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Original Research Article

Nutritional status of COPD patients - An observational study

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Abstract

Chronic obstructive pulmonary disease (COPD) is a major health problem in developing countries like India. In present study, 30 patients of known COPD were selected. Data collection was done for patient's general information as well as anthropometric measurements, biochemical reports, clinical signs and nutrient intake. Using this data, patients were diagnosed nutritionally. Mean height was found to be 163 cm. and 158 cm. in males and females respectively. Mean weight was 60 kg. in males and 54 kg. in females. No patient was found overweight or obese. All of them were either in normal BMI range or in underweight category. Haemoglobin report showed that 16.66% patients were severely anemic, while 53.33% patients were mildly anemic. Symptoms of anorexia, cough and weakness were observed in 70%, 63.33% and 46.66% patients respectively. Nutrient intake was found in the range of 50-75%. We found that 26% males and 62% of the females were found at risk of malnutrition.

Keywords: COPD (chronic obstructive pulmonary disease), acute lung injury, chronic respiratory disease, inflammation, interleukin

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Introduction

Chronic obstructive pulmonary disease (COPD) is a major public health problem in India. It is characterized by persistent and progressive airflow limitation. It may be due to an inflammatory response or because of noxious particles or gases in the airways and lungs [1]. COPD is a treatable and preventable disease, still a major culprit for morbidity and mortality across the globe [2]. Not only in developing, but also in developed countries like USA, COPD has been a leading cause of mortality [3].

Symptoms of COPD often appear at a late stage, when lungs have been damaged drastically specially in case of chronic smokers. Symptoms include shortness of breath, especially on exertion. Besides this, wheezing, chest tightness, sputum producing chronic cough, recurrent respiratory infections, fatigue, unintentional weight loss, swelling in ankle etc.

Major etiological factors behind COPD are tobacco and smoking. Other factors include exposure to fumes from cooking fuel, pollution, poor ventilation.

COPD can be categorized under three parts:

1. Chronic bronchitis
2. Emphysema
3. Asthma

Chronic bronchitis is associated with drastic decline in lung function, increasing exacerbations, reducing quality of life and higher risk of mortality [4]. Emphysema is associated with higher soluble receptors for advanced glycation end product (sRAGE) levels [5].

Aim

To compare nutritional status of COPD patients

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Objectives

- To study various etiological factors that lead to COPD
- To study the nutritional status of COPD patients

Methodology

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

Inclusion criteria

- Known case of COPD
- Patient Aged 40 - 80 years.
- Both male and female patients.

Exclusion criteria

- Patients below 40 year and above 80 year.
- Patients suffering with any other critical illness
- Non willing patients

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 name of the respondent, age/ sex, educational status, occupational status, activity pattern, economic status, marital status etc.

Part 2: Anthropometric measurements:

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

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Weight: The platform beam balance was used for weight measurement.

Height: A vertical measuring rod i.e. known as heightometer or a scale fixed to a wall was used to measure height of the patients

Mid upper arm circumference: The midpoint between the tip of the acromion of scapula and tip of the olecranon of the fore arm bone was measured using non stretchable measuring tape only. In this process, ulna is located with the arm flexed at the elbow and the mid point was marked with a pen. Fiber glass tape was used and the reading is taken to the closest milli meter.

Body Mass Index (BMI): Weight (kg) was divided by height in (m^2) to calculate BMI.

Part 3: Biochemical reports:

Patient's biochemical reports were noted down as suggested by medical team. These included mainly electrolytes and complete blood count (CBC)

Part 4: Clinical signs & symptoms:

Patients were studied for prevalent clinical signs and symptoms that may alter food intake also. These included shortness of breath, wheezing, chest tightness, chronic cough, frequent respiratory infections, lack of energy, and unintentional weight loss during last 3 months.

Part 5: Diet intake:

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. Empty calorie intake was noted down using food frequency questionnaire.

Part 6: Nutritional Diagnosis:

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

1. SGA rating A - Normally nourished/ Healthy

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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

S. No.	Age/sex	Education	Activity	Economic status	Marital status
1	82y/M	Illiterate	Moderate	MIG	Married
2	73y/F	Illiterate	Moderate	LIG	Married
3	60y/F	Illiterate	Sedentary	HIG	Married
4	64y/M	Illiterate	Heavy	LIG	Married
5	68y/M	Metric	Sedentary	LIG	Married
6	72y/F	Illiterate	Sedentary	HIG	Married
7	45y/M	Graduate	Sedentary	MIG	Married
8	61y/M	Metric	Moderate	MIG	Married
9	71y/M	Metric	Moderate	MIG	Married
10	63y/M	Metric	Moderate	HIG	Married
11	71y/M	Graduate	Heavy	MIG	Married
12	55y/F	Illiterate	Sedentary	MIG	Married
13	55y/M	Graduate	Sedentary	MIG	Married
14	48y/F	Metric	Moderate	MIG	Married
15	58y/M	Graduate	Heavy	MIG	Married
16	73y/M	Metric	Sedentary	MIG	Married
17	43y/F	Illiterate	Moderate	MIG	Married
18	42y/M	Illiterate	Moderate	HIG	Married
19	76y/M	Illiterate	Moderate	MIG	Married
20	76y/M	Metric	Moderate	MIG	Married
21	63y/M	Illiterate	Sedentary	HIG	Married
22	52y/M	Graduate	Moderate	MIG	Married
23	71y/M	Illiterate	Sedentary	HIG	Married

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24	50y/M	Metric	Heavy	MIG	Married
25	52y/F	Illiterate	Sedentary	HIG	Married
26	72y/M	Metric	Moderate	MIG	Married
27	72y/M	Illiterate	Sedentary	MIG	Married
28	52y/M	Illiterate	Moderate	MIG	Married
29	60y/F	Illiterate	Moderate	MIG	Married
30	65y/M	Metric	Moderate	HIG	Married

Table 1: General information of COPD patients

Table 1 is showing that all patients were married. Activity pattern of 30 patients showed that 43% patients were moderately active, 50% of them were sedentary active while only 6.6% patients were engaged in heavy activity. Twenty percent had low economic status, 56% were middle class and 23% patients were from higher class also. Educational status showed 50% patients were illiterate, 33.33% patients were metric pass while only 16% patients were graduate. It shows that problem of COPD is mostly seen in illiterate people as they are more prone for working in dust or mines or habitual of smoking.

Assessment of Nutritional status

Anthropometric measurements

Out of 30 patients, 22 were male and 8 were female. It shows males are more prone for COPD rather than females due to their habit of smoking or due to their occupation, but females are also not totally free from the risk.

Anthropometric measurements showed that mean height of the males was 163 cm, while for females, it was 158 cm. Mean weight in males was found to be 60 kg, and in females, it was 54 kg. It is evident from the data that no patient was in the category of overweight or obese. All of them were either in normal BMI range or in underweight category. Mid upper arm circumference (MUAC) was also observed in the normal range in most of the patients. Only 5% patients showed below normal MUAC.

Biochemical assessment - Electrolytes / CBC

Parameters	Range
Sodium (mg)	128 - 145
Potassium (mg)	3.1 - 5.5

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Hemoglobin (mg/dL)	
Severely anaemic (Hb 8 or below)	5 (16.66%)
Mildly anaemic (Hb 8 - 12)	16 (53.33%)
Normal Hb (>12)	9 (30%)
Serum Creatinine (mg/dL)	0.1 - 1
Random blood sugar (mg/dL)	87 - 150

Table 2: Biochemical reports of COPD patients

Routine biochemical reports were studied that were recommended by medical team. Sodium content was seen in the range of 128-145 mg. Due to cough production, sodium losses may be higher. Potassium content was also found in normal range. Hemoglobin level showed that 16.66% patients were severely anemic while 53.33% patients were mildly anemic. Creatinine and random blood sugar levels were found in the normal range. Only 1 patient showed higher creatinine level (3.1) and 1 patient was found in state of hypoglycaemia. All others were normal.

Clinical signs and symptoms

Patients were evaluated for signs and symptoms associated to COPD out of which major symptoms found were weakness, cough and anorexia in majority of the patients as shown in following figure:

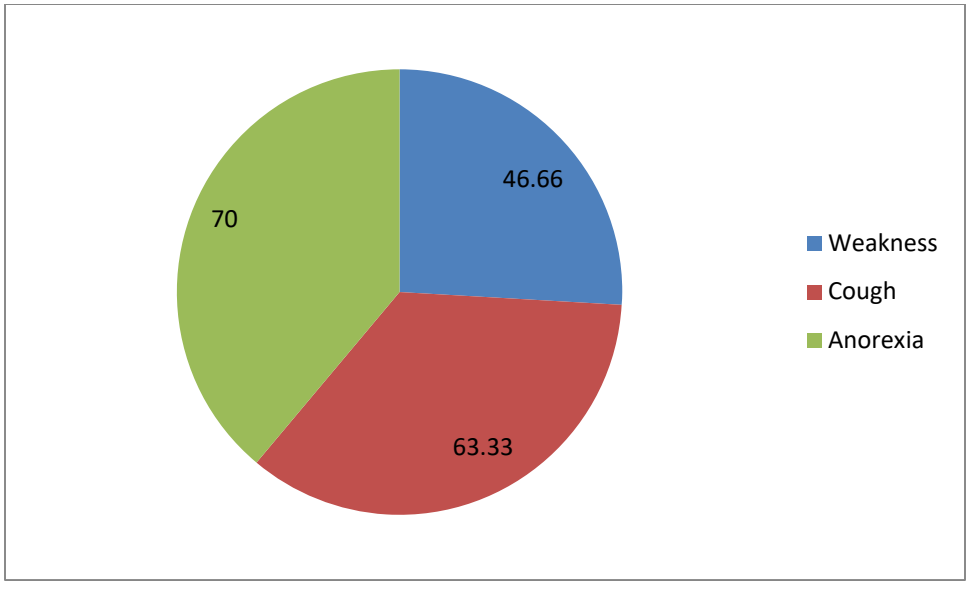

Figure 1: Percentage of Clinical signs & symptoms in 30 COPD patients

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As is evident from figure 1, 70% of the patients showed symptom of anorexia, while 63.33% patients suffered with cough and 46.66% patients faced weakness. These symptoms further led to decreased food intake.

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Nutrient intake as per home diet recall

Patient's nutrient intake was calculated in comparison to the requirements on the basis on home diet recall. It was categorized as shown in figures below:

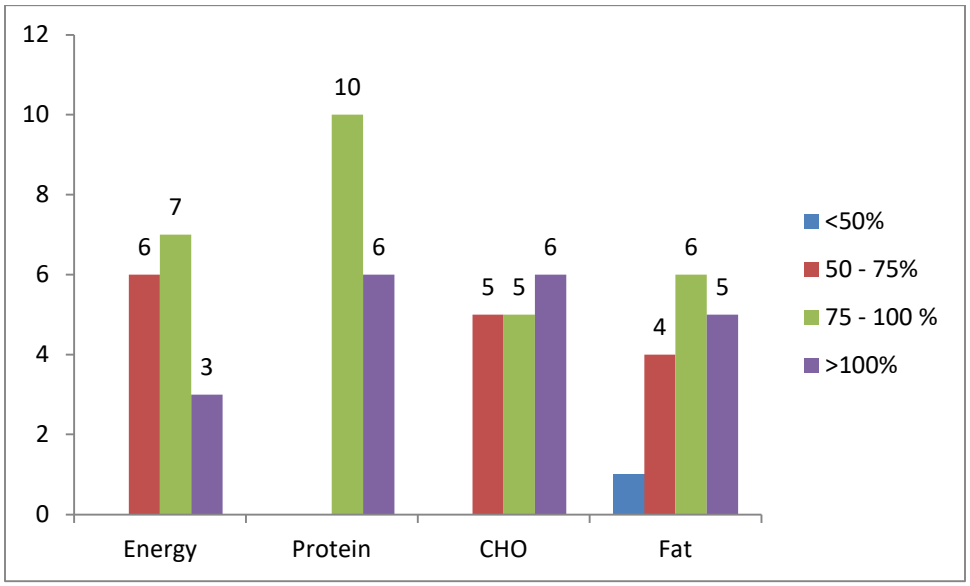

Figure 2: Nutrient intake in comparison to requirements

Above figure 2 is depicting that out of 30 patients, 1 patient showed fat intake < 50% of the requirements. Protein intake of most of the patients was in the range of 75% - 100 %. Twenty percent patients showed energy intake in the range of 50 -75%. Carbohydrate and fat intake was also found in the range of 50- 75% in 16% and 13% patients respectively, while some patients showed nutrient intake even more than their requirements although not statistically significant.

Nutritional diagnosis

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SGA rating	Males (N=22)	Percentage	Females (N=8)	Percentage
A	14	64%	3	38%
B	6	26%	5	62%
C	2	10%		

Table 3: Nutritional status of COPD patients

Table 3 is showing that 64% male patients were nutritionally healthy as they were scored as SGA rating A. On the other hand, 26% patients were at risk of malnutrition with SGA rating B and 10% were found malnourished in males showing SGA rating C.

In females, 38 % female patients were normal (SGA rating A) and 62 % were at risk of malnutrition (SGA rating B). This is in consonance with the study performed by Ozsoy at el., 2019 [6] who showed as COPD progresses, the ability to complete activities of daily living is compromised.

Conclusion

Thirty COPD patients were selected for the present study. They were analyzed for their general information and nutritional status. Nutritional status was analyzed with the help of anthropometry, biochemical reports, clinical signs & symptoms and nutrient intake.

Out of 30 patients, 22 patients were males and 8 were females. It was found that 50% of the patients were illiterate. Fifty percent patients were sedentary active. 76% patients were from low to middle income groups.

Assessment of nutritional status showed that mean height of the males was 163 cm and for females, it was 158 cm. Mean weight was 60 kg. and 54 kg. in males and females respectively. No patient was found overweight or obese. All of them were either in normal BMI range or in underweight category. Biochemical investigations showed sodium content in the range of 128-145 mg. As per report of haemoglobin, 16.66% patients were found severely anemic, while 53.33% patients were mildly anemic.

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Seventy percent of the patients showed symptom of anorexia, while 63.33% patients suffered with cough and 46.6% patients faced weakness that were major contributory factors for poor appetite and decreased food intake.

Study of diet intake revealed that fat intake was < 50% of the requirements in 3% patients. Protein intake of most of the patients was in the range of 75% - 100%. Twenty percent patients showed energy intake in the range of 50 -75%. Carbohydrate and fat intake were also found in the range of 50-75% in 16% and 13% patients respectively,
Finally, 64% male patients scored SGA rating A, i.e. they were nutritionally healthy. On the other hand, 26% patients were at risk of malnutrition with SGA rating B and 10% were found malnourished in males showing SGA rating C. Thirty eight percent females were patients were well nourished while 62% were at risk of malnutrition.

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