Table (1): Demographic characteristics of the studied population (n=101)

Variable	Summary statistics
Age (year) [mean ± SD(range)]	60±8.52(44-85)
Gender (n,%) Females Males	34 (33.66%) 67 (66.34%)
Smoking status (n,%) Non-smoker Current Ex-smoker	21 (20.79%) 32 (31.68%) 48 (47.52%)

Table(2): Etiology of AECOPD of the studied population (n=101)

Etiology*	Number %
Infectious Positive bacterial sputum culture Negative bacterial sputum culture *Total*	66 (65.35%)29 (28.71%) *95 (94.06%)*
Non infectious	6 (5.94%)

*Patients who had positive sputum culture, fever or purulent sputum, were considered to have infectious AECOPD, while the others who had none of them were considered to have non-infectious AECOPD (Elkorashy et al., 2014).

Table (2)shows that infectious causes of AECOPD weresuspected in94.06% of the patients. Positive bacterial sputum culture was found in65.35%of all cases.

Table (3): Microbiological findings (by sputum culture) in the studied population (n=101**)**

Microbiology	Number (%)
No growth	31(30.65%)
Positive sputum culture	66 (65.35%)
§ Streptococcus pneumonia	15 (14.85%)
§ Haemophilus influenza	14 (13.87%)
§ Pseudomonas aeruginosa	11 (10.89%)
§ Staphylococcus aureus	9 (8.9%)
§ Klebsiella pneumonia	6 (5.94%)
§ Streptococcus pyogenes	5 (4.96%)
§ Streptococcus parasanguinis	4 (3.96%)
§ Enterococci	2 (1.98%)

Table (3) shows that 65.35% of the patients had positive sputum cultures. The most frequent bacterial growth were:Strept.pneumonia, H. influenza, P. aeruginosa and Staph.aureus (14.85%, 13.87%, 10.89% and 8.9%respectively)**.**

Table(4): Outcome of the studied population (n=101)

Outcome	Number (%)
Improvement	83 (82.18%)
Non improvementICU admissionDeath*Total*	14 (13.86%) 4 (3.96%) *18 (17.82%)*

ICU: intensive care unit

Table (4) shows that 82.18% of the cases improved with management in the ward of Chest Department, 13.86% of the cases were referred to ICU, and 3.96% of the cases died.

Table(5): Relation between patient's outcome and demographic characteristics

Variable	**Improved**(n=83)	**Not improved**(n=18)	**Odds ratio** (95%CI)	**P value**
Age (year) (mean ± SD)	59.84±8.04	62.72±10.34	1.04 (0.98-1.10)	0.2
Gender(n,%). Females **Males**	32(38.55%) **51(61.45%)**	2 (11.11%) **16 (88.89%)**	1 **5.01 (1.08-23.29)**	**0.04**
Smoking status (n,%) Smokers Nonsmokers	64 (77.1%) 19 (22.9%)	6 (88.89%) 2 (11..11%)	2.38(0.50-11.26) 1	0.28

Table (5) shows that poor outcome was significantly related to male gender (P= 0.04). Patients with poor outcome had higher mean age in comparison with patients who improved, but this relation was statistically not significant.

Table (6): Relation between the patient's outcome and the characteristics of the disease and current exacerbation

Variable	Improved (n=83)	Not improved (n=18)	Odds ratio(95% CI)	P value
Duration of the disease (year) (mean±SD)	11.88±8.46	13.83±6.93	1.03 (0.97-1.09)	0.36
Prior LTOT (n,%)	**12 (14.46%)**	**8(44.44%)**	**4.73 (1. 56-14.4)**	**0.006**
Prior ICU admission (last year)(n,%)	**5 (6.02%)**	**6 (33.33%)**	**7.8 (2.01-29.59)**	**0.003**
Prior hospitalization (last year)(n,%) 0 1 **≥2**	39 (46.99%) 23 (27.71%) **21(25.3%)**	2 (11.11%) 5 (27.78%) **11(61.11%)**	1 4.24(0.76-23.65) **10.21 (2.07-50.5)**	. 0.1 **0.004**
Frequency of AECOPD (last year) (mean ± SD)	**2.25±1.17**	**3.22±1**	**2.15 (1.29-3.6)**	**0.003**
Exacerbation severity (n,%) Severe Moderate/ Mild	60 (72.29%) 23 (27.71%)	17 (94.44%) 1 (5.56%)	6.52 (0.82-51.81) 1	0.08

LTOT: long term oxygen therapy. **ICU:**intensive care unit.

Table(6) shows that there were significant relations between poor outcome andhistory of prior LTOT, priorICU admission,previous ≥2 hospital admissions in the last year and higher mean frequency of exacerbation in the last year (P=0.006, 0.003, 0.004 and 0.003 in order).

Table (7):Relation between patient's outcome and their clinical data

Variable	Improved (n=83)	Not improved (n=18)	Odds ratio (95%CI)	P value
Increased sputum volume(n,%)	76 (91.57%)	18 (100%)	3.83(0.00)	0.99
Increased dyspnea(n,%)	82(98.76%)	18 (100%)	3.55 (0.00)	1
Altered consciousness (n,%)	**10 (12.05%)**	**7 (38.89%)**	**4.65 (1.46-14.8)**	**0.009**
Cyanosis (n,%)	48 (57.83%)	16 (88.9%)	3.47 (0.93-12.92)	0.06
Pulse rate (mean ± SD)	**100.77±15.6**	**111.0±20.1**	**1.04 (1.01-1.07)**	**0.02**
Respiratory rate (mean ± SD)	**26.2±3.99**	**31.11±3.99**	**1.36 (1.16-1.61)**	**<0.0001**
Fever (n%)	**51 (61.45%)**	**17 (94.44%)**	**10.67(1.35-84.08)**	**0.03**
Flapping tremor (n,%)	**18 (31.67%)**	**14 (77.8%)**	**12.64 (3.7-43.14)**	**<0.0001**
Pedal edema (n,%)	**33 (39.76%)**	**16 (88,9%)**	**5.04 (1.53-16.65)**	**0.008**

Table (7) demonstrates that poor outcome was significantly related to presence of consciousness alteration, higher rates of pulse and respiration, fever,flapping tremorsand pedal edema, in comparison with good outcome (P= 0.009, 0.02, <0.0001, 0.03,<0.0001 and0.008respectively).

Table (8)Relation between patient's outcome and comorbidities

Variable	Improved (n=83)	Not improved (n=18)	Odds ratio(95% CI)	P value
Bronchiectasis (n,%)	**8 (9.64%)**	**5 (27.78%)**	**3.60 (1.02-12.8)**	**0.047**
Pneumonia (n,%)	13 (15.66%)	6 (33.33%)	2.69 (0.86-8.46)	0.09
Sleep disorders (n,%)	8 (9.64%)	3 (16.67%)	1.88 (0.45-7.89)	0.39
DCP (n,%)	**36 (43.37%)**	**15 (83.33%)**	**6.53 (1.76-24.28)**	**0.005**
IHD (n,%)	18 (21.69%)	7 (38.89%)	2.3 (0.78-9.78)	0.13
Hypertension (n,%)	35 (42.17%)	8 (44.44%)	1.1 (0.39-3.06)	0.86
DM (n,%)	**20 (24.1%)**	**10 (55.56%)**	**3.94 (1.36-11.3)**	**0.008**
Renal diseases (n,%)	4 (4.82%)	3 (16.67%)	3.95 (0.8-19.5)	0.09
Hepatic diseases (n,%)	7 (8.43%)	4 (22.22%)	3.1 (0.8-12)	0.1
Comorbidity (n,%) **<2** **≥2**	 19 (22.9%) 64 (77.1%)	 0 18 (100%)	 Omitted 4.54(0.00)	 1

DCP: decompensated corpulmonale**IHD**: ischemic heart disease **DM:** diabetes mellitus

Table (8)demonstrates that the patients with poor outcome had higher frequencies of associated comorbidities (i.e. bronchiectasis,DCP and DM) in comparison with the patients with good outcome (P= 0.047, 0.005 and 0.008 respectively).

Table (9): Relation between the patient's outcome and arterial blood gas parameters on admission

Variable	Improved (n=83)	Not improved (n=18)	Odds ratio(95% CI)	P value
pH(mean ± SD)	**7.4±0.07**	**7.35±0.06**	**0.0001 (0-0.2)**	**0.007**
$PaCo_2$(mean ± SD)	**47.73±16.83**	**59.89±17.45**	**1.04 (1.00-1.08)**	**0.01**
PaO_2(mean ± SD)	**56.1±16.32**	**42.28±12.82**	**0.93 (0.88-0.98)**	**0.003**
SaO_2 (mean ± SD)	**82.52±11.73**	**70.64±12.78**	**0.93 (0.89-0.97)**	**0.001**
HCO_3 .(mean ± SD)	**26.36±5.44**	**28.56±6.11**	**1.07 (0.98-1.17)**	**0.14**

pH:potential of hydrogen.**$PaCO_2$:** partial arterial tension of carbon dioxide.**PaO_2:** partial arterial tension of oxygen. **SaO_2**: arterial oxygen saturation.**HCO_3:** bicarbonate.

Table(9)shows that,on admission, the patients with poor outcome had lower mean values of pH, PaO_2 and SaO_2% in comparison with the patients with good outcome (P= 0.007, 0.003 and 0.001respectively). The patients with poor outcome had higher values of $PaCO_2$ in comparison with patients with good outcome (P= 0.01).

Table (10): Relation between the patient's outcome and the laboratory investigations

Variable	Improved (n=83)	Not improved (n=18)	Odds ratio(95% CI)	P value
Leukocytosis (n,%)	**32 (38.55%)**	**15 (83.33%)**	**1.13(1.03-1.24)**	**0.008**
Polycythemia (n,%)	12 (14.46%)	3 (16.67%)	1.18 (0.3-4.7)	0.81
Thrombocytopenia (n,%)	**7 (8.54%)**	**8 (44.44%)**	**8.57 (2.56-28.7)**	**0.001**
Elevated serum creatinine (n,%)	**19 (22.89%)**	**9 (50%)**	**3.37 (1.17-9.68)**	**0.02**
Elevated liver enzyme (n,%)	**16 (19.28%)**	**11 (61.11%)**	**6.58 (2.2-19.63)**	**0.001**
Serum albumin(mean ± SD)	**3.62±0.58**	**3.19±0.57**	**0.19 (0.06-0.63)**	**0.007**
Sodium(mean ± SD)	**131.93±6.41**	**128.4±8.33**	**0.92 (0.84-1.01)**	**0.08**
Potassium (mean ± SD)	**3.25±0.65**	**3.2±0.65**	**0.88 (0.36-2.12)**	**0.78**
Calcium (mean ± SD)	**1.01±0.08**	**0.99±0.10**	**0.15 (0.0003-84.5)**	**0.55**

Table(10) shows that poor outcomewas significantly related to leukocytosis, thrombocytopenia, elevation of the serum level of creatinine, liver enzymes(ALT&AST) and lower meanserum level of albumin (P= 0.008, 0.001, 0.02, 0.001 and 0.007 respectively).

Table (11): Relation between patient's outcome and radiological findings

Variable	**Improved** (n=83)	**Not improved** (n=18)	**Odds ratio (**95% CI**)**	**P value**
Hyperinflation (n,%)	78 (93.98%)	17 (94.44%)	1.09 (0.12-9.94)	1
Cardiomegaly (n,%)	**29 (34.94%)**	**15 (83.33%)**	**9.31 (2.49-34.82)**	**0.001**
Bronchiectatic change (n,%)	**8 (9.64%)**	**5 (27.78%)**	**3.60 (1.02-12.8)**	**0.047**
Pneumothorax (n,%)	4 (4.82%)	0	Omitted	
Lung infiltrates (n,%)	13 (15.66%)	6 (33.33%)	2.69 (0.86-8.46)	0.10
Pleural effusion (n,%)	6 (7.23%)	2 (11.11%)	1.60 (0.30-8.68)	0.63
Hydro-pneumothorax(n,%)	0	2 (11.11%)	Omitted	
Lung abscess (n,%)	0	1 (5.56%)	Omitted	

Table (11) shows that the frequency of cardiomegaly and bronchiectatic changes as radiological findings in the patient with poor outcome was significantly higher than that in patients with good outcome (P= 0.001 and 0.047 respectively).

Table (12): Relation between pulmonary artery systolic pressure (according to echocardiography) and patient's outcome

PASP (n,%)	**Improved** (n=83)	**Not improved** (n=18)	**Odds ratio(95%CI)**	**P value**
Normal *(<25)mmHg* Mild *(25:40)mmHg* Moderate *(40:55)mmHg***Severe** *(>55) mmHg*	25(30.12%) 23 (27.71%) 23(27.71%) **12 (14.46%)**	1 (5.56%) 3 (16.67%) 8(44.44%) **6(33.33%)**	1 3.26(0.32-33.61) 8.70(1.0-74.99) **12.5(1.35-115.79)**	0.32 0.05 **0.03**

PASP: pulmonary artery systolic pressure.

Table(12) shows that poor outcome had a significant relation to severe pulmonary hypertension (P= 0.03).

Table (13): Relation between patient's outcome and spirometricparameters

Variable	**Improved**(n=82)	**Not improved**(n=9)	**Odds ratio(95% CI)**	**P value**
FEV_1 (L) (mean ± SD)	**1.07±0.46**	**0.58±0.2**	**0.003(0.00-0.3)**	**0.01**
FVC(L) (mean ± SD)	**1.86±0.74**	**1.19±0.34**	**0.14(0.03-0.69)**	**0.02**
FEV_1/FVC % (mean ± SD)	57.24±9.37	51.82±17.94	0.59 (0.89-1.02)	0.15
COPD staging (n,%) II/ III **IV**	55 (67.07%) **27(32.93%)**	2 (22.22%) **7(77.78%)**	**1** **7.13 (1.38-36.66)**	**0.02**

*Spirometric parameters were recorded foronly 91 patient so the total number of the studied population in this table is 91.

FEV_1: forced expiratory volume in 1st second**FVC**: forced vital capacity

Table (13) shows that the patients with poor outcome had significantly lower mean values of FEV_1 and FVC (P= 0.01 and 0.02 respectively) in comparison with the patient who improved. Poor outcome had a significant relationship with severe COPD stage (stage IV) (P=0.02).

Table (14): Relation between the etiology of AECOPD and patient's outcome

Etiology	**Improved** (n=83)	**Not improved** (n=18)	**Odds ratio(95% CI)**	**P value**
Infectious (n,%) . . Positive sputum culture . Negative sputum culture**Noninfectious** (n,%)	51(61.5%) 26(31.3%) 6(7.2%)	15(83.3%) 3(16.7%) 0	3.14 (0.84-11.7) 0.44 (0.12-1.65)Omitted	0.09 0.22

As regard the etiology of AECOPD, **table (14)** shows that bacterial infection was more frequent among the patients who had poor prognosis but statistically insignificant(P=0.09).

Table (15): Relation between the bacterial growth and patient's outcome (n=101)*

Bacterial growth	Improved (n=83)	Not improved (n=18)	Odds ratio(95% CI)	P value
Streptococcus pneumonia	15 (18.07%)	0	Omitted	
Haemophilus influenza	12(14.46 %)	2(11.11 %)	0.53(0.08-3.7)	0.51
Pseudomonas aeruginosa	**5(6.02%)**	**6(33.33 %)**	**0.07(0.01-0.39)**	**0.002**
Staphylococcus aureus	**2(2.41%)**	**7(38.89%)**	**0.03 (0.004-0.18)**	**<0.0001**
Klebsiella pneumonia	6 (7.23 %)	0	Omitted	
Streptococcus pyogenes	5 (6.02%)	0	Omitted	
Streptococcus parasanguinis	4 (4.82%)	0	Omitted	
Enterococci	2 (2.41%)	0	Omitted	
Total (n=66)	51 (61.44%)	15(83.33%)	3.14 (0.84-11.7)	0.09

***Only 65.35% of the patients (66 patients) had bacterial growth in their sputum culture.

Table (15) shows that there was a significant relation between poor outcome and isolation of Staphylococcus aureusand Pseudomonas aeruginosa from the sputum culture of the patients(P<0.0001and 0.002 respectively).