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VALIDITY AND RESPONSIVENESS OF THE MANCHESTER FATIGUE SCALE IN POST-COVID

VALIDADE E RESPONSIVIDADE DA ESCALA DE FADIGA DE MANCHESTER EM PACIENTES PÓS-COVID

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Abstract

Objective: This study investigates the Manchester COPD Fatigue Scale's (MCFS) validity and responsiveness in individuals after hospitalization due to COVID-19.

Methods: A longitudinal observational study included 53 adults diagnosed with COVID-19. Modified Medical Research Council dyspnea scale (mMRC), Six-Minute Step Test (6MST), Saint George's Respiratory Questionnaire (SGRQ), and Hospital Anxiety and Depression Scale (HADS) were assessed. The measurement properties tested were concurrent, convergent, discriminant validities, and responsiveness.

Results: The MCFS showed concurrent, convergent, and discriminant validity, with moderate to strong significant correlations with fatigue (r_s=0.57), symptoms (r_s=-0.27), exercise performance (r_s=0.39), depression (r_s=0.67), and dyspnea (r_s=0.44) measures. The instrument exhibited internal responsiveness with reduced fatigue scores three months after hospital discharge (median total score from 14.5 to 5.0,p<0.001). External responsiveness was shown through associations between MCFS scores and dyspnea changes.

Conclusion: The MCFS is a valid and responsive tool for physicians and researchers in effectively identifying, monitoring, and managing post-COVID-19 fatigue.

Keywords: Fatigue. Post-Acute COVID-19 Syndrome. Symptom Assessment.

Resumo

Objetivo: Este estudo investigou a validade e a responsividade da Escala de Fadiga da DPOC de Manchester (MCFS) em indivíduos após hospitalização por COVID-19.

Métodos: Este estudo observacional longitudinal incluiu 53 adultos com diagnóstico de COVID-19. Foram avaliadas a escala de dispneia modificada do Medical Research Council (mMRC), o teste do degrau de seis minutos (6MST), o questionário respiratório de Saint George (SGRQ) e a escala hospitalar de ansiedade e depressão (HADS). As propriedades de medida testadas foram validades concorrente, convergente, discriminante e responsividade.

Resultados: A MCFS apresentou validade concorrente, convergente e discriminante, com correlações significativas moderadas a fortes com fadiga (r_s=0,57), sintomas (r_s=-0,27), desempenho no exercício (r_s=0,39), depressão (r_s=0,67), e medidas de dispneia (r_s=0,44). O instrumento apresentou responsividade interna com redução dos escores de fadiga três meses após a alta hospitalar (mediana do escore total de 14,5 a 5,0, p<0,001). A responsividade externa foi demonstrada por meio de associações entre os escores do MCFS e as alterações da dispneia.

Conclusão: O MCFS é uma ferramenta válida e responsiva para médicos e pesquisadores na identificação, monitoramento e gerenciamento eficazes da fadiga pós-COVID-19.

Descritores: Fadiga; Síndrome de COVID-19 pós-aguda; Avaliação de sintomas.

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Introduction

Among the post-COVID symptoms, fatigue stands out as the most prevalent, affecting 50 to 70% of hospitalized and non-hospitalized individuals. Fatigue is characterized by persistent and extreme exhaustion, not easily relieved by rest, and can have a profound impact on physical, mental, and cognitive aspects, leading to reduced quality of life, social relations, and emotional well-being.[1]

As the public health concern surrounding post-COVID fatigue grows, it is crucial to assess and address this issue effectively.[2] While some instruments like the "Fatigue Severity Scale (FSS)" and the "Functional Assessment of Chronic Illness Therapy (FACIT)" are available for fatigue assessment, they lack comprehensive coverage of the multidimensional impact of fatigue,[3] not being specific in scales for respiratory diseases. To address this gap, we propose using the Manchester fatigue scale, initially developed for chronic obstructive pulmonary disease, as it considers various dimensions of fatigue in individuals with respiratory diseases.[4] Therefore, our hypothesis is that the Manchester fatigue scale could be a valid and responsive tool to measure fatigue in individuals after COVID-19 hospitalization. The present study aims to test the validity and responsiveness of the Manchester fatigue scale in post-hospitalization patients due to COVID19.

Methodology

Study design and ethical aspects

This longitudinal observational study was approved by the Research Ethics Committees of three hospitals: the University Hospital of the Federal University of Juiz de Fora (#4,002,358), Santa Casa de Misericórdia Hospital of Juiz de Fora (#4,056,210), and João Penido Regional Hospital (#4,013,533). Participants provided informed consent. Data for the study was collected between June 2020 and January 2022. Participants were assessed within five days after discharge due to COVID-19 infection and again three months later at their homes, both times in person by the same assessors. All participants gave written informed consent.

Selection of participants

Fifty-three participants were included in the study, selected from individuals hospitalized for COVID-19 between June 2020 and October 2021. Eligibility criteria included

age ≥18 years, RT-PCR positive for COVID-19, and residency in Juiz de Fora. Exclusions encompassed individuals with neuromuscular or musculoskeletal dysfunctions, those unable to comprehend study procedures, patients with unstable cardiovascular diseases, history of other fatigue-causing disorders, and those who initiated rehabilitation after hospital discharge.

Assessments

Demographic, anthropometric, clinical, and hospitalization data

Clinical and demographic data, anthropometric measurements, length of hospital stay, and Charlson Comorbidity Index, were extracted from medical records. Initial assessments were conducted at participants' homes within 72 hours of hospital discharge by trained researchers.

Charlson comorbidity index

Evaluates comorbidities and predicts intra-hospital mortality based on nineteen clinical variations, scored between 0 and 6 (Box 1).[5] The higher the index, the greater the likelihood of patient death or hospitalization.

Pulmonary function

Assessed through spirometry using a portable spirometer (Spirobank II, Medical International Research). Results were expressed in absolute values and percentage predicted for the Brazilian population.[6]

Manchester Fatigue Scale (MCFS)

The MCDS is a specific, valid, reliable, and treatment-responsive instrument, translated and validated for the Brazilian population with COPD[7] used to measure fatigue in individuals with COPD. The instrument incorporates multidimensional aspects of fatigue, including the physical, cognitive, and psychosocial dimensions of this symptom. It consists of self-reported questions divided into three domains: physical fatigue (11 items), cognitive fatigue (7 items), and psychosocial fatigue (9 items). Its score is calculated based on the sum of the response options of each question, ranging from 0 to 54, with higher scores indicating greater fatigue (Box 2).[4]

Modified Medical Research Council (mMRC)

The mMRC dyspnea scale is a widely used clinical tool designed to measure the degree of breathlessness experienced by individuals with respiratory conditions. A scale measuring dyspnea and fatigue during gradual activities (Box 3), with scores ranging from 0 to 4.[8]

Six-Minute Step Test (6MST)

The six-minute step test was used to assess the exercise capacity of the study participants. A 20 cm high step, with 80 cm in length, 40 cm in width, and a non-slip surface, was used. The test began with the participant in an upright position, being instructed to step up and down the step as quickly as possible for six minutes, with a free cadence determined by the participant. The test was interrupted if the patient experienced discomfort, nausea, significant dyspnea, extreme fatigue, chest pain, or if $SpO_2 \leq 80\%$. In cases where the patient used oxygen therapy, the test was conducted with a constant oxygen flow, according to the medical prescription. [9]

Saint George's Respiratory Questionnaire (SGRQ)

Quality of life was assessed using the SGRQ. The questionnaire has a total score, presents absolute values and percentage of the predicted, and evaluates three domains: activities, impacts, and symptoms. The total score and each domain score range from 0 to 100, with lower values indicating better quality of life.[10]

Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale (HADS) is an assessment tool used to detect anxiety and depression in non-psychiatric patients. It consists of 14 items, split into two subscales: 7 items for anxiety (HADS-A) and 7 for depression (HADS-D)(Box 4). Each item is scored on a 4-point scale, with total subscale scores ranging from 0 to 21. Higher scores indicate greater anxiety or depression, with cut-offs defining normal, borderline, and abnormal levels. In the study, HADS was administered to evaluate participants' psychological well-being, providing insights into the mental health of the study population.[1]

Statistical Analysis

The Shapiro-Wilk test was used to verify data distribution. Validity was assessed through concurrent, convergent, and discriminant validity. Concurrent validity was evaluated by the correlation of the MDFS with fatigue and performance in the 6MST, and the symptoms domain of the SGRQ. Convergent validity was examined through the correlation of MCFS with depression and dyspnea. Correlation coefficients were used to interpret the strength of associations. Discriminant validity was evaluated by analyzing whether the MCFS scores can effectively differentiate between groups based on varying levels of dyspnea, as assessed by the mMRC categories. The internal responsiveness of the MCFS was observed by the reduction in the fatigue from the first visit after hospital discharge to after three months of follow-up. The Wilcoxon test and effect size analysis were employed for responsiveness evaluation. The association between the change in the MCFS and the change in the dyspnea after three months of follow-up score analyzed external responsiveness. A p-value <0.05 was considered statistically significant. Statistical analyzes were performed using the software SPSS version 26.

Results

A total of 256 participants were initially recruited from June 2020 to October 2021. Among them, 211 were excluded: residing in a different city (n=55), inability to complete tests (n=75), institutionalization (n=9), refusal (n=70), and readmission (n=2). Subsequently, 53 participants were included in the validity analysis, and 42 in the responsiveness analysis. In the second evaluation, 11 participants were dropped out from the study, nine refused to participate, and two were hospitalized.

Participants' average age was age of 55±12 years, 52% were men, most of them (72%) had at least one comorbidity, and the mean length of hospitalization was 11±8.6 days (Table 1).

Table 1 - Participants' baseline characteristics

Variables	Results n = 53
Male, n (%)	34 (52.3)
Age, years	55.3 ± 12.6
Weight, kg	81.1 ± 18.3
Height, cm	167.3 ± 10.9
BMI, kg/m^2	28.9 ± 6.7
Charlson Comorbidity Index	1 (0 – 8)
Length of stay, days	11 ± 8.6
Used ICU, n (%)	16 (30)
Length of stay in ICU, days	9.4 ± 7.9
Used MV, n (%)	7 (13)
FEV_1, L	2.29 ± 0.81
FEV_1, % pred	75.0 ± 17.8
FVC, L	2.82 ± 1.0
FVC, % pred	74.5 ± 15.1
FEV_1/FVC	82.4 ± 12.6
MCFS cognitive, points	4.0 (0 - 14)
MCFS physical, points	4.5 (0 - 22)
MCFS psychosocial, points	5.0 (0 - 18)
MCFS total, points	12.5 (0 - 50)
mMRC, point	2.0 (0 – 4.0)
6MST, n° steps	95.8 ± 31.2
6MST, % pred.	72.3 ± 22.9
Borg fatigue initial on 6MST	0 (0 - 8)
Borg fatigue final on 6MST	3 (0-10)
SGRQ symptoms, points	54.7 (15.5 - 79)
SGRQ activities, points	56.7 (10 - 100)
SGRQ impact, points	59.4 (25.3 – 94.3)
SGRQ total, points	55 (22.4 – 91.0)
HADS depression, points	3 (0 - 13)
HADS anxiety, points	5 (0 – 18)

Data presented in mean ± SD or median (minimum – maximum), frequency (percentage). Abbreviations: BMI: body mass index; ICU: Intensive care unit; MV: mechanical ventilation; FEV_1: Forced expiratory vital in one second; FVC: forced vital capacity; MCFS: Manchester COPD Fatigue Scale's; 6MST: six-minute step test; SGRQ: Saint George Respiratory Questionnaire; HADS: Hospital Anxiety and Depression Scale.

Validity

The concurrent validity was observed by the direct and moderate relationship of all domains and the total score of the MCFS with fatigue at the end of 6MST; in addition to the moderate and inverse relationship between the physical domain and the total MCFS score with exercise performance; and *also,* a weak and inverse relationship between the physical domain and the total MCFS score with the symptoms of the SGRQ. The convergent validity can be

observed by all domains' moderate and direct relationship and the total score of the MCFS with depression and with dyspnea in the daily activities (mMRC) (Table 2).

Table 2 - Correlations between subscales and total MCFS and measures of validity

	Concurrent validity			Convergent validity	
MCFS	**Fatigue during exercise**	**Symptoms (SGRQ)**	**Exercise performance (6MST)**	**Depression**	**Dyspnea (mMRC)**
Physical	0.53**	-0.30*	-0.49**	0.64**	0.49**
Cognitive	0.54**	-0.18	-030*	0.54**	0.35**
Psychosocial	0.52**	-0.26	-0.27*	0.61**	0.37**
Total	0.57**	-0.27*	0.39**	0.67**	0.44**

Abbreviations: SGRQ: Saint George Respiratory questionnaire; 6MST: six-minute step test; mMRC: modified Medical Research Council; Manchester COPD Fatigue Scale's * p< 0.05

For discriminant validity, it was confirmed that the MCFS scores discriminate groups that differ in the severity of dyspnea assessed by the mMRC categories (Table 3). The total score and dimensions of the MCFS showed significant differences according to the categorization of dyspnea, that is, participants with more symptoms of dyspnea in activities have more symptoms of fatigue.

Table 3 - Discriminant validity - comparison between MCFS and symptom of dyspnea, categorized as mild (0-2) and severe (3-4) assessed by mMRC

	mMRC				
MCFS	0 - 2		3 – 4		p value
	median	min - max	median	min – max	
Physical	2.50	0 – 22.0	13.0	2.50 – 21.0	<0.001
Cognitive	2.75	0 – 13.5	9.5	0 – 14.0	0.008
Psychosocial	3.00	0 – 15.0	11.0	0 – 18.0	0.004
Total	9.25	0 – 45.0	36.0	4 – 49.5	<0.001

Abbreviations: mMRC: modified Medical Research Council; MCFS: Manchester COPD Fatigue Scale's.

Responsiveness

At the first visit after hospital discharge, the median scores were: 4.50 for physical fatigue, 4.00 for cognitive fatigue, and 5.00 for psychosocial fatigue. The overall total fatigue score had a median of 14.50. After three months of follow-up, median scores significantly decreased in all domains. Median scores at this time were: 1.50 for physical fatigue, 0.75 for cognitive fatigue, and 2.25 for psychosocial fatigue. The overall total fatigue score had a median of 5.00. Statistical analysis showed a highly significant difference (p<0.001) in fatigue levels

between the two time points for all domains and the total fatigue score. Furthermore, the effect size, which represents the magnitude of change in fatigue levels, was substantial, ranging from 0.50 to 0.60.

The Wilcoxon test revealed a significant reduction in fatigue three months after hospital discharge, with $z=-5.05$, $p<0.001$, with a large effect size for the total score, as well as for the physical domains $z=-4.87$, cognitive $z=-4.04$ and psychosocial $z=-4.52$, respectively, all with large effect size and $p<0.001$.

External responsiveness showed a significant association between the change in the total MCFS score and the change in the mMRC dyspnea score ($r_s=0.38$,$p=0.03$); as well as relationships for change in the physical and psychosocial domain with a change in mMRC ($r_s=0.36$,$p=0.04$ and $r_s=0.35$,$p=0.04$, respectively). The change in the cognitive domain did not correlate with the change in dyspnea in the mMRC ($r_s=0.27$,$p=0.12$).

Discussion

The MCFS demonstrated its validity and responsiveness in assessing fatigue severity and tracking its changes over time in hospitalized individuals after COVID-19.

The study included patients with pronounced COVID-19 symptoms requiring hospitalization before vaccines were available. Investigating fatigue in this population, which predominantly comprises productive age individuals, is emphasized due to its potential impact on work capacity and quality of life. Validated instruments are necessary to effectively assess, monitor, and control COVID-19-associated fatigue. The present study's findings align with previous research, confirming that fatigue is a prevalent symptom in COVID-19 hospitalized patients, persisting even after three months from symptom onset.[12]

The MCFS, designed for chronic disease patients, offers the advantage of multidimensional fatigue assessment concerning daily activities, aiding in identifying patient limitations and guiding interventions. Despite various scales existing to assess fatigue in COVID-19 patients, only one study examined the validity of two scales, namely the Fatigue Severity Scale and the Two Single-Item Screening Questions.[13] However, these instruments were one-dimensional, only tested against depression and quality of life, and lacked longitudinal evaluation.

Post-COVID fatigue involves post-exertion discomfort, reflecting the physical dimension of fatigue.[14] The study established MCFS's validity by correlating it with 6MST performance and fatigue intensity, validating it for this dimension. Its convergence was

confirmed through associations with depression and dyspnea during daily activities, revealing involvement in various fatigue dimensions. Persistent fatigue can also lead to depressed mood, affecting sleep, motivation, and social participation, exacerbating depression. Central fatigue and depression are interconnected; for example, central fatigue can reduce motivation and interest, potentiate depression, and vice versa. This association might be bidirectional.[15]

The correlation between MCFS and activity-related dyspnea adds to its concurrent validity due to shared pathophysiological mechanisms in chronic lung disease. The study confirmed MCFS's discriminant validity by effectively differentiating fatigue severity based on mMRC dyspnea levels, similar to observations in COPD patients. Despite differing pathophysiologies, MCFS remains a reliable measure of COVID-19-related fatigue.

The findings of this study align with the broader recommendations for managing post-COVID-19 fatigue outlined in the literature[16], particularly the need for a comprehensive diagnostic approach. The MCFS can play a crucial role in identifying fatigue severity and tracking changes, but it is essential to recognize that post-COVID fatigue may be part of a multisymptom cluster. As suggested by recent studies, when post-COVID fatigue is identified, a structured diagnostic work-up should be initiated to investigate potential underlying causes, such as end-organ sequelae, mental health conditions exacerbated by COVID-19, or other premorbid conditions where fatigue is a key feature [17]. Screening tools are recommended to characterize clinically significant fatigue and associated symptoms. The MCFS's multidimensional approach complements these recommendations by assessing fatigue across various domains, including physical and emotional aspects, offering a holistic view of patient health. This aligns with the present study's findings that link fatigue with activity-related dyspnea, depression, and reduced motivation, providing additional evidence for the utility of the MCFS in both clinical and research settings.

The MCFS demonstrated significant internal responsiveness, indicating the body's ability to regulate and adapt physiological responses to fatigue. Additionally, it showed moderate external responsiveness associated with improved dyspnea during activities. In patients with DPOC, MCFS showed small to moderate responsiveness in fatigue severety after a pulmonary rehabilitation program.[18] This difference in effect is expected, since DPOC is a chronic, progressive disease with different pathophysiological mechanisms from COVID-19.

Concerns have been raised that exercise-based rehabilitation programs may increase symptoms of fatigue in individuals with post-COVID-19 conditions. Daynes's study[19] showed a reduction in pre- and post-program fatigue in conjunction with an increase in exercise capacity, thus highlighting the potential benefit of symptom management in individuals with

long COVID. In this context, highlighting MCFS responsiveness, it can be an ally in long COVID rehabilitation programs.

The study acknowledges limitations, such as sample size and difficulties in establishing a gold standard fatigue assessment due to the multifactorial nature of the phenomenon. The COVID-19 pandemic's social distancing recommendations also contributed to many patient refusals.

The study's strength lies in providing the MCFS as an available tool to assess COVID-19-associated fatigue since no validated instrument was specifically designed for this population. Its use can aid healthcare professionals in identifying and monitoring post-COVID-19 fatigue, enabling effective therapeutic interventions to improve patient's quality of life.

The MCFS has significant clinical applicability in post-COVID-19 care. Its multidimensional design allows healthcare professionals to evaluate not only the physical but also the emotional and social components of fatigue, offering a thorough understanding of the patient's condition. In clinical practice, the MCFS can be used to track fatigue progression over time, helping clinicians identify whether fatigue is improving or worsening post-discharge, thereby aiding in monitoring long-term recovery. Given the prevalence of post-COVID fatigue and its association with reduced work capacity and diminished quality of life, as observed in this study, the MCFS can be employed in rehabilitation programs. By identifying specific areas where fatigue impacts daily activities, the scale provides crucial information for tailoring rehabilitation strategies, whether focusing on physical endurance, psychological support, or respiratory management.

In conclusion, the present study recommends using the Manchester Fatigue Scale as a valid and responsive tool for physicians and researchers in identifying, monitoring, and managing post-COVID-19 fatigue effectively.

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Box 1 - Charlson Comorbidities index score

Comorbidity	
Prior myocardial infarction	1
Congestive heart failure	1
Peripheral vascular disease	1
Cerebrovascular disease	1
Dementia	1
Chronic pulmonar disease	1
Rheumatologic disease	1
Peptic ulcer disease	1
Mild liver disease	1
Diabetes	1
Ceebrovascular (hemiplegia)event	2
Moderate-to-severe renal disease	2
Diabetes with chronic complications	2
Cancer without metastases	2
Leukemia	2
Lymphoma	2
Moderate or severe liver disease	3
Metastatic solid tumor	6
Acquired immune-deficiency syndrome (AIDS)	6

Box 2 - Manchester COPD-Fatigue Scale

Thinking about your fatigue over the past 2 weeks….	Response categories
1) Because of my fatigue, I limit my social activities outside the home	Never Rarely Sometimes Usually Always
2) Carrying a light load (e.g., one bag of grocery shopping) makes me fatigued	Never Rarely Sometimes Usually Always
3) I avoid walking uphill or taking the stairs because I know I would end up feeling fatigued	Never Rarely Sometimes Usually Always
4) I avoid pushing a light load (e.g., a trolley or an electric lawn mower on level ground) because I know I would end up totally fatigued	Never Rarely Sometimes Usually Always
5) I feel fatigued even before I start any exercise	Never Rarely Sometimes Usually Always
6) When I carry out the rubbish, I feel fatigued	Never Rarely Sometimes Usually Always
7) To walk from the house to the car or bus makes me feel fatigued (about 50 metres)	Never Rarely Sometimes Usually Always
8) Because I am fatigued, I find it difficult to think clearly	Never Rarely Sometimes Usually Always
9) Because I am fatigued, I find it hard to concentrate	Never Rarely Sometimes Usually Always
10) When I want to do some physical activity, I feel have no energy to do it	Never Rarely Sometimes Usually Always
11) My fatigue makes me frustrated	Never Rarely Sometimes Usually Always
12) When I am fatigued, I get fed up	Never Rarely Sometimes Usually Always
13) My fatigue depresses me	Never Rarely Sometimes Usually Always
14) My fatigue stops me from doing the things I enjoy	Never Rarely Sometimes Usually Always
15) Because of my fatigue, my legs feel heavy	Never Rarely Sometimes Usually Always
16) Because of my fatigue, I am much slower at doing things	Never Rarely Sometimes Usually Always
17) My fatigue is bothersome	Never Rarely Sometimes Usually Always
18) Because of my fatigue, I am slower in thinking things through than the people around me	Never Rarely Sometimes Usually Always
19) I feel drowsy	Never Rarely Sometimes Usually Always
20) Because of my fatigue, I feel less motivated than in the past	Never Rarely Sometimes Usually Always
21) I feel lethargic	Never Rarely Sometimes Usually Always
22) I feel weak because of my fatigue	Never Rarely Sometimes Usually Always
23) I am concerned about how my fatigue is perceived by others	Never Rarely Sometimes Usually Always
24) Overall, my fatigue interferes with me being able to carry out my duties and responsibilities	Never Rarely Sometimes Usually Always
25) Overall, fatigue causes problems for me	Never Rarely Sometimes Usually Always
26) Because of my fatigue I am no longer able to participate in life as I used to	Never Rarely Sometimes Usually Always
27) Doing an activity repeatedly (eg, getting up and down from the chair, or garden, or loading and unloading the washing machine) makes me fatigued	Never Rarely Sometimes Usually Always

Box 3 - The mMRC (Modified Medical Research Council) Dyspnoea Scale

Description	Grade
I only get breathless with strenuous exercise	0
I get short of breath when hurrying on level ground or walking up a slight hill	1
On level ground, I walk slower than people of my age because of breathlessness, or I have to stop for breath when walking at my own pace on the level	2
I stop for breath after walking about 100 yards or after a few minutes on level ground	3
I am too breathless to leave the house or I am breathless when dressing/undressing	4

Box 4 - St. George's Respiratory Questionnaire

Part 1

Questions about how much chest trouble you have	
	Please select ONE box for each question:
Question 1. I cough:	a) Most days a week b) Several days a week c) Only with chest infections d) Not at all
Question 2. I bring up phlegm (sputum):	a) Most days a week b) Several days a week c) Only with chest infections d) Not at all
Question 3. I have shortness of breath:	a) Most days a week b) Several days a Week c) Not at all
Question 4. I have attacks of wheezing:	a) Most days a week b) Several days a week c) A few days a month d) Only with chest infections e) Not at all
Question 5. How many attacks of chest trouble did you have during the last year?	a) 3 or more attacks b) 1 or 2 attacks c) None
Question 6. How often do you have good days (with little chest trouble)?	a) No good days b) A few good days c) Most days are good d) Every day is good
Question 7. If you have a wheeze, is it worse in the morning?	( ) No ( ) Yes
8. How would you describe your chest condition?	Please select ONE: a) Causes me a lot of problems or is the most important problem I have b) Causes me a few problems c) Causes no problem
9. Questions about what activities usually make you feel breathless.	For each statement please select the box that applies to you these days: True False ( ) ( ) Getting washed or dressed ( ) ( ) Walking around the home ( ) ( ) Walking outside on the level ( ) ( ) Walking up a flight of stairs ( ) ( ) Walking up hills
10. Some more questions about your cough and breathlessness.	For each statement please select the box that applies to you these days: True False ( ) ( ) My cough hurts ( ) ( ) My cough makes me tired ( ) ( ) I am breathless when I talk ( ) ( ) I am breathless when I bend over ( ) ( ) My cough or breathing disturbs my sleep ( ) ( ) I get exhausted easily
11. Questions about other effects that your chest trouble may have on you	For each statement please select the box that applies to you these days: True False ( ) ( ) My cough or breathing is embarrassing in public ( ) ( ) My chest trouble is a nuisance to my family, friends or neighbours ( ) ( ) I get afraid or panic when I cannot get my breath ( ) ( ) I feel that I am not in control of my chest problem

Questions about how much chest trouble you have	
	( ) ( ) I have become frail or an invalid because of my chest ( ) ( ) Exercise is not safe for me ( ) ( ) Everything seems too much of an effort
12. These are questions about how your activities might be affected by your breathing.	For each statement please select the box that applies to you because of your breathing: True False ( ) ( ) I take a long time to get washed or dressed ( ) ( ) I cannot take a bath or shower, or I take a long time ( ) ( ) I walk slower than other people, or I stop for rests ( ) ( ) Jobs such as housework take a long time, or I have to stop for rests ( ) ( ) If I walk up one flight of stairs, I have to go slowly or stop ( ) ( ) If I hurry or walk fast, I have to stop or slow down ( ) ( ) My breathing makes it difficult to do things such as walk up hills, carrying things up stairs, light gardening such as weeding, dance, play bowls or play golf ( ) ( ) My breathing makes it difficult to do things such as carry heavy loads, dig the garden or shovel snow, jog or walk at 5 miles per hour, play tennis or swim
13. We would like to know how your chest trouble usually affects your daily life	For each statement please select the box that applies to you because of your breathing: True False ( ) ( ) I cannot play sports or games ( ) ( ) I cannot go out for entertainment or recreation ( ) ( ) I cannot go out of the house to do the shopping ( ) ( ) I cannot do housework ( ) ( ) I cannot move far from my bed or chair
14. How does your chest trouble affect you?	Please select ONE: ( ) It does not stop me doing anything I would like to do ( ) It stops me doing one or two things I would like to do ( ) It stops me doing most of the things I would like to do ( ) It stops me doing everything I would like to do

Box 5 - Hospital Anxiety and Depression Scale

1. I feel tense or 'wound up': 3.Most of the time 2.A lot of the time 1.From time to time, occasionally 0. Not at all	**8. I feel as if I am slowed down:** 3.Nearly all the time 2.Very often 1.Sometimes 0.Not at all
2. I still enjoy the things I used to enjoy: 0.Definitely as much 1.Not quite so much 2.Only a little 3.Hardly at all	**9. I get a sort of frightened feeling like 'buterflies'in the stomach:** 0.Not at all 1.Occasionally 2.Quite often 3.Very often
3. I get a sort of frightened feeling as if something awful is about to happen: 3.Very definitely and quite badly 2.Yes, but not too badly 1.A little, but it doesn't worry me 0.Not at all	**10. I have lost interest in my appearance:** 3.Definitely 2.I don't take as much care as I should 1.I may not take quite as much care 0. I take just as much care as ever
4. I can laugh and see the funny side of things: 0.As much as I always could 1.Not quite so much now 2.Definitely not so much now 3.Not at all	**11. I feel restless as I have to be on the move:** 3.Very much indeed 2.Quite a lot 1.Not very much 0.Not at all
5. Worrying thoughts go through my mind: 3. A great deal of the time 2. A lot of the time 1.From time to time, but not too often 0. Only occasionally	**12. I look forward with enjoyment to things:** 0.As much as I ever did 1.Rather less than I used to 2.Definitely less than I used to 3.Hardly at all
6. I feel cheerful 3.Not at all 2.Not often 1.Sometimes 0.Most of the time	**13. I get sudden feelings of panic:** 3.Very often indeed 2.Quite often 1.Not very often 0.Not at all
7. I can sit at ease and feel relaxed: 0.Definitely 1.Usually 2.Not often 3.Not at all	**14. I can enjoy a good book or radio or TV program:** 0.Often 1.Sometimes 2.Not often 3.Very seldom