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# Anxiety, Depression And Quality Of Life In Relation To Physical Activity Among Copd Population - A Correlation Study

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**ABSTRACT**

**Background:** Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory condition characterized by airflow limitation and persistent respiratory symptoms. Beyond its physical implications, COPD significantly impacts mental health and quality of life (QoL), with anxiety and depression being prevalent among this population. These psychological conditions not only exacerbate disease outcomes but also reduce treatment adherence and overall well-being. Regular Physical activity has been associated with improved exercise capacity, reduced symptom burden, and better mental health outcomes in COPD patients. Despite its importance, reduced activity levels are common in this population, primarily due to dyspnoea, fatigue, and psychological barriers, further perpetuating a cycle of physical and mental health decline

**Study design:** A Corelation study

**Aim:** This study aims to explores the correlation between physical activity levels, anxiety, depression, and QoL in individuals with COPD.

**Objective:** To evaluate the relationship between Anxiety, Depression and Quality of life in relation to Physical Activity among COPD population through Patient Health Questionnaire-4, WHO Quality of Life-BREF and International Physical Activity Questionnaire.

**Participants**: The participants were recruited based on exclusion and inclusion criteria. A total of 73 participants were included in the study.

**Methods: -**A co-relation study was conducted on 73 participants with Chronic obstructive pulmonary disease (COPD) from Santosh Hospital, Ghaziabad. Convenient Sampling technique was used for sample collection. Participants were included and excluded as per inclusion and exclusion criteria. Questionnaire-Patient Health Questionnaire -4 (PHQ-4), WHO Quality of Life-BREF (WHOQOL-BREF), International Physical Activity Questionnaire (IPAQ) were used as outcome measures.

**Result:** The analysis shows that higher physical activity, as measured by the IPAQ, is positively associated with better quality of life (WHO scoring) and negatively associated with symptoms of anxiety and depression (PHQ-4 scoring). Similarly, better quality of life is associated with fewer mental health symptoms. All these correlations are statistically significant, highlighting the strong relationships between physical activity, quality of life, and mental health.

**Conclusion:** The data suggest that individuals with higher levels of physical activity tend to experience better quality of life and lower symptoms of anxiety and depression. Conversely, those with greater anxiety and depression tend to report a lower quality of life.

**Keywords:** COPD, Physical activity, Quality of life, Anxiety and Depression

## INTRODUCTION:

Patients suffering from chronic obstructive pulmonary disease (COPD) frequently experience anxiety and depression.[1] Patients with COPD show clinically significant signs of co-occurring anxiety and despair. Increased use of emergency medical services, hospital readmissions, early death, and acute exacerbations (AECOPD) are all linked to untreated depression and anxiety.[1]

An approximate estimate of 30 million people in India suffers from COPD.[2] It is a very debilitating illness that impacts emotional and sexual relationships, leisure and professional activities, and physical functioning. Fatigue and dyspnoea limit a patient's capacity for exercise, which lowers their quality of life (QoL). The main goal of COPD therapies is to enhance patients' quality of life.[2]

Regular PA is helpful in lowering the risk of several chronic diseases, according to strong evidence.[3] On the other hand, a lack of physical activity increases the likelihood of poor outcomes for individuals with COPD and causes early death in

patients with chronic illnesses. The majority of COPD patients are typically compelled to reduce PA and adopt a sedentary lifestyle due to activity-related dyspnoea and impaired exercise tolerance.[3]
This study explores the correlation between physical activity levels, anxiety, depression, and QoL in individuals with COPD. By understanding these relationships, this study can help in providing insights for improving holistic care strategies, including targeted interventions to enhance mental health and quality of life through tailored physical activity programs.

**METHODOLOGY:**
A total of 73 participants with Chronic obstructive pulmonary disease (COPD) were included in the study through convenient Sampling technique. Participants were recruited from Santosh Hospital, Ghaziabad.
As per inclusion criteria, Individuals with age between 45 and 69 years, both male and female, and Individuals with clinical and spirometry diagnosis of COPD were included. As per Exclusion criteria Body mass index (BMI) >35 kg/m2, Hemodynamic instability, change in medications, Clinical stability (no exacerbation in the last 2 months), Presence of contraindications for the 6MWT, Skin problems that prevent attachment of the physical activity monitor to the lower limb, Inability to understand the questionnaires/explanations, Patients who are with any cognitive impairments were excluded.

**Outcome measures:**
The Patient Health Questionnaire-4 (PHQ-4)
A self-report tool called the PHQ-4 incorporates two items from the PHQ-9 and two from the GAD-7. The criteria for major depressive disorder and generalized anxiety disorder in the Diagnostic and Statistical Manual of Mental Disorders served as the basis for these items. The four items of the PHQ-4 are responded on a 4-point Likert scale, with 0 representing "not at all" and 3 representing "almost every day." The questionnaire's developers state that it has two subscales: depression (PHQ-2) and anxiety (GAD-2). However, by combining the two subscales, one can estimate a general scale for measuring distress (PHQ-4). The PHQ-4 total scale and its subscales (PHQ-2 and GAD-2) have a range of 0 to 6, with a cut-off point of ≥3 for likely cases of depression or anxiety and ≥6 for distress.[4]

**WHO Quality of Life-BREF (WHOQOL-BREF).**
The WHOQOL-BREF is a 26-item assessment that includes QOL and general health questions in addition to four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items). Every single item in the WHOQOL-BREF has a response scale, which is a five-point ordinal scale, with scores ranging from 1 to 5. After that, the scores are linearly converted to a 0–100 scale. Items on mobility, everyday activities, functional ability, energy, pain, and sleep are all included in the physical health area. Self-image, negative ideas, good attitudes, self-esteem, mentality, learning capacity, memory focus, religion, and mental state are among the psychological domain measures. Questions about sex life, social support, and personal connections are included in the social relationships area. Financial resources, safety, health and social services, physical living environment, learning possibilities, recreation, general environment (noise, air pollution, etc.), and transportation are all included in the environmental health domain.[5]

**International Physical Activity Questionnaire (IPAQ)**
Measurement instruments like the International Physical Activity Questionnaire (IPAQ) are frequently utilized. The IPAQ, a standardized self-report questionnaire, was created to give researchers and practitioners an estimate of sedentary behaviour and physical activity levels for individuals in a variety of socioeconomic contexts, ranging from 15 to 69 years old. The 27 questions on the IPAQ (long form) are organized into domains and provide insight into the activities of the last seven days. 1) Physical activity related to employment; 2) physical activity related to transportation; 3) physical activity related to housework, house maintenance, and family care; 4) physical activity related to recreation, sports, and leisure time; and 5) time spent sitting.[6]

**DATA COLLECTION:**
A total of 73 participants included in the study through convenient sampling.

**DATA ANALYSIS:**
The Microsoft excel 2021 data sheet were used to make master chart.
All statistical test was performed using the SPSS Software version 29.0.0 Descriptive statistical analysis was used to interpretate the result of the study in which frequency, percentage, mean, standard deviation. Pearson Correlation was used to analyse the raw score of the outcome measures.

**RESULT**
The analysis of this study where in all the statistical tools below, the probability value of 0.05 is considered a significant level. The descriptive statistics table above provide an overview of the sample consisting of 73 participants.

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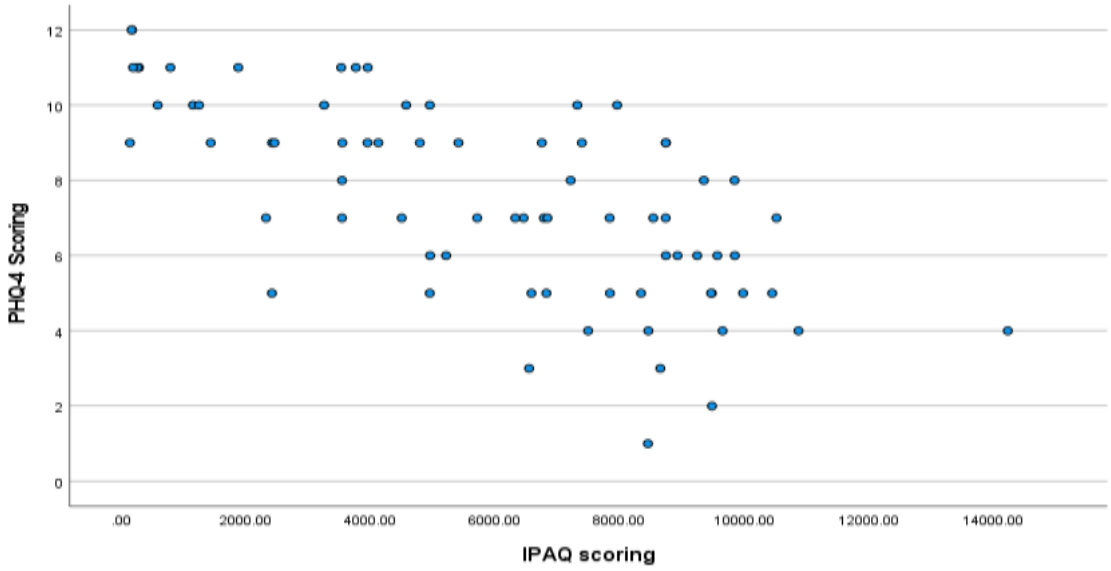
The age of participants ranges from 45 to 69 years. The statistical analysis examines three different scales: PHQ-4, WHO scoring, and IPAQ scoring. The average scores are as follows: PHQ-4 has a mean score of 7.5, WHO scoring has a mean of 44.9, and IPAQ scoring has a mean of 5900.2. The standard error, which reflects the precision of these means, is 0.3 for PHQ-4, 1.8 for WHO scoring, and 391.4 for IPAQ scoring.
Additionally, the standard deviations, which indicate the variability within the scores, are 2.6 for PHQ-4, 15.3 for WHO scoring, and 3344.3 for IPAQ scoring. These statistics provide insights into the central tendencies and variability across the different scales.
The table 1.0 and figure 1.0 represents the correlation analysis results between IPAQ Scoring and PHQ-4 Scoring. The Pearson correlation coefficient is -0.686, indicating a strong negative correlation between these two variables. This means that as the IPAQ score increases, the PHQ-4 score tends to decrease, and vice versa.

**Table 1.0 Pearson Correlation of IPAQ Scoring and PHQ-4 Scoring**

| Correlations | | | |
|---|---|---|---|
| | | IPAQ scoring | PHQ-4 Scoring |
| IPAQ scoring | Pearson Correlation | 1 | -.686** |
| | Sig. (2-tailed) | | <.001 |
| | N | 73 | 73 |
| PHQ-4 Scoring | Pearson Correlation | -.686** | 1 |
| | Sig. (2-tailed) | <.001 | |
| | N | 73 | 73 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

**Figure 1.0 Pearson Correlation of IPAQ Scoring and PHQ-4 Scoring**




The correlation analysis reveals relationships between the scales, WHO and IPAQ Scoring: The Pearson correlation coefficient was 0.7860, showing a strong positive correlation. This implies that higher WHO scores were associated with higher IPAQ scores. The significance level is less than 0.001, confirming that this correlation is statistically significant. The sample size (N) for this analysis was also 73 as showing in table 2.0 and figure 2.0.

**Table 2.0 Pearson Correlation of IPAQ Scoring and WHO Scoring**

| Correlations | | | |
|---|---|---|---|
| | | WHO Scoring | IPAQ scoring |
| WHO Scoring | Pearson Correlation | 1 | .786** |

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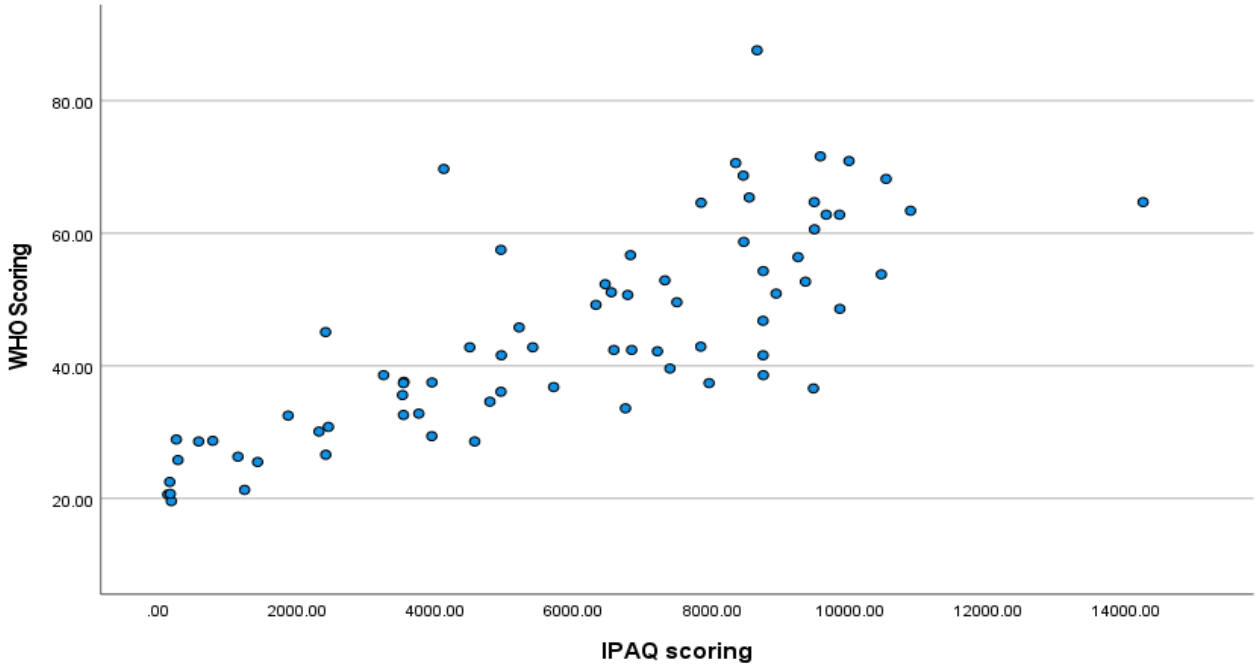
| | | | |
|---|---|---|---|
| | Sig. (2-tailed) | | <.001 |
| | N | 73 | 73 |
| IPAQ scoring | Pearson Correlation | .786** | 1 |
| | Sig. (2-tailed) | <.001 | |
| | N | 73 | 73 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | |

**Figure 2.0 Pearson Correlation of IPAQ Scoring and WHO Scoring**




The table 3.0 illustrates the relationships between three different scores: the IPAQ scoring, the PHQ-4 scoring, and the WHO scoring, using Pearson's correlation coefficients.
IPAQ and PHQ-4 Scoring: The Pearson correlation coefficient was −0.686, indicating a strong negative correlation. This means that higher IPAQ scores are associated with lower PHQ-4 scores. The correlation is statistically significant at the 0.01 level, with a significance level of less than 0.001. The sample size (N) is 73.

**Table 3.0 Pearson Correlation Comparison of PHQ-4 Scoring, WHO Scoring and IPAQ Scoring**

| Correlations | | | | |
|---|---|---|---|---|
| | | IPAQ scoring | PHQ-4 Scoring | WHO Scoring |
| IPAQ scoring | Pearson Correlation | 1 | -.686** | .786** |
| | Sig. (2-tailed) | | <.001 | <.001 |
| | N | 73 | 73 | 73 |
| PHQ-4 Scoring | Pearson Correlation | -.686** | 1 | -.745** |
| | Sig. (2-tailed) | <.001 | | <.001 |
| | N | 73 | 73 | 73 |
| WHO Scoring | Pearson Correlation | .786** | -.745** | 1 |
| | Sig. (2-tailed) | <.001 | <.001 | |
| | N | 73 | 73 | 73 |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | |

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**DISCUSSION:**

The present study explores the impact of anxiety, depression and quality of life in relation to physical activity among COPD population through Patient Health Questionnaire, WHO Quality of Life-BREF and International Physical Activity Questionnaire. In this study, 73 participants were chosen, based on inclusion criteria.

The objectives of this research were to assess anxiety, depression and quality of life in relation to physical activity among COPD population. According to the analysis, increased physical activity, as determined by the IPAQ scale, is inversely correlated with symptoms of anxiety and depression (PHQ-4 scoring) and directly correlated with improved quality of life (WHO scoring). In a similar vein, fewer mental health symptoms are linked to higher quality of life. These statistically significant associations demonstrate the close connections among mental health, quality of life, and physical activity.

The table 1.0 and figure 1.0 represents the correlation analysis results between IPAQ Scoring and PHQ-4 Scoring. The Pearson correlation coefficient is -0.686, indicating a strong negative correlation between these two variables. This means that as the IPAQ score increases, the PHQ-4 score tends to decrease, and vice versa.

The significance level (Sig. 2-tailed) is reported as less than 0.001, showing that the correlation is statistically significant at the 0.01 level where the null hypothesis is rejected and alternative hypothesis is accepted. This suggests that the likelihood of the observed correlation occurring by chance is very low. The sample size (N) for both variables is 73.

In summary, the data indicate a strong, statistically significant inverse relationship between IPAQ Scoring and PHQ-4 Scoring in the sample of 73 participants.

Anne-Marie Selzler et al. states whether PA was assessed objectively or by self-report, there was a slight negative correlation between depression and PA in COPD patients. In individuals with COPD, the type of PA measurement modified the association between anxiety and PA; objectively measured PA showed a slight positive correlation with anxiety, while self-reported PA had a slight negative correlation. The findings refute the idea that treating anxiety and sadness will increase physical activity in COPD patients.[7]

Kapil Sharma et al. states even though their age, education, smoking status, and BMI were comparable to those of non-depressed COPD patients, depressed subjects showed lower levels of physical exercise in leisure, leisure and locomotion activities daily, and total physical activities, as indicated by the modified Baecke questionnaire, and a lower distance walked in the MWD6. Furthermore, compared to the other group, the depressive and physically impaired participants evaluated separately had worse quality of life (SF 36), increased ward stay, greater levels of shortness of breath, and COPD severity.[8]

The table 2.0 and figure 2.0 displays the results of a correlation analysis between IPAQ Scoring and WHO Scoring. The Pearson correlation coefficient between these two variables is 0.786, indicating a strong positive correlation. This suggests that as the WHO score increases, the IPAQ score also tends to increase, and vice versa.

The significance level (Sig. 2-tailed) is reported as less than 0.001, which means that the correlation is statistically significant at the 0.01 level where the null hypothesis will be rejected and alternative hypothesis will be accepted. This indicates a very low probability that the observed correlation is due to chance. The sample size (N) for both variables is 73. In summary, the data suggest a strong, statistically significant positive relationship between WHO Scoring and IPAQ Scoring in the sample of 73 participants.

Andreas Horner et al. mentioned nearly half of stable COPD outpatients in Austria report symptoms of mild to moderate or severe depression, which are linked to heart disease as the only significant comorbidity, lower FEV1, less physical activity, more pain, more respiratory symptoms and exacerbations, and older age but not gender or smoking. This implies that treating depression in COPD patients may be a key therapeutic goal.[9]

Igor Grygus et al. stated Following the implementation of the suggested physical rehabilitation program in both male and female patients with severe COPD, we saw improvements in the experimental group's general health and overall quality of life. The quality of life improved as a result of more indicators in troublesome areas. Patients in the experimental group reported feeling less uncomfortable, being less addicted to drugs, being more mobile, having more vital activity, being able to carry out daily duties, feeling less tired, having better sleep, thinking better, and interacting with others more. Only spiritual domain indicators showed a negligible growth at the same time. In contrast, the control group's male and female patients with severe COPD did not observe any appreciable changes in their overall health or quality of life.[10]

The table 3.0 illustrates the relationships between three different scores: the IPAQ scoring, the PHQ-4 scoring, and the WHO scoring, using Pearson's correlation coefficients.

IPAQ scoring is positively correlated with WHO scoring, with a strong correlation coefficient of 0.786. This implies that individuals who report higher levels of physical activity (as measured by the IPAQ) tend to have higher quality of life scores according to the WHO's assessment. The significance level for this correlation is less than 0.001, indicating that this relationship is statistically significant and unlikely to be due to chance.

Conversely, IPAQ scoring is negatively correlated with PHQ-4 scoring, with a correlation coefficient of -0.686. This negative relationship suggests that higher levels of physical activity are associated with lower levels of anxiety and depression symptoms, as measured by the PHQ-4. This correlation is also statistically significant with a p-value of less than 0.001. Finally, the WHO scoring is negatively correlated with PHQ-4 scoring, with a strong correlation coefficient of -0.745. This indicates that individuals with a higher quality of life, as measured by the WHO, tend to report fewer symptoms of anxiety and depression. This relationship is also statistically significant, with a p-value of less than 0.001.

In summary, the table shows that higher physical activity is linked to both better quality of life and lower anxiety and depression, while a better quality of life is associated with fewer mental health symptoms. All these relationships are statistically significant.

**CONCLUSION:**

In conclusion, the analysis of the PHQ-4, WHO Quality of Life, and IPAQ scores highlights the significant interplay between physical activity, mental health, and overall quality of life. The data suggest that individuals with higher levels of physical activity tend to experience better quality of life and lower symptoms of anxiety and depression. Conversely, those with greater anxiety and depression tend to report a lower quality of life. These findings emphasize the importance of physical activity in enhancing mental health and well-being, while also illustrating the strong, statistically significant correlations between these critical aspects of health. The consistency and strength of these relationships underscore the need for integrated approaches to improve both mental and physical health outcomes.

**LIMITATION OF THE STUDY:**

The samples were collected from only one setting.
Study duration was short

**FUTURE RECOMMENDATION:**

A larger sample size should be used in further researches.
The samples should be collected from more than one setting.
Further studies should include other variables like sleep quality.
Physical activity interventions—such as resistance training, aerobic exercises will be most useful in lowering anxiety and depression and increasing the quality of life should be conducted.

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