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Risk Factors of Acute exacerbation of Chronic Obstructive Pulmonary Disease

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Abstract
Background: Acute exacerbation of Chronic Obstructive Pulmonary Disease is regarded as one of the most chronic illnesses affecting the elderly patients globally. Exacerbations of COPD are frequent and have significant clinical and financial ramifications. **Aim:** To determine risk factors of acute exacerbation of Chronic Obstructive Pulmonary Disease. **Study design:** A descriptive research design used to collect data of the research. **Setting:** This research was conducted in chest intensive care unit at Assiut University Hospital. **Patients:** A convenient patients of all available patients (male and female) diagnosed with Acute exacerbation of chronic obstructive pulmonary disease with age grouped ranged from 20 - 60 years within of nine months in the Assiut university hospital's chest intensive care unit. **Tools:** Two tools were used to gather study data; **Tool I:** Patient's assessment tool, **Tool II:** Risk factors assessment tool. **Results:** The study showed that the majority of the patients under study were male, and their ages ranged from 45 to 60 years. The main risk factors for COPD were smoking (83.3%), high blood pressure (83.3%), cardiac disorders (68.3%) and patients had diabetes mellitus (60%). **Conclusion:** The study showed that major risk factors among chest intensive care unit patients with COPD were smoking, hypertension, diabetes mellitus and patients with cardiac disorders. **Recommendations:** Create a training program and refresher courses for health caregivers regarding risk factors of complications among patients with acute exacerbation of chronic obstructive pulmonary disease.

Keyword: Acute exacerbation, Chronic Obstructive Pulmonary Disease (COPD) & Risk factors.

Introduction:
The third most prevalent cause of death worldwide is chronic obstructive pulmonary disease (COPD) and is a public health emergency (World health organization, 2020). COPD is a lung illness which reasons the airways to constrict. Breathlessness results from a restriction in the airflow caused by this. Emphysema, which causes the lung and airways to be destroyed, and chronic bronchitis are among them. Breathlessness, a persistent cough, and sputum production are the most typical signs of COPD. Exacerbations can range in duration from a few days to several weeks and are characterized by severe periods of worsening dyspnoea, coughing and sputum produce, are another common occurrence for patients with COPD. **(Shakeel et al., 2023).**

Acute exacerbation of chronic obstructive pulmonary disease (AECOPD)is an abrupt worsening of COPD symptoms, namely dyspnoea, coughing up more phlegm, limited exercise tolerance, and increased sputum production. When these symptoms last longer than 48 hours, they usually result in worsening lung function, a higher risk of respiratory failure, and can even result in death. **(GOLD, 2020; Ambali & Jayanth, 2019).**

Chronic Obstructive Pulmonary Disease is becoming a more significant public health concern in Egypt, Despite the lack of information about illness, death and prevalence. Therefore, the 2020 healthy people targets comprised a decrease in rates of hospitalization and chest intensive care unit visitations; the 2030 targets will remain the same. **(Aliakbar et al., 2020).**

Respiratory function changes with age as functional capacity declines. Functional residual capacity increases when alveolar and alveolar-capillary surface area rises and elasticity falls. The respiratory rate increased for the elderly > 65 years old (16–28 breaths per minute) and for the elderly ≥ 80 years old (10–30 breaths per minute). As people age, their swallow respiration coordination slightly alters. Low partial pressures of oxygen (PaO2) in the elderly are a natural feature of aging **(Bowdish et al., 2019).**

The risk factors for the onset and progression of COPD vary greatly because the condition is worldwide in nature. In general, there are two categories of factors that predispose to the development of COPD: host risk factors and inhalational exposure factors. Although long-term cigarette smoking has long been thought to be the primary cause of COPD, however other risk factors including occupational exposures and even concomitant asthma can contribute to fixed airflow obstruction. **(Leung et al., 2021).**

Numerous factors have been discovered in clinical and nursing research as COPD risk factors. These can be divided into two categories. the first category of risk factors consists of unchangeable factors such age, sex and history of the family. **(GOLD, 2023).** The second category consists of items that are modifiable, like tobacco smoking, environmental exposure, respiratory infections, the presence of comorbidities such as bronchiectasis and heart disease, poor health status and the presence of emphysema. **(Mallia & Johnston, 2022)**

The most prevalent clinical sign of COPD is dyspnoea. In addition, symptoms impair the quality of sleep, make it difficult to perform daily duties and physical activities, and are linked to a reduction in the quality of life that is directly tied to one's health **(Mendes et al., 2022).** worsening dyspnoea, tightness in the chest, persistent coughing (whether phlegm is present or not) and wheezing are the most prevalent signs of COPD. Accurate diagnosing and effective managing of COPD are essential for living longer and enhancing quality of life. **(World Health Organization, 2021).**

COPD symptoms might include sputum production, weariness, tightness in the chest, persistent cough, and dyspnoea that worsens with time. Many patients experience intermittent chronic coughing, with or without sputum production, which can occur years before airflow limitation develops. In addition, patients with COPD may be more susceptible to "winter colds" or "acute bronchitis." Primary care physicians should take middle-aged or older smokers who frequently have respiratory tract infections into consideration when diagnosing COPD **(GOLD, 2021).**

The study's significance:

COPD was the third leading cause of mortality and the fifth leading cause of disability in adjusted years of live in 2020. Age-related increases in COPD prevalence impact around 300 million individuals globally, accounting for three million annual deaths, primarily countries with low to moderate incomes. **(Roberto et al., 2020).**

According to the Assiut university hospital's statistical data, 400 patients were admitted to the chest intensive care unit in 2022 due to acute exacerbation of chronic obstructive pulmonary disease, which can lead to various complications as pulmonary oedema, decrease cardiovascular output, irregular rhythms and an episode of acute respiratory failure. Therefore, the purpose of this study was to collect data that could be useful in planning and carrying out future nursing studies for this patient group in an attempt to lower or eliminate COPD risk factors, reduce complications and prevent mortality rate.

The study's aim:

The current research seeks to determine risk factors of acute exacerbation of chronic obstructive pulmonary disease.

Patients & Method

Research Design:

The study employed a descriptive study design for the purpose of data collection.

Research question:

What are the risk factors related to acute exacerbation of chronic obstructive pulmonary disease?

Setting:

This research was conducted in the Assiut university hospital's chest intensive care unit.

Patients:

A convenient patients of all available patients (male and female) diagnosed with Acute exacerbation of chronic obstructive pulmonary disease within of nine months period from 20/11/2022 to 20/7/2023 (60 male and female patients), age range between 20-60 years and agreed to participate in the research.

Tools of the study:

Tools of data collecting: To collect study data two tools were applied:

Tool (l): patient's assessment tool.

The tool was developed after reviewing of the relevant literatures by the researcher **(Roth et al., 2020)**. the tool is composed of **Three primary parts**.

Part I: Patient's demographic data and clinical sheet:

Socio-demographic data: Involves patient's code, ages, gender, occupation and. **Clinical data:** Included diagnosis of the patients, previous medical data of chronic disease and body mass index.

Part II: Patient's hemodynamic assessment sheet: The part involved heart rate, blood pressure levels, respiratory rate, temperature, oxygen saturation, respiratory assessment and cardiac assessment.

Part III: investigation assessment sheet which include:

Diagnostic study

- Chest x- rays comment.
- CG comment.

Laboratory study

The following part pertains to data about the findings of laboratory tests included white blood cell (WBC), Arterial blood gases (ABG), C-reactive protein levels (CRP) and random blood glucose levels.

Tool (II): Risk factors assessment tool.

The tool was developed by the researcher after reviewing of the relevant literatures to identify risk factors for chronic obstructive pulmonary disease (COPD) such as (family history, smoking, high blood

pressure, excessive body wight, advancing age, physical inactivity, coronary heart disease and exacerbation of COPD).

Methods:

The research was divided into **three primary phases**, the preparing, implementation and evaluation phases.

Phase (1): preparatory phase:

- Permission to perform the research was authorized from the responsible authorities at Assiut University Hospital's Chest intensive care unit after explaining the purpose of the research**.**
- The tools were developed following a review of relevant literature.

Validity:

The research tools were evaluated for face validity by three specialists from the Critical care Nursing and emergency department, Faculty of Nursing, Assiut University. this review ensured that the tools effectively measured the intended variables. The tools were adjusted in response to the assessment of phrase clarity, content appropriateness and items sequencing.

Reliability:

The developed tools were exanimated to reliability through the use of the Cronbach's alpha to assess reliability of tools (first, second) which were 0.87 - 0.789 which were acceptable.

A pilot study:

A pilot study was conducted to evaluate to the tool's applicability, understand ability, and clarity. As well as, to identify potential issues that might arise during the actual data collection. The study was applied to 10% of the patients that consider 6 patients to see the validity and reliability of the study tool. The patients involved in the pilot study were not included in the final study sample.

Ethical considerations:

- The research proposal received approval from the Ethical Committee at Faculty of Nursing, Assiut University.
- There are no risks to the participants during study's implementation.
- Written consent was obtained from patients that participants in the study, after explaining the nature and the purpose of the study.
- Participants of the study are informed of their right to decline participation or withdraw from the research anytime without providing a reason.
- Confidentiality and anonymity of the collected data were maintained, the study adhered to established ethical principles in clinical research and participants' privacy was respected throughout the data collection.

Phase (2): Implementation phase:

- The researcher used textbook, papers, significant newspapers and other local and worldwide literature for the current study. The tools were developed using this literature and standard scale, experts in critical nursing evaluated them for validation.
- The sample of the study meeting the research criteria including patients with acute exacerbation of COPD.
- By using first tool, the researcher evaluated each patient in the study. Evaluate patient's socio-demographic and assessment of patient's medical data and then for presence of risk factors using second tool.
- At the end of the study determine the frequency of risk factors for acute exacerbation of COPD patients by followed up the patient status and guided by the physician diagnosis.
- Evaluated each patient two times (in admission and once per shift through 48 hours from admission) by using study tools.
- The study took almost 9 months to collect data.

Phase 3: Evaluation phase:

This data was evaluated on 48 hours from patients' assessment and from records of patient such as:

- Hemodynamic state for patients includes: (heart rate, blood pressure level, respiratory rate, temperature and oxygen saturation level).
- Diagnostic study such as: chest x-rays and ECG comment.
- Lab tests like ABGs was performed on a daily from admission and once per shift for 48 hours.
- Assessment risk factors at the time of admission for patients suffering from acute exacerbation of COPD.

Statistical design:

The data collection was coded, tabulated and analyzed by using the Statistical Package for Social Sciences (SPSS) version 26. The data was displayed in tables and figures containing numbers, percentages, means, standard deviation.

Result

Table (1): Percentage distribution of Socio demographic data for chronic obstructive pulmonary disease patients (n=60)

	No	%
Age group		
Less than or Equal 50 years	21	35.0
More than 50 years	39	65.0
Mean±SD (range)	**53.45±5.67(41-60)**	
Sex		
Male	40	66.7
Female	20	33.3
Marital status		
Married	51	85.0
Divorced	2	3.3
Widow	7	11.7
Occupation		
Housewife	16	26.7
Employee	26	43.3
Farmer	15	25.0
Unemployed	3	5.0

Table (2): Percentage distribution of the studied patients regarding to past medical history on chest intensive care unit (n=60)

Variables	No	%
Past medical history		
Hypertension	43	71.6
Diabetes mellitus	35	58.3
Previous respiratory disease		
Yes	56	93.3
No	4	6.7
Types of respiratory disease		
Pulmonary edema	9	15.0
Pneumonia	12	20.0
Chronic bronchitis	13	21.6
Obstructive sleep apnea syndrome	6	10.0
Respiratory failure	7	11.7
Previous exacerbation of COPD	9	15.0
Cardiac disease		
Yes	31	51.7
No	29	48.1
Types of Cardiac disease		
Myocardial infarction (MI)	9	15.0
Thrombosis	8	13.3
Heart failure	6	10.0
Ischemic heart disease (IHD)	8	13.3
Renal disease		
Yes	9	15
No	51	85
Types of renal disease		
Acute renal failure	1	1.7
Ectopic kidney	1	1.7
Renal failure	4	6.7
Renal impairment	3	5.0
Smoking status		
Smoker	50	83.3
Non smoker	10	16.7

Variables	No	%
Type of smoking		
Current smoker	40	66.6
Passive smoker	10	16.7
Smoking index		
Heavy	21	35
Moderate	9	15
Mild	10	16.6

Table (3): Descriptive Statistics for Hemodynamic data Assessment Patient (n=60)

Hemodynamic parameters	Mean±SD	Range
Temperature		
1st day	37.76±0.23	37.4-38.4
2nd day	37.5±0.14	37-37.8
Pulse		
1st day	94.23±11.73	60-112
2nd day	92.82±10.67	60-105
SBB		
1st day	130.75±10.29	115-160
2nd day	129.17±8.03	110-140
DBB		
1st day	78.5±6.78	65-90
2nd day	78.25±5.35	70-90
Respiratory Rate		
1st day	23.88±3.87	18-33
2nd day	21.92±2.74	16-28
Oxygen saturation		
1st day	87.97±2.23	84-92
2nd day	88.62±1.45	85-92

Table (4): Percentage distribution of the studied patients regarding risk factors of acute exacerbation of COPD (n=60)

Variables	Yes		No	
	No	%	No	%
Non modifiable factors				
Advanced age	32	53.3	28	46.7
Family history	29	48.3	31	51.7
Gender				
Male	40	66.7	20	33.3
Female	20	33.3	40	66.7
Modifiable factors				
Smoking	50	83.3	10	16.7
Hypertension	50	83.3	10	16.7
DM	36	60.0	24	40.0
Presence of emphysema	35	58.3	25	41.7
Respiratory failure	23	38.3	37	61.7
Severe airflow limitation	56	93.3	4	6.7
Seasonal variations	41	68.3	19	31.7
Previous exacerbations of COPD	48	80.0	12	20.0
Body Mass Index (BMI)				
Underweight	0	0	60	100
Normal weight	10	16.7	50	83.3
Overweight	20	33.3	40	66.7
Obese	30	50	30	50

Variables	Yes		No	
	No	%	No	%
Cardiac disease	41	68.3	19	31.7
Myocardial infarction (MI)	12	20	29	48.3
Thrombosis	10	16.7	31	51.6
Heart failure	8	13.3	33	55
Ischemic heart disease (IHD)	11	18.3	30	50
kidney disease	25	41.7	35	58.3
Acute renal failure	10	16.7	15	25
Chronic renal failure	8	13.3	17	28.4
Renal impairment	7	11.7	18	30

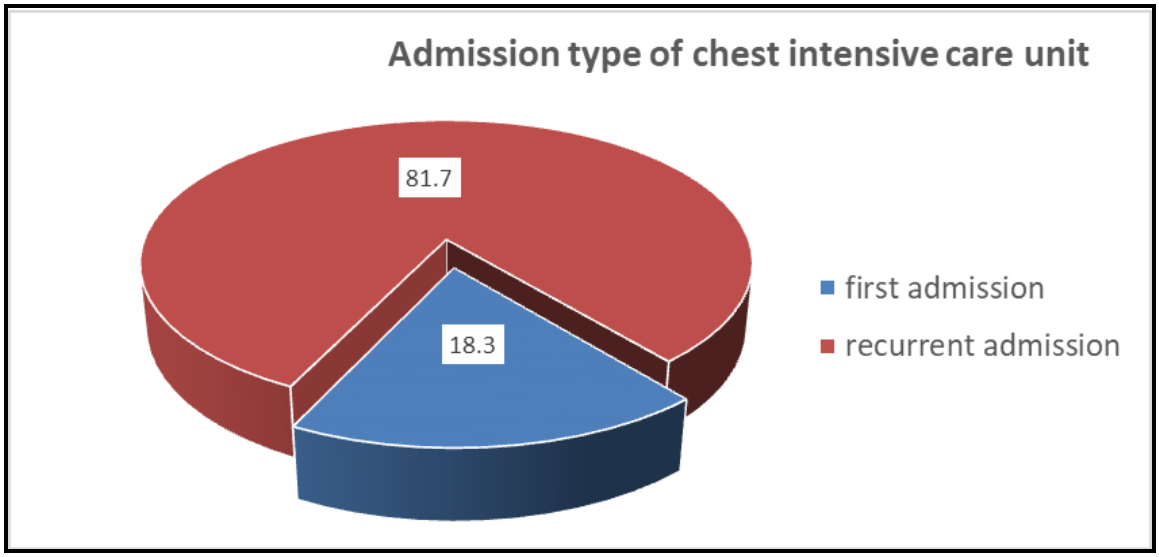

Figure (1): Percentage distribution of the studied patients regarding to Admission type of chest intensive care unit (n=60)

Table (1): Shows the percentage distribution of the patients under study with regard to Socio demographic data it was observed that 66.7% were male, their 65.0% age is more than 50 years and 85.0% were married and were farmer (43.3%).

Table (2): Shows the percentage distribution of the patients under study with regard to previous medical records, presented that ; over half have a history of high blood pressure (71.6%) and diabetes(58.3%) ,it was discovered that almost every patients in the intensive care unit for chest had respiratory disorders(93.3%) ,it was noticed that 51.7% of the patients' medical history of cardiac disorders, considering the status of smoking it was founded that 83.3% were smokers, it was observed most of them 66.6% were presently smoking, Also, 35% were heavy smokers.

Table (3): Show parameters related to hemodynamic and vital signs on chest care unit. At first day, regarding temperature, it can discover that the average value was (37.76±0.23) and systolic blood pressure it can observe that (130.75±10.29), Respiratory rate it can observe that (23.88±3.87), Oxygen saturation it can observe that (87.97±2.23).

Table (4): Shows the percentage distribution of the patients under study with regard to risk factors of acute exacerbation of COPD on chest intensive care unit, founded that 53.3% of patient had Non modifiable risk factor of advanced age and more than half were male. It was noticed that smoking, hypertension, diabetes mellitus, Severe airflow limitation, prior exacerbation of COPD were the commonest modifiable factors affecting COPD status with percentages of 83.3%, 83.3%, 60.0%, 93.3%, 80.0%. disease and it was noticed that nearly all of patient had modifiable risk factor of obesity that (50%) and 33.3% of the patients with COPD were obesity by index of body mass and it was observed that cardiac disease was modifiable factors affecting COPD status with percentage of 68.3%.

Figure (1): Shows the percentage distribution of the patients under study with regard to medical records it was showed that 81.7% were recurrent admission and 18.3% were first admission.

Discussion:

The prevalent and curable condition known as acute exacerbation of COPD is marked by increasing tissue damage and airflow restriction. It is linked to structural alterations in the lungs as a result of chronic inflammation followed by continuous exposure to dangerous particles or gases most frequently smoking. Reduced lung recoil and airway constriction are the results of chronic inflammation. Cough, dyspnoea, and sputum production are common signs of the illness. Symptoms can vary from showing no signs to leading to respiratory failure. **(Kılıç et al., 2023).**

Regarding the characteristics of demographic; the current research shows that over half of patients are males, married, their ages were between fifty and sixty years. According to the researcher, this could be explained by the fact that age may reflect the total of all lifetime exposures to COPD risk factors and that old people may not have the immunity to fight the disease by the time the condition worsens, in contrast to young people. The occurrence of COPD is also thought to increase with age due to physiological changes that occur at the alveoli.

Regarding age; in the present study shows that more than half of patients with COPD is more than 50 years. This might explain the age-related changes in the respiratory system that are associated with COPD, such as decreased lung functions, increased gas trapping, lung elasticity loss, and expansion of the distal air gaps. These findings are in harmony with research conducted through **Helmy et al., (2022),** those found that over half of patients had chronic obstructive lung disease were in the fifty to sixty-year age range. Further, this result disagrees with **Ayres & Gabbott, (2020)** who mentioned that COPD is more common in young women between the ages of 20–40 years and its main cause is proposed to be psychological.

Regarding sex; in the present study shows that more than half of patients were male. According to the research, risk factors are more prevalent in males, mainly cigarette smokers and frequent occupational exposure to an irritating workplace. The present findings are consistent with the research carried out by **Suleymanova & Baranova, 2020 & Helmy et al., (2022),** which demonstrated that more than fifty percent of patients were males and they were married. Additionally, this outcome was agreed with **Khalil et al., (2019),** they performed research on "sleep quality among patients with chronic obstructive pulmonary disease in Egypt" and more than half of the patients with COPD were observed to be male. On the opposite direction, the result was inconsistent with **Ojuawo et al., (2019),** they performed research on "profile of patients with chronic obstructive pulmonary disease in Ilorin who were never-smokers" and the study sample with COPD that involved nearly of fifty percent of females were reported. Also, these results are disagreement with the research done by **Sulku et al., (2019)** who was found that over half of the patients they looked at were female.

Concerning the marital status, the present study demonstrated that almost eighty percent of patients with acute exacerbation of COPD were married. This in compatible with **Martha et al., (2021)**, who reported that the marital status was more than half of research individuals were married. Also, that outcome agrees with **Ibrahim & Abd El-Maksoud, (2018)** who explained that the study sample's married people was over half.

Regarding past medical history; this present research shown that more than fifty percent of studied patients had cardiac disease, high blood pressure and diabetes, it was discovered that almost eighty percent of patients in the intensive care unit for chest had respiratory disorders, this result agrees with **Martha et al., (2021),** who reported that more than half of patient had hypertension and diabetes which were the most common comorbidities among COPD patients who were elderly. These outcomes concurred with those of an Egyptian study conducted by **Farag et al., (2018)** stated that the two most common comorbidities among COPD patients that have been documented are diabetes mellitus and hypertension. Older Patients had almost eighty percent of patients have one or more comorbidity factors.

the present research results considering the status of smoking it was founded that more than half were smokers, it was observed almost sixty percent them were presently smoking, Also, more than thirty percent were heavy smokers. The finding was matched with **Mohamed et al., (2019),** who reported that majority of the patients were smokers.

regarding to patients of study, the result was shown that nearly all of patients have respiratory disorders. This may be due to hereditary causes of respiratory diseases and most of studied patients had cigarette smoking. This outcome was consistent with the result of **(Zeinab et al., 2022),** who stated that of the studied patients with respiratory disease.

Regarding vital signs & hemodynamic parameters. the present study shows that at first day, it was noticed that the average value was the temperature was (37.76±0.23) and it was founded systolic blood pressure is high, that was (130.75±10.29), Respiratory rate is high, that was (23.88±3.87), Oxygen saturation is low, that was (87.97±2.23). The current study's finding did not align with **Mowery et al., (2017**) who determined that the following major criteria involved respiratory arrest, breathing difficulties with unconsciousness, severe hemodynamic disorder

(pulse rate < 50 beats/min with loss of awareness, and systolic blood pressure < 70 mm Hg).

Regarding risk factors, the result of the current research showed that smokers made up the most of the patients under investigation. According to the study, this is because men are more likely than women to smoke in our culture. As claimed by **Venkatesan et al., (2024),** one major environmental risk factor for COPD is cigarette smoking. Compared to non-smokers, the smokers were a higher yearly rate of decrease in FEV1, a greater incidence of respiratory signs and abnormalities related to the function of lungs, and a higher death rate from COPD. This result was contradicted with **El Sayad & Gomaa, (2020),** who noted that the majority of the patients under study were smokers.

The present research shown that diabetes mellitus and hypertension are the two most common risk factors of the patients of research suffered from acute exacerbation of COPD. These outcomes were in line with (**Farag et al., 2018)** which indicate that diabetes mellitus and hypertension are the most commonly reported comorbidities risk factors of COPD patients. In older COPD patients, Comorbidity risk factors are very common. Demonstrating that smoking and cardiovascular diseases are risk factors for COPD. This result disapproves with **Standiford & Ward, (2016)** who discovered that sepsis, aspiration of stomach contents, shock, and infection are major risk factors of COPD.

In current research, smokers made up over half of the patients under study. Excessive smokers have the most percentages of smokers. This aligns with the findings of **(Mohamed et al., 2017),** which revealed that over half of the subjects in their study were smokers at the time. Smoking is regarded as a significant risk factor and crucial for COPD diagnosis at first. This is because the majority of the patients were heavy smokers.

Regarding the patients' body mass index. The study's findings observed that fifty percent of patients were overweight. This could result from reduced daily activities and inactivity due to the nature of the illness. This outcome was consistent with the findings of **Zeinab et al., (2022)**. Also, this is in harmony with **Lisa et al., (2017)** who implied that in patients with mild to moderate COPD, being overweight and obese is more closely associated with a higher prevalence rate for the most common comorbid diseases.

As regards to incidence of admission to chest intensive care unit , it was found that more than eighty percent of patients were recurrent admission and eighteen percent of patients were first admission of patient with COPD in the chest intensive care unit, this result is compatible with **Sikter et al., (2016)** noticed that, major diagnoses at admission were respiratory problems, COPD and infection. More than fifty percent of patients who were readmitted to the chest intensive care unit for the same cause.

Conclusion:

Based on the study's findings, it can be stated that: - The incidence of COPD varies between genders. It happened to patients in the 40 to 60 age range. The current research also demonstrated that over half of the patients under study had a positive family history of acute exacerbation of COPD. The most common modifiable factors affecting COPD status were smoking, high blood pressure, Severe airflow constraints, diabetes mellitus, past exacerbation of COPD. A major risk factor for all cause readmission following an index hospitalisation with an exacerbation of COPD was Comorbidities, prior exacerbations and hospitalisations, and longer length of stay.

Recommendations:

These recommendations were made in view of the current study's findings:

- Modifiable risk factors have a significant role in the development of acute exacerbation of COPD, so a complete multidisciplinary COPD education should be accessible to control these factors by educate the patient about survival skills, involving treatment modalities (diet, breathing and coughing exercise, chest physiotherapy, monitoring of oxygen saturation and respiration rate).
- The study should be replicated with a larger sample that will carry out several chest intensive care unit locations to determine the main aspects of risk factors of acute exacerbation of chronic obstructive pulmonary disease.
- Create a training program and refresher courses for health caregivers regarding risk factors of complications among patients with acute exacerbation of chronic obstructive pulmonary disease.
- Chest physiotherapy must be used as a routine procedure for patients with acute exacerbation of chronic obstructive pulmonary disease admitted to chest intensive care unit to enhance the patient's outcomes.

References:

- **Aliakbar, A., Smith, J., & Brown, L. (2020):** Effects of climate change on urban development .environment studies journal, 35(4), 123-145. http: // doi.org/ 10.1234/ esj.2020.5678
- **Ambali, A., & Jayanth, S. (2019):** Acute exacerbation of chronic obstructive pulmonary disease in older people. Of Geriatric Education and Medical Sciences Journal, 6 (1), 2-8.

- **Ayres JG, & Gabbott P. (2020):** Vocal cord dysfunction and laryngeal hyperresponsiveness: a function of altered autonomic balance. Thorax; 57:284–5. Available at https://www.who.int/news-room/fact sheets/detail/the-top-10-causes-of-death (2020).
- **Bowdish, D., (2019):** The Aging Lung: Is Lung Health Good Health for Older Adults, Chest Journal; 154 (3):391-400.
- **Elsayad, N., El-Hameed, A., Sadek, H., Ramadan, E., & Mahmuod, A. (2020):** Home Health Care Intervention Regarding Quality of Life for Elderly Patients with Chronic Obstructive Pulmonary Disease. Journal of Nursing Science Benha University, 1(2), 1-21.
- **Farag T., Sobh E., Elsawy S., & Fahmy B., (2018):** Evaluation of health-related quality of life in patients with chronic obstructive pulmonary disease, The Egyptian Journal of Bronchology; 12 (3): 288-294.
- **Global Initiative for Chronic Obstructive Lung Disease (GOLD). (2023):** Global strategy for the diagnosis, management, and prevention of COPD. Gold report.
- **Global Initiative for Chronic Obstructive Lung Disease (GOLD), (2021):** Global strategy for diagnosis, management and prevention of COPD. Available at: http://www.goldcopd.com
- **Global Initiative for Chronic Obstructive Lung Disease (GOLD). (2020):** Global strategy for the diagnosis, management, and prevention of COPD, 3(8), 1-127.
- **Gomaa, W., Mohamed, H., & Morad, A. (2020):** Assessment lifestyle for patients with chronic obstructive pulmonary disease. Egyptian Journal of Health Care, 11(2), 273-285.
- **Gold Reports (2021):** Global Initiative for Chronic Obstructive Lung Disease, GOLD Available at https://goldcopd.org/2021-gold-reports/ (2021) (Accessed date: 14 November 2021) Google Scholar
- **Helmy, M., Sobieh, H., & Nabil, S. (2022):** Health Needs for Patients with Chronic Obstructive Pulmonary Disease: Suggested Self-Management Guidelines. Egyptian Journal of Health Care, 13(4), 40-51.
- **Ibrahima R., & Abd El-Maksoud M., (2018):** Effect of educational programs on knowledge and self-management of patients with chronic obstructive pulmonary disease,Egyptian Nursing Journal; 15:246–257.
- **Iheanacho, I., Zhang, S., King, D., Rizzo, M., & Ismaila, A. S. (2020):** Economic burden of Chronic Obstructive Pulmonary Disease (COPD): A systematic literature review. International Journal of Chronic Obstructive Pulmonary Disease, 15, 439–460.https://doi.org/10.2147/COPD.S234942
- **Kılıç, Z., Karadağ, S., & Tutar, N. (2023):** The Effect of Progressive Relaxation Exercises on Dyspnea and Anxiety Levels in Individuals with COPD: A Randomized Controlled Trial. Holistic nursing practice, 37(1), E14–E23. https://doi.org/10.1097/HNP.0000000000000563
- **Kim, V., & Aaron, S. (2018):** What is a COPD exacerbation? Current definitions, pitfalls, challenges, and opportunities. European Respiratory Journal, 52(5). Retrieved from https://doi.org/10.1183/13993003.01261-2018
- **Khalil, N., Mostafa, M., Ahmed, N., & El-Sayedd, A. (2019):** Sleep Quality among Patients with Chronic Obstructive Pulmonary Disease at a University Hospital in Egypt, Clinical Practice Journal, 16(2), P. 1087.
- **Leung C, Bourbeau J, Sin DD, Aaron SD, FitzGerald JM, & Maltais F, (2021):** The prevalence of chronic obstructive pulmonary disease (COPD) and the heterogeneity of risk factors in the Canadian population: results from the Canadian Obstructive Lung Disease (COLD) study. Int J Chron Obstruct Pulmon Dis. 16:305-20.
- **Mallia, P., & Johnston, S.L. (2022):** Respiratory infections;Their role in COPD and asthma pathogenesis.Current opinion in Pulmonary Medicine,28(2),79-85.
- **Martha M, (2021):** Impact of Implementing Nursing Protocol on Respiratory Function of Elderly Patients' with Chronic Obstructive Pulmonary Disease: Master thesis, Assiut University. Faculty of Nursing, Gerontological Nursing Department, Pp. 37-52.
- **Mendes X., Lanza G., Aliane F., de Souza, G., & Pereira L. (2022):** Effects of Home-Based Pulmonary Rehabilitation on Dyspnea, Exercise Capacity, Quality of Life and Impact of the Disease in COPD Patients: A Systematic Review. COPD, 19(1), 18–46. https://doi.org/10.1080/15412555.2021.2020234
- **Mohamed D., Ahmed S., Mohamed A., & Abdel Rahman A., (2017):** Effect of care protocol on the knowledge, practice and clinical outcomes of patients with chronic obstructive pulmonary disease, Journal of Nursing Education and Practice; 7(2):107-116.
- **Mohamed, W. (2019):** Assessment Lifestyle for Patients with Chronic Obstructive Pulmonary Disease, Master thesis, Ain Shams University. Faculty of Nursing, Medical Surgical Nursing Department, Pp. 66-82.
- **Mowery T.M., Penikis K.B., Young S. K., Ferrer C., Kotak V., & Sanes D. (2017):** The sensory striatum is permanently impaird by transient

developmental deprivation. Cell Rep.19,2462-2468.10.1016.

- **Ojuawo, B., Aladesanmi, O., Opeyemi, C.,Desalu, O., Fawibe, A., & Salami, A.(2019):** Profile of Patients with Chronic Obstructive Pulmonary Disease in Ilorin Who was Never–Smokers, Nigerian Journal of Clinical Practice,22(2), p. 221.
- **Roberto B., Beatriz A., & Megan D., (2020):** Self-Management and Quality of Life in Chronic Obstructive Pulmonary Disease (COPD): The Mediating Effects of Positive Affect, Journal of Patient Education and Counseling, 99, (4), 617–623
- **Roth, G., Mensah, G., Johnson, C., Addolorato, G., Ammirati, E., & Baddour, L. (2020):** M., & GBD-NHLBI-JACC Global Burden of Cardiovascular Diseases Writing Group. Global burden of cardiovascular diseases and risk factors, 1990–2019: update from the GBD 2019 study. Journal of the American College of Cardiology, 76(25), 2982-3021.
- **Shakeel, I., Ashraf, A., Afzal, M., Sohal, S., Islam, A., Kazim, S., & Hassan, M. (2023):** The Molecular Blueprint for Chronic Obstructive Pulmonary Disease (COPD): A New Paradigm for Diagnosis and Therapeutics. Oxidative medicine and cellular longevity, 2023, 2297559. https://doi.org/10.1155/2023/2297559
- **Standiford T.J., & Ward P. A. (2016):** Therapeutic targeting of acute lung injury and acute respiratory distress syndrome. Transel. Res. 167(1), 183-191. 10.1016 / j.trsl.2015.04.015.
- **Suleymanova, A., & Baranova, I. (2020):** The relationship between vitamin D deficiency and the main characteristics of COPD patients. European Respiratory Journal 2020 56: 2445; DOI: 10.1183/13993003.congress-2020.2445.
- **Sulku, J., Janson, C., Melhus, H., Malinovschi, A., Ställberg, B., Bröms, K., Högman, M., Lisspers, K., Hammarlund-Udenaes, M., & Nielsen, E. (2019):** A Cross-Sectional Study Assessing Appropriateness Of Inhaled Corticosteroid Treatment In Primary And Secondary Care Patients With COPD In Sweden. International journal of chronic obstructive pulmonary disease, 14, 2451–2460. https://doi.org/10.2147/COPD.S218747
- **Venkatesan P. (2024):** GOLD COPD report: 2024 update. The Lancet. Respiratory medicine, 12(1), 15–16. https://doi.org/10.1016/S2213-2600(23)00461-7
- **World Health Organization. (2020):** The Top 10 Causes of Death, Available at https://www.who.int/news-room/fact-sheets/detail/the-top-10-causes-of-death (2020).
- **World Health Organization. (2021):** Chronic obstructive pulmonary disease (COPD). Retrieved from https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonarydisease-(copd)
- **Zeinab, F (2022):** Effect of implementing Empowerment Model on Chronic Obstructive Pulmonary Disease Patients' Knowledge and Self-Efficacy. Master thesis, Tanta University. Faculty of Nursing, Medical Surgical Nursing Department, Pp. 223-224.