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Perception of evaluators and patients about a physiotherapeutic evaluation protocol proposed for the post-COVID-19 period: cross-sectional study

Percepção de avaliadores e pacientes sobre um protocolo de avaliação fisioterapêutica proposto para o período pós-COVID-19: estudo transversal

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Abstract

Background: physiotherapy plays a fundamental role in the recovery of patients in the post-COVID-19 period, however, a systematized physiotherapeutic assessment method is important to help professionals. **Aim:** to assess the perception of evaluators and patients regarding a post-COVID-19 assessment model. **Methods:** cross-sectional study that assessed COVID-19 survivors, using a protocol that included information on: post-COVID-19 functional status, signs, symptoms, anthropometric measurements, exercise tolerance, muscle strength, balance, mobility, respiratory dysfunctions, fatigue, sleep disorders, and quality of life. At the end of each assessment, evaluators and patients answered a questionnaire about their perception of the degree of difficulty of the assessment process. **Results:** three final-year undergraduate students in Physiotherapy evaluated 25 individuals with a mean age of 47.2±21.3 years, and the mean duration of the assessments was 58±11 minutes. Regarding the difficulty in performing the clinical tests, 40% reported moderate difficulty, 40% said it was easy, 16% very easy, and one reported it as extremely difficult. The majority (64%) found it easy to answer the questions on the scales/questionnaires and 96% strongly agreed that the evaluator performed the assessment clearly. The evaluators agreed on the predictions of the assessment in an outpatient setting. **Conclusion:** the results were satisfactory regarding the applicability of the proposed physiotherapy evaluation protocol for post-COVID-19 patients. The perception of patients and evaluators was positive regarding the low degree of difficulty in carrying out the tests and scales/questionnaires and also regarding the clarity and objectivity of the evaluation.

Keywords: Post-Acute COVID-19 Syndrome; Physical Therapy; Evaluation Study.

Resumo

Introdução: a fisioterapia tem papel fundamental na recuperação de pacientes no período pós-COVID-19, porém, é importante um método de avaliação fisioterapêutica sistematizado para auxílio dos profissionais. **Objetivo:** avaliar a percepção de avaliadores e pacientes sobre um modelo de avaliação no pós-COVID-19. **Métodos:** estudo transversal que avaliou sobreviventes da COVID-19, utilizando-se um protocolo que incluiu coletar informações sobre: estado funcional pós-COVID-19, sinais, sintomas, medidas antropométricas, tolerância ao esforço, força muscular, equilíbrio, mobilidade, disfunções respiratórias, fadiga, distúrbios do sono e qualidade de vida. Ao final de cada avaliação, avaliadores e pacientes responderam um questionário sobre a percepção do grau de dificuldade do processo avaliativo. **Resultados:** três alunas do último ano da graduação em Fisioterapia, avaliaram 25 indivíduos com idade média de 47,2±21,3 anos, sendo o tempo médio de duração das avaliações foi de 58±11 minutos. Sobre a dificuldade para realizar os testes clínicos, 40% relataram dificuldade moderada, 40% disseram ter sido fácil, 16% muito fácil e um relatou como extremamente difícil. A maioria (64%) apontou facilidade para responder às perguntas das escalas/questionários e 96% concordaram totalmente que o avaliador executou a avaliação de forma clara. Os avaliadores concordaram sobre a viabilidade da avaliação em ambiente ambulatorial.

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Conclusão: os resultados foram satisfatórios quanto à aplicabilidade do protocolo de avaliação fisioterapêutica proposto para pacientes pós-COVID-19. A percepção dos pacientes e dos avaliadores foi positiva no que se refere ao baixo grau de dificuldade para a realização dos testes e escalas/questionários e também quanto à clareza e à objetividade da avaliação.

Palavras-chave: Síndrome Pós-COVID-19 Aguda; Modalidades de Fisioterapia; Estudo de Avaliação.

INTRODUCTION

COVID-19 is an infectious disease caused by the virus belonging to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is a new strain of RNA virus from the *Coronaviridae* family[1,2].

In the study by Nalbandian et al.[3], SARS-CoV-2 infection was divided into three stages, which were characterized as the acute period of infection, subacute period (4 to 12 weeks from symptom onset) and chronic, known as Post-COVID Syndrome (persistent manifestations beyond 12 weeks), characterized by persistent symptoms that cannot be explained by an alternative diagnosis[3-5].

Thus, physical therapy plays a fundamental role in the recovery of functionality of these people. In this context, the Brazilian Association of Respiratory Physical Therapy, Cardiovascular Therapy, and Intensive Care Physical Therapy (ASSOBRAFIR) published recommendations for post-COVID-19 assessment and rehabilitation, which presented tests and scales/questionnaires for assessing functional capacity, peripheral and respiratory muscle strength, respiratory function, balance and mobility, symptoms of fatigue, dyspnea, disabilities, sleep disorders and quality of life[6]. ASSOBRAFIR highlighted on the same occasion the use of the scale for assessing the functional status of patients affected by COVID-19, the Post-COVID-19 Functional Status Scale (*Post-COVID-19 Functional Status Scale - PCFS*), also translated into Brazilian Portuguese[7,8].

Some barriers can be identified during patient assessment, including the availability of material and location for clinical tests, time to perform tests and scales/questionnaires, physical therapist prior knowledge, and patient limitations for performing tests and/or interpreting questionnaires. Thus, there is a demand for instruments that collaborate in organizing the physical therapy assessment for post-COVID-19 patients, including available assessment tools for application, according to individual patient limitations in an outpatient setting, with the expectation of guiding clinical practice and consequent patient recovery.

With the high demand for patient care in the post-COVID-19 period, undergraduate students and professors from the physical therapy course at an educational institution in the interior of São Paulo compiled a model form to guide physical therapy assessment[9], as well as organized its respective application manual[10]. The proposed assessment protocol and manual aimed to assist the organization of the symptoms evaluations, functional limitations, and biopsychosocial factors of patients and, consequently, help guiding the physical therapy conduct[9,10].

In order to improve the elaborated material, the present study aimed to evaluate the perception of evaluators and patients about the applicability of a guiding model of physical therapy assessment form for patients in the post-COVID-19 period, analyzing the perception of difficulty in performing the tests, scales and questionnaires selected for the assessment protocol, the level of invasion of the questions, the clarity and objectivity of the assessment and the execution time of the assessment.

METHODS

Study design

This is a cross-sectional study that evaluated COVID-19 survivors using a physical therapy assessment form model developed by professors and students of the Physical Therapy course at Centro Universitário de Adamantina-SP, based on ASSOBRAFIR recommendations[6] and bibliographic research of the literature.

The graphic layout of the form, previously published by the research group[9], has the following sections (Supplementary Material): 1) basic elements such as patient identification and anamnesis steps; 2) PCFS scale in self-applicable format to guide the functional status of patients; 3) collection of vital signs, anthropometric measurements, pulmonary auscultation and cough; and 4) clinical tests, scale and questionnaires applied in the following sequence: (i) peak expiratory flow, (ii) handgrip dynamometry, (iii) skeletal muscle strength (*Medical Research Council* - MRC), (iv) balance assessment - MiniBest Test, (v) Time Up and Go (TUG), (vi) *Modified Medical Research Council* (mMRC), (vii) *Functional Assessment of Chronic Illness Therapy* (FACIT), (viii) Euroqol 5D3L (EQ-5D-3L), (ix) Mini Sleep, (x) 1-minute sit-to-stand test (1MSTST) (Chart 1).

In order to guide the use and good practices of each selected instrument, according to their respective validation references, the same authors elaborated and published the execution manual for each clinical test, scale and questionnaire of the physical therapy assessment form, available in the publication by Benatti et al[10].

Patient sample design

The recruitment of volunteer participants, submitted to post-COVID-19 assessment, occurred in a non-probabilistic

Chart 1. Assessment methods and instruments for physical therapy assessment of clinical and functional conditions of post-COVID-19 patients, according to the proposal of the form/protocol by Trevisan et al.[9].

Clinical condition assessed	Instruments suggested in the assessment form/protocol
Exercise tolerance	1-minute Sit-to-Stand Test (1-MSTST)
Skeletal muscle strength	Handgrip Dynamometry
	Medical Research Council (MRC)
Balance	*MiniBest Test*
Mobility	*Timed Up and Go* (TUG)
Respiratory dysfunctions	Peak expiratory flow
	Oximetry
Dyspnea	*Modified Medical Research Council* (mMRC)
Fatigue	*Functional Assessment of Chronic Illness Therapy* (FACIT)
Sleep disorders	*Mini-Sleep*
Quality of life	Euroqol 5D3L (EQ 5D 3L)
Residual symptoms	List elaborated with possible COVID-19 residual symptoms

manner by convenience, via dissemination of the research on social networks and media.

The study included individuals aged 18 years or older, regardless of gender, who were discharged from hospital at least six weeks after confirmation of COVID-19 diagnosis or, in case of non-hospitalization, at least 14 days of isolation after diagnosis; with stable peripheral oxygen saturation (>94%). The cognitive level of participants was analyzed through orientation in time and space in the anamnesis developed by the researchers themselves.

Exclusion criteria were considered: body temperature greater than 38 ºC; resting heart rate less than 40 bpm or greater than 120 bpm; time of onset of symptoms suggestive of COVID-19 less than three days; dyspnea at rest; complex or decompensated arrhythmias; and unstable chest pain (angina). In addition, other clinical conditions previously diagnosed by doctors were observed such as: myocarditis, congestive heart failure, pulmonary hypertension, deep vein thrombosis and unconsolidated fractures[11].

Evaluator selection design

The recruitment of evaluators occurred by invitation made in the classroom to undergraduate students of the Physical Therapy course at Centro Universitário de Adamantina-SP.

The selection criteria included: being in the last year of graduation (fifth year); having been approved in supervised internships of Cardiorespiratory Physical Therapy and Hospital Physical Therapy; and having completed the other mandatory supervised internships offered in the fourth year of the course (Physical Therapy Orthopedics and Traumatology I and Physical Therapy in Adult Neurology I), since most of the tools used in the proposed assessment are part of the routine of students during supervised internships of the course.

Excluded were: students who participated in any stage of the construction of the physical therapy assessment form for post-COVID-19 patients[9], which is being analyzed in the present work, and/or its respective manual[10]; not having participated in the initial research meeting; and not having demonstrated interest or not having participated in the prior orientation for familiarization and execution of the assessment instruments incorporated in the assessment.

Ethical aspects

All participants were previously informed about the objectives and procedures of the research and, after agreement, signed the informed consent forms (ICF). The study was approved by the Research Ethics Committee of UNIMAR - University of Marília - Faculty of Medicine and Nursing (CEP-UNIMAR), under opinion No. 5,325,847.

Assessment procedures

After eligibility of individuals, they were referred for assessments that took place at the clinic school of the University Center between May and June 2022. Two days a week were stipulated for assessments to occur and participants were previously scheduled randomly according to participant availability.

Personal and anthropometric data, medical history, smoking history, and COVID-19 history were collected, in addition to functional status according to the PCFS Scale[7], which is also included in the evaluation protocol of the file under analysis.

Then, participants were evaluated for: reduced exercise tolerance, respiratory dysfunctions, reduced skeletal muscle strength, loss of balance and altered mobility. In addition to symptoms of dyspnea and fatigue, overall quality of life and sleep disorders.

The criteria for interrupting the tests applied according to the assessment protocol were: saturation less than 88 - 93%, without improvement at rest with pursed-lip breathing or

oxygen therapy support; fluctuations in body temperature less than 37.2 ºC; worsening of respiratory symptoms and/or fatigue, without relief after rest; increase in heart rate above 85% or more in relation to resting heart rate; sensation of effort/dyspnea greater than 3 on the Modified Borg Scale; angina; severe cough; dizziness, nausea or headache; blurred vision and sweating; palpitations[12].

To assess patients' perception of the proposed physical therapy assessment protocol for the post-COVID-19 period, each patient was given a self-administered questionnaire developed by the researchers themselves at the end of the assessment. The questionnaire has questions, on a five-point *likert* scale, about aspects of experience and perception related to difficulty, clarity, and objectivity that participants experienced during the application of tests, scales, and questionnaires. Related to the feeling of invasion of privacy and the duration of the entire proposed assessment process (Figure 1).

At the end of each assessment performed, the student evaluator also answered the self-administered questionnaire developed by the researchers themselves (Figure 2) on the perception of the level of difficulty in developing tests, scales and questionnaires, the feasibility of the assessment form at the outpatient level, the clarity and objectivity of the proposed protocol. The same questionnaire also assessed the evaluator's perception of the patient's reaction during the assessment and the duration of the entire proposed assessment process.

Data analysis

Descriptive statistics were used to characterize the sample and quantitative variables were expressed as mean and standard deviation and categorical variables as absolute frequency and percentage. Univariate chi-square test was used to analyze the proportion between evaluators' and patients' responses regarding experience and degree of difficulty during application of the assessment form. The statistical program used was SPSS 22.0 and the level of significance adopted was $p<0.05$.

RESULTS

Initially, 29 individuals were eligible for the study, however, four were excluded, three for presenting unstable vital signs and one for not completing all proposed assessments, with 25 individuals included in the study.

Table 1 presents the characterization of the sample, including anthropometric and sociodemographic characteristics and data related to their case with COVID-19.

The results regarding the assessment of exercise tolerance, respiratory function, skeletal muscle strength, body balance, mobility, in addition to symptoms of dyspnea and fatigue, and questionnaires on overall quality of life and sleep disorders, are presented in Table 2. All patients completed the assessment form, except for the 1MSTST which was not performed by one patient, but the same performed the other proposed tests.

The assessment lasted on average 58.0±11.0 minutes. Figure 3 shows the perception of difficulty in performing the tests, scales and questionnaires present in the assessment form, the perception regarding invasion of privacy and the perception of applicability regarding the clarity and objectivity of the assessment and the perception regarding the infrastructure used for the assessment.

The evaluated patients answered the following questions:

How difficult was it for you to perform the tests in this assessment?
☐ extremely difficult ☐ very difficult ☐ moderate ☐ easy ☐ very easy

How difficult was it for you to answer the questions in the questionnaires of this assessment?
☐ extremely difficult ☐ very difficult ☐ moderate ☐ easy ☐ very easy

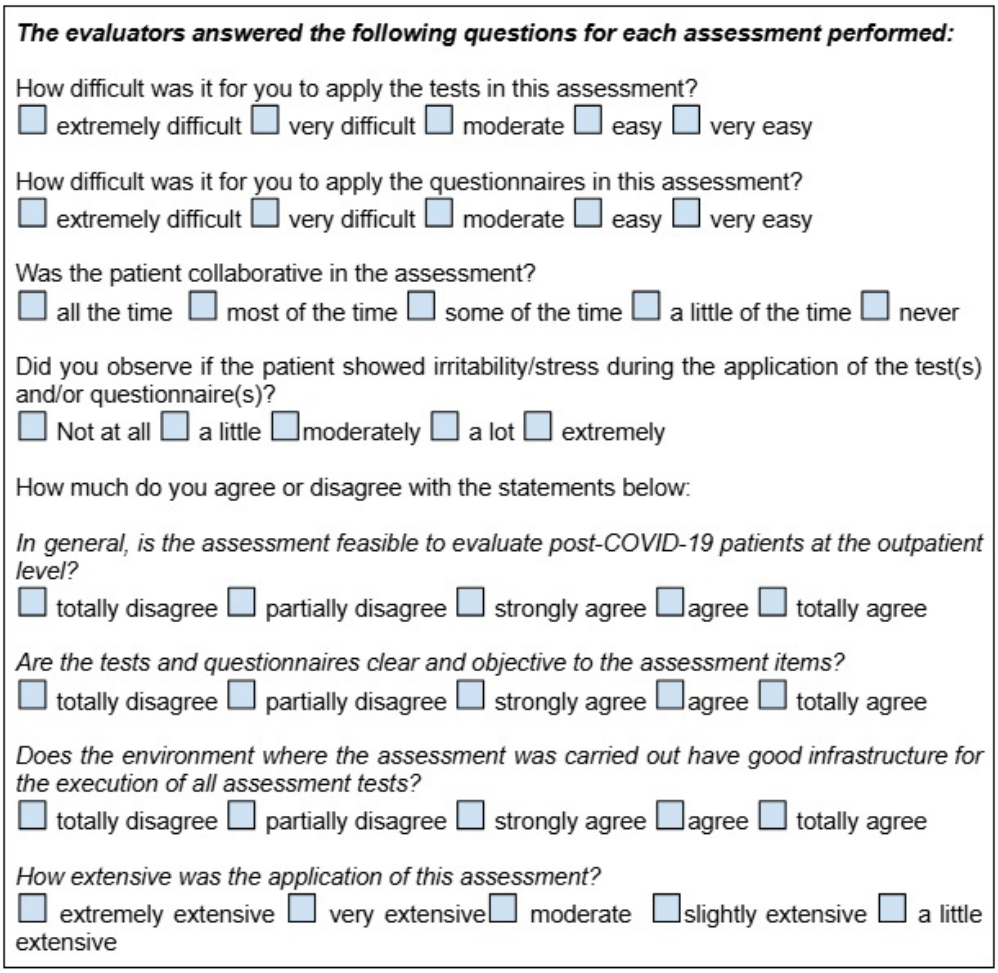
Was the assessment invasive?
☐ not at all ☐ a little ☐ moderately ☐ a lot ☐ extremely

How much do you agree or disagree with the statements below:

The evaluator performed the assessment clearly and objectively?
☐ totally disagree ☐ partially disagree ☐ neither agree nor disagree ☐ agree ☐ totally agree

Does the environment where the assessment was carried out have good infrastructure for executing all the assessment tests?
☐ totally disagree ☐ partially disagree ☐ neither agree nor disagree ☐ agree ☐ totally agree

Figure 1. Questionnaire about the experience and degree of difficulty during the performance of tests, scales, and questionnaires of the assessment form protocol for post-COVID-19 patients analyzed.
Source: authors.



The evaluators answered the following questions for each assessment performed:

How difficult was it for you to apply the tests in this assessment?
☐ extremely difficult ☐ very difficult ☐ moderate ☐ easy ☐ very easy

How difficult was it for you to apply the questionnaires in this assessment?
☐ extremely difficult ☐ very difficult ☐ moderate ☐ easy ☐ very easy

Was the patient collaborative in the assessment?
☐ all the time ☐ most of the time ☐ some of the time ☐ a little of the time ☐ never

Did you observe if the patient showed irritability/stress during the application of the test(s) and/or questionnaire(s)?
☐ Not at all ☐ a little ☐ moderately ☐ a lot ☐ extremely

How much do you agree or disagree with the statements below:

In general, is the assessment feasible to evaluate post-COVID-19 patients at the outpatient level?
☐ totally disagree ☐ partially disagree ☐ strongly agree ☐ agree ☐ totally agree

Are the tests and questionnaires clear and objective to the assessment items?
☐ totally disagree ☐ partially disagree ☐ strongly agree ☐ agree ☐ totally agree

Does the environment where the assessment was carried out have good infrastructure for the execution of all assessment tests?
☐ totally disagree ☐ partially disagree ☐ strongly agree ☐ agree ☐ totally agree

How extensive was the application of this assessment?
☐ extremely extensive ☐ very extensive ☐ moderate ☐ slightly extensive ☐ a little extensive

Figure 2. Questionnaire about the experience and degree of difficulty during the application of tests, scales, and questionnaires of the analyzed assessment form protocol.
Source: authors.

Of the 25 assessed, 40% reported moderate perception of difficulty, followed by 40% and 16% who reported easy and very easy perception of difficulty, respectively (p=0.021). However, one patient reported it being extremely difficult to perform the clinical tests, and this patient presented grade 3 functionality on the PCFS scale.

Regarding the questionnaires and scales, 64% of patients reported it being easy to answer the questions, followed by 20% who felt moderate difficulty and 16% reported it being very easy to answer (p=0.005).

All totally agreed (96%) or just agreed (4%) that the evaluator performed the assessment clearly and objectively (p<0.0001). In addition, the vast majority totally agreed (76%) or just agreed (16%) that the environment where the assessment was carried out had good infrastructure (p<0.0001).

To perform the assessments described above, three female physical therapy students were selected as evaluators, with the following ages: 22 years, 29 years, and 56 years.

Of the 25 assessments performed by the evaluators, 23 (92%) of them were reported as easy to perform for both clinical tests and questionnaires and scales (p<0.0001). However, two assessments were reported as very difficult to perform, and these were applied to patients with grade 2 functionality according to the PCFS scale.

All evaluators reported that the assessed individuals were collaborative throughout the assessment time, in addition to not showing signs of irritability and/or stress.

Furthermore, the evaluators agreed that the assessment form is feasible for application in an outpatient setting, presents clarity and objectivity, in addition to having been executed in an environment with good infrastructure. However, all agreed that it has a moderately extensive application in terms of time.

And, finally, all assessed individuals and evaluators reported that the applied assessment procedures were not invasive, in the sense of not invading privacy.

DISCUSSION

The study shows that the physiotherapy assessment form analyzed according to the perception of evaluators and patients had an application duration of 58.0±11.0 minutes

Table 1. Characterization of the sample of participants evaluated in the study.

Variables	Total (n=25)
Age (years) - mean (SD)	47.2 (21.3)
Sex	***n (%)***
Female	22 (88)
Male	3 (12)
Self-declared Race/Ethnicity	***n (%)***
White	18 (72)
Black	3 (12)
Mixed	4 (16)
Housing	***n (%)***
Location - Urban area	25 (100)
Type - House	25 (100)
Marital Status	***n (%)***
Single	12 (48)
Married/cohabiting/stable union	13 (52)
Education	***n (%)***
Incomplete elementary	3 (12)
Complete elementary	2 (8)
Complete high school	17 (68)
Complete higher education	3 (12)
Anthropometric Characteristics	
Body Mass Index - median (SD)	27.8 (6.6)
Abdominal Circumference (cm) - median (SD)	90.8 (16.0)
Conicity Index	***n (%)***
Low risk for cardiovascular diseases	9 (36)
High risk for cardiovascular diseases	16 (64)
Post-COVID-19 Anamnesis	**n (%)**
Admitted to ward	3 (12)
Use of O_2 and/or hospital NIV	2 (8)
Admitted to ICU	1 (4)
Underwent Physical Therapy in acute period	1 (4)
Post-COVID-19 physical therapy sessions indicated	6 (24)
Underwent post-COVID-19 physical therapy sessions	5 (20)
COVID-19 Vaccination	**n (%)**
Yes	23 (92)
Comorbidities	**n (%)**
Hypertension	12 (48)
Diabetes	4 (16)
COPD	4 (16)
Stroke	1 (4)
Functional Status Profile before COVID-19 **n(%)**	
Degree 0	16 (64)
Degree 1	7 (28)
Degree 2	2 (8)
Post-COVID-19 Functional Status Profile, n(%)	**n (%)**
Degree 0	9 (36)
Degree 1	3 (12)
Degree 2	11 (44)
Degree 3	2 (8)

Legend: SD: standard deviation; n(%): absolute frequency (percentage); O_2: oxygen; NIV: non-invasive ventilation; ICU: intensive care unit; COPD: Chronic Obstructive Pulmonary Disease.

in COVID-19 survivors, in which 44% were in the mild functional limitation level according to the PCFS scale.

Table 2. Results of clinical tests and questionnaires/scales performed in the post-COVID-19 physical therapy assessment (n=25 patients).

Clinical tests	Results - *Mean (SD)*
1MSTST, (repetitions)	25.6 (14.7)
Handgrip Dynamometry, (% of predicted)	
Right upper limb	73.2 (21.4)
Left upper limb	75.7 (27.6)
MRC, (score)	50.6 (6.8)
MiniBest Test, (score)	26.5 (6.5)
TUG, (seconds)	6.6 (2.3)
Peak expiratory flow, (% of predicted)	81.5 (15.3)
SpO_2 (%)	97.6 (1.2)
Questionnaires/scales	**Results - *Mean (SD)***
VAS, (score)	71.5 (19.9)
mMRC, (score)	2.6 (1.7)
FACIT, (score)	39.2 (10.2)
Mini-Sleep, (score)	
Insomnia	12.1 (5.1)
Hypersomnia	21.8 (6.5)
Total	34.0 (9.9)
EQ-5D	n(%)
Mobility	
No problems	18 (72)
Moderate problems	7 (28)
Self-care	
No problems	22 (88)
Moderate problems	3 (12)
Usual activities	
No problems	18 (72)
Moderate problems	7 (28)
Pain/discomfort	
No problems	14 (56)
Moderate problems	9 (36)
Extreme problems	2 (8)
Anxiety/depression	
No problems	11 (44)
Moderate problems	12 (48)
Extreme problems	2 (8)

Legend: n(%): absolute frequency and percentage; MSD: right upper limb; MSE: left upper limb; MRC: Medical Research Council; TUG: Timed Up and Go; SpO_2: Peripheral oxygen saturation; mMRC: Modified Medical Research Council; FACIT: Functional Assessment of Chronic Illness Therapy; EQ-5D: Euroqol-5 dimensions.; VAS: Visual analogic scale. Data expressed as mean and standard deviation (SD), except for the EQ-5D dimensions that were expressed as frequency and percentage.

Of the 25 patients, 40% reported moderate perception of difficulty, followed by 40% who reported ease in performing clinical tests. As for the questionnaires selected for the assessment protocol, 64% of patients reported having answered them without difficulties. Patients totally agreed (96%) or just agreed (4%) that the evaluator performed the assessment clearly and objectively. And, as for the evaluators, they recorded ease in carrying out the assessments in 92% of cases and that all patients were collaborative and did not show signs of irritability and/or stress. However, the evaluators pointed out that the assessment process was moderately extensive.

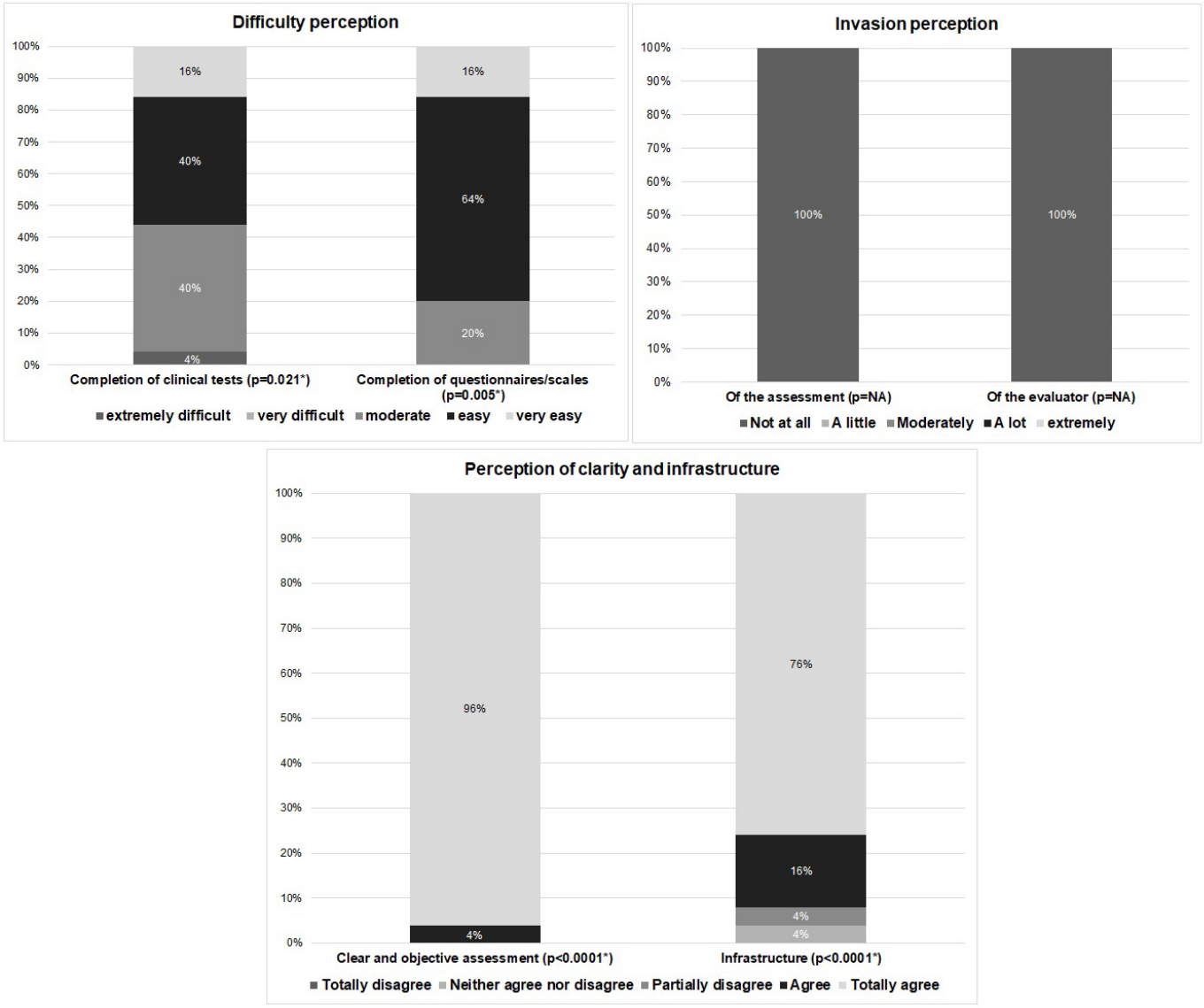


Figure 3. Frequency of responses from evaluated patients on the perception of difficulty, privacy invasion, applicability regarding clarity and objectivity, and infrastructure during the post-COVID-19 physical therapy assessment. NA: not applicable; *p<0.05.

In terms of clinical presentation, COVID-19 proved to be a heterogeneous disease, and the PCFS scale can measure the consequence of the disease beyond outcomes such as mortality. The use of the PCFS scale is not intended to replace other relevant instruments, but rather as an additional outcome that assesses the functional consequences of COVID-19. In addition to collaborating with the assessment of the general health of post-COVID-19 patients[7].

The clinical tests used in the applied assessment aimed to evaluate reduced exercise tolerance, respiratory dysfunctions, reduced skeletal muscle strength, loss of balance and altered mobility. However, depending on the level of functional limitation, the individual may present some difficulty in performing the tests.

In this sense, the study recorded that, after physical therapy assessment, 40% of those assessed reported moderate perception of difficulty, followed by 40% who reported perception of difficulty at an easy level during the performance of clinical tests. However, one patient reported it being extremely difficult to perform the *MiniBest Test* and 1MSTST, and this patient presented moderate functional limitation grade on the PCFS scale.

As for the clinical tests applied in the assessment, the 1MSTST was used to assess reduced exercise tolerance, as it is easy and quick to apply. A study that aimed to propose the use of 1MSTST to assess physical capacity and exertion desaturation in COVID-19 survivors, concluded that 83% of participants were able to complete the test and others did not meet the 1MSTST criteria due to mobility limitation and/or hemodynamic instability[13].

In our research, the 1MSTST was not performed by only one patient, 62 years old with mild PCFS grade. However, the same was able to perform the *Timed Up and Go test* (TUG)[13], which in addition to being a tool to assess dynamic balance performance and probability of falls in the elderly

population, assesses functional mobility[14,15]. Thus, it is suggested that patients with impairments in functionality according to PCFS perform only the TUG[13] and/or other tests such as 30-second sit-to-stand, 5-repetition sit-to-stand and *Short Physical Performance Battery* (SPPB).

The assessment of respiratory dysfunctions was performed using peak expiratory flow, with the *Peak Flow* equipment, to indicate the presence of airway obstruction. It consists of a small and portable instrument, which has been gaining increasing space, enabling a measure of pulmonary function not only in specialized laboratories, but also in hospital, outpatient and even home settings[16]. In the study by Hazarika et al.[17] they observed that after three months of hospitalization for moderate to severe acute respiratory distress syndrome (ARDS) due to COVID-19, 43.86% of patients who required the use of high-flow nasal cannula (HFNC) or non-invasive ventilation (NIV), and 47% who required invasive ventilation presented abnormalities in peak expiratory flow, without changes in the FEV1/FVC ratio on spirometry examination.

Therefore, in the absence of spirometry which is considered a high-cost resource, which requires prior training of the examiner and correct execution by the patient, we suggest that *Peak Flow* can be used to find abnormalities in peak expiratory flow. However, it does not replace the spirometry exam if the objective is to evaluate dysfunctions in pulmonary volumes and capacities. In our study, all patients were able to perform the peak expiratory flow assessment without difficulties.

Regarding the peripheral muscle strength test, we used handgrip dynamometry, which uses a portable device (*Hand Grip*), allowing the procedure to occur quickly, at low cost and non-invasively[18]. Traditionally, handgrip dynamometer has been used in rehabilitation to assess the physical condition of the upper limbs, by measuring the strength of hand and forearm muscles[19].

The *Medical Research Council* (MRC) scale allows measuring muscle strength subjectively through shoulder abduction, elbow flexion, wrist extension, hip flexion, knee extension and ankle dorsiflexion movements[20]. For Zhu et al.[21], the reduction of exercises during the pandemic period was extremely significant due to home isolation and other restrictions, especially for suspected and confirmed cases of COVID-19 and patients in prolonged hospital stays. In this sense, we emphasize that both handgrip dynamometry and the MRC scale were performed by all participants without difficulties or restrictions, suggesting feasibility for assessing peripheral muscle strength in a simple and effective manner.

For balance assessment, the *MiniBest Test* was used, which includes 14 tasks related to anticipatory postures, reactive postural response adjustments, sensory orientation, and gait stability[22]. A study conducted by Vitale et al.[23], aiming to evaluate the effect of a resistance training program in healthy elderly individuals, lasting six months and during confinement due to COVID-19, demonstrated that the *MiniBest Test* was performed in approximately 12 to 15 minutes. In other words, it is also a validated and quick-to-execute tool for assessing body balance.

In addition to clinical tests, we observed that after applying the questionnaires and scales, 64% of those evaluated reported that it was easy to answer the questions, followed by 20% who felt moderate difficulty and 16% reported that it was very easy to answer. The questionnaires and/or scales used aimed to assess dyspnea(*Modified Medical Research Council* - mMRC)[24], fatigue(*Functional Assessment of Chronic Illness Therapy – Fatigue*- FACIT-F)[25], sleep quality (*Mini-Sleep Questionnaire* - MSQ-BR)[26] and life quality (EuroQol-5D-3L)[27].

The mMRC scale has five points based on the severity of dyspnea[24], and in the present study, 44% of those evaluated reported suffering from shortness of breath during intense exercises (grade 1), followed by 28% who reported needing to stop to breathe after walking less than 100 meters (grade 4) and 16% answered that they feel short of breath to the point of not leaving home or when getting dressed (grade 5).

The FACIT-F aimed to assess physical, functional, emotional fatigue and its social consequences, in thirteen statement items, with five response options ranging from "I don't feel" to "very much", referring to the last seven days[25].

Fatigue and dyspnea are among the main symptoms found after the acute period of COVID-19, both in hospitalized and non-hospitalized patients[5,28], and assessing this symptom helps in conducting the physical therapy treatment strategy. In addition to ASSOBRAFIR's recommendations regarding the use of mMRC and FACIT-F scales[6], we observed that studies with post-COVID-19 patients also used the same instruments[29-32].

Another aspect evaluated was sleep quality, through the MSQ-BR questionnaire. This instrument was developed for screening sleep disorders, composed of ten items that assess both insomnia and excessive daytime sleepiness[26]. Our results showed that 52% of those evaluated had significant difficulties with sleep. Thus, assessing sleep is necessary especially for those who have undergone hospitalization[33].

Finally, the EuroQol-5D-3L is one of the widely used instruments to portray quality of life. It is composed of five aspects of health: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. In addition, it contains a visual analog scale that records self-assessment of health from 0 to 100[27].It consists of a tool already used in post-COVID-19 patients, as studies show that COVID-19 significantly impacts quality of life during the acute and chronic period, especially in more severe cases, advanced ages, in women and people living in low-income countries[29,32,34].

The evaluators agreed that the assessment form is feasible for application in an outpatient setting, presenting

clarity and objectivity, in addition to having been executed in an environment with good infrastructure. At the same time, they agreed that the proposed assessment protocol compiled in the analyzed assessment form had a moderately extensive application time (average of 58.0± 11.0 minutes), corroborating with the *American Physical Therapy Association (APTA)* which states that the assessment of highly complex patients lasts about 45 minutes[35]. The slightly higher average time for developing the assessments found in the results can be explained by the fact that the evaluators are not yet trained professionals. However, such inference could only be confirmed by comparing groups of students and professionals. However, this was not a hypothesis raised for this work since the students involved had experience of similar assessments throughout the internships carried out during the fourth year of the course, including in cardiorespiratory physical therapy and hospital physical therapy sectors.

Although the described results point to a positive perception for its clinical and outpatient applicability of the analyzed assessment protocol, the cross-sectional design with only quantitative analysis and the small sample size of patients and evaluators disfavors the broad generalization of results. However, it is possible to highlight as a strong point that the use of standardized forms and protocols, as analyzed in this work, can also assist in determining the physical therapy diagnosis inside and outside the academic environment, meeting the proposal of COFFITO with the institution of the Brazilian Classification of Physical Therapy Diagnoses (CBDF) by Resolution No.555/2022[36]. Thus, generating the possibility of new analyses for the assessment form studied here beyond the perception of patients and evaluators regarding its applicability, as well as for studies on aspects that may contribute to the physical therapy diagnosis and on aspects that assist in the implementation of more assertive treatment and rehabilitation proposals for patients in the post-COVID-19 period.

CONCLUSION

When identifying the importance of systematizing the instrumentation available for the physical therapy assessment of patients in the post-COVID-19 period in a protocol model that can be used inside and outside the academic environment, it is also understood that it is necessary to assess the feasibility and interest for the day-to-day of the physical therapist in the area.

Regarding the perception of evaluators and patients as to the difficulty in performing the selected tests, scales and questionnaires, the level of invasion of the questions, the clarity and objectivity of the assessment and the execution time of the assessment, it was possible to observe positive results regarding the applicability and feasibility of the proposed assessment model. Since patients considered the suggested clinical tests easy to perform and the questionnaires easy to understand, and the vast majority totally agreed that the assessment was carried out clearly and objectively. In practice, such results, associated with the fact that the analyzed post-COVID patient form directs the physical therapy assessment in an organized and thorough manner, using accessible tools that are easy to execute and interpret, can collaborate for the assertive delineation of diagnosis and physical therapy treatment.

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Nothing to declare.

CONFLICT OF INTEREST

Nothing to declare.

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SUPPLEMENTARY MATERIAL

Supplementary material accompanies this paper.

PROPOSTA DE FICHA DE AVALIAÇÃO FISIOTERAPÊUTICA PARA PACIENTES PÓS COVID - 19

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