Research Article

Validity and Reliability of the Hospital Anxiety and Depression Scale (HADS) in Patients with Chronic Obstructive Pulmonary Disease (COPD)

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Abstract

Background: Limited research has assessed the psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in patients with Chronic Obstructive Pulmonary Disease (COPD).

Purpose: This retrospective study assessed the construct validity and internal consistency reliability of the HADS in patients with COPD.

Methods: Construct validity was established by assessing known groups and convergent and divergent validity. Mann-Whitney U-test assessed known group validity, and Spearman's correlations (ρ) assessed convergent validity. Cronbach's alpha determined the internal consistency reliability of the HADS.

Results: Forty-six patients with COPD [mean age = 71 ± 8 years, 50% Male] completed the HADS and measures of loneliness and health-related quality of life in Toronto ON, Canada. Of the 46 patients, 35% scored ≥ 8 for anxiety, and 46% scored ≥ 8 for depression. The mean HADS score was 6.8 ± 5, 7.4 ± 3, and 14.2 ± 7 for HADS-Anxiety, HADS-Depression, and HADS-Total, respectively. As expected, the HADS did not detect differences between groups based on clinical and physical characteristics.

The HADS-Anxiety, HADS-Depression, and HADS-Total scores had moderate to strong correlations ($p < 0.001$) with measures of loneliness [$\rho = 0.46, 0.69, 0.63$] and quality of life [Chronic Respiratory Questionnaire (CRQ)-Total: $\rho = -0.68, -0.48, -0.66$], respectively. Cronbach's alpha for HADS-Anxiety, HADS-Depression, and HADS-Total were 0.88, 0.75, and 0.88, respectively.

Conclusion: The HADS-Total and its subscales demonstrated excellent construct validity and satisfactory internal consistency reliability. This study supports using the HADS to assess symptoms of anxiety and depression in COPD.

Keywords: Anxiety, COPD, Depression, HADS, Reliability, Validity

Abbreviations: BMI: Body Mass Index; COPD: Chronic Obstructive Pulmonary Disease; CRQ: Chronic Respiratory Disease Questionnaire; FEV_1: Forced Expiratory Volume in 1 second; FVC: Forced Vital Capacity; HADS: Hospital Anxiety and Depression Scale; HRQoL: Health-related Quality of Life; MRC: Medical Research Council scale; UCLA-LS: University of California Los Angeles Loneliness Scale; 6-MWT: 6-minute Walk Test

Introduction

Chronic obstructive pulmonary disease (COPD) is persistent air-flow limitation predominantly caused by smoking and is associated with advanced age [1,2]. By 2030, COPD is predicted to be the third leading cause of death [3] and to increase healthcare costs due to the progressive nature of the disease and frequent hospitalization [4]. Patients with COPD experience a wide array of pulmonary symptoms (e.g., dyspnea and coughing) and extrapulmonary complications such as cardiovascular disease, balance impairments [5,6], anxiety and depression [7], and loneliness [8], which impact the management of COPD and reduce health-related quality of life (HRQoL) [1].

The prevalence of anxiety and depression in patients with COPD is estimated to range from 10 to 86% [9–12]. COPD is known to reduce exercise tolerance and severely limit daily life activities, which increase the risk of developing symptoms of anxiety and depression [7,11]. Feelings of fear and hopelessness, panic attacks, and low self-esteem manifest anxiety and depression in COPD [7,11,12]. Untreated symptoms of anxiety and depression in patients with COPD are associated with increased severity of exacerbations and increased mortality and medical costs [7,11–13].

The Hospital Anxiety and Depression Scale (HADS) is widely used to assess symptoms of anxiety and depression in patients with COPD [14,15]. The HADS requires patients to rate several statements about their feelings in the past week on a scale ranging from zero (no, not at all) to three (yes, definitely) for total scores of 0 – 21. The HADS has been used and validated for COPD; however, a recent systematic review showed limited evidence supporting the construct validity of the HADS total scale and HADS depression subscale [16]. Providing robust information about the psychometric properties of the HADS can assist clinicians and researchers to assess depression and anxiety more accurately in patients with COPD.

Study Purpose and hypotheses

This study aimed to assess the construct validity (known groups, convergent and divergent) and internal consistency reliability of the HADS in patients with COPD. After searching the literature and based on empirical studies done in the field of depression and anxiety in COPD [7,8,11–13,17], we hypothesized moderate to strong correlations with measures of HRQoL [Chronic Respiratory Disease Questionnaire (CRQ)] and loneliness [University of California and Los Angeles Loneliness scale (UCLA-LS)] as these measures are associated with symptoms of depression and anxiety.

The relationship between anxiety and depression and demographic and clinical variables was previously documented. However, the results of these studies were largely inconsistent. For example, some studies reported greater depression and anxiety among women [11–13], but not others [7]. While COPD severity was the predictive factor for depression in some studies [7,13], others did not find any association [12]. Since these factors had indirect

effect on depression and anxiety in patients with COPD, we expected insignificant differences in HADS scores between groups based on demographics (e.g., sex, marital status) and clinical characteristics (e.g., COPD severity, oxygen use, gait aid use). Finally, we expected high internal consistency reliability of the HADS (Cronbach's alpha > 0.70) [18].

Methods and Materials

Study design and setting

This retrospective study was completed using baseline data from a previous study on loneliness conducted at West Park Healthcare Centre, Toronto, ON, Canada. Ethics approval was received for the original study (JREB #21-008-WP), and informed consent was obtained from all participants. Patients with COPD completed three questionnaires: the HADS, UCLA-LS, and CRQ. A full description of the recruitment process and data collection is published [8].

Eligibility criteria

Participants were included if they (1) had a medical diagnosis of COPD, (2) could communicate in English, and (3) were 18 years or older and were excluded if they failed to complete the outcome measures (UCLA-LS, HADS, CRQ).

Outcomes measures

Patients' demographic and clinical characteristics were retrieved from their medical records.

Sex, marital status, educational level, COPD severity [Medical Research Council (MRC) dyspnea scale], oxygen use, and gait aid use variables were used to assess known group's validity of the HADS. Age, body mass index (BMI), smoking history, duration of COPD, exercise tolerance test (6-MWT), and spirometry tests [Forced expiratory volume in 1 second (FEV_1), forced vital capacity (FVC)] were used to assess divergent validity of the HADS. To assess convergent validity, participants completed the HADS and two measures: the UCLA-LS and CRQ.

HADS: The HADS is a self-report scale that includes 14 items divided into two seven-item subscales: HADS-Anxiety and HADS-Depression. It assesses feelings of anxiety and depression experienced during the preceding week. Scoring for each item ranges from zero (no not at all) to three (yes definitely) for total scores of 0 – 21. Five of the fourteen items are reverse scored. Higher scores indicate greater symptoms of depression or anxiety [14]. A cutoff score ≥ 8 denotes anxiety or depression [19]. The HADS has previously been used and validated in patients with COPD [20].

UCLA-LS (version 3): Loneliness levels were assessed using the 20-item self-reported UCLA-LS (version 3). Each item is rated on a 1-4 Likert scale, from "never" to "always". Positively worded items are reverse scored. The scale has a possible total score of 20 to 80 points, with higher scores indicating greater loneliness [21]. The UCLA-LS has been reported to be a valid [r = 0.43 – 0.72] and reliable [ICC = 0.96] measure of loneliness [22] and can be used in patients with COPD [8].

CRQ: The 20-item self-administered version (CRQ-SA) was used to assess HRQoL. The CRQ has four domains: CRQ-Dyspnea (five-item), CRQ-Fatigue (four-item), CRQ-Emotional function (seven-item), and CRQ-Mastery (four-item). Scoring for each item ranges from one (maximum impairment) to seven (no impairment), with higher scores indicating fewer impairments [23]. The CRQ is a valid (r = 0.77), reliable (ICC = 0.73 – 0.95), and responsive measure of HRQoL in patients with COPD [24].

Statistical analysis

Statistical Package for the Social Sciences (SPSS, version 29) was used to complete statistical analysis. Demographic and clinical data were summarized using descriptive statistics. The assumption of normality was assessed using the Kolmogorov–Smirnov test. The normality assumption was violated for the UCLA-LS and HADS-A ($p < 0.05$). Therefore, the Mann-Whitney U test was used to assess known group's validity. Convergent and divergent validity of the HADS was assessed using Spearman's correlations. The strength of the correlations was determined as follows: r < 0.1 = no correlation, 0.1 ≤ r < 0.3 = weak correlations, 0.3 ≤ r < 0.5 = moderate correlations, and r ≥ 0.5 = strong correlations [25]. Cronbach's alpha was calculated for the HADS total score and for its subscales to assess the internal consistency of the scale.

Cronbach's alpha equal to or greater than 0.70 was considered satisfactory [18]. Inter-item correlations were calculated using Spearman's correlations.

Results

Participants' characteristics

The mean age of patients with COPD was 71 (SD = 8), ranging from 52 – 91 years. The average HADS score was 14.2 (7), 7.4 (3), & 6.8 (5) for the HADS total score, HADS-Depression and HADS-Anxiety respectively. Based on the predetermined cut-off scores for anxiety and depression, in this study, 35% scored ≥ 8 for anxiety, and 46% scored ≥ 8 for depression. Characteristics of the 46 individuals with COPD are summarized in Table 1.

Construct validity

Known groups or discriminative validity: The results of known group's validity are summarized in Table 2. No differences were observed between groups based on sex, marital status, education level, severity of COPD, oxygen use and gait aid use.

Convergent and divergent validity: Results of Spearman's correlation between the HADS and its subscales with the outcome measures are shown in Table 3. The HADS total score had strong correlations ($p < 0.001$) with the UCLA-LS ($\rho = 0.63$), CRQ-Fatigue ($\rho = -0.60$), CRQ-Emotional function ($\rho = -0.73$), CRQ-Mastery ($\rho = -0.61$), and CRQ-Total ($\rho = -0.66$), and moderate correlations with CRQ-Dyspnea ($\rho = -0.47$).

Table 1: Characteristics of individuals with COPD (N = 46).			
Variable		**N (%)**	**Mean ± SD**
Sex	Male Female	23 (50) 23 (50)	
Marital status	Married Unmarried (single, divorced, widowed)	18 (39) 28 (61)	
Weight, kg Height, m			71 ± 15 1.7 ± 0.1
Smoking history, pack/year			39 ± 14
Oxygen use	Yes No	25 (54) 21 (46)	
Gait aid use, rollator	Yes No	26 (57) 20 (43)	
Educational level	Elementary High school College University	3 (7) 26 (57) 13 (28) 4 (9)	
Lung function	FEV_1, L FEV_1 % predicted FVC, L FVC % predicted FEV_1/FVC %		1.0 ± 0.5 39 ± 17 2.7 ± 1.1 74 ± 23 40 ± 13
Duration of COPD, years			11 ± 8
COPD severity, MRC (/5)	Grade 1 and 2, Mild Grade 3, Moderate Grade 4, Severe Grade 5, Very severe	3 (6) 16 (35) 18 (39) 9 (20)	

Descriptive statistics were used to summarize the N (%) and mean and standard deviation (SD) of all variables. COPD: Chronic Obstructive Pulmonary Disease, FEV_1: Forced Expiratory Volume in 1 Second; FVC: Forced Vital Capacity, MRC: Medical Research Council

Table 2: Known groups validity of the HADS in individuals with COPD (N = 46)			
Variable	**HADS-Anxiety Mean Rank (P value)**	**HADS-Depression Mean Rank (P value)**	**HADS-Total Mean Rank (P value)**
Sex Male vs. Female	22 vs. 25 (NS)	26 vs. 21 (NS)	24 vs. 23 (NS)
Marital status Married vs. Unmarried	24 vs. 23 (NS)	23 vs. 24 (NS)	23 vs. 24 (NS)
Educational level Elementary vs. High school	23 vs. 14 (NS)	16 vs. 15 (NS)	21 vs. 14 (NS)
Elementary vs. College	12 vs. 8 (NS)	8 vs. 9 (NS)	10 vs. 8 (NS)
Elementary vs. University	6 vs. 3 (NS)	5 vs. 4 (NS)	5 vs. 3 (NS)
COPD severity Mild vs. Moderate	7 vs. 11 (NS)	6 vs. 11 (NS)	6 vs. 11 (NS)
Mild vs. Severe	8 vs. 11 (NS)	7 vs. 12 (NS)	7 vs. 12 (NS)
Mild vs. Very severe	6 vs. 7 (NS)	5 vs. 7 (NS)	6 vs. 7 (NS)
Oxygen use Yes vs. No	21 vs. 26 (NS)	22 vs. 25 (NS)	22 vs. 26 (NS)
Gait aid use (Rollator) Yes vs. No	23 vs. 24 (NS)	24 vs. 23 (NS)	24 vs. 23 (NS)

Mann-Whitney U test was used to assess known groups or discriminative validity of the HADS. Data are presented as mean ranks. COPD: Chronic Obstructive Pulmonary Disease; HADS: Hospital Anxiety and Depression Scale; NS: non-significant.

The HADS-Depression subscale had ($p < 0.001$) strong correlations with the UCLA-LS ($\rho = 0.69$), CRQ-Fatigue ($\rho = -0.56$), CRQ-Emotional function ($\rho = -0.54$), and moderate correlations with CRQ-Mastery ($\rho = -0.40$), and CRQ-Total ($\rho = -0.48$). The HADS-Anxiety subscale had ($p < 0.001$) strong correlations CRQ-Dyspnea ($\rho = -0.52$), CRQ-Fatigue ($\rho = -0.52$), CRQ-Emotional function ($\rho = -0.74$), CRQ-Mastery ($\rho = -0.68$), and CRQ-Total ($\rho = -0.68$), and moderate correlations with UCLA-LS ($\rho = 0.46$). These results indicate that increased symptoms of anxiety and depression are associated with more loneliness and lower HRQoL.

The HADS did not correlate with BMI, smoking history, duration of COPD, FEV_1 % predicted, FVC % predicted, and the 6-MWT, confirming its divergent validity but had moderate to strong correlation with age ($\rho = -0.46 – 0.52$, $p < 0.001$).

Reliability analysis

Spearman's correlations of the total scale ($\rho = 0.44 – 0.75$), anxiety subscale ($\rho = 0.64 – 0.79$), and depression subscale ($\rho = 0.52 – 0.74$) were all statistically significant ($p < 0.001$), as presented in Table 4.

Table 5 presents the item total statistics of the HADS in individuals with COPD. Cronbach's alpha for the HADS total scale, HADS-Anxiety subscale, and HADS-Depression subscale were 0.88, 0.88, and 0.75, respectively. Cronbach's alpha changed slightly when individual items were removed from the HADS total scale (Cronbach's alpha = 0.86 – 0.89), indicating that all of the scale's

items should be retained. For the HADS-Anxiety subscale, Cronbach's alpha changed slightly when individual items were removed (Cronbach's alpha = 0.85 – 0.88). For the HADS-Depression subscale, Cronbach's alpha was worse with the removal of items HADS-D-6 and HADS-D-12 (Cronbach's alpha = 0.68), indicating that these items should be retained. For the other items in the HADS-Depression subscale, Cronbach's alpha changed slightly (Cronbach's alpha = 0.71 – 0.76).

Discussion

This study assessed the construct validity and internal consistency reliability of the HADS in patients with COPD. The HADS had moderate to strong associations with measures of loneliness and HRQoL, supporting its convergent validity. The insignificant differences in the HADS scores between groups and the absence of relationships with demographics and clinical measures confirmed the scale's known groups and divergent validity, respectively. Lastly, the HADS and its subscales demonstrated satisfactory internal consistency reliability. Using the HADS for assessing symptoms of anxiety and depression may assist clinicians involved in respiratory care to identify these symptoms and improve the management and outcomes in patients with COPD.

In the current sample, 34% and 46% of patients with COPD reported symptoms of anxiety and depression, respectively. These results are consistent with previous research that reported a mod-

Table 3: Convergent and divergent validity of the HADS in individuals with COPD (N = 46).

Variable	Mean ± SD	Spearman's correlations HADS-Anxiety	Spearman's correlations HADS-Depression	Spearman's correlations HADS-Total
HADS-Anxiety	6.8 ± 5	1.00	--	($\rho = 0.90$, $p < 0.001$)
HADS-Depression	7.4 ± 3	($\rho = 0.56$, $p < 0.001$)	1.00	($\rho = 0.86$, $p < 0.001$)
HADS-Total	14.2 ± 7	--	--	1.00
Convergent validity				
UCLA-LS	45 ± 14	($\rho = 0.46$, $p < 0.001$)	($\rho = 0.69$, $p < 0.001$)	($\rho = 0.63$, $p < 0.001$)
CRQ-Dyspnea	3.7 ± 1	($\rho = -0.52$, $p < 0.001$)	($\rho = -0.28$, $p < 0.06$)	($\rho = -0.47$, $p < 0.001$)
CRQ-Fatigue	3.3 ± 1	($\rho = -0.52$, $p < 0.001$)	($\rho = -0.56$, $p < 0.001$)	($\rho = -0.60$, $p < 0.001$)
CRQ-Emotional function	4.1 ± 1	($\rho = -0.74$, $p < 0.001$)	($\rho = -0.54$, $p < 0.001$)	($\rho = -0.73$, $p < 0.001$)
CRQ-Mastery	4.0 ± 2	($\rho = -0.68$, $p < 0.001$)	($\rho = -0.40$, $p < 0.001$)	($\rho = -0.61$, $p < 0.001$)
CRQ-Total	3.8 ± 1	($\rho = -0.68$, $p < 0.001$)	($\rho = -0.48$, $p < 0.001$)	($\rho = -0.66$, $p < 0.001$)
Divergent validity				
Age	71 ± 8	($\rho = -0.50$, $p < 0.001$)	($\rho = -0.46$, $p < 0.001$)	($\rho = -0.52$, $p < 0.001$)
BMI, kg/m²	26 ± 6	($\rho = 0.004$, NS)	($\rho = -0.07$, NS)	($\rho = -0.01$, NS)
Smoking-history (pack years)	39 ± 14	($\rho = -0.06$, NS)	($\rho = 0.14$, NS)	($\rho = 0.07$, NS)
Duration of COPD, years	11 ± 8	($\rho = -0.08$, NS)	($\rho = -0.21$, NS)	($\rho = -0.15$, NS)
FEV_1% predicted	39 ± 17	($\rho = 0.001$, NS)	($\rho = -0.18$, NS)	($\rho = -0.07$, NS)
FVC % predicted	74 ± 23	($\rho = 0.02$, NS)	($\rho = -0.28$, NS)	($\rho = -0.09$, NS)
Exercise capacity, 6MWT, m	291 ± 115	($\rho = 0.16$, NS)	($\rho = -0.04$, NS)	($\rho = 0.06$, NS)

Descriptive statistics were used to summarize the mean and SD of all variables. Spearman's correlations were performed to assess convergent and divergent validity of the HADS scale with all variables. BMI: Body Mass Index; COPD: Chronic Obstructive Pulmonary Disease; CRQ: Chronic Respiratory Disease Questionnaire; FEV_1: Forced Expiratory Volume in 1 second; FVC: Forced Vital Capacity; HADS: Hospital Anxiety and Depression Scale; 6-MWT: 6-Minute Walk Test; NS: non-significant, SD: Standard Deviation; UCLA-LS: The University of California Los Angeles Loneliness Scale.

Table 4: Item-subscale and item-total score correlations of the HADS in COPD (N = 46).		
Item	**Item-subscale correlations**	**Item-total scale correlations**
Anxiety subscale		
1. I feel tense or "wound up"	(ρ = 0.79, p < 0.001)	(ρ = 0.75, p < 0.001)
3. I get a sort of frightened feeling as if something awful is about to happen	(ρ = 0.71, p < 0.001)	(ρ = 0.67, p < 0.001)
5. Worrying thoughts go through my mind	(ρ = 0.78, p < 0.001)	(ρ = 0.77, p < 0.001)
7. I can sit at ease and feel relaxed	(ρ = 0.67, p < 0.001)	(ρ = 0.58, p < 0.001)
9. I get a sort of frightened feeling like "butterflies" in the stomach	(ρ = 0.79, p < 0.001)	(ρ = 0.61, p < 0.001)
11. I feel restless as I have to be on the move	(ρ = 0.64, p < 0.001)	(ρ = 0.65, p < 0.001)
13. I get sudden feelings of panic	(ρ = 0.76, p < 0.001)	(ρ = 0.63, p < 0.001)
Depression subscale		
2. I still enjoy the things I used to enjoy	(ρ = 0.67, p < 0.001)	(ρ = 0.55, p < 0.001)
4. I can laugh and see the funny side of things	(ρ = 0.55, p < 0.001)	(ρ = 0.58, p < 0.001)
6. I feel cheerful	(ρ = 0.72, p < 0.001)	(ρ = 0.72, p < 0.001)
8. I feel as if I am slowed down	(ρ = 0.63, p < 0.001)	(ρ = 0.54, p < 0.001)
10. I have lost interest in my appearance	(ρ = 0.62, p < 0.001)	(ρ = 0.54, p < 0.001)
12. I look forward with enjoyment to things	(ρ = 0.74, p < 0.001)	(ρ = 0.55, p < 0.001)
14. I can enjoy a good book or radio or TV program	(ρ = 0.52, p < 0.001)	(ρ = 0.44, p = 0.002)

Spearman's correlations were used to determine correlations between items and subscales and total HADS. COPD: Chronic Obstructive Pulmonary Disease; HADS: Hospital Anxiety and Depression Scale.

Table 5: Item total statistics of the HADS in COPD (N = 46).				
Item	**Total scale mean if item deleted**	**Scale variance if item deleted**	**Corrected item-Total correlation**	**Cronbach's Alpha if item deleted**
HADS-Anxiety-1	13.0	42.8	0.74	0.86
HADS-Anxiety-3	13.3	42.5	0.66	0.87
HADS-Anxiety-5	13.1	40.3	0.73	0.86
HADS-Anxiety-7	13.2	44.9	0.57	0.87
HADS-Anxiety-9	13.5	45.0	0.58	0.87
HADS-Anxiety-11	13.2	44.9	0.57	0.87
HADS-Anxiety-13	13.4	43.9	0.64	0.87
HADS-Depression-2	12.8	44.8	0.47	0.88
HADS-Depression-4	13.7	46.3	0.56	0.87
HADS-Depression-6	13.4	44.4	0.63	0.87
HADS-Depression-8	12.1	45.9	0.46	0.87
HADS-Depression-10	13.2	46.2	0.40	0.88
HADS-Depression-12	13.0	45.2	0.48	0.88
HADS-Depression-14	13.9	49.2	0.20	0.89

Reliability statistics were used to examine the internal consistency of the HADS. COPD: Chronic Obstructive Pulmonary Disease; HADS: Hospital Anxiety and Depression Scale.

erate to high prevalence of anxiety and depression in patients with COPD [9–12].

In this study, increased levels of anxiety and depression were associated with impaired HRQoL and higher levels of loneliness, confirming the convergent validity of the HADS, and emphasizing the importance of screening for symptoms of anxiety and depression in patients with COPD. These findings are consistent with previous reports in which the HADS total score and its subscales correlated negatively with the quality-of-life index pulmonary questionnaire and its subscales (Pearson's correlations, r = 0.26 – 0.59) and positively with the General Health Questionnaire (r = 0.29 – 0.81), suggesting that HADS is a valid tool to assess anxiety and depression in patients with COPD [17,20].

In line with our hypothesis, the HADS and its subscales did not discriminate between groups of patients with COPD based on demographics (sex, marital status, educational level) and clinical variables (COPD severity, oxygen use, gait aid use), indicating no effect of these factors on levels of anxiety and depression in patients with COPD. However, age is significantly and inversely associated with the HADS, showing that symptoms of anxiety and depression decrease with advanced age. The findings of the discriminative validity of the HADS in COPD are empirical as previous research did not assess the discriminative validity of the HADS in patients with COPD based on demographics and clinical characteristics.

Lastly, the HADS and its subscales demonstrated satisfactory internal consistency reliability with Cronbach's alpha values of 0.75 – 0.88, consistent with previous reports in patients with COPD, which reported Cronbach's alpha values of 0.73 – 0.91 [17,20,26,27].

Strengths and limitations

This study adds new information about the construct (known groups, convergent and divergent) validity of the HADS in patients with COPD. The convergent validity of the HADS was assessed by correlating the scale with valid and reliable tools (UCLA-LS and CRQ) used in patients with COPD.

The limitations of the study are as follows: (1) the small sample size precluded examining the structural or face validity of the HADS to better understand its psychometric properties in COPD; (2) data were collected from one clinical setting limiting the generalizability of results; and (3) a response bias may result from self-reported scales as patients may underreport their negative emotions.

Conclusion

The HADS and its anxiety and depression subscales had excellent known groups, convergent and divergent validity, and internal consistency reliability. The findings of this study support the use of the HADS for assessing anxiety and depression in patients with COPD in the clinical setting.

Acknowledgments

Conflict of Interest

All authors declare no conflict of interest

Author contributions

Sanaa A. Alsubheen: Conceptualization, Formal analysis, Methodology, Writing - original draft, Writing - review & editing, & approval of final version. **Cindy Ellerton:** Data curation, Methodology, Writing - review & editing, & approval of final version. **Noor Alsubheen:** Conceptualization, Data analysis, Methodology, Writing - review & editing, & approval of final version. **Mohammad Ismail:** Methodology, Writing - review & editing, & approval of final version. All authors agree to be accountable for all aspects of the work.

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