



ASSESSMENT OF NUTRITIONAL STATUS IN A CHRONIC OBSTRUCTIVE PULMONARY DISEASE COHORT

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ABSTRACT **Background:** Chronic obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality across the globe with substantial social and economic burden. Anorexia , weight loss and easy fatigability are common in patients with severe and very severe COPD. Malnutrition affects muscle function, exercise performance and also has detrimental effect on pulmonary function.

Methods: Hospital based descriptive study was carried out to assess lung function and nutritional indicators (BMI, Mid arm circumference) in COPD patients. Statistical analysis was carried out using SPSS 15.0

Results: 55 patients of COPD were included in the study. 44 patients were male(80%) and 11 were female (20%).23 patients (41.81%) were underweight as assessed by BMI. 32 patients (58.18%) had Mid Arm Circumference (MAC) below the cut off of 24 cm taken in our study. Percentage of patients with low BMI and MAC increased with increasing GOLD patient group.

Conclusion: Nutritional assessment is an integral part of COPD assessment. Nutritional assessment and counselling in COPD patients will go a long way in proper management of these patients.

KEYWORDS : COPD, Malnutrition, Mid Arm Circumference, Body Mass Index.**Introduction**

Chronic obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality across the globe with substantial social and economic burden.¹The Global Burden of Disease Study has projected that COPD will become third leading cause of death by 2020, a rapid progress from being the sixth leading cause in 1990. A newer projection however places it as the fourth leading cause of death by 2030.²Comorbidities contribute to the severity of individual disease in COPD³ and assessment of co-morbidities as a part of assessment of COPD is recommended.³ Degenerative co-morbidities include caecexia and muscle wasting.⁴Muscle wasting is a determinant of mortality in COPD independent of airflow obstruction.⁵This study was designed to assess the nutritional status of a COPD cohort using standard indicators of nutritional status.

Material and Method

A hospital based descriptive study was carried out at tertiary care centre of Indian Navy. Patients who were diagnosed as COPD between Jan 2013 to Jan 2014 were included in the study. Patients included in the study had the diagnosis of COPD confirmed by post bronchodilator spirometry having FEV1/FVC < 0.70. Patients with asthma, active infections, malignancy and unwilling to participate in the study were excluded. Data collected included demographic data, exposure to COPD risk factor, anthropometric data{height, weight, Mid Arm Circumference (MAC), Body Mass Index(BMI)}. FEV1 % predicted, Modified Medical Research Council (mMRC) grading, COPD Assessment Test (CAT score) and exacerbation history was assessed to determine the COPD patient category as recommended by Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (GOLD). A total of 62 patients were enrolled but only 55 were included in final analysis due to lack of complete data for other patients. Data was compiled in MS Excel and statistical analysis was carried out using SPSS version 15.0.

Results

55 patients of COPD were included in the study. 44 patients were male(80%) and 11 were female (20%).Age and sex distribution of the study population was as given in Table 1

Table 1: Age and sex distribution of study population

Age (Yrs)	Male	Female	Total Patients	Percentage(%)
45-55	7	1	8	14.55
56-65	18	5	23	41.82
66-75	16	4	20	36.36

>75	3	1	4	7.27
Total	44	11	55	100

Risk factors for COPD included Smoking (n=43; 78.18%), exposure to biomass fuel (n=11; 20%) and exposure to vehicular smoke(n=1;1.81%). Smoking index was used to quantify smoking exposure among the study subjects. Smoking index is defined as no. of cigarettes or bidi's smoked per day multiplied by the total duration of smoking in years. It is a better index to quantify smoking in Indian context as compared to pack years (one pack of 20 cigarettes smoked every day for one year is one pack year) because usually the cigarette packets in India contain 10 cigarettes and also many smokers smoke bidi. A smoking index of <100, 100 to 300 and >300 is used to classify smokers as mild, moderate and heavy respectively.634 subjects were heavy smokers(79.06%) and 9 were moderate smokers (20.9%).

GOLD Patient group classification 3

The study population was assessed using CAT , mMRC ,exacerbation in past 01 year and FEV1 % predicted on spirometry. Patient Group A included patients with low risk and less symptoms, Group B had low risk and more symptoms, Group C had High Risk and Less Symptoms, Group D were high risk with more symptoms. The GOLD patient group classification of study population is given in Table 2

Table 2: GOLD Patient group classification of study population

GOLD patient group	No. of Patients	Percentage(%)
A	7	12.3
B	32	58.18
C	10	18.18
D	6	10.91
Total	55	100

Body Mass Index(BMI)

BMI cutoff for Indian population were used⁷.Cut off used were as follows:

Normal BMI: 18.0-22.9 kg/m² , Overweight: 23.0-24.9 kg/ m² , Obesity: >25 kg/m²

BMI distribution of the study population was as given in Table 3

Table 3: BMI distribution of study population

BMI in Kg/m ²	Number of patients	Percent(%)
< 18	23	41.81
18-22.9	20	36.36
23-24.9	12	21.82
>25	0	0
Total	55	100

Mid Arm Circumference(MAC)

Distribution of MAC in study population was as in Table 4

Table 4: MAC distribution of study population

MAC	No. of Patients	Percentage(%)
<24 cm	32	58.18
>24 cm	23	41.82%
Total	55	100

Distribution of BMI and MAC in GOLD patient groups

Distribution of BMI and MAC in various GOLD patient groups was as in Table 5

GOLD Patient Group	BMI <18/Total patient in Group	Percent age(%)	MAC <24/Total patient in Group	Percentage (%)
A	1/7	14	1/7	14
B	13/32	40.6	19/32	59.3
C	5/10	50	6/10	60
D	4/6	66	5/6	83.3

Discussion

COPD is a common preventable and treatable disease characterised by persistent airflow limitation which is progressive. Burden of COPD and health care cost are progressively increasing. Co-morbidities contribute to overall severity in an individual. Co-morbidities commonly associated with COPD include Ischaemic Heart Disease (IHD), heart failure, hypertension, atrial fibrillation, metabolic syndrome, lung cancer, anxiety and depression and various others.

Anorexia, weight loss and easy fatigability are common in patients with severe and very severe COPD. Malnutrition affects muscle function, exercise performance and also has detrimental effect on pulmonary function. Presence of emphysema like changes in lungs of patients with anorexia nervosa clearly indicates the impact of malnutrition on alveoli. BMI and MAC are indicators of nutritional status. In a study conducted by Chakraborty et al in Jharkhand they found that MAC of 24 cm was simple and efficient cut off for determination of undernutrition and higher rate of illness. In our study if we used BMI 41.81% of the study population was underweight. Using a MAC cut off of 24 cm showed 58.18 of the study population was undernourished. The percentage of undernourished subjects increased with worsening GOLD patient group. This is easily explained by increased severity of disease in the higher patient groups. Nutritional depletion in COPD is multifactorial- increased energy expenditure, systemic inflammation and reduced food intake being the most common causes. Exacerbations also result in deplete nutritional status and loss of lean body mass. In a study done by Gupta et al they found high prevalence of malnutrition among admitted COPD patients. They also found that BMI negatively correlated with duration of hospital stay and degree of obstruction (FEV1 %) correlated well with body weight. Our study also shows that the percentage of patients with malnutrition increased in progressively as the GOLD patient grouping worsened.

Conclusion

Nutritional assessment should be an integral part of COPD assessment. Unfortunately it is often neglected. Nutritional assessment and counselling in COPD patients will go a long way in proper management of these patients.

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