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Relationship Between Level Of Obesity And COPD

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Abstract
Background: *Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disorder characterized by airflow limitation and persistent respiratory symptoms. Traditionally associated with malnutrition and low body mass (BMI), recent evidence suggests a growing prevalence of obesity in COPD patients, influencing disease severity, exacerbation, and quality of life. However, data on the relationship between obesity and COPD, particularly in Arab populations, remain limited.*
Aim of the study: *To investigate the relationship between COPD and levels of obesity.*
Materials and methods: *A cross-sectional study was conducted at Baghdad Teaching Hospital from June 2024 to June 2025, including 100 COPD patients. BMI was categorized as normal (<25 kg/m²), overweight (25–29.9 kg/m²), and obese (≥30 kg/m²). Dyspnea severity was assessed using the Medical Research Council (MRC) Dyspnea Scale, and quality of life was evaluated with the St. George's Respiratory Questionnaire (SGRQ). COPD exacerbations, inhaled medication use, and comorbidities were analyzed. Statistical significance was set at $p \leq 0.05$.*
Results: *Obesity prevalence was 41%, and 75% of patients were overweight or obese. Higher BMI was significantly associated with increased dyspnea severity ($p = 0.01$), worse activity and impact scores ($p < 0.05$), and greater inhaled corticosteroid (ICS) use ($p = 0.02$). Lower BMI patients had significantly higher COPD exacerbation rates requiring prednisone and antibiotics ($p = 0.02$, $p = 0.048$).*
Conclusion: *Obesity is highly prevalent in COPD patients and significantly influences dyspnea severity, quality of life, and ICS use. Lower BMI is associated with increased exacerbation frequency.*

INTRODUCTION

COPD is a progressive lung disorder characterized by persistent respiratory symptoms and airflow obstruction, often resulting from prolonged exposure to harmful particles, particularly tobacco smoke [1][2]. Traditionally COPD was associated with malnutrition and low body mass index (BMI), recent evidence has shifted the focus toward the increasing prevalence of overweight and obesity in COPD patients [3][4]. Overweight and obesity, now recognized as the fifth leading cause of death globally, have significant implications for respiratory health and disease outcomes. The intersection of obesity and COPD has gathered substantial attention due to its complex and multifaceted impact on the disease's pathophysiology [5][6]. Evidence suggests a higher prevalence of obesity among individuals with COPD compared to the general population. For instance, the Canadian National Health Survey reported that 24.6% of COPD patients were classified as obese, compared to 17.1% of the general population. Similarly, U.S.-based studies have shown that over half of early-stage COPD patients (GOLD 1 and 2) have a BMI above 30, with obesity rates decreasing as disease severity progresses [7]. Obesity significantly influences lung function through both mechanical and inflammatory pathways. This includes reduced lung compliance, diminished lung volumes and dynamic hyperinflation, which are exacerbated during physical exertion. These changes in lung mechanics contribute to increased dyspnea and exercise intolerance, beyond lung mechanics, obesity amplifies systemic inflammation, a hallmark of COPD. Adipose tissue serves as a reservoir of proinflammatory cytokines [8].

Patients and methods

A cross-sectional study carried out in Baghdad teaching hospital during the period from the 1ST of June 2024 to 31st of June 2025. The study population included 100 patients with COPD admitted to the Internal Medicine ward in Baghdad teaching hospital who were enrolled in the study after fulfilling the inclusion criteria using convenient sampling techniques. All adult patients are diagnosed with COPD. People with a diagnosis of malignancy, RA and

IBD were excluded, regardless of disease activity. Data were collected using a pre prepared questionnaire. The questionnaire was designed by the authors after extensive literature review based on previously published studies. Subsequently, the questionnaire underwent further analysis, revision, and editing based on feedback from a consultant specialist. Data were collected through an interview by the authors.

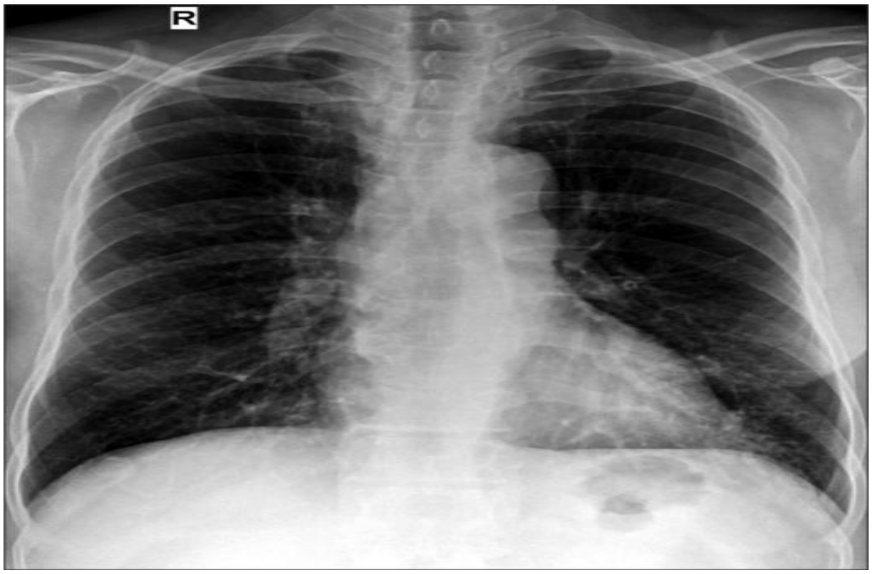


Figure 1: chest X-ray of hyperinflated chest for COPD patient [10].

In the analysis of patient data, Body Mass Index (BMI) was computed by dividing the participant's weight in kilograms by the square of their height in meters. BMI was then categorized to normal (<25 kg/m2), overweight (25 <30 kg/m2) and obese (>30 kg/m2). Dyspnea severity was assessed using the Medical Research Council (MRC) Dyspnea Scale, a widely validated and simple tool designed to quantify the impact of breathlessness on a patient's daily activities. The MRC Dyspnea Scale categorizes dyspnea into five grades (1–5), ranging from Grade 1, indicating breathlessness only during strenuous exercise, to Grade 5, where patients experience severe breathlessness that limits them to basic activities such as dressing or remaining housebound [9]. Analysis of data was carried out using the available statistical package of SPSS-26 (Statistical Packages for Social Sciences- version 26). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The significance of difference of different means (quantitative data) was tested using ANOVA test for difference among more than two independent means. The significance of difference of different percentages (qualitative data) was tested using Pearson Chi-square test (2-test) with application of Yate's correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05 [11].

RESULTS

A total sample size of 100 patients were included in the study. Among them, 59 (59.0%) were male, while 41 (41.0%) were female. The mean age of the participants was 53.4 ± 8.82 years. The age distribution of the study population showed that the majority of participants were in the 50–59-year-old category, accounting for 43 (43.0%) of the total sample. This was followed by the 40–49-year-old group, which comprised 35 (35.0%) of participants. The 60–69-year-old category included 13 (13.0%) of the sample, while the 70–79-year-old group comprised 5 (5.0%) of participants. The smallest age group was the 30–39-year-old category, representing 4 (4.0%) of the total sample as shown in table 1.**Table 1**: Age and gender distribution for study sample.

		Frequency	Percent
Sex	Male	59	59.0
	Female	41	41.0
	Total	100	100.0
Age (Mean ± SD)		53.4±8.82	
Age groups	30–39-year-old	4	4.0

	40–49-year-old	35	35.0
	50–59-year-old	43	43.0
	60–69-year-old	13	13.0
	70–79-year-old	5	5.0
	Total	100	100.0

The distribution of Body Mass Index (BMI) categories among the study population showed that 41 (41%) of patients were classified as obese (≥30 kg/m²). The overweight category (25.0–29.9 kg/m²) included 34 (34%) of patients and 25 (25%) of the patients had a normal BMI (18.5–24.9 kg/m²), indicating that 75 (75%) of the sample were above the normal weight range as shown in figure 2.

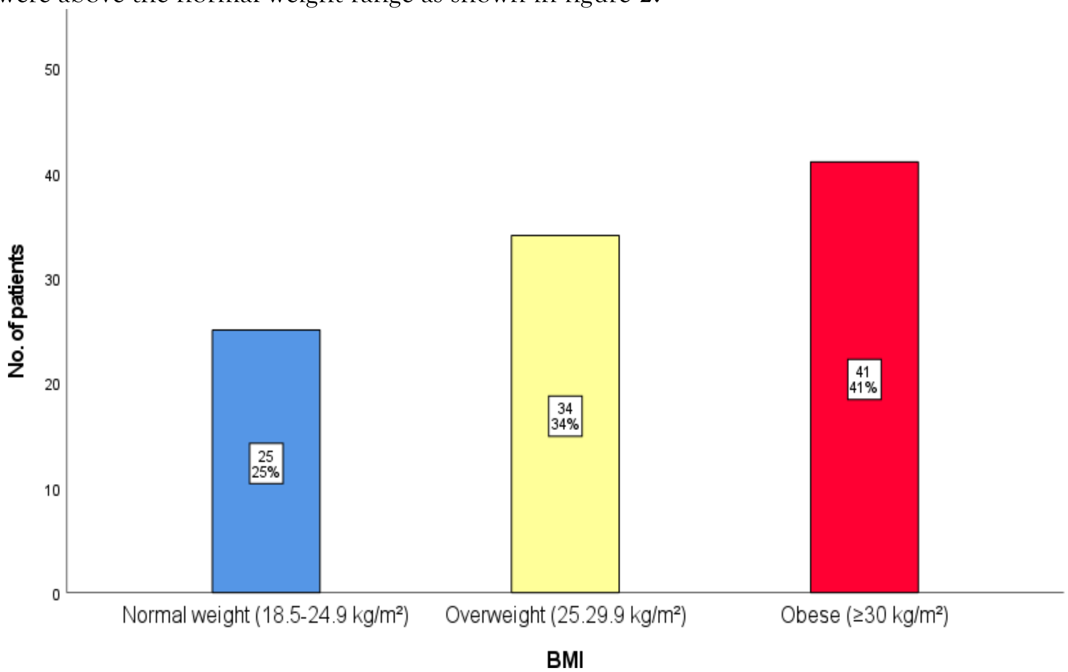


Figure 2: BMI for patients of the study.

The smoking status distribution among the study population showed that 39 (39%) of participants were former smokers, while 38 (38%) were current smokers. A total of 23 (23%) of participants were non-smokers as shown in figure 3.

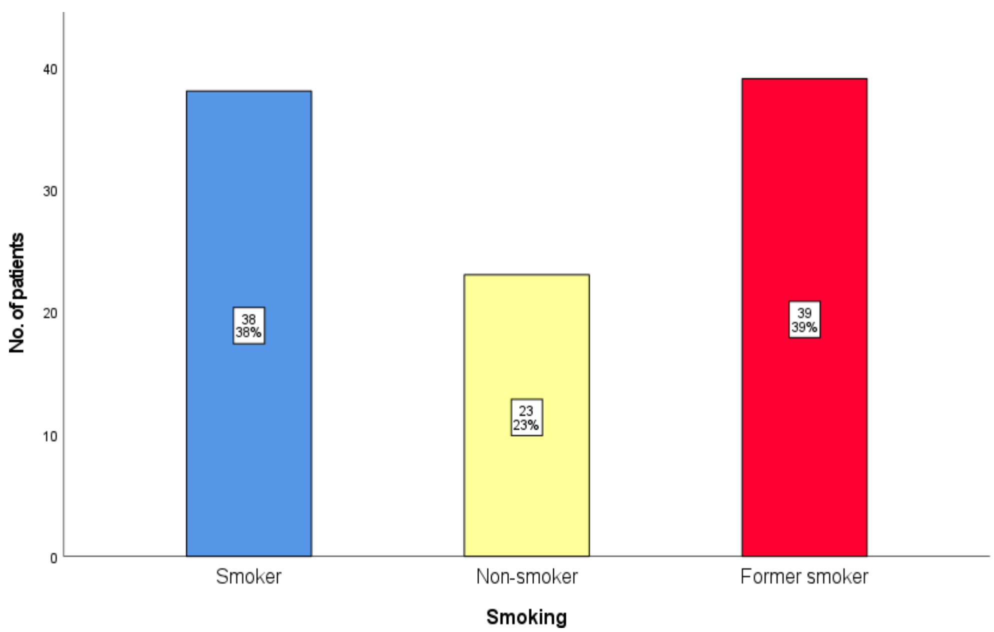


Figure 3: Smoking status among patients of the study.

The mean pack-years of smoking was 42.48 ± 13.84 among current smokers, while it was lower in former smokers, with a mean of 36.81 ± 18.74 as shown in figure 4.

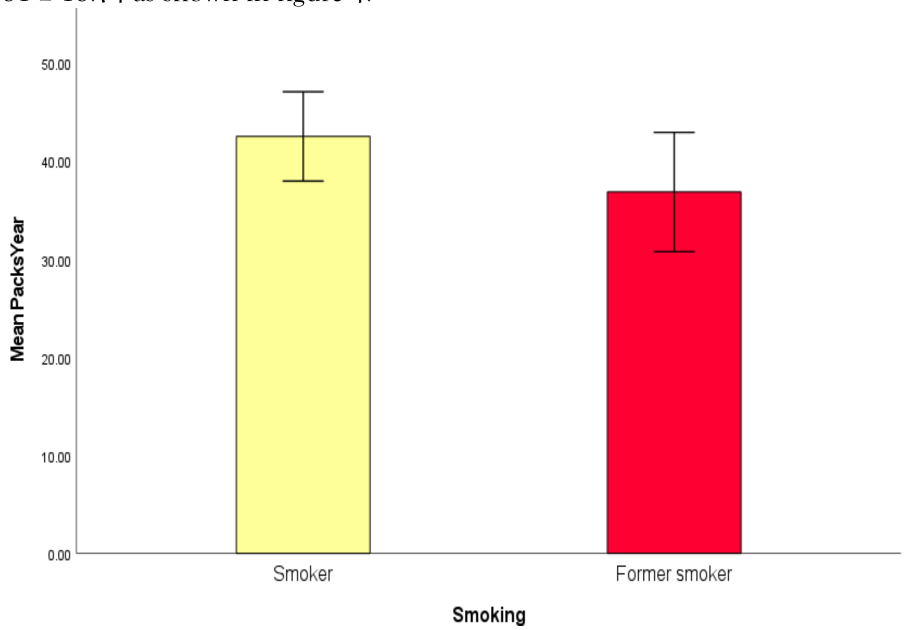


Figure 4: Packs-years smoked for patients of the study.

Among the study population, 77 (77%) of patients had at least one comorbidity, while 23 (23%) had no comorbidities. Among those with comorbidities, 44 (44%) had one comorbidity, 21 (21%) had two comorbidities, and 12 (12%) had three or more comorbidities as shown in figure 5.

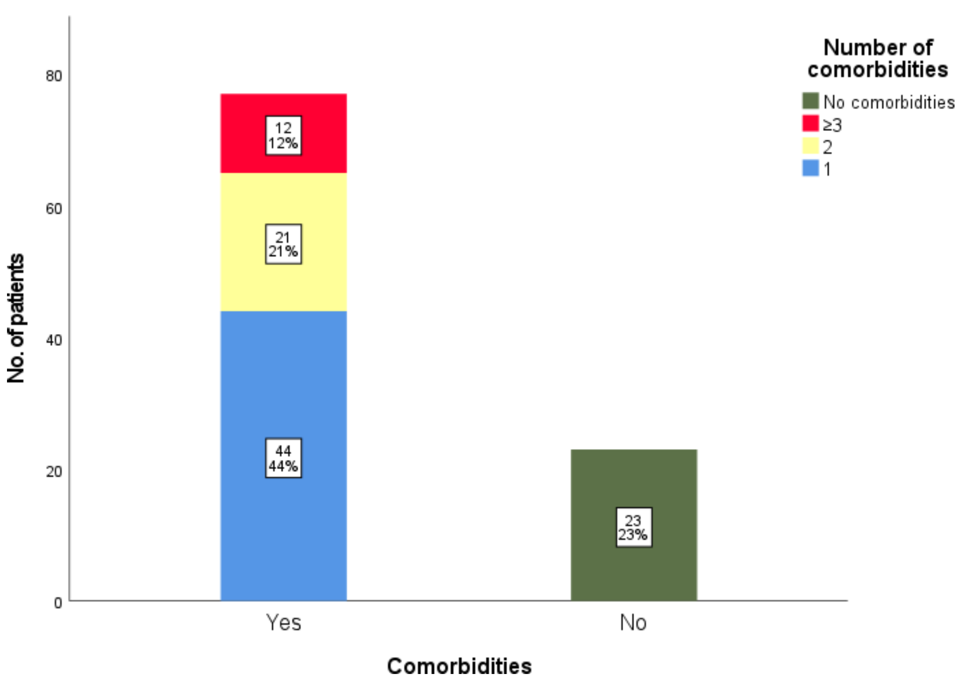


Figure 5: Status and number of comorbidities for patients of the study.

The prevalence of each of the chronic medical conditions among the study population showed that 30 (30%) of patients had Type 2 Diabetes Mellitus (DM-2). Meanwhile, hypertension was diagnosed in 52 (52%) of patients. For hyperlipidemia, 39 (39%) of patients had the condition. And the lowest prevalence was observed in coronary artery disease (CAD), where only 9 (9%) of patients had the condition as shown in figure 6.

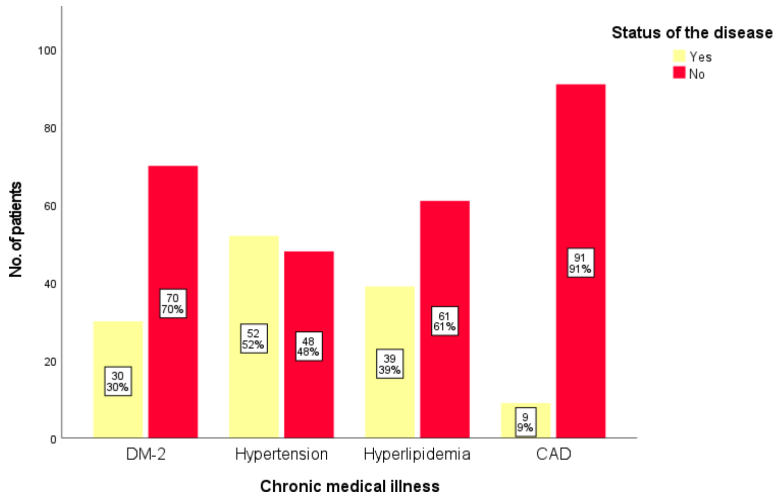
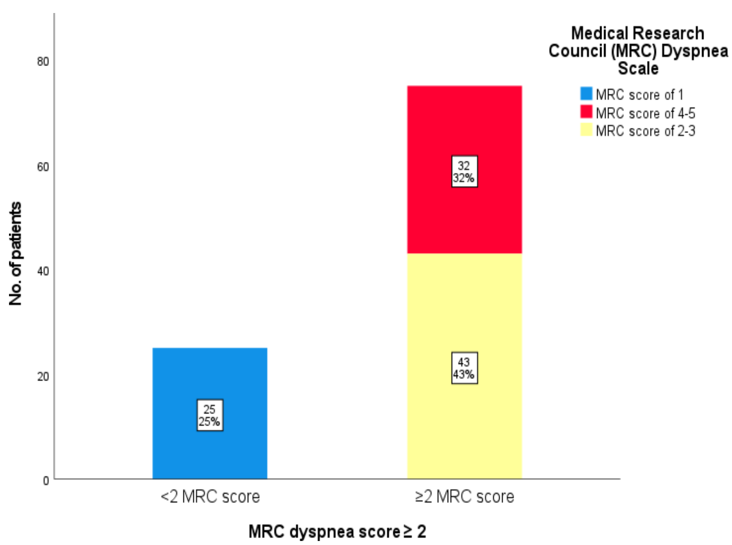


Figure 6: Prevalence of chronic medical illnesses among the patients of the study.

Assessment of dyspnea among the study sample using the MRC dyspnea score revealed that 75 (75%) of patients had an MRC dyspnea score of ≥2, indicating moderate to severe dyspnea, while 25 (25%) had an MRC score of <2, suggesting mild or no dyspnea. Among those with ≥2 MRC scores, 43 (43%) had an MRC score of 2–3, and 32 (32%) had an MRC score of 4–5, indicating more severe dyspnea as shown in figure 7.

Figure 7: Medical Research Council (MRC) Dyspnea Scale.



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Quality of life assessment using the St. George's Respiratory Questionnaire (SGRQ) showed that among the individual SGRQ domains, the activity score was the highest domain with mean of (65.44 ± 16.74). The symptom score reflected moderate burden on respiratory symptoms with mean of (51.93 ± 16.57). The impact score was the lowest (38.60 ± 13.73). The overall mean SGRQ score was (52.84 ± 15.65) as shown in figure 8.

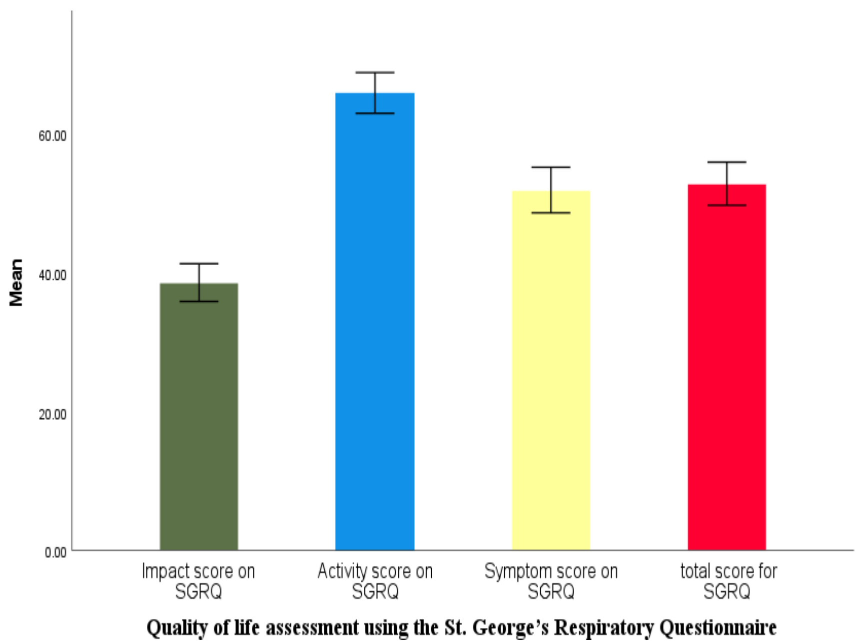
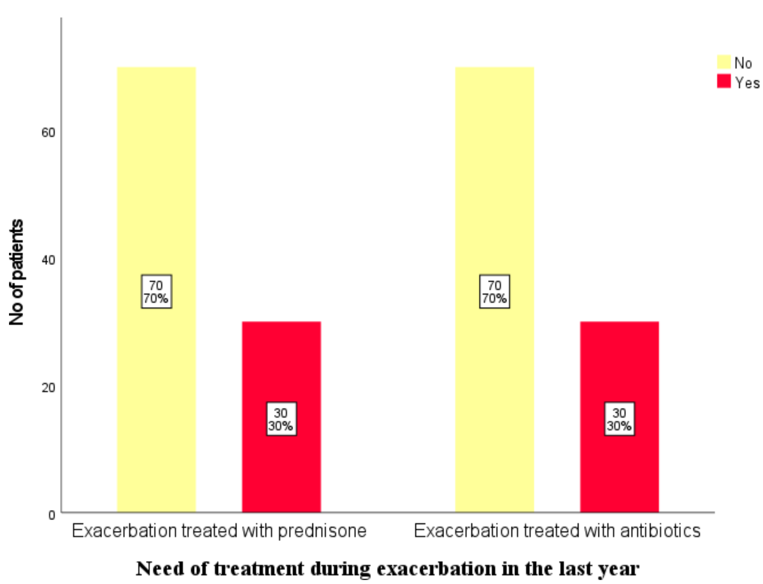


Figure 8: Quality of life assessment using the St. George's Respiratory Questionnaire.



The analysis of exacerbation management over the past year revealed that 30 (30%) of patients required prednisone treatment for exacerbations, while 70 (70%) did not require systemic corticosteroid therapy. Similarly, 30 (30%) of patients required antibiotic treatment for exacerbations

Figure 9: Exacerbation management over the past year for patients of the study.The distribution of inhaled medication use showed that 91 (91%) of patients were prescribed short-acting medications, while long-acting beta-agonists (BA) were prescribed for 55 (55%) of patients were on therapy and inhaled corticosteroids (ICS), 58 (58%) of patients were on ICS therapy as shown in figure 10.

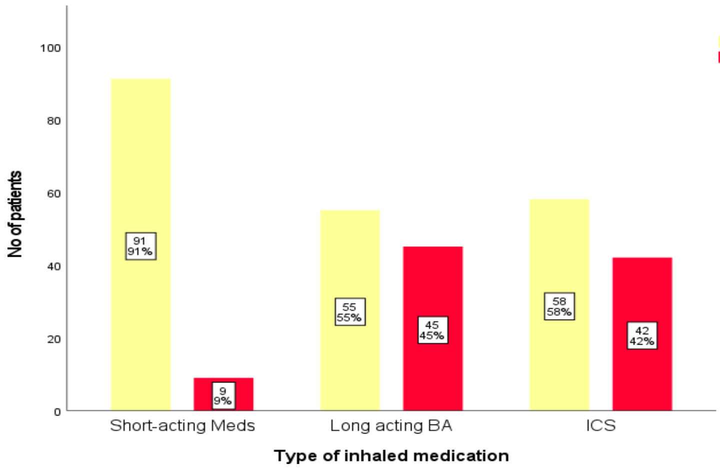


Figure 10: Inhaled medications prescribed for patients of the study.

The distribution of inhaled medication uses among the study population showed that 37 (37%) of patients were on a combination of short-acting + long-acting beta- agonists (BA) + inhaled corticosteroids (ICS), making it the most used inhaled therapy. A total of 35 (35%) of patients used a combination of short-acting + long-acting BA or ICS, while 19 (19%) relied solely on short-acting medications. Only 9 (9%) of patients did not use any inhaled medications as shown in figure 11.

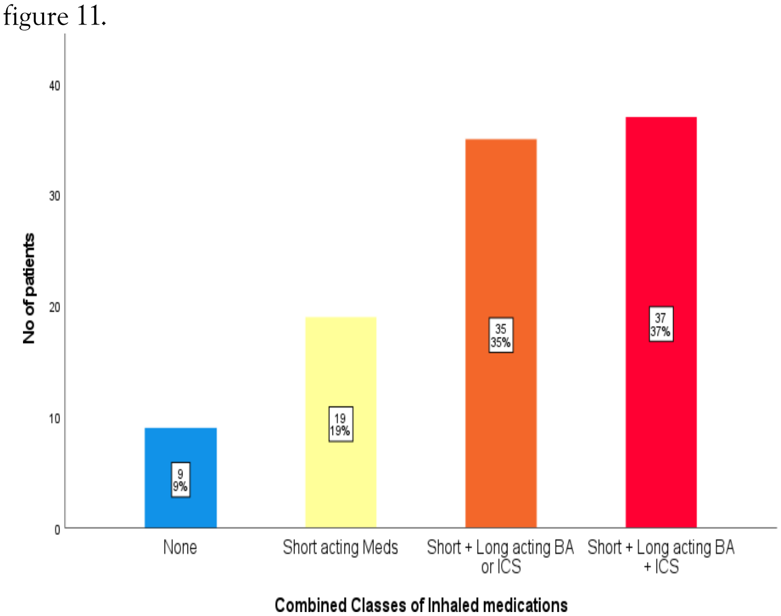


Figure 11: Use of inhaled medications alone or in combination for patients of the study.

Analytical statistics

The association for age and gender with BMI showed no statistically significant difference with p-value>0.05 as shown in table2.**Table 2:** Age and gender association with BMI for patients of the study.

Demographic characteristics			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Age groups	30–39-year-old	No	0	2	2	5.92	0.684
		%	0.0%	5.9%	4.9%		
	40–49-year-old	No	8	11	16		
		%	32.0%	32.4%	39.0%		
	50–59-year-old	No	12	15	16		
		%	48.0%	44.1%	39.0%		
	60–69-year-old	No	2	5	6		
		%	8.0%	14.7%	14.6%		
	70–79-year-old	No	3	1	1		
		%	12.0%	2.9%	2.4%		
Sex	Male	No	15	20	24	0.014	0.993
		%	60.0%	58.8%	58.5%		
	Female	No	10	14	17		
		%	40.0%	41.2%	41.5%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		

X^2: Pearson Chi-square value.

The association for smoking status with BMI showed no statistically significant association with p-value of 0.91. Meanwhile, there was a statistically significant association between packs smoker per year with BMI with p-value of 0.001 as shown in table 3.

Table 3: Smoking status and packs/year smoked association with BMI for patients of the study.

			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Smoking	Smoker	No	11	13	14	1.004	0.916
		%	44.0%	38.2%	34.1%		
	Non- smoker	No	6	8	9		
		%	24.0%	23.5%	22.0%		
	Former smoker	No	8	13	18		
		%	32.0%	38.2%	43.9%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		
						F-test	P-value
Packs Year		Mean	27.2	42.3	44.8	8.6	0.001*
		SD	14.2	13.8	16.7		
		Std. Error	3.3	2.7	3.0		

X^2: Pearson Chi-square value, *statistically significant at p-value<0.05.

Assessment of the past medical history of the patients of the study, BMI showed a statistically significant association with status of comorbidities and presence of DM-2 with p-value<0.05. Meanwhile, BMI showed no statistically significant association with number of comorbidities, presence of hypertension, hyperlipidemia and CAD with p-value>0.05 as shown in table 4.

Table 4: Comorbidities status and number, presence of DM-2, hypertension, hyperlipidemia and CAD association with BMI for patients of the study

			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Comorbidities	Yes	No	16	24	37	7.23	0.02*
		%	64.0%	70.6%	90.2%		
	No	No	9	10	4		
		%	36.0%	29.4%	9.8%		
Number of comorbidities	1	No	11	12	21	8.81	0.18
		%	68.8%	50.0%	56.8%		
	2	No	3	7	11		
		%	18.8%	29.2%	29.7%		
	≥3	No	2	5	5		
		%	12.5%	20.8%	13.5%		
DM-2	Yes	No	3	11	16	6.17	0.046*
		%	12.0%	32.4%	39.0%		
	No	No	22	23	25		
		%	88.0%	67.6%	61.0%		
Hypertension	Yes	No	12	16	24	1.19	0.55
		%	48.0%	47.1%	58.5%		
	No	No	13	18	17		
		%	52.0%	52.9%	41.5%		
Hyperlipidemia	Yes	No	7	14	18	1.75	0.41
		%	28.0%	41.2%	43.9%		
	No	No	18	20	23		
		%	72.0%	58.8%	56.1%		
CAD	Yes	No	2	3	4	0.06	0.97
		%	8.0%	8.8%	9.8%		
	No	No	23	31	37		
		%	92.0%	91.2%	90.2%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		

X^2: Pearson Chi-square value, *statistically significant at p-value<0.05.

Pearson's Chi-square analysis demonstrated a statistically significant association between BMI with MRC Dyspnea Scale severity and MRC dyspnea score ≥2 with p-value<0.05. However, there was no statistically significant association between BMI category and the least level of activity causing dyspnea, as assessed by the St. George's Respiratory Questionnaire (SGRQ) dyspnea with p- value of 0.46 as shown in table 5

Table 5: MRC Dyspnea Scale severity, MRC dyspnea score ≥2 and least level of activity causing dyspnea (SGRQ) association with BMI for patients of the study.

			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Medical Research Council (MRC) Dyspnea Scale	MRC score of 1	No	9	12	4	9.42	0.04*
		%	36.0%	35.3%	9.8%		
	MRC score of 2-3	No	10	13	20		
		%	40.0%	38.2%	48.8%		
	MRC score of 4-5	No	6	9	17		
		%	24.0%	26.5%	41.5%		
MRC dyspnea score ≥ 2	<2 MRC score	No	9	12	4	8.61	0.01*
		%	36.0%	35.3%	9.8%		
	≥2 MRC score	No	16	22	37		
		%	64.0%	64.7%	90.2%		
Least level of activity causing dyspnea (SGRQ)	Walking up-stairs or up-hill	No	8	10	10	3.61	0.46
		%	32.0%	29.4%	24.4%		
	Walking on flat ground	No	10	13	11		
		%	40.0%	38.2%	26.8%		
	Sitting still or dressing	No	7	11	20		
		%	28.0%	32.4%	48.8%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		

X^2: Pearson Chi-square value, *statistically significant at p-value<0.05.

Analysis of quality of life using the St. George's Respiratory Questionnaire (SGRQ) revealed that symptom and total scores did not show statistically significant difference with p-value>0.05, while there were statistically significant differences for impact and activity scores across BMI categories with p-value<0.05. Post hoc analysis for impact score and activity score with BMI showed a statistically significant difference between normal-weight and obese individuals (p-value<0.05), while the difference between overweight with normal-weight and obese individuals showed no statistically significance difference (p-value>0.05) as shown in table 6.

Table 6: Quality of life assessment using the St. George's Respiratory Questionnaire association with BMI for patients of the study.

SGRQ		Mean	SD	SE	F-test	P-value
Impact score	Normal wt.	33.3	12.9	2.6	5.5	0.006*
	Overweight	36.4	11.5	2.0		
	Obese	43.6	14.5	2.3		
	Total	38.6	13.7	1.4		
Activity score	Normal wt.	60.0	13.4	2.7	3.4	0.03*
	Overweight	65.9	17.0	2.9		

	Obese	69.6	12.6	2.0		
	Total	65.9	14.8	1.5		
Symptom score on SGRQ	Normal wt.	57.5	15.7	3.1	2.1	0.12
	Overweight	51.2	18.8	3.2		
	Obese	49.1	14.6	2.3		
	Total	51.9	16.6	1.7		
Total score	Normal wt.	52.6	15.5	3.1	1.1	0.34
	Overweight	50.0	15.8	2.7		
	Obese	55.3	15.5	2.4		
	Total	52.8	15.6	1.6		
Post hoc analysis for statistically significant domains						
Impact score on SGRQ		Normal wt.		Overweight		0.635
				Obese		0.007*
		Overweight		Obese		0.054
Activity score on SGRQ		Normal wt.		Overweight		0.276
				Obese		0.028*
		Overweight		Obese		0.516

*Statistically significant at p-value<0.05.

Chi-square analysis revealed a statistically significant association between BMI and exacerbation treatments with both prednisone and antibiotics in the last year with p-value<0.05 as shown in table 7

Table 7: Exacerbation treatment in the last year association with BMI for patients of the study.

Exacerbation in last year			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Treated with prednisone	Yes	No	12	10	8	6.01	0.048*
		%	48.0%	29.4%	19.5%		
	No	No	13	24	33		
		%	52.0%	70.6%	80.5%		
Treated with antibiotics	Yes	No	12	11	7	7.2	0.02*
		%	48.0%	32.4%	17.1%		
	No	No	13	23	34		
		%	52.0%	67.6%	82.9%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		

X^2: Pearson Chi-square value, *statistically significant at p-value<0.05.

For the use of inhaled medication, there was a statistically significant association between BMI and inhaled corticosteroid (ICS) use with p-value of 0.02, while no significant associations were observed for short-acting inhalers, long-acting inhalers, or combined inhaler classes with p-value>0.05 as shown in table 8.

Table 8: Use of inhaled medication association with BMI for patients of the study.

			BMI category			X^2	P-value
			Normal wt.	Overweight	Obese		
Short-acting inhaler	Yes	No	22	32	37	0.707	0.749

		%	88.0%	94.1%	90.2%		
	No	No	3	2	4		
		%	12.0%	5.9%	9.8%		
Long-acting inhaler	Yes	No	13	20	22	0.322	0.903
		%	52.0%	58.8%	53.7%		
	No	No	12	14	19		
		%	48.0%	41.2%	46.3%		
Inhaled corticosteroids	Yes	No	9	20	29	7.57	0.02*
		%	36.0%	58.8%	70.7%		
	No	No	16	14	12		
		%	64.0%	41.2%	29.3%		
Combined Classes of Inhaled meds	None	No	3	2	4	5.5	0.48
		%	12.0%	5.9%	9.8%		
	Short acting Meds	No	9	7	6		
		%	36.0%	20.6%	14.6%		
	Short + Long-acting BA or ICS	No	4	10	11		
		%	16.0%	29.4%	26.8%		
	Short + Long-acting BA + ICS	No	9	15	20		
		%	36.0%	44.1%	48.8%		
Total		No	25	34	41		
		%	100.0%	100.0%	100.0%		

X^2: Pearson Chi-square value, *statistically significant at p-value<0.05.

DISCUSSION

The relationship between obesity and chronic obstructive pulmonary disease (COPD) is increasingly recognized as an important factor influencing disease presentation, progression, and management. While COPD has traditionally been associated with low body mass index (BMI) and malnutrition, recent epidemiological trends indicate a rising prevalence of overweight and obesity in COPD patients [12]. Obesity affects lung function through both mechanical and inflammatory pathways, contributing to increased dyspnea, reduced exercise capacity, and a greater burden of comorbid conditions. Additionally, obesity may influence COPD exacerbation rates and the effectiveness of pharmacologic interventions [13][14]. The prevalence of obesity among COPD patients in this study was notably high, with 75% of participants classified as either overweight or obese. This exceeds the reported obesity prevalence in the general population of Iraq, where a 2021 study indicated that 65% of adults were overweight or obese. While that study did not specifically examine COPD patients, the high burden of obesity in the general population suggests a potential overlap [15]. The findings of this study are in line with the growing body of literature highlighting the increasing burden of obesity in COPD populations worldwide. However, variations in reported obesity prevalence exist across different studies, likely influenced by regional, genetic, and lifestyle factors. For instance, a 2018 study from the Netherlands found that 21.8% of COPD patients were obese, a percentage significantly lower than the 41% observed in this study [16]. Meanwhile, a large-scale U.S.-based study conducted in 2022 indicated that 54% of COPD patients had a BMI exceeding 30 kg/m², which is even higher than the findings of this study [17]. Furthermore, recent research from Saudi Arabia in 2024 reported an obesity prevalence of 38.2% among COPD patients which closely in line with the finding of this study [18]. These discrepancies in obesity rates across different populations may be attributed to several factors, including variations in dietary patterns, physical activity levels, socioeconomic status, and healthcare access. The increasing prevalence of obesity in COPD populations globally suggests a potential shift in disease phenotype, wherein metabolic dysfunction and systemic inflammation contribute to disease progression.One of the key observations in this study was the lack of a statistically significant association between BMI with age or gender distribution. This is consistent with the findings of two Turkish study one in 2021 and the other in 2018 which reported similar findings [(19)(20)]. This suggests that obesity in COPD patients is not necessarily influenced by demographic factors but may be more strongly related to lifestyle behaviors, comorbid conditions, and underlying pathophysiological mechanisms. In contrast to smoking status, which showed no statistically significant association with BMI in this study, a significant relationship was observed between pack-years smoked and obesity levels. Our findings revealed that obese individuals had a higher mean pack-year history compared to normal-weight patients, suggesting a potential link between prolonged smoking exposure and increased body weight in COPD patients. This is consistent with the findings of a 2014 Spanish study, which similarly reported a positive association between higher cumulative smoking exposure and obesity levels in COPD patients [(21).] This indicates a possible link between prolonged smoking exposure and weight gain in COPD patients. This could be because individuals with extensive smoking histories often experience greater respiratory limitations, leading to a more sedentary lifestyle. Heavy smokers with COPD frequently develop exercise intolerance due to progressive airflow obstruction, dyspnea, and fatigue, which in turn contributes to reduced physical activity and subsequent weight gain.In terms of comorbid conditions, this study demonstrated a significant association between BMI and the presence of comorbidities, particularly type 2 diabetes mellitus (DM-2). These findings were consistent with that of previous study in Saudi Arabia in 2024 and Turkish study in 2017 [(18)(22).] There is a strong interconnection between obesity, insulin resistance, and systemic inflammation. However, no significant association was observed between BMI and other comorbidities such as hypertension, hyperlipidemia, or coronary artery disease (CAD), which agreed with the findings of Dupuis [(23)(24).] A major finding of this study was the significant association between obesity and dyspnea severity. The large majority of obese COPD patients had an MRC Dyspnea Scale score of ≥2, compared to 64% of normal-weight patients. This aligns with the findings of Jin X. et al in 2024 and Kim E et al in 2021 [(25)(26).] This suggests that obesity exacerbates dyspnea through multiple mechanisms, including reduced lung compliance, decreased expiratory reserve volume, and increased airway resistance as reported in the aforementioned study. Additionally, obesity contributes to dynamic hyperinflation, particularly during exertion, leading to greater respiratory discomfort. Despite this association, BMI was not significantly correlated with the least level of activity causing dyspnea, as assessed by the St. George's Respiratory Questionnaire (SGRQ), indicating that factors other than obesity may play a role in perceived breathlessness at lower activity levels. This is consistent with the findings of Cecere L. et al [(23).] Interestingly, prior studies have reported varying results regarding the association between BMI and quality of life in COPD patients. A study by Ozel A et al. found a statistically significant association only for the symptom score, but no significant differences were observed for the total SGRQ score, impact score, or activity score [(19).] This contrasts with the findings of this study, where symptom scores were not significantly affected by BMI, suggesting that other factors, such as disease severity, exacerbation frequency, or underlying metabolic dysfunction, may influence symptom perception in different study populations. On the other hand, a study by Yilmaz F et al. reported significant associations between obesity and impact, activity, and total scores but did not find a statistically significant relationship with the symptom score [(20).] This aligns more closely with this study findings, further reinforcing the notion that obesity primarily worsens physical activity limitations and the psychosocial burden of COPD, rather than directly exacerbating respiratory symptoms. The discrepancies between these studies may be attributed to several factors, including differences in study populations, sample sizes, COPD severity distribution, and cultural influences on symptom reporting and quality of life perception. Additionally, variations in comorbid conditions, such as cardiovascular disease, diabetes, or musculoskeletal disorders, may play a role in modulating how obesity impacts COPD-related quality of life. For COPD exacerbations, the study showed a significant association between body mass index (BMI) and the frequency of chronic obstructive pulmonary disease (COPD) exacerbations requiring treatment with prednisone or antibiotics over the past year. Notably, patients with a lower BMI exhibited a higher necessity for these interventions compared to their obese counterparts. This finding aligns with several recent studies that have explored the relationship between BMI and COPD exacerbations. For instance, a 2024 Meta-analysis highlighted that patients with lower BMI had an increased risk of COPD exacerbations, whereas overweight and obese patients did not show a heightened risk compared to individuals with normal BMI [27]. Similarly, research from 2024 indicated that low BMI in COPD patients is associated with poor outcomes, including increased exacerbation frequency and lung function decline [28]. The use of inhaled medications varied across BMI groups, with a statistically significant association observed between BMI and inhaled corticosteroid (ICS) use. A higher proportion of obese patients were on ICS therapy, which consistent with the findings of Cecere et al [23]. The increased use of ICS therapy in obese COPD patients could be attributed to the associated with systemic and airway inflammation dur to obesity, with elevated levels of pro-inflammatory cytokines such as tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6), and C-reactive protein (CRP). These inflammatory mediators may contribute to more frequent or severe exacerbations, leading clinicians to favor ICS therapy as a means of controlling airway inflammation.

CONCLUSIONS

Three quarters of COPD patients in this study were either overweight or obese, exceeding the previously reported general population prevalence of obesity in Iraq. The growing burden of obesity in COPD reflects a potential shift in disease phenotype. BMI did not show a significant correlation with age, gender or smoking status, but a significant association was found between higher pack-years smoked and obesity. More than ninety percent of obese COPD patients had an MRC Dyspnea Scale score of ≥2, indicating moderate to severe dyspnea. Obesity contributes to reduced lung compliance, decreased expiratory reserve volume, and airway resistance, exacerbating breathlessness.Activity and impact scores on the St. George's Respiratory Questionnaire (SGRQ) were significantly worse in obese patients. While symptom scores and total SGRQ scores did not show a significant association with BMI, suggesting obesity affects physical and psychosocial burden more than respiratory symptoms. A statistically significant association was found between obesity and inhaled corticosteroid (ICS) use which may be due to higher systemic inflammation in obese patients, prompting clinicians to prefer ICS therapy for reducing exacerbations.

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