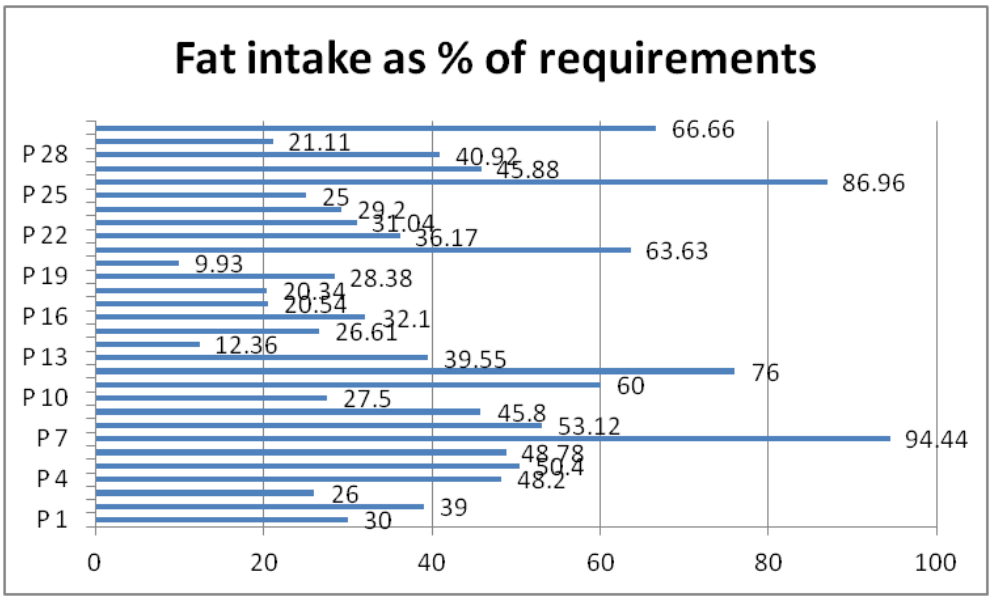
Graph 2: Protein intake in comparison to the requirements

It was observed from graph 2 that protein intake of 36% patients was in the range of 40 - 60 % of the requirements while 53.33% patients showed normal intake of protein.



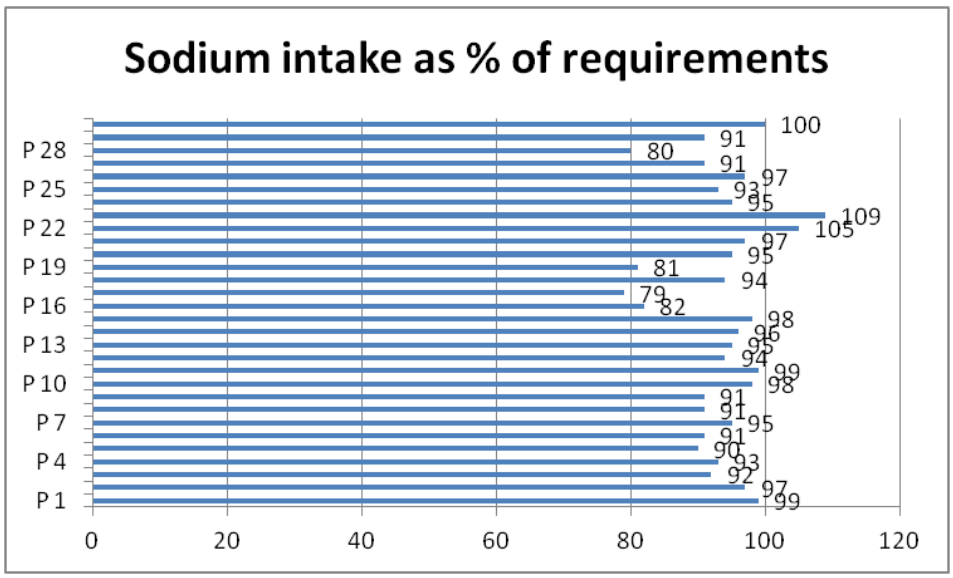
Graph 3: Carbohydrate intake in comparison to the requirement

Majority of the patients showed normal carbohydrate intake. Just 6 out of 30 patients had carbohydrate intake above the requirements.



Graph 4: Fat intake in comparison to the requirement

Above graph 4 is presenting the fat intake of the patients and it was found that out of 30, 6 patients (20%) had high fat intake. While all other patients showed a fat intake in the category of 20 - 60 % and . It may be due to the fact that after getting done lipid profile, as cholesterol and lipid profile was high, patients were counseled for dietary modifications accordingly, therefore most of the patients had reduced their fat intake.



Graph 5: Sodium intake in comparison to requirements

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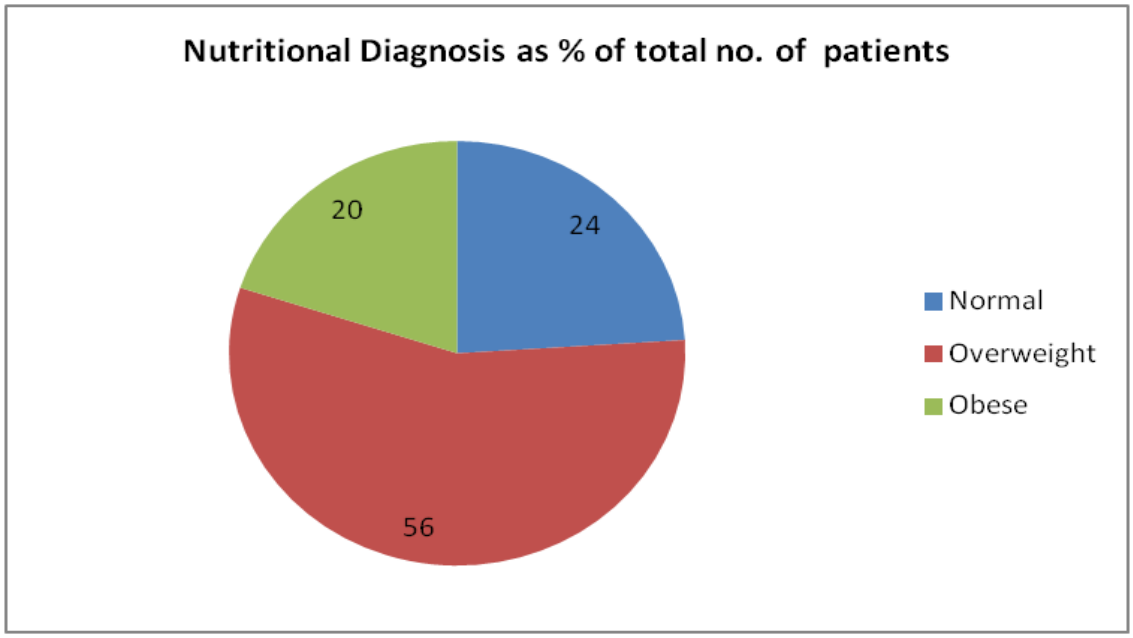
Above graph 5 is depicting the fact that majority of patients had sodium intake Compatible to the requirements. In fact some (6.66%) of the patients showed sodium intake above the recommended levels. High sodium intake is also a risk factor of developing metabolic syndrome. It is also in much consonance with the study of Mehndiratta & Sharma, 2021.

2.5 Nutritional Diagnosis



Graph 6:Nutritional diagnosis of atherosclerotic patients

Patients were categorized under following headings as per Subjective Global Assessment (SGA) tool. This graph shows that 24% of patients were Normal, while 56% of patients were overweight and 20% were obese. Obesity was seen in those patients whose calorie and fat intake was less as compared to the requirements. These patients had a higher ratio of waist to hip ratio also.

Conclusion

Taking data of 30 atherosclerosis patients, it was found that atherosclerosis is found mostly in men and women of 55 - 70 years of age but it can occur at any age. Symptoms like shortness of breath, fatigue, loss of appetite and constipation etc. were found in the majority of the patients. Atherosclerosis was also found in patients with diabetes. Twenty six percent patients were found to have hypertension, this may be attributed to the higher salt consumption with overweight. Therefore timely nutritional assessment and proper treatment and lifestyle counseling is of utmost importance as it may save quality of life of a person.

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