**UNIVERSITY OF MEDICINE AND PHARMACY**
**"CAROL DAVILA" BUCHAREST**
**DOCTORAL SCHOOL**
**MEDICAL FIELD**

# DOCTORAL THESIS

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2026

**UNIVERSITY OF MEDICINE AND PHARMACY**
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# ASSESSING THE PERCEPTION OF PATIENTS WITH CHRONIC DISEASES REGARDING THE ACCESSIBILITY AND QUALITY OF MEDICAL SERVICES IN CRISIS SITUATIONS

# SANITARY

## THESIS SUMMARY

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# LIST OF PUBLISHED WORKS

1.Original Research Article- **Article 1**

Militaru A., Armean P., Ghita N., **Andrei D.P**. **-Barriers to Healthcare Access During the Coronavirus Disease 2019 (COVID-19) Pandemic: A Cross-Sectional Study Among Romanian Patients with Chronic Illnesses and Confirmed SARS-CoV-2 Infection.**

**( STUDY A)**

Journal: Healthcare (MDPI)
Year: **2025Volume: 13**
Article number: **1333DOI: 10.3390/healthcare13111333**
Impact factor (JIF): ≈ **2.7**

Quartile: **Q2**

Publication link:

Barriers to Healthcare Access During the Coronavirus Disease 2019 (COVID-19) Pandemic: A Cross-Sectional Study Among Romanian Patients with Chronic Illnesses and Confirmed SARS-CoV-2 Infection (https://www.mdpi.com/2227-9032/13/11/1333)

2.Original Research Article- **Article 2**

**Andrei D.P**., Militaru A., Armean P., Ghita N.- **Perceptions of Rehabilitation Access After SARS-CoV-2 Infection in Romanian Patients with Chronic Diseases: A Mixed-Methods Exploratory Study. ( STUDY B)**

Journal: Healthcare (MDPI)
Year: **2025Volume: 13**
Article number: **1532DOI: 10.3390/healthcare13131532**
Impact factor (JIF): ≈ **2.7**
Quartile: **Q2Link publication:**

Perceptions of Rehabilitation Access After SARSCoV2 Infection in Romanian Patients with Chronic Diseases: A MixedMethods Exploratory Study ( https://www.mdpi.com/2227-9032/13/13/1532

3.Original Research Article- **Article 3**

Andrei D.P., Militaru A., Ghita N., Armean P. **A Pragmatic Outpatient Triage Approach for Post-COVID Functional Impairment in Patients with Chronic Diseases: A Pilot Study. ( STUDY C)**

Journal: Healthcare (MDPI)
Manuscript ID: **healthcare-4305493Submission date: 22 April 2026**
Status: **Under peer review (advanced stage of evaluation following reviewer assessments and revisions).**

## LIST OF ABBREVIATIONS AND SYMBOLS

| Abbreviation | Meaning |
|---|---|
| ADO | Oral antidiabetics |
| ANM | National Medicines Agency |
| APC | Article Processing Charge |
| ATI | Anesthesia and Intensive Care |
| BCV | Cardiovascular disease |
| TWO | Infectious diseases |
| COPD | Chronic obstructive pulmonary disease |
| CASE | Health Insurance House |
| CCBT | Cognitive Behavioral Therapy |
| CI | Confidence interval |
| CNAS | National Health Insurance House |
| COVID-19 | Coronavirus Disease 2019 |
| CRP | C-reactive protein / C-reactive protein |
| DZ | Diabetes mellitus |
| ECDC | European Centre for Disease Prevention and Control |
| ECMO | Extracorporeal Membrane Oxygenation |
| FFP2 | Filtering Face Piece – Class 2 |
| FFP3 | Filtering Face Piece – Class 3 |
| FRCV | Cardiovascular risk factors |
| HTA | High blood pressure |
| ACE inhibitors | Angiotensin-converting enzyme inhibitor |
| INBI | National Institute of Infectious Diseases |
| INSP | National Institute of Public Health |
| IP | Investigator Principal |
| LDH | Lactate dehydrogenase |
| MAPN | Ministry of National Defense |
| WHO | World Health Organization |

| | |
|---|---|
| ENT | Otorhinolaryngology |
| PCR | Polymerase Chain Reaction |
| PPE | Personal Protective Equipment (Echipament Individual de Protecție) |
| PRM | Recovery, Physical Medicine and Balneology |
| RT-PCR | Reverse Transcription Polymerase Chain Reaction |
| SARS-CoV-2 | Severe Acute Respiratory Syndrome Coronavirus 2 |
| SEC | European Society of Cardiology |
| SCCA | Acute cardiovascular syndrome COVID-19 |
| SWEAT | Central Military Emergency University Hospital |
| TIIP | Intermediate therapy / post-operative care |
| UPU | Emergency Reception Unit |
| ESR | Erythrocyte sedimentation rate |

## INTRODUCTION

I chose the topic of this doctoral thesis because it analyzes an essential field for shaping future health policies in Romania. The quality of medical services does not depend only on protocols and technology; it is equally important to really involve and adapt the entire system, as reflected in the proverb "Man sanctifies the place". According to Donabedian's model, quality is evaluated by the structure, process and results of the medical act [1].

The pandemic generated by SARSCoV2 has highlighted the limits of the health system in crisis management. Studies show significant effects on the quality and accessibility of services for patients with chronic diseases [2,3]. However, in Romania there is a lack of data on their perception, which underlines the value of the present intervention.

***The main goal of this paper is to assess the experience of chronic patients — an individual-centered approach with potential for post-pandemic legislative and practical recommendations.***

### MOTIVATION, NOVELTY AND IMPORTANCE

- The topic is topical and relevant for the Romanian medical system.
- Five chronic pathologies (HTA, BCI, DZ, COPD, neoplasm) at high risk in the context COVID19 were analyzed from the patient's perspective.
- The studies undertaken by the research team not only assess the quality and access during the crisis, but also the need for post-COVID recovery — in line with the WHO recommendations on the rehabilitation of those affected [4,5].

### FRAMING

The research is part of the international trends related to the COVID19 pandemic, quality of services and post-infection recovery [2,6], adding an original perspective in the Romanian context, complementary to the existing protocols.

### ASSUMPTIONS AND OBJECTIVES

**Main hypothesis:** Patients with chronic diseases who have had COVID19 perceive a significant decrease in the quality and accessibility of healthcare services during the crisis.

**General objectives studied in the doctoral thesis.**

1. Evaluation of the quality of services and the perception of patients.
2. Identifying access barriers during the pandemic.
3. Formulation of strategies and recommendations for post-COVID rehabilitation.

## METHODOLOGY

This doctoral thesis uses a complex methodological approach, integrating quantitative and qualitative methods, through the development of three complementary substudies, aiming to assess the impact of the COVID-19 pandemic on patients with chronic diseases, the accessibility of medical services and the functional recovery post-infection.

## STUDY A – BARRIERS TO ACCESS TO HEALTHCARE DURING THE COVID-19 PANDEMIC

Study A was conducted as an **observational, cross-sectional, exploratory study** with a predominantly quantitative approach.

The study included adult patients diagnosed with at least one chronic condition (high blood pressure, diabetes, ischaemic heart disease, neoplasm or chronic obstructive pulmonary disease) and with a confirmed history of SARS-CoV-2 infection.

Data collection was carried out through a **structured questionnaire with 30 items**, administered by the principal investigator, who assessed:

- accessibility of medical services;
- delays in providing care;
- use of public and private services;
- the use of remote consultations;
- perception of the quality of medical care and nursing services.

The data analysis included descriptive and comparative statistics according to socio-demographic characteristics and the environment of origin.

## STUDY B – PERCEPTION OF ACCESS TO POST-COVID-19 RECOVERY SERVICES

Study B was designed as an **observational, cross-sectional, exploratory, mixed-methods study**.

Adult patients with chronic diseases and a confirmed history of SARS-CoV-2 infection, who used recovery services after the acute phase of the disease, were included.

Data were collected through a **structured questionnaire with 18 items**, which combined:

- closed-ended questions, evaluated on Likert scales;
- an open-ended question aimed at identifying personal experiences and perceived barriers.

The following were evaluated:

- accessibility of recovery services;
- the perceived quality of the services;
- the empathy of the medical staff;
- efficiency of recovery;
- difficulties encountered in accessing services.

The qualitative component used **thematic analysis** to identify the main recurring themes and experiences reported by participants.

Statistical analysis included descriptive methods and non-parametric tests for group comparison.

## STUDY C – FUNCTIONAL ASSESSMENT AND DEVELOPMENT OF A PRACTICAL POST-COVID TRIAGE MODEL

Study C was conducted as an **observational, cross-sectional, pilot, exploratory study** aimed at assessing the feasibility of a practical model of functional assessment and outpatient triage.

Adult patients with at least one chronic disease and a confirmed history of SARS-CoV-2 infection were included, assessed between four weeks and six months after the acute phase of the disease.

The functional assessment included:

- Modified Medical Research Council (mMRC) scale for dyspnea;
- the Borg scale of the perception of effort;
- the "1-minute sit-to-stand" test;
- measurement of peripheral oxygen saturation ($SpO_2$);
- monitoring your heart rate before and after exercise.

Based on the functional parameters evaluated, the patients were classified into risk categories:

- reduced risk;
- moderate risk;
- Increased risk.

The proposed model had the role of facilitating the early identification of patients who require recovery or additional multidisciplinary evaluation.

The data were analyzed using descriptive statistics, consistent with the exploratory and pilot nature of the study.

## ETHICAL ASPECTS

All studies included in the thesis were carried out in accordance with the principles of the Declaration of Helsinki, the General Data Protection Regulation (GDPR – EU Regulation 2016/679) and the Romanian legislation in force. Participants signed informed consent prior to inclusion in the study. The research protocol was approved by the Ethics Commission of the "Prof. Dr. Theodor Burghele" Clinical Hospital, Bucharest (No. 4/12.10.2020).

## THESIS STRUCTURE

1. **General part** — contains theoretical chapters on quality of services, accessibility in pandemics and post-infection rehabilitation.
2. **Original part** — presentation of the three sub-studies (A, B and C).
3. **Conclusions** — synthesis of results and recommendation formulations, including for post-COVID recovery practices.

## INTERDISCIPLINARITY

It addresses internal medicine, physical and recovery medicine, nursing, public health, health management, and the psychology of recovery—reflecting the complexity of the topic.

## LIMITATIONS AND PROSPECTS

- **Limitations:** restricted pandemic context (2020–2026), regional samples, collected using the snow bubble method, mostly from outpatient specialist consultations and less post-hospital discharge, from informal patient networks
- **Future research** perspectives: extension of the study to other pathologies and geographical areas, evaluation of long-term interventions and piloting rehabilitation programs.

# I. GENERAL PART

The pandemic caused by the sars-cov-2 virus has been one of the most important public health events in recent decades, producing major changes in the organization of health systems worldwide and profoundly affecting the continuity of medical care. During the pandemic, health systems were under unprecedented pressure, having to quickly reorganize their activity to respond to the urgent needs generated by the increase in the number of cases and the need to implement epidemiological measures to control the infection. These transformations have influenced not only the care of patients with covid-19, but also the access and quality of services for people with chronic diseases.

The general part of this doctoral thesis aims to analyze the fundamental concepts regarding the quality and accessibility of medical services, to assess the impact of the pandemic on patients with chronic conditions and to present modern post-covid recovery strategies. The structure of this section integrates information from international and national literature and provides the theoretical foundation necessary for the development of original research.

## DEFINING THE CONCEPTS OF QUALITY, ACCESSIBILITY AND SATISFACTION

The quality of medical services is a complex and multidimensional concept, which includes both objective components, related to the technical performance and efficiency of medical interventions, and subjective components, associated with the patient's experience and perception of the medical act. In the literature, the quality of healthcare services is defined as the extent to which the services provided increase the likelihood of achieving the desired results and are consistent with current medical knowledge.

The model proposed by Donabedian is one of the most widely used conceptual frameworks for health quality assessment and describes three fundamental components: structure, process and outcome. The structural component includes infrastructure, material resources and available human resources. The process component refers to the totality of the activities carried out within the medical act, including diagnosis, treatment and communication with the patient. The outcome component reflects the effects of the interventions on health status and patient satisfaction.

Accessibility is the real possibility for a person to benefit from medical services when they are needed, without the existence of geographical, economic or social barriers. The concept of accessibility goes beyond the mere availability of services and includes aspects such as waiting time, associated costs, location of health facilities and distribution of medical resources.

Patient satisfaction is an important dimension in quality assessment and can be considered an indirect indicator of the performance of the medical system. Numerous studies have shown that patient satisfaction influences treatment adherence, continuity of care, and clinical outcomes. From the perspective of modern, patient-centered medicine, satisfaction is associated not only with therapeutic results, but also with the interpersonal relationship between the patient and the medical staff.

## MODELS AND INDICATORS FOR ASSESSING THE QUALITY OF MEDICAL SERVICES

In the evaluation of the quality of medical services, several theoretical models and standardized tools have been developed. In addition to the Donabedian model, the Maxwell model adds additional dimensions such as efficiency, effectiveness, equity, continuity and acceptability of health services. This model emphasizes that the performance of the healthcare system should not only be assessed by clinical outcomes, but also by how services respond to the needs of the population.

Another important model is represented by the standards developed by the joint commission on accreditation of healthcare organizations (Jcaho), which emphasize patient safety, continuity of care, clinical information management and monitoring of the performance of medical institutions.

The indicators used for quality assessment can be classified into structure indicators, process indicators and result indicators. These include readmission rate, length of hospitalization, frequency of complications, level of patient satisfaction, and waiting time for medical services.

## ACCESSIBILITY OF HEALTHCARE IN THE CONTEXT OF THE COVID-19 PANDEMIC

One of the most important consequences of the covid-19 pandemic on medical systems has been the impact on access to medical services. During the pandemic, many health units reorganized their activity for the care of infected patients, and this process influenced the availability of services for patients with other pathologies. Movement restrictions, fear of infection and reduced face-to-face consultations have led to delays in diagnosis and treatment.

In Romania, the main difficulties identified during the pandemic included the reduction of appointments for non-urgent consultations, the suspension of outpatient activities, the delay of paraclinical investigations and the limitation of access to monitoring services for chronic patients.

In response to these difficulties, various solutions have been developed to maintain continuity of care. These included the rapid deployment of telemedicine services, the use of digital platforms for appointments and remote monitoring, as well as the development of separate circuits for covid and non-covid patients. However, the effectiveness of these measures has been influenced by the level of digitalisation and the availability of the necessary infrastructure.

## THE IMPACT OF THE COVID-19 PANDEMIC ON PATIENTS WITH CHRONIC DISEASES

The covid-19 pandemic has had a significant impact on patients with chronic conditions, both through the increased risk of severe disease progression and the additional difficulties in accessing medical services. Patients with hypertension, ischemic cardiovascular disease, diabetes, chronic obstructive pulmonary disease and neoplasm were vulnerable categories, with an increased risk of complications and mortality.

SARS-CoV-2 infection can produce important systemic effects through complex inflammatory and immunological mechanisms, causing cardiovascular, respiratory, neurological and metabolic damage. International studies have shown that the presence of chronic comorbidities is associated with a higher probability of hospitalization, the need for intensive care and increased mortality.

In addition to the direct effects of the infection, chronic patients were also indirectly affected by the interruption of regular medical monitoring, the postponement of investigations and the reduction of access to treatments and recovery services.

## THE ROLE OF NURSING AND POST-COVID RECOVERY STRATEGIES

The pandemic has highlighted the essential role of medical staff and especially nursing in maintaining continuity of care and managing crisis situations. The nursing staff had an important role in triage, monitoring, medical education and psychological support activities.

In the post-pandemic period, the recovery of patients affected by covid-19 has become an important component of medical management. Numerous studies have reported the persistence of symptoms such as fatigue, dyspnea, reduced exercise tolerance and psychological disorders even after the resolution of the acute episode of the disease.

Modern recovery strategies include breathing exercises, functional recovery, monitoring of persistent symptoms, and multidisciplinary assessment. The World Health Organization recommends integrating post-covid recovery into current medical practice, by developing specialized services and adapting them to the needs of chronic patients.

Overall, the literature review highlights that the COVID-19 pandemic has highlighted the existing vulnerabilities of health systems and the need to develop more effective and flexible strategies to ensure continuity of care in health crisis situations.

# II. SPECIAL PART

The special part of the doctoral thesis includes the personal contributions resulting from the original research and aims to assess the impact of the COVID-19 pandemic on access to medical services and on the recovery process in patients with chronic conditions. The research was built on the need to identify the real experiences of patients and the difficulties encountered by them in the pandemic and post-pandemic period.

The general hypothesis of the research started from the premise that patients with chronic diseases who had SARS-CoV-2 infection encountered significant difficulties in accessing medical and recovery services, and these difficulties influenced the perception of the quality of care and the continuity of the medical act.

A mixed methodological approach was used to verify the hypotheses formulated, integrating quantitative and qualitative methods and being structured in three complementary sub-studies.

The methodology used included cross-sectional observational studies conducted among patients with chronic conditions and a confirmed history of SARS-CoV-2 infection. The participants were selected from the patients monitored in outpatient clinics and clinical units in Bucharest.

The investigated population included people diagnosed with one or more of the following conditions:

- high blood pressure;
- ischemic heart disease;
- diabetes;
- chronic obstructive pulmonary disease;
- neoplasm.

Data were collected using structured questionnaires and standardised functional tools, depending on the objectives of each sub-study.

Statistical analysis included descriptive and inferential methods, using frequencies, percentages, averages, standard deviations, medians, and nonparametric tests such as the Mann–Whitney U and the Fisher exact test. For the qualitative component, the thematic analysis of open-ended responses was used.

All studies have been carried out in accordance with the principles of the Declaration of Helsinki and the provisions on the protection of personal data.

## II.1 STUDY A

### BARRIERS IN ACCESS TO MEDICAL SERVICES DURING THE COVID-19 PANDEMIC FOR ROMANIAN PATIENTS WITH CHRONIC DISEASES AND A CONFIRMED HISTORY OF SARS-COV-2 INFECTION

The first study aimed to assess the difficulties faced by patients with chronic diseases in accessing healthcare during the COVID-19 pandemic and to analyse how changes in the healthcare system influenced their experience.

The COVID-19 pandemic has led to the rapid reorganization of the medical system, by limiting face-to-face consultations, suspending some services and redirecting resources to the care of infected patients. These changes have particularly affected people with chronic pathologies, who require continuous monitoring and regular access to medical services.

The study was conducted as a cross-sectional observational study and included **16 adult participants** with a confirmed history of SARS-CoV-2 infection and at least one associated chronic condition.

Data were collected using a structured questionnaire that assessed:

- accessibility of medical services;
- delays in providing care;

- use of public and private services;
- experience of remote consultations;
- perception of medical care and nursing services.

The results showed that the distribution of participants showed a predominance of female and urban people.

The analysis of the types of medical services accessed during the pandemic showed a relatively equal distribution between the use of public and private services, suggesting that some of the participants had to identify alternatives to compensate for the difficulties encountered in the public system.

An important aspect identified in the study was the impact of digitalization on access to medical services. Although the introduction of remote consultations and e-platforms allowed for some continuity of care to be maintained, the benefits of this transition were not evenly distributed among participants.

Older people reported difficulties in using digital tools more frequently compared to younger participants, suggesting a difference in digital literacy and access to technology.

The study also found that a significant proportion of participants reported negative effects associated with delays in providing medical services, including:

- worsening of symptoms;
- difficulties in monitoring the disease;
- psychological and emotional impact;
- interruption of continuity of care.

Regarding the level of satisfaction with medical care, most participants reported moderate to high values, but differences were observed between age groups and between the categories of patients investigated.

The results suggest that the COVID-19 pandemic has accentuated the already existing vulnerabilities of the healthcare system and highlighted the need to develop more flexible models of healthcare organisation.

The main contributions of this study are to identify concrete barriers encountered by chronic patients and to highlight the impact that the reorganization of medical services can have on the continuity of care.

## II.2. STUDY B

## PERCEPTION OF THE ACCESSIBILITY AND QUALITY OF POST-COVID-19 RECOVERY SERVICES AMONG ROMANIAN PATIENTS WITH CHRONIC DISEASES

The second study was designed to assess how patients with chronic diseases perceived the accessibility and quality of recovery services after SARS-CoV-2 infection and to identify the difficulties encountered in accessing these services.

The interest in this topic has arisen in the context in which a significant number of people continue to present persistent symptoms after the resolution of the acute infectious episode. In the international literature, these manifestations are described as a post-COVID condition and include symptoms such as fatigue, dyspnea, reduced exercise tolerance, sleep disorders, anxiety and psychological impairment.

Patients with chronic pathologies are a vulnerable category because they may have a reduced functional reserve and require continuous monitoring and therapeutic support. In this context, post-COVID recovery services can play an important role in reducing persistent symptoms and improving quality of life.

The study was carried out through a mixed-methods approach, integrating both quantitative components and elements of qualitative analysis. We included **76 adult patients** with a confirmed

history of SARS-CoV-2 infection and previously diagnosed with at least one of the following conditions:

- high blood pressure;
- diabetes;
- ischemic heart disease;
- chronic obstructive pulmonary disease;
- neoplasm.

Data were collected through a structured questionnaire consisting of closed and open-ended questions, which assessed:

- accessibility of recovery services;
- perceived quality of care;
- the efficiency of medical interventions;
- the patient-medical staff relationship;
- barriers to access;
- continuity of care.

The results showed that the accessibility of recovery services was perceived as limited by a number of geographical, financial and organisational factors.

Among the most frequently reported difficulties were:

- costs associated with recovery;
- distance to specialized centers;
- lack of medical recommendations;
- reduced availability of public services;
- transport difficulties.

The comparative analysis highlighted differences between participants from urban and rural areas. People in rural areas reported more frequently difficulties in accessing and reduced availability of specialized services.

The qualitative component of the research highlighted the existence of unmet needs regarding the continuity of care and the support provided to patients after discharge. Many participants reported the need for services closer to home and more efficient coordination between the different specialties involved in post-COVID management

## II.3 STUDY C

### FUNCTIONAL ASSESSMENT AND DEVELOPMENT OF A PRACTICAL OUTPATIENT TRIAGE MODEL FOR POST-COVID FUNCTIONAL IMPAIRMENT IN PATIENTS WITH CHRONIC DISEASES

The third study was exploratory and pilot in nature and aimed to assess the feasibility of a practical functional assessment model for patients with persistent symptoms after COVID-19.

The motivation for this study was the lack of simple standardized tools that would allow the rapid identification of patients with functional impairment and their referral to additional recovery services.

The study included **38 adult patients**, aged between 38 and 82 years, previously diagnosed with at least one chronic condition and a confirmed history of SARS-CoV-2 infection.

The evaluation of the participants included both subjective and objective measurements.

The tools used included:

- Modified Medical Research Council (mMRC) scale;
- Borg scale;
- peripheral pulse oximetry;
- heart rate monitoring;
- the "one-minute sit-to-stand" test.

The results highlighted that the most common persistent symptoms were:

- fatigue;

- dyspnea;
- sleep disorders;
- anxiety;
- palpitations.

The functional assessments demonstrated the existence of different degrees of functional impairment between participants and highlighted changes in physiological parameters after exercise.

The application of the proposed triage model allowed the classification of participants into three risk categories:

- reduced risk;
- moderate risk;
- Severe risk.

This classification made it possible to individualise recommendations and refer participants towards recovery programmes and further assessments when they were deemed necessary.

The results obtained suggest that the use of simple and accessible tools can be a useful alternative for the initial functional assessment of post-COVID patients in the outpatient clinic

The results of the study suggest that the accessibility of recovery services does not depend exclusively on their existence, but also on the way they are organized and integrated into the patient's journey.

## III. PERSONAL CONTRIBUTIONS

The original contributions of this thesis are represented by the integration of the patient's perspective in the evaluation of the accessibility and quality of medical services in the context of the COVID-19 pandemic and the post-pandemic period.

An element of originality of the research is the use of a complex methodological approach, which combines quantitative and qualitative methods for analyzing the experience of chronic patients.

The thesis brings data on:

- the difficulties encountered by chronic patients in accessing medical services;
- perception of post-COVID recovery;
- the influence of socio-demographic factors on the patient experience;
- persistence of functional impairment after COVID;
- applicability of a simplified functional triage model.

An important contribution is the development of a practical algorithm for functional assessment and therapeutic guidance, which can be used in outpatient practice.

## IV. GENERAL CONCLUSIONS OF THE THESIS

The overall results of the research highlight that the COVID-19 pandemic has had an important impact on the continuity of care and the accessibility of healthcare services for patients with chronic diseases.

The difficulties identified were not limited to the acute period of the pandemic, but continued to influence the patients' experience and the post-infectious recovery process.

Patients reported multiple barriers to accessing healthcare and post-COVID recovery, and these difficulties were influenced by geographical, economic, and organizational factors.

The results obtained support the need to develop more flexible and resilient medical systems, capable of maintaining continuity of care even in situations of health crisis.

At the same time, the data suggest that the integration of functional assessment and the development of standardized recovery pathways can contribute to improving the management of post-COVID patients.

This thesis provides relevant information for the development of patient-centered health policies and can be a starting point for future research dedicated to optimizing the care of patients with chronic conditions.

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