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Status of Body Mass Index(BMI) & Waist Circumference (WC) in Patients of Chronic Obstructive Pulmonary Disease(COPD) & Relationship With Severity.

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Abstract
Aims & Objective *– To study the BMI & Waist circumference in patients of COPD & their correlation with severity of disease.*
Material & method*-This prospective study was conducted in Dept. of Respiratory Medicine MGMC&H, Jaipur from Jan 2015 to March 2016. Patients were diagnosed COPD according to GOLD update(2015) & staging(severity) was done according to Spirometry criteria. Waist circumference was measured & BMI was calculated (WHO criteria) in all cases. BMI & Waist circumference were analyzed & co-related with severity of disease.*
Results*-120(82M, 38F) patients of COPD was analyzed .Out of 120 patients stage I were 8(6.67%),II 41(34.17), III 38(31.67%) & stage IV 33(27.50). BMI in stage 1,2,3,4 were 22.9, 24.86, 21.38, 18.36 respectively with mean BMI 21.84kg/m2 . Waist circumference in stage 1,2,3,4 were 79.63, 91.34,85.13,76.06 respectively. BMI and waist circumference decreases with increasing severity of COPD which was statistically significant*
Conclusion *–BMI & waist circumference decreases more in severe & very severe disease. Follow up monitoring of BMI with nutritional status is required for better management of COPD patients.*
Keywords: *Body Mass Index , Waist circumference, COPD*

I. Introduction

Chronic obstructive pulmonary disease (COPD) is a significant cause of worldwide morbidity and mortality and considered to be systemic disease with widespread extra-pulmonary manifestation[(1)].It is associated with muscles atrophy & decreased strength leading to low fat free mass causing low BMI with severity of disease leading to increase exercise intolerance, morbidity and mortality. Waist circumference is also important anthroprometric profile which should be measured in COPD patients. Therefore we plan to study status of BMI & Waist circumference in patients of COPD & correlate both with its severity.

II. Material And Methods

120 patients of COPD reporting to the Dept. of Respiratory Medicine from Jan 2015 to March 2016 at Mahatma Gandhi Hospital, Jaipur. COPD diagnosis & grading of severity was done as per GOLD guidelines 2015[(2)].BMI was calculated by Wt (kg)/ht^2 (m^2) & classified according to WHO criteria [(3)]. Waist Circumference (WC) was measured at approximate midpoint between lower margin of last palpable rib & top of ilaic crest according to WHO STEPS protocol. Correlation of BMI & WC with severity of COPD was assessed.

III. Results

Out of 120 patients 82(68.3%) males & 38(31.67%) were females, with male to female ratio 2.1:1. Mean age of studied patients was 59.79±8.46 years, ranging from 40-83 years. Mean age of males and females was 61.085±8.56 and 57±7.644 respectively.

Table 1: Gender Profile of COPD Cases

Gender	No.	%
Male	82	68.3
Female	38	31.7
Total	120	100

Table 2: Age Profile of COPD Cases

Age Group	Female (n=38)		Male (n=82)		Total (n=120)	
	No	%	No	%	No	%
<50	7	18.42	10	12.20	17	14.17
51 to 60	21	55.26	36	43.90	57	47.50
61 to 70	8	21.05	25	30.49	33	27.50
>70	2	5.26	11	13.41	13	10.83
Total	38	100.00	82	100.00	120	100.00

Chi-square = 3.849 with 3 degrees of freedom; P = 0.374

Mean weight was 56.24 ±14.21kg. Mean BMI was 21.84±5.36 kg/m^2 .Mean waist circumference was 92.63±8.1cm.

Table 3: Anthropometric Profile in COPD Cases

BMI	Female (n=38)		Male (n=82)		Total (n=120)	
	No	%	No	%	No	%
<18.5 (Underweight)	13	34.21	24	29.268	37	30.83
18.5 to24.9 (Normal)	10	26.32	43	52.439	53	44.17
25 to 30 (Overweight)	12	31.58	11	13.415	23	19.17
>30 (Obese)	3	7.89	4	4.878	7	5.83
Total	38	100	82	100	120	100

Chi-square = 9.093 with 3 degrees of freedom; P = 0.036 S

Among COPD cases, majority of patients 53(44.17%) had normal BMI, followed by underweight 37(30.83%), overweight 23(19.17%) and obese (5.83%).Numbers of females were significantly more than males in overweight patients (p-0.036).

Table 4: Staging of COPD as per Spirometry

Stage	No.	%
1	8	6.67
2	41	34.17
3	38	31.67
4	33	27.50
Total	120	100

Maximum number of patients 41 (34.17%) were in stage 2, 38 (31.67%) in stage 3, 33 (27.5%) in stage 4 and minimum 8 (6.67%) in stage 1.

Table 5: Co-relation of BMI ,WC with severity of COPD

COPD	Stage 1	Stage 2	Stage 3	Stage 4	
BMI	22.9±2.04	24.86±5.2	21.38±5.2	18.36±4.03	<0.001
WC	79.63±13.11	91.34±14.42	85.13±14.67	76.06±13.46	<0.001

BMI in stage 1,2,3,4 were 22.9, 24.86, 21.38, 18.36 respectively with mean BMI 21.84kg/m2 . Waist circumference in stage 1,2,3,4 were 79.63, 91.34,85.13,76.06 respectively. BMI and waist circumference decreases with increasing severity of COPD which was statistically significant.

IV. Discussion

Despite adequate calorie intake cachexia is common co-morbidity of COPD patients due to multifactorial mechanisms. Low BMI is considered poor prognostic marker of COPD. Our study comprises of

120 COPD cases (68.3% males and 31.67% females) with male to female ratio 2.1:1 which is similar to Indian council of medical research (ICMR) study (M:F;1.56:1) [(4)] .

In present study patients were in age of 40 - 83 years with mean age of 59.8± 8.46 years. 3/4th of patients lie in age groups of 51-70 years both in males (67.8%) and females (32.2%). There was no significant difference in mean age of either sex. Dhadke et al[(5)] also reported similar results.

As per spirometry assessment in our study almost 1/3rd patients were in each stage 2 and 3, followed by stage 4 and minimum in stage 1 (6.7%). Results were variable in other studies while maximum cases were reported in moderate to severe COPD.[(In our study, BMI/ WC decreases with progression of COPD severity Similar to a study done by Sajal de et al [(8)] , thereby indicating under weight is more in severe COPD.

In comparison to our & other Indian studies, western COPD population have lower prevalence of underweight as majority of patients in India report in late stages of COPD where mean BMI decreases which is also supported by Sajal De et al. In our study we observed that mean BMI, waist circumference decreases significantly with increasing severity of COPD which was statistically significant Increased BMI, waist circumference in early stages of COPD, makes them more prone for metabolic syndrome.

V. Conclusion

Obesity in COPD patients act as long term killer with short term protection than the rapid effect of cachexia-malnutrition leading to high morbidity & mortality. BMI,WC reduces with the progression of COPD. So both together affect its outcome. Thus follow up monitoring of BMI & nutritional status is essential for better outcome.

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