

## A Relationship between COPD and Psychiatric Disorders

Dr.Mohan Kumar.M<sup>1</sup>, Vimallesh Mani<sup>\*2</sup>, Winston Daniel.C.V<sup>2</sup>, Nesamani.D<sup>2</sup>

<sup>1</sup>Department of pharmacy practice, Arulmigu kalasalingam college of pharmacy,krishnan koil.

<sup>2</sup>Department of pharmacy practice, Arulmigu kalasalingam college of pharmacy,krishnan koil.

Corresponding Author: Vimallesh Mani

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### ABSTRACT

Chronic obstructive pulmonary disease (COPD), a collection of lung disorders, is the fifth-leading cause of mortality nationwide in 2011 and its consequences on the physiology, mind, and civilization are linked to the emergence of depression and anxiety. Depression can both cause and result from COPD at the same time, but the precise mechanism is still not established. COPD exacerbations are a significant cause of high morbidity and mortality rates in COPD patients. As the illness progresses, exacerbations become more frequent, impacting daily activities and quality of life. Factors such as viruses, bacteria, and common

pollutants contribute to physiologic deterioration. COPD patients with anxiety or depression can benefit from various treatment options like medication, psychotherapy, and exercise. COPD patients often experience stress, anxiety, and sadness, which can negatively impact their overall health. To improve pulmonary rehabilitation and slow disease progression, researchers should focus on other forms of psychotherapy that treat depression, anxiety, and stress symptoms.

**Keywords:** COPD, Anxiety, Stress, Dyspnea, Psychotherapy, Mood disorder, Exercise, Psychological disorder and civilization are linked to the emergence of depression and anxiety.<sup>7</sup>

As depression can both cause and result from COPD at the exact same moment, the two parameters certainly have such a bidirectional relationship. Yet the precise mechanism It is still not established whether COPD and anxiety or depression are interconnected.<sup>8</sup> As depressive mood worsens, concomitant depressive disorder makes life quality exceptionally tough, the motivation needed for dealing with the chronic illness and its immobilising consequences may be harder to manage by depression. Misbranding of COPD side effects that also include depressive symptoms could lead to a reduction in detection and under depression treatment.<sup>9</sup>

However still, there is a tangled relationship between depression, cessation of smoking, and nicotine dependence.<sup>10</sup> A concurrent depressive condition complicates the quality of life for individuals with chronic illnesses even more. Comorbid depression could make things worse COPD prognosis. Depression frequently occurs in Because of diminished medication adherence functional capability, reduced productivity increasing consumption of health resources due to impairment, which could make an exacerbation more likely, and mortality.<sup>11</sup> Individuals with COPD who would have been depressed and

### I. INTRODUCTON

A collection of lung disorders known as chronic obstructive pulmonary disease (COPD), which also includes chronic bronchitis and emphysema, is distinguished by bronchial blockage, recurrent productive coughing and dyspnea, reduced ventilator performance, and easy fatigability.<sup>1</sup> In 2011, the fifth-leading reason for mortality nationwide was chronic obstructive pulmonary disease (COPD), and by 2015, it was anticipated to be the third-leading cause.<sup>2</sup> Individuals with COPD are considerably more inclined to suffer from anxiousness and depressed symptoms.<sup>3</sup> Affective-cognitive disorders like depression are signified by a decline in social interaction, sadness, and a lack of motivation, delight, and productivity.<sup>4</sup> Depression and anxiety symptoms frequently embody those of COPD, which makes it hard to differentiate between the two and treat them.<sup>5</sup> According to forecasts, COPD will over time become the third greatest cause of mortality worldwide as a result of rising population, urbanization, as well as other circumstances. COPD is currently the fourth highest cause of mortality in the United States by 2030, and enhanced exposure to hazards.<sup>6</sup> The consequences of COPD on the physiology, mind,

anxious had more chronic conditions and more hospitalisation rates.<sup>1213</sup>

High rates of depression, ranging from 62-72%, had been documented in COPD patients in India who seemed to have anxiety and depression prevalence rates.<sup>14-16</sup> Rather than pulmonary etiology, other co-morbid illnesses that are accompanied with COPD are what kill the preponderance of COPD patients. These include diabetes, ischemic heart disease, renal impairment, hypertension, and skeletal muscle depression, malfunction, and osteoporosis.<sup>17</sup> In COPD patients, co-occurring psychiatric illnesses such as depression and anxiety exacerbate morbidity and decrease standard of living, medication concordance and pulmonary reconstruction.<sup>18</sup>

As depressive mood worsens, concomitant depressive disorder impacts life quality especially challenging. The desire necessary for coping with the chronic illness and its immobilising consequences may be challenged further by depression. Misbranding of COPD side effects that include depressed feelings could result in decreased detection and under depression treatment.<sup>19</sup> Although some psychological co-morbidities have an incidence on the severity attributed to COPD, these are rarely acknowledged.<sup>20</sup> Yet, the numerous interconnections between nutrients or foods render it impractical to establish an association between diet and mental wellbeing in respiratory disease.<sup>21</sup>

Patients with COPD are more likely than individuals with other chronic illnesses such as cancer, hypertension, diabetes, or musculoskeletal conditions to experience anxiety and depression, which most likely results from diminished physical, respiratory and functional capacity, substance abuse, and recurrent hospitalisations.<sup>22 23</sup>

A persistent depressive condition complicates the quality of life for individuals with chronic illnesses even more. Comorbid depression could make things worse. COPD outlook. Depression frequently results in due to low medication adherence functional capability, reduced productivity higher utilisation of health resources due to disabilities, which could make an aggravation more likely, and mortality.<sup>24</sup>

### ETIOLOGY OF COPD

Since COPD exacerbations are a major source of the high morbidity and mortality rates observed in COPD patients, the causes and mechanisms of exacerbations have received a lot of attention.<sup>25</sup> As the illness progresses, exacerbations of COPD grow more frequent, and certain

individuals are more susceptible to them. These exacerbations can have a considerable impact on daily activities and quality of life, and they are a primary cause of hospital admission and readmission.<sup>26</sup> In addition, COPD exacerbations caused by a range of factors, such as viruses, bacteria, and maybe common pollutants, are associated with considerable physiologic deterioration and an increase in inflammatory changes in the airways. Exacerbations of COPD that are caused by viruses or pollutants are more common throughout the winter, and there may be substantial interactions between the cold weather and these exacerbations.<sup>27</sup>

### BACTERIAL COLONIZATION

Airway bacterial colonisation affects 30% of COPD patients, which has been linked to the degree of airflow obstruction and current consumption of nicotine.<sup>28</sup> Although *Haemophilus influenzae* and *Streptococcus pneumoniae* have been associated with COPD exacerbations, several studies<sup>29 30</sup> However, not all studies have found increasing bacterial counts during exacerbations. Soler and Partners<sup>31</sup> Exacerbations with purulent sputum production were more likely than exacerbations with mucoid sputum to produce positive bacterial cultures.<sup>32</sup>

To ascertain if bacterial colonisation predisposes people to the decline in lung function that is a hallmark of COPD, further long-term studies are required. Therefore, bacterial colonisation in COPD patients may be a highly reliable indicator of airway inflammation. However, it's also conceivable that bacterial and viral infections might combine during COPD exacerbations. Other organisms, such as *Chlamydia pneumoniae*, which has been related to asthmatic exacerbation, may potentially contribute to the aggravation of COPD. There needs to be further research.

### VIRAL INFECTIONS

Exacerbations of COPD are frequently caused by viral infections, especially upper respiratory tract infections. Infections with respiratory viruses are more common in the winter because the population is more likely to have them. Additionally, as COPD patients' lung function has been connected to slight but significant declines with a fall in ambient temperature during the winter, patients may be more vulnerable to exacerbations in the winter.<sup>33</sup> It has not previously been believed that rhinoviruses represent a

substantial factor in COPD flare-ups. In a two-year experiment by Scott and colleagues, 44 people with chronic bronchitis took part.<sup>34</sup>

### POLLUTION

The relationship between air pollution and COPD flare-ups has drawn a lot of attention, notably the impact of common pollutants on hospital admissions. As environmental pollution increases, more COPD patients are being admitted to hospitals, which is a sign that their symptoms are getting worse. During the UK pollution event in December 1991, the COPD mortality rate rose coupled with an increase in hospital admissions among older COPD patients<sup>35</sup>. According to data from a study of air pollution in six European cities (Air Pollution and Health, a European Approach project), the relative risks for COPD hospital admissions due to increases of 50 g/m<sup>3</sup> in the daily mean level of pollutants (with lags from 1 to 3 days) were 1.02 for SO<sub>2</sub>, NO<sub>2</sub>, and total suspendable particles, and 1.04 for ozone.<sup>36</sup> Additionally, an analysis of the data gathered from Birmingham, AL, revealed a relative risk of 1.27 for COPD hospital admissions connected to particle inhalation. The greatest association between hospital admission for COPD and particle pollution has frequently been seen. In addition, a study from Australia found a relationship between NO<sub>2</sub> exposure and a 4.6% rise in COPD hospital admissions.<sup>37</sup>

### MEASUREMENTS OF PSYCHIATRIC CONDITIONS IN COPD PATIENTS

The participants beginning to answered a confidential sociodemographic questionnaire. Basic personal information, physical activity, stimulants, and perceptions of one's own health status were all topics covered in the inquiries. The gathered information was put to use for statistical evaluation and group characteristics.

#### Semi structured intake proforma

Age, gender, education, socioeconomic level, marital status, and disease factors like overall illness duration, duration of hospital stay, etc. are all sociodemographic information on the form.

#### Depression Anxiety and Stress Scale (DASS)

Three self-report scales known as the DASS were developed for evaluating the negative emotional states of stress, anxiety, and depression. The 14 items on each of the three DASS scales are

broken down into subscales of 2–5 items that have comparable content.

In a research to evaluate the psychometric qualities of the DASS, Nieuwenhuijsen et al. [20] found that the internal consistency of the DASS subscales was strong, with cronbach's alphas of 0.94, 0.88, and 0.93 for depression, anxiety, and stress, respectively.

#### Sarason Social Support Questionnaire (SSQ; short version)

A quantitative, psychometrically sound survey instrument designed to gauge social support and satisfaction with it is the SSQ Sarason, et al. [21]. It exhibits convergent internal concept validity and strong test-retest reliability. The SSQ is a 6-item questionnaire with a 2-part answer in its shortened form.

#### Initial Assessment of Patients

In five subgroups, based on the patients' functional statuses, pulmonary rehabilitation was done. Age, level of weariness, co-occurring cardiovascular illnesses, and post-test shortness of breath were all taken into account. The qualification method for patients was based on the 6-min walk test (6MWT) and spirometry.

The patient's stamina and aerobic capacity were evaluated using the 6MWT. The patient's aim was to cover as much ground as possible while moving swiftly and staying upright for six minutes. Distance travelled, energy expenditure (reported in MET), the number of breaks and their length, and the levels of dyspnea and weariness using a 10-point Modified Borg Scale were the investigated parameters. Also measured was the body's hemodynamic reaction to exercise. The outcomes of the 6MWT were expressed as metabolic equivalent (MET), which was determined using the formula below.<sup>38</sup>

$$\text{MET} = -0.0971 \times V_3 + 1.5021 \times V_2 - 5.3762 \times V$$

#### Generalised Anxiety Disorder-7

This short 7-item measure is used to evaluate the signs and symptoms of generalised anxiety disorder (GAD).<sup>39</sup> Total scores fall into four categories: minimum (0–4), mild (5–9), moderate (10–14), and severe (15–21) anxiety. The GAD-7 has been verified for the population through translation.<sup>40</sup> GAD-7 has been implemented for COPD patients.<sup>41</sup>

## EFFECT OF PSYCHOLOGICAL DISORDERS IN COPD

As a chronic condition, COPD is characterised by a wide range of symptoms that don't just affect the respiratory system. Patients' psyches change as a result of systemic physical changes, and vice versa. It is considered that individuals with COPD who experience dyspnea will experience decreased quality of life, anxiety connected to their dyspnea, and fear.<sup>42</sup> Furthermore, weariness brought on by dyspnea and its associated respiratory discomfort may lower your ability to exercise. Evidence also suggests that avoiding physical activity is influenced by fear.<sup>43</sup> The majority of the literature on these comorbidities is produced in high-income environments. This is one of the few research we are aware of that examines the co-morbidity of depression and anxiety in COPD patients from Pakistan and how it affects a variety of psychosocial outcomes. Our sample's 51% depression prevalence is comparable to the 57.2% previously reported a prevalence from respiratory clinics.<sup>44</sup> It was also looked at how common COPD is based on how severe the condition is. After controlling for confounders, two-thirds of the studies revealed that the prevalence of depression increased with the severity of COPD.<sup>45</sup> The severity of the medical condition is evident in this set of individuals as they experience growing sorrow, which can eventually develop into depression.<sup>46</sup> Further research reveal that anxiety is frequently triggered by dyspnea symptoms.

In addition, melancholy and worry might make dyspnea symptoms worse. This creates a vicious cycle in which psychological symptoms worsen dyspnea, which in turn causes a rise in the severity of worry and sadness.<sup>47-49</sup> Despite the fact that dyspnea can be lessened by participating in pulmonary rehabilitation programmes, which in turn can lessen stress or anxiety symptoms.<sup>50</sup> In another study, the traditional dietary pattern was linked to a lower risk of depression, while there was no association between the Western dietary pattern and depression after controlling for age, socioeconomic position, education, and health behaviours.<sup>51</sup> Additionally, investigators are looking for the genetic causes of COPD-related depression. Interleukin 6 (IL-6) levels have been linked to depressed symptoms in COPD, according to studies performed by Rybka et al.<sup>52</sup> Patients who have recently gone through a COPD exacerbation are also more likely to feel despair and anxiety.

Anxiety affects 9–58% of patients, and depression affects 19–50% of patients.<sup>53</sup>

According to Dowson et al., 28% and 50%, correspondingly, of COPD patients suffer from depression. Additionally, this study found a link between the severity of the illness and the degree of anxiety and sadness. The despair and anxiety scores increase as COPD severity increases.<sup>54</sup> A review of the findings from our study revealed that 14% of patients frequently experience stress. According to a study by Yohannes et al., 25% of COPD patients are prone to experiencing anxious (mild stress rates are 8%, moderate stress rates are 8%, severe stress rates are 6%, and really severe stress rates are 3%).<sup>55</sup> Numerous studies have demonstrated that exercise benefits COPD patients' mental health. No matter how long it lasts, physical therapy greatly diminishes depressive and anxious symptoms.<sup>56-58</sup> Vegetables, fruits, dairy products, nuts, olive oil and its seeds, fish, and whole grains are all foods present in healthy dietary patterns that have a positive impact on symptoms of depression.<sup>59</sup>

In a another study, a healthy eating regimen that included lots of fruits, vegetables, nuts, and whole grains also had a good correlation with FEV1 readings.<sup>60</sup> Depending on the stage of COPD, anxiety prevalence fluctuated between 10 to 100% and depression prevalence from 7 to 79%.<sup>60</sup> As contrasted with this, depression can exacerbate chronic illness. Alcohol use may result from chronic disease and comorbid depression.<sup>61</sup> One cause for study inconsistencies is that several tools monitoring anxiety and depression symptoms were utilised in various examinations.<sup>62,63</sup> Applications that enable comprehensive rehabilitation of pulmonary patients by combining exercise therapy with behavioural therapy in a VR environment could be a useful tool because VR technology is continually improving. It has already been discussed how pulmonary sufferers can use virtual reality to do physical training.<sup>64-66</sup> Additionally, it has been hypothesised that psychotherapy, such as cognitive behavioural therapy, may lessen anxiety symptoms, panic episodes, and the frequency of hospital admissions.<sup>67-69</sup> This is due to the fact that as a COPD patient ages, decreased energy, restrictions on routine duties, and an inability to participate in social activities induce sadness, which feeds melancholy.<sup>70</sup>



### Social stress

For COPD patients, anxiety and despair are natural stressors brought on by physical symptoms like breathing issues.<sup>71</sup> However, it has also been shown that extrinsic stressors, such as life events, are associated with depression and low quality of life in this population.<sup>72</sup> According to a recent longitudinal study, nearly half of COPD patients said they had dealt with challenging circumstances that had a big influence on their life.<sup>73</sup>

### Quality of life

Individuals in this study who fit the criteria for depression were more likely to report having a poorer quality of life when it came to their health. In Pakistan, research on the relationship between COPD and quality of life was done by Baloch et al.<sup>74</sup> stating that a lower quality of life was associated to a COPD exacerbation. Prospective cohort data from other sources also indicate the link between worsening quality of life and developing respiratory problems.<sup>75</sup>

### Age and gender differences

Our sample was relatively young with 65% of the participants being under the age of 45 years. The published literature has previously described a younger demographic with COPD.<sup>76</sup> Over 70% of the COPD patients in a newly published cross-sectional study's sample were between the ages of 18 and 41. In Pakistan, COPD may manifest earlier in life due to occupational exposure to coal mines, agriculture, welding, and air pollution.<sup>77</sup> However, among early COPD patients, being a woman increases the likelihood of developing depression. Regarding the possibility of acquiring anxiety disorders with symptoms like phobic disorder, panic disorder, and generalised anxiety disorder, there is also a female predominance in COPD.<sup>78-81</sup> Worldwide, females are more likely to experience depression, demonstrating that biological differences may be the cause of the differential risk.<sup>82</sup>

### MANAGEMENT

There are several treatment options available to COPD patients who struggle with anxiety or depression, including medication, psychotherapy, and exercise as part of a comprehensive PR plan. However, similar to patients with COPD and cognitive disorders, there is little evidence that treating psychiatric disorders in patients with COPD improves COPD outcomes,

and prospective longitudinal studies evaluating such associations in sizable, diverse populations of COPD patients are lacking. Cognitive behavioural therapy (CBT) is acknowledged as the first line of psychotherapy for older persons with mild to severe depression, depending on availability and patient desire.<sup>83</sup> It puts an emphasis on recognising and re-framing harmful, dysfunctional ideas while engaging in enjoyable and social activities. Hynninen and co.<sup>84</sup> Five studies found that CBT was superior to traditional therapy in improving the psychological health (depression) of COPD patients ( $P=0.04$ ). However, a similar study discovered a non-significant trend preferring CBT over conventional treatment for reducing anxiety and depression in COPD patients.<sup>85</sup> It suggests using selective serotonin reuptake inhibitors (SSRIs) as a first-line treatment for depression or anxiety because to its improved safety profile compared to tricyclic antidepressants (TCAs). However, a recent systematic review that examined the efficiency of TCAs and SSRIs in individuals with COPD found inconsistent results in clinical studies.<sup>86</sup>

## II. CONCLUSIONS

Patients with COPD are more likely to experience stress, anxiety, and sadness, which could negatively impact their overall health. The effectiveness of pulmonary rehabilitation may increase and the progression of the disease may be slowed by improvements in mental health. Because there aren't enough trained behavioural therapists, researchers should concentrate on other forms of psychotherapy that might be useful in treating depression, anxiety, and stress symptoms. Patients with COPD frequently co-morbidly experience anxiety and depression. Anxiety and depression are significant indicators of COPD outcomes. Recognising and managing depression and anxiety in COPD may improve outcomes and may reduce the need for medical services, which is important in a resource-constrained environment. In order to improve these patients' quality of life, it is crucial to evaluate the feelings of sadness, anxiety, and stress levels in COPD patients. Anxiety and depressive symptoms were highly linked with female sex and poor health status. To lower the risks of anxiety and/or depression during the early stages of COPD in community settings, more interventions should be developed. Depression was a common co-morbid condition among COPD patients and was linked to age, alcoholism, and the seriousness of the disease. This study showed that a

healthy diet is preferable to an unhealthy one, is related with a low prevalence of depression, and enhances lung function in COPD patients. By taking into account the high frequency of depression among patients with COPD as well as the significance of nutrition in preventing and treating illness and managing the degree of depression, more studies can be used to emphasise the consumption of healthy and mixed dietary patterns. Despite this, there is currently a dearth of data about the detection and treatment of anxiety and depression that coexist. Clinical anxiety disorders are very common in COPD patients, according to a review of gold standard studies that made the diagnosis from a clinical interview using a standardised psychiatric framework. Fewer than half of individuals with clinical anxiety, according to recent estimates, are identified and maintained by healthcare professionals. The inability of current equipment to detect anxiety in populations with somatic sickness may be a limitation. For instance, widely used screening instruments like the Hospital Anxiety Depression Scale and Beck Anxiety Inventory have measures that heavily weight somatic aspects. However, it is unknown if these measures will have long-term advantages in terms of lowering healthcare utilisation and enhancing psychological health, physical impairment, and quality of life. Evidence indicates that the implementation of stricter criteria reduces the variability of the estimates of depression prevalence in COPD cases and controls, according to the current systematic evaluation of the literature, which is based on controlled, well-conducted studies.

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