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PSYCHOLOGICAL CONSEQUENCES OF THE CORONAVIRUS PANDEMIC: THE IMPACT ON HEALTHCARE WORKERS, MENTAL HEALTH SERVICES AND COVID-19 PATIENTS

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Psychological consequences of the coronavirus pandemic: the impact on healthcare workers, mental health services and COVID-19 patients
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SOMMARIO

La pandemia COVID-19 ha avuto un impatto profondo sulla salute mentale, colpendo in particolare gli operatori sanitari, i servizi di salute mentale e i pazienti COVID-19. Gli operatori sanitari di tutto il mondo si sono trovati ad affrontare uno stress senza precedenti a causa dell'aumento dei carichi di lavoro, della limitatezza delle risorse e dell'elevato rischio di infezione, facendo registrare tassi elevati di ansia, depressione, disturbo da stress post-traumatico e burnout. Gli operatori sanitari in servizio nelle terapie intensive e sub-intensive COVID-19 sono risultati particolarmente colpiti da conseguenze psicopatologiche. La letteratura indica che, mentre alcuni operatori sono riusciti ad adattarsi in maniera sufficientemente adeguata agli stressor pandemici, altri hanno manifestati sintomi di disagio psicologico, che sono perdurati anche a distanza di 1-2 anni dall'inizio della pandemia. I fattori di rischio per lo sviluppo di psicopatologia includono il ruolo lavorativo, il livello di esposizione e le caratteristiche personali, con livelli di disagio più elevati tra infermieri e gli operatori più giovani. In risposta a questa sfida, sono stati sperimentati diversi trattamenti psicologici, tra cui programmi basati sulla mindfulness e sulla compassione, che hanno mostrato risultati promettenti nel ridurre il burnout e promuovere la resilienza.

Anche i servizi di salute mentale hanno affrontato sfide significative che hanno messo a dura prova il sistema di assistenza psichiatrica. L'emergenza sanitaria ha determinato un incremento sostanziale della domanda di supporto psicologico e psichiatrico, con un conseguente sovraccarico delle strutture e delle risorse disponibili.

I pazienti che sono sopravvissuti al COVID-19 hanno sperimentato, a loro volta, sintomi di disagio psicologico. I pazienti che hanno sviluppato la sindrome da Long-COVID hanno manifestato anche ansia, depressione e insonnia, con esperienze esacerbate da sintomi persistenti come la dispnea. Gli interventi che promuovono l'autocompassione e la resilienza sono stati associati a migliori risultati di salute mentale in questo gruppo, suggerendo nuove direzioni per il supporto e lo sviluppo terapeutico.

Nel complesso, le conseguenze psicologiche pandemia rendono necessario mettere a punto strategie di supporto mirato e a lungo termine all'interno dei servizi sanitari.

Affrontare queste sfide attraverso interventi sistematici, l'allocazione di maggiori risorse e un rafforzato sostegno per gli operatori sanitari e i pazienti sopravvissuti al COVID-19 rimane fondamentale per gestire le conseguenze psicologiche della crisi post-pandemica.

ABSTRACT

The COVID-19 pandemic has profoundly impacted mental health, particularly affecting healthcare workers (HCWs), mental health services, and COVID-19 patients. HCWs have faced unprecedented stress due to increased workloads, resource limitations, and exposure to high infection risks, leading to elevated rates of anxiety, depression, PTSD, and burnout. Frontline workers in ICUs and high-risk COVID-19 units were especially vulnerable. Studies indicate that while some HCWs adapted to pandemic stressors, others continued to experience psychological distress even a year post-outbreak. Risk factors include role, exposure level, and personal characteristics, with nurses and younger HCWs showing higher distress levels. In response, psychological interventions, including mindfulness and compassion-based programs, have been tested, showing promising results in reducing burnout and promoting resilience.

Mental health services also faced challenges during the pandemic, such as increased demand for emergency psychiatric consultations and strained rehabilitation resources. Mental health service providers had to adapt, balancing pandemic-related constraints with the growing need for psychological support among HCWs and the general population.

COVID-19 survivors experienced unique psychological distress linked to trauma, discrimination, and stigma. Long-COVID patients reported anxiety, depression, and insomnia, and these experiences were exacerbated by persistent symptoms like dyspnea. Interventions promoting self-compassion and resilience were linked to better mental health outcomes in this group, suggesting new avenues for support and therapeutic development.

Overall, the pandemic's lasting psychological effects underscore the need for targeted, long-term mental health support within healthcare and mental health services. Addressing these challenges through systematic interventions, increased resource allocation, and enhanced support for HCWs and COVID-19 survivors remains critical in managing the enduring impact of the COVID-19 crisis.

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Articles contributing to this thesis (in chronological order)

Published:

1. Lasalvia, A., **Bodini, L.**, Amaddeo, F., Porru, S., Carta, A., Poli, R., & Bonetto, C. (2021). The sustained psychological impact of the COVID-19 pandemic on health care workers one year after the outbreak—a repeated cross-sectional survey in a tertiary hospital of North-East Italy. *International journal of environmental research and public health*, *18*(24), 13374.
2. Bonetto, C., Pace, D., **Bodini, L.**, Colombi, M., Van Bortel, T., & Lasalvia, A. (2022). Development and psychometric validation of new questionnaires assessing experienced discrimination and internalised stigma among people with Covid-19. *Epidemiology and Psychiatric Sciences*, *31*, e37.
3. **Bodini, L.**, Bonetto, C., Cheli, S., Del Piccolo, L., Rimondini, M., Rossi, A., Carta, A., Porru, S., Amaddeo, F., & Lasalvia, A. (2022). Effectiveness of a Mindful Compassion Care Program in reducing burnout and psychological distress amongst frontline hospital nurses during the COVID-19 pandemic: a study protocol for a randomized controlled trial. *Trials*, *23*(1), 734.
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List of abbreviations:

6MWT: Six-Minute Walk Test
AOUI: Azienda Ospedaliera Universitaria Integrata
CAB: Comunità Alloggio di Base
CAE: Comunità Alloggio Estensiva
CARP: Verona University Committee on Research
CEDISC: Covid-19 Experienced DISCrimination scale
CG: Control Group
CFT: Compassion Focused Therapy
COINS: COvid-19 INternalised Stigma scale
COVID-19: Coronavirus Disease 2019
CTRP: Comunità Terapeutica Riabilitativa Protetta
DLCO: Diffusion Capacity of the Lung for Carbon Monoxide
ED: Emergency Department
EX: Emotional Exhaustion
FFMQ: Five Facet Mindfulness Questionnaire
FSCRS: Forms of Self-Criticising/attacking and Self-Reassuring Scale
GAD-7: Generalized Anxiety Disorder - 7 items
GAP: Gruppo Appartamento Protetto
HCWs: Healthcare Workers
ICD-9-CM: International Classification of Diseases - 9th Revision, Clinical Modification
ICU: Intensive Care Unit
IES-R: Impact of Event Scale - Revised
IG: Intervention Group
ISI: Insomnia Severity Index
ITT: Intention to Treat
MBCT: Mindfulness-Based Cognitive Therapy
MBI-GS: Maslach Burnout Inventory - General Survey
MBSR: Mindfulness-Based Stress Reduction
MCCP: Mindful Compassion Care Program
mMRC: Modified Medical Research Council Dyspnea Scale

PHQ-9: Patient Health Questionnaire - 9 items

PPE: Personal Protective Equipment

PSS: Perceived Stress Scale

PSS-10: Perceived Stress Scale - 10 items

PTSD: Post-Traumatic Stress Disorder

RCT: Randomized Controlled Trial

RFs: Residential Facilities

SARS: Severe Acute Respiratory Syndrome

SAS: Self-Rating Anxiety Scale

WHO: World Health Organization

WL: Waiting List

INTRODUCTION

The COVID-19 pandemic represents an unparalleled global health emergency that exposed the vulnerabilities of healthcare systems and societies worldwide. The rapid emergence and spread of SARS-CoV-2 presented a challenge of unprecedented magnitude, catching healthcare infrastructures and populations unprepared for a crisis of such scale and severity. Italy, as the first Western country to experience widespread transmission, became an early epicenter of the pandemic, offering critical insights into the clinical, logistical, and societal challenges posed by this novel virus.

The pandemic's impact in Italy began on January 30, 2020, when the first two cases of COVID-19 were confirmed in Rome, involving Chinese tourists. The situation escalated rapidly with the identification of the first locally transmitted case in Codogno, Lombardy, on February 21, 2020, marking the beginning of a severe outbreak in the northern regions. By March 9, 2020, the Italian government imposed a nationwide lockdown, the first of its kind in Europe, in an effort to curb the exponential spread of the virus.

By May 2023, the World Health Organization (WHO) reported over 6.9 million confirmed deaths globally, with excess mortality estimates suggesting the true toll could surpass a staggering 20 million lives lost. In Italy alone, nearly 190,000 confirmed deaths were recorded, ranking among the highest mortality rates in Europe. The scale of this devastation is unprecedented in recent history, leaving an indelible mark on families, communities, and societies worldwide.

A range of public health measures was implemented to contain viral transmission, including lockdowns, quarantines, travel restrictions, and closures of schools and businesses. Entire municipalities in northern Italy were isolated to curb the virus. While effective in limiting contagion, these measures caused significant economic disruptions, logistical challenges, and the reorganization of healthcare delivery.

The Veneto region, among the first areas severely impacted, experienced overwhelming demand on healthcare services. Hospitals exceeded capacity, ICUs faced shortages of beds and ventilators, and medical staff operated under extreme conditions with insufficient personal protective equipment (PPE).

The clinical burden intensified the crisis, with surging hospitalizations and many patients requiring prolonged ICU stays and mechanical ventilation. Survivors frequently experienced complications, including respiratory dysfunction and cardiovascular issues, collectively termed "long COVID." Prioritizing COVID-19 cases further strained healthcare systems, delaying routine care and depriving patients with chronic conditions of essential monitoring and treatment.

Within this unprecedented and multifaceted scenario, the purpose of this thesis is to explore the psychological impact of the COVID-19 pandemic from diverse perspectives, providing insights into the unique challenges faced by different populations and the broader implications for mental health during public health emergencies. As the World Health Organization has stated, *"There is no health without mental health",* psychological well-being is a fundamental component of overall health, particularly during crises of this magnitude. This principle highlights the critical need to address not only the significant physical repercussions of the pandemic – for example severe respiratory, cardiovascular, and long-term debilitating conditions – but also its profound psychological effects. Indeed, the pandemic's stressors created a complex psychological framework that deeply impacted three key populations: frontline healthcare workers, mental health services and their users, and COVID-19 survivors.

Healthcare workers faced extraordinary professional demands while managing personal fears and uncertainties. They had to rapidly adapt to new protocols, work under intensive pressure, and confront high mortality rates among their patients. Mental health services underwent significant reorganization, needing to maintain care continuity while adapting to new safety protocols and responding to increased demand. COVID-19 survivors encountered not only the physical consequences of the disease but also significant psychological challenges, including stigma, discrimination, and adaptation to persistent symptoms.

Building on these premises, this thesis is structured into three chapters, each exploring a distinct perspective on the psychological impact of the COVID-19 pandemic. Chapter 1 examines the impact of the COVID-19 pandemic on *healthcare professionals*. It begins with an overview of psychological distress among healthcare workers, followed by a longitudinal study tracking outcomes over

one year. The chapter then presents research on psychological interventions, including a randomized controlled trial of a mindfulness-based program and a pilot study of a digital intervention platform. Chapter 2 focuses on *mental health services* during the pandemic. It analyzes changes in emergency psychiatric consultations and explores challenges faced by residential facilities. This chapter provides both quantitative evidence of service utilization changes and qualitative insights into adaptation strategies. Chapter 3 investigates psychological distress among *COVID-19 survivors*. It presents the development and validation of new assessment tools for measuring discrimination and stigma. The chapter examines relationships between persistent symptoms and psychological outcomes and explores protective factors such as self-compassion.

These chapters contribute to a broader understanding of how the COVID-19 pandemic affected mental health across different populations and contexts. Each chapter includes multiple published paper.

The research objectives of this thesis focus on three main areas corresponding to the key populations studied. Regarding healthcare workers, the research presented in this thesis will evaluate the immediate and long-term psychological impact on hospital staff, particularly nurses and intensive care unit workers. It will monitor the evolution of psychological distress from the lockdown period to one year after, while also testing the effectiveness of mindfulness and compassion-based interventions in reducing burnout. Additionally, the thesis will explore the development and validation of digital interventions for psychological support of healthcare professionals.

In the domain of mental health services, the thesis explores the changes in emergency psychiatric consultations during different phases of the pandemic, as well as examine the impact of containment measures on psychiatric residential facilities. The thesis will investigate adaptation strategies and organizational changes in mental health service delivery, while evaluating the effectiveness of new service delivery models implemented during the crisis.

For COVID-19 survivors, the research in this thesis will develop and validate specific tools to measure experienced discrimination and internalized stigma. It will also assess the relationship between persistent symptoms, such as dyspnea, and

psychological distress, while exploring the role of self-compassion in disease adaptation. Additionally, the thesis will investigate the impact of social stigma on the mental health outcomes of COVID-19 survivors.

To achieve this, the thesis employs diverse research methodologies to thoroughly investigate the psychological impact of the COVID-19 pandemic.

For healthcare workers, we utilized a longitudinal approach, tracking changes in psychological outcomes over time. A repeated cross-sectional survey at the Verona Academic Hospital examined stress, anxiety, and burnout levels from the initial lockdown period through the subsequent year. This revealed how responses shifted from acute stress to more chronic distress, with nurses and intensive care staff showing particularly concerning levels of psychological issues. While quantitative assessments provided statistical evidence, qualitative data from open-ended questions and group discussions offered deeper insights into healthcare workers' personal and professional challenges. Building on these findings, our research team developed and implemented a randomized controlled trial to evaluate the effectiveness of a mindfulness-based program in reducing burnout among frontline nurses. Additionally, we conducted a pilot study to explore the feasibility of digital interventions for flexible, accessible healthcare worker support.

Regarding mental health services, we carried out a retrospective analysis of administrative data to understand changes in emergency psychiatric consultations and service utilization patterns before and during the pandemic. Cross-sectional studies also assessed the immediate impact on service providers and the organizational adaptations required. Notably, our research within psychiatric residential facilities examined how both staff and residents experienced the pandemic's disruptions to therapeutic activities and rehabilitation programs.

The third chapter employed diverse methodologies to examine the psychological impact on COVID-19 survivors, with a focus on stigma and long-term effects. Cross-sectional surveys, validated psychometric tools, physical evaluations, and qualitative responses provided a comprehensive understanding of the challenges faced by this population, including the relationships between persistent symptoms, stigma, and mental health.

In conclusion, this thesis provides a comprehensive exploration of the psychological impact of the COVID-19 pandemic across three key populations: healthcare workers, mental health services, and COVID-19 survivors. Through the use of diverse methodologies, including longitudinal studies, cross-sectional surveys, psychometric validation, and clinical evaluations, the research offers critical insights into the multifaceted challenges posed by the pandemic. In the following chapters, the results of various studies conducted by the research team I was part of during my three years of doctoral training will be presented and analyzed in detail.

CHAPTER 1 – IMPACT OF COVID-19 PANDEMIC ON HEALTHCARE PROFESSIONALS

This Chapter explores the psychological impact of COVID-19 on healthcare workers (HCWs), particularly those in high-stress hospitals roles. Since the pandemic's onset, HCWs have experienced elevated rates of anxiety, depression, PTSD, burnout, and moral injury, with those on the front lines treating critical COVID-19 patients being most affected. The Chapter examines both short-term and long-term psychological consequences, noting that burnout and depressive symptoms have persisted or worsened over time.

It identifies key risk factors, such as gender, age, occupation, and traumatic exposure, highlighting that nurses, residents, and ICU staff experience the highest distress levels. Conversely, protective factors- like supportive work environments and mental health resources- contributed to better mental health outcomes.

The chapter also addresses psychological interventions aimed at supporting HCWs, such as mindfulness-based programs and compassion focused therapy, demonstrating their effectiveness in improving well-being and reducing burnout. It underscores the need for healthcare systems to prioritize HCWs' mental health by integrating long-term mental health initiatives and fostering a supportive organizational culture.

As a future direction, the Chapter highlights the potential of implementing a Digital Mindfulness Program that combines mindfulness and compassion-based tools. This program could offer HCWs accessible, flexible online resources to manage stress, build resilience, and cultivate self-compassion, enabling them to engage with these practices conveniently.

Impact of COVID-19 on psychological distress in Healthcare Workers: an overview

The COVID-19 pandemic, declared by the World Health Organization (WHO) on March 11, 2020, profoundly disrupted global health systems, placing unparalleled demands on healthcare workers (HCWs) and exposing them to unique stressors and risks. Increased workloads limited protective resources, and the constant risk of infection, significantly impacted HCWs mental health. Studies have documented elevated levels of psychological distress among HCWs, including anxiety, depression, post-traumatic stress disorder (PTSD), burnout, and even moral injury, stemming from the ethical dilemmas encountered during patient care (Arias-Ulloa et al., 2023; Coimbra et al., 2024; Lee et al., 2023).

This Chapter reviews the psychological toll of the COVID-19 pandemic on HCWs, focusing on the prevalence and contributing factors of various mental health disorders. It aims to highlight the risk factors, outcomes, and protective factors that can inform strategies to support mental health and resilience in this workforce.

Systematic reviews and meta-analyses have shown high rates of mental health issues among HCWs during the pandemic, with approximately 30% experiencing anxiety and depression (Lee et al., 2023; Tong et al., 2023). Insomnia rates ranged from 19.7% to 73.7%, depending on the country, while PTSD symptoms were reported by 25.5% of HCWs (Blasco-Belled et al., 2024; Umbetkulova et al., 2024). Moral injury was also prevalent, resulting from ethically challenging situations like deciding which patients should receive limited medical resources. Studies found moral injury was associated with depression, anxiety, PTSD, and suicidal ideation (Coimbra et al., 2024).

Several risk factors contributed HCWs' psychological distress during the pandemic, painting a complex picture of vulnerability. Demographic and professional characteristics played a significant role , with female healthcare workers, younger individuals, and nurses experiencing greater psychological distress than their male, older, and physician counterparts (Arias-Ulloa et al., 2023; Lee et al., 2023). The work environment was another critical factor: frontline workers, those assigned to high-risk COVID-19 units, and HCWs with extended shifts faced heightened levels of stress, burnout, and mental health challenges. The lack of adequate of personal

protective equipment (PPE) and repeated exposure to infected patients further exacerbated anxiety and PTSD symptoms (Blasco-Belled et al., 2024; Umbetkulova et al., 2024).

Social and personal circumstances also played a role. HCWs with limited social support—such as those living alone—experienced higher distress levels. Additionally, fear of infecting loved ones and prolonged separation from family amplified emotional burdens (Ghahramani et al., 2023).

Despite these challenges, several protective factors contributed to better mental health outcomes for HCWs. Supportive work environments, characterized by access to psychological resources, a positive workplace culture, and sufficient personal protective equipment (PPE),helped mitigate distress (Shechter et al., 2020; Tong et al., 2023). Personal resilience and coping strategies, including mindfulness, maintaining social connections, and engaging in self-care, also proved beneficial Institutional support, such as mental health programs and resources, further alleviated psychological impacts (Lee et al., 2023; Umbetkulova et al., 2024).

The long-term psychological impact on HCWs is an area of growing concern. Research indicates that symptoms of PTSD, anxiety, and depression can persist beyond the immediate crisis. Longitudinal studies reveal that while some symptoms decrease over time, others may persist or worsen without adequate interventions. Unresolved mental health issues among HCWs can lead to burnout, reduce quality of patient care, and lower retention rates in healthcare professions (Umbetkulova et al., 2024).

Addressing these challenges requires the integration of mental health support into occupational health programs, particularly for frontline workers. Proactive measures - such as routine psychological assessments, mindfulness training, and fostering a culture that prioritizes mental well-being - are crucial for preparing healthcare systems for future crises (Coimbra et al., 2024; Ghahramani et al., 2023).

In conclusion, the COVID-19 pandemic highlighted the psychological vulnerabilities of HCWs during public health emergencies. Elevated rates of anxiety, depression, PTSD, and moral injury underscore the substantial mental health toll on this workforce. Understanding the factors that contribute to or

mitigate psychological distress can guide the development of targeted interventions to support HCWs' mental health during and after pandemics.

The Sustained Psychological Impact of the COVID-19 Pandemic on Health Care Workers One Year after the Outbreak—A Repeated Cross-Sectional Survey in a Tertiary Hospital of North-East Italy (Lasalvia, Bodini, Amaddeo et al., *International Journal of Environmental Research and Public Health*, 2021)*

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The Sustained Psychological Impact of the COVID-19 Pandemic on Health Care Workers One Year after the Outbreak—A Repeated Cross-Sectional Survey in a Tertiary Hospital of North-East Italy

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Abstract: This study aimed to evaluate the mental health outcomes of health care workers (HCWs) of the Verona academic hospital trust (Italy) one year after the outbreak of COVID-19 and to identify predicted risk factors. A web-based survey was conducted from mid-April to mid-May 2021 on hospital workers one year after the first evaluation performed during the lock-down phase of the COVID-19 pandemic. Post-traumatic stress, general anxiety, depression, and burnout were assessed by using, respectively, the impact of event scale (IES-R), the self-rating anxiety scale (SAS), the patient health questionnaire (PHQ-9) and the Maslach burnout inventory-general survey (MBI-GS). Multivariate logistic regression analysis was performed to identify factors associated with each of the four mental health outcomes one year after the COVID-19 outbreak. A total of 1033 HCWs participated. The percentage of HCWs scoring above the cut-off increased from 2020 to 2021 in all of the outcome domains (anxiety, 50.1% vs. 55.7, $p < 0.05$; depression, 26.6% vs. 40.6%, $p < 0.001$; burnout, 28.6% vs. 40.6%, $p < 0.001$; chi-square test), with the exception of post-traumatic distress. There was also an increase when stratifying by occupation and workplace, with a greater increase for depression and burnout. Multivariate analysis revealed that, one year after the COVID-19 outbreak, nurses were at the greatest risk of anxiety and depression, whereas residents were at the greatest risk of burnout (in terms of low professional efficacy). Working in intensive care units was associated with an increased risk of developing severe emotional exhaustion and a cynical attitude towards work.

** The study has been published (Lasalvia et al., 2021) and is reproduced with permission.*

Abstract

This study aimed to evaluate the mental health outcomes of health care workers (HCWs) of the Verona academic hospital trust (Italy) 1 year after the outbreak of COVID-19 and to identify predicted risk factors. A web-based survey was conducted from mid-April to mid-May 2021 on hospital workers 1 year after the first evaluation performed during the lock-down phase of the COVID-19 pandemic. Post-traumatic stress, general anxiety, depression and burnout were assessed by using, respectively, the Impact of Event Scale (IES-R), the Self-Rating Anxiety Scale (SAS), the Patient Health Questionnaire (PHQ-9) and the Maslach Burnout Inventory-General Survey (MBI-GS). Multivariate logistic regression analysis was performed to identify factors associated with each of the four mental health outcomes 1 year after the COVID-19 outbreak. A total of 1,033 HCWs participated. The percentage of HCWs scoring above the cut-off increased from 2020 to 2021 in all the outcome domains (anxiety, 50.1% vs 55.7, $p < 0.05$; depression, 26.6% vs 40.6%, $p < 0.001$; burnout, 28.6% vs 40.6%, $p < 0.001$; chi-square test), with the exception of post-traumatic distress. There was also an increase when stratifying by occupation and workplace, with a greater increase for depression and burnout. Multivariate analysis revealed that, 1 year after the COVID-19 outbreak, nurses were at the greatest risk of anxiety and depression, whereas residents were at the greatest risk of burnout (in terms of low professional efficacy). Working in intensive care units was associated with an increased risk of developing severe emotional exhaustion and a cynical attitude towards work.

Introduction

Working in large tertiary hospitals during the COVID-19 pandemic has been found to be stressful or definitely traumatic for many health care workers (HCWs) (Carmassi et al., 2020). A number of studies have consistently found that a relevant proportion of HCWs, especially those at the frontline with critically ill COVID-19 patients, have developed clinically significant symptoms of post-traumatic stress, anxiety, depression and professional burnout (De Kock et al., 2021; Santabárbara et al., 2021). Several factors seem to increase the risk of adverse mental health outcomes among HCWs, including working in intensive care units (ICUs), uncertainty of dealing with an unknown illness, the rapid global spread and significant mortality of the disease and lack of personal protective equipment and effective treatment protocols (Sanghera et al., 2020). However, although the COVID-19 outbreak has been acutely stressful for most HCWs, the longer-term impact of the pandemic is still largely unknown. Most studies published so far have investigated the immediate psychological impact of the pandemic on HCWs (Cabarkapa et al., 2020; Dong et al., 2021; Pappa et al., 2020; Shreffler et al., 2020). Moreover, findings are still conflicting.

The few studies exploring the short-term impact of the pandemic on HCWs provide conflicting results. A study carried out in Singapore amongst medical residents showed that those who were deployed to the higher-risk National Centre for Infectious Diseases to manage patients with COVID-19 had lower perceived stress at the 3-month follow-up (Chew et al., 2020). Similarly, a study conducted in Belgium amongst ICU nurses showed that they had improved depression, anxiety and somatisation over a 2-month period (Van Steenkiste et al., 2022). In contrast, a study conducted on Argentinean HCWs found a deterioration of self-perceived job performance and increased prevalence of depression and anxiety over a 4-month period (López Steinmetz et al., 2022). Moreover, one large prospective study amongst Chinese frontline HCWs found significantly worse psychiatric status (in terms of somatisation, obsessive-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism) and sleep quality a month after the COVID-19 outbreak (C. Huang et al., 2021). Another longitudinal study conducted in China found significantly higher risks for

depression, anxiety and post-traumatic stress disorder (PTSD) symptoms during the outbreak period compared with the stable period of the pandemic a month later (Cai et al., 2020).

To date, very little information is available on the psychological impact of the pandemic on HCWs over a more prolonged period. Moreover, research has so far addressed only some specific hospital units or some given occupational categories. A recent study conducted in Singapore among health care staff of an emergency department found a significant improvement in anxiety in all professionals, but a significant worsening in depression among doctors over a period of 1 year (Th'ng et al., 2021). A repeated cross-sectional study on intensive care physicians in a COVID-19 hub hospital in Central Italy reported sustained high levels of occupational stress, anxiety and depression; low satisfaction; and burnout over 1 year since the pandemic onset (Magnavita et al., 2021a).

Based on the above literature, more research is needed to fully understand the long-term impact of the pandemic on the full spectrum of hospital workers and on staff working in the various hospital units (including frontline services). Understanding the enduring occupational and psychological effects of working during the COVID-19 pandemic is important because it involves the well-being of many HCWs and, in turn, the effectiveness and safety of the care provided to patients. The objective of the present study was to assess the psychological impact of the COVID-19 pandemic on the full range of occupational profiles of HCWs working in a large academic hospital in north-east Italy 1 year after the outbreak and to identify personal and job-related factors that might have increased the risk of developing adverse mental health outcomes 1 year later.

Materials and Methods

Study Design

The study described here is part of a repeated two-point cross-sectional survey. Specifically, it represents the second evaluation conducted on the HCWs of the Verona University Hospital Trust; they had first been assessed during the lock-down period of the COVID-19 pandemic (mid-April to mid-May 2020). The survey was promoted and conducted by the Section of Psychiatry at the University of Verona

and supported by the Health Directorate of the Verona University Hospital Trust. All staff working in the Verona University Hospital during the COVID-19 pandemic were asked to participate. The sample addressed in the study is composed by those who accepted to participate. HCWs participated in the study on a voluntary basis and were asked to sign a written consent form. The findings of the first assessment are presented in full elsewhere (Lasalvia et al., 2021a; Lasalvia et al., 2021c). One year after the first assessment (mid-April to mid-May 2021), HCWs of the Verona Academic Hospital Trust were invited to re-assess their psychological status. Similarly to the first assessment, the evaluation carried out in 2021 was made by using self-rated scales hosted on a web-based survey platform (SurveyMonkey); participants could complete the online questionnaires by using their PCs, smartphones or other mobile devices. The study description and the invitation to participate, as well as the link to the online questionnaires, was published in the hospital's newsletter and sent via e-mail to all hospital workers by the Trust administration. A reminder for completing the questionnaire was sent to all potential participants after 1 week. The survey was anonymous, and confidentiality of information was guaranteed. The second online survey required about 15–20 minutes to be completed.

Setting and Participants

The Verona University Hospital is the second largest hospital trust in Italy in terms of the number of beds and the fifth largest in terms of admissions. The hospital staff comprises 5,942 personnel (including nearly 1,200 residents of the medical specialty schools at the University of Verona). Beginning on 17 March 2020, the Veneto regional government converted part of the hospital into a 'COVID-19 hospital'. Thus, dedicated pathways for both suspected and confirmed COVID-19 cases were established within the hospital, as well as in other hospital units located in clearly restricted areas specifically devoted to the treatment of patients with COVID-19. All staff members working in the Verona University Hospital were asked to participate in the study.

Assessment Measures

Post-traumatic distress was assessed by using the Impact of Event Scale-Revised (IES-R) (D. S. Weiss & Marmar, 1997a), a 22-item self-report instrument that measures subjective distress caused by traumatic events on a 5-point scale from 0 (not at all) to 4 (extremely) during the previous 7 days. The scale was slightly adapted for this study: participants were first asked whether they might have experienced a stressful/traumatic event at work related to COVID-19; three response options were available, (1) 'Yes, definitely', (2) 'Yes, maybe' and (3) 'No'. Those responding 1 or 2 were then invited to specify (by writing a free response in their own terms) which kind of stressful/traumatic event it was and were asked to rate how much they were distressed or bothered during the past 7 days by each item listed in the IES-R. The maximum score is 88 (worst post-traumatic stress state). We used a cut-off score of 24 for detecting symptoms of post-traumatic distress that deserve clinical attention (Creamer et al., 2003). For the specific purpose of this study, analysis was conducted only on those participants responding 'Yes, definitely' to the entry question. Free responses were analyzed using qualitative content analysis, in which consensus codes were reached by two of the authors (A.L. and F.A.) through an iterative process with preliminary and secondary coding. From this analysis, themes emerged into which responses could be categorized. The same procedure has been also applied in the first assessment.

Symptoms of anxiety were assessed by using the Self-Rating Anxiety Scale (SAS) (Zung, 1971) that contains 20 items, each rated on a 5-point scale from 1 (a little of the time) to 4 (most of the time). The maximum score of 80 indicates an extremely high anxiety level and the cut-off score for clinically significant anxiety symptoms is 36 (Dunstan & Scott, 2020).

Symptoms of depression were assessed by using the Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001), a self-rated nine-item scale that asks if the subject has experienced symptoms of depression in the previous 2 weeks. Subjects are asked to rate how often each symptom occurred: 0 (not at all), 1 (several days), 2 (more than half the days), or 3 (nearly every day). The total PHQ-9 score ranges from 0 (absence of depressive symptoms) to 27 (most severe depressive symptoms). We used a cut-off score of 10 to indicate a condition that potentially deserves clinical attention (Kroenke & Spitzer, 2002).

Burnout was assessed by using the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli, 1996). It consists of 16 items constituting three subscales that parallel those of the original MBI: Emotional Exhaustion (EX; 5 items) covers the experience of both emotional and physical fatigue; Cynicism (CY; 5 items) reflects indifference, a detached attitude towards work and active disengagement from work; and Professional Efficacy (EF; 6 items) consists of feelings of competence, successful achievement and accomplishment in one's work, which diminishes when burnout is developing. All MBI-GS items are scored on a 7-point rating scale ranging from 0 (never) to 6 (always). We used the only Italian cut-off scores available in the literature for the health care sector (>2.20 for EX, >2.00 for CY and <3.66 for EF). These cut-offs were derived from a large sample of mental health professionals working in the Veneto region (Lasalvia et al., 2009).

Personal sociodemographic information and job characteristics were also collected, including gender, age, having psychological problems developed before the COVID-19 outbreak requiring specialised help, occupation and place of work (hospital unit). For the purpose of analysis, the various hospital units were grouped according to the degree of clinical engagement with COVID-19 patients, from most engaged to least engaged: ICUs (that during the lock-down phase were entirely dedicated to critically ill *COVID-19 patients*), sub-intensive COVID-19 wards (i.e. infectious disease, pulmonary medicine and internal medicine wards specifically dedicated to COVID-19), other frontline services dealing with patients with COVID-19 (i.e. radiology and emergency department), non-COVID-19 wards, laboratory diagnostic services (i.e. laboratory medicine, transfusion medicine, immunology, p*athology, microbiology)* and administration.

Statistical Analysis

Statistical analyses were carried out by using SPSS 22 and Stata 15. Descriptive statistics are reported as frequencies and percentages. Comparisons between categorical variables were performed by using the chi-square test or Fisher's exact test where appropriate.

The precision of the proportion estimate for each adverse outcome was determined by calculating the margin of error for the two-sided 95% confidence interval (CI).

The proportion of participants for each adverse outcome (post-traumatic distress, anxiety, depression and burnout domains) in relation to personal (gender and age) and job (occupation, work place and experienced traumatic event) characteristics was explored by stratifying for the aforementioned risk factors. Finally, multivariate logistic regression models for the same outcomes gave adjusted odds ratios (ORs) and 95% CIs. Goodness-of-fit measures were estimated for these models. The alpha level was set to 0.05 for all effects.

Results

Personal and Job Characteristics

A total of 1,033 HCWs completed the online survey in April–May 2021. This sample was similar to the one recruited in April–May 2020 with respect to all personal characteristics and occupational profile; the two samples differed only in workplace, with participants of the second assessment being more frequently employed in ICUs (13.6% vs 9%), sub-intensive COVID-19 units (15.8% vs 8.3%) and other frontline services dealing with patients with COVID-19 (11.5% vs 7.6%) and less in non-COVID-19 wards (40.3% vs 55%) and laboratory diagnostic services (8.9% vs 11%) (chi-square test, $p < 0.001$).

Table 1 shows personal and job characteristics of Verona hospital workers participating in the 2021 survey.

Table 2 provides information on treatments for mental health problems that participants reported having had received over the previous year.

Overall, 8% (n=86) reported having had received some form of mental health treatment over the previous year. Most of them (68.6%) were still in treatment at the time of evaluation. Among those seeking help for mental health problems, most (68.6%) received treatment by private practitioners rather than by public services (31.4%). Regarding the specific type of intervention, nearly half reported having had received only psychological therapy, 10% psychopharmacological therapy only and 28% a combined therapy. Mental health treatment was considered beneficial by nearly all HCWs reporting to have been treated.

Mental Health Outcomes 1 Year After the Pandemic Onset

The IES-R, the SAS, the PHQ-9 and the MBI-GS were completed, respectively, by 82.5% (n=335), 90.2% (n=932), 88.8% (n=917) and 86.8% (n=897) of eligible participants. When comparing percentages of completers and non-completers with respect to personal information across the four outcome domains, no staff characteristic was significantly associated with the pattern of response/no response, with the exception of the IES-R, which was completed by a higher percentage of females (85.4% vs. 74.2%; Fisher's exact test, p = 0.018).

Overall, 1 year after the outbreak onset, 34.8% (n=335) of participants reported having had definitely experienced a stressful/traumatic event related to COVID-19 at work. The frequency distribution of specific traumatic events is given in Table 3. In brief, the most frequent traumatic themes reported by hospital workers in the 2021 assessment were related to dealing with death and dying, demanding work conditions and the fear of infection, reported – respectively – by 31%, 24.6% and 11% of respondents. It should be noted that the ranking (and frequency) of traumatic experiences reported in the 2021 survey was different from that reported in the previous year.

Among those who reported a COVID-19-related traumatic experience, 72.2% (95% CI 67%–77%; margin of error 2.5%) showed symptoms of post-traumatic distress at 1 year. Moreover, in the overall sample, 55.7% (95% CI 52%–59%; margin of error 1.6%) reported symptoms of anxiety and 40.6% (95% CI 37%–44%; margin of error 1.6%) reported symptoms of depression 1 year after the onset of the COVID-19 pandemic. Finally, 1 year after the onset of the pandemic, 50.4% (95% CI 47%–54%; margin of error 1.7%) of participants displayed high emotional exhaustion (EX), 46.2% (95% CI 43%–49%; margin of error 1.7%) low professional efficacy (EF) and 35.9% (95% CI 33%–39%; margin of error 1.6%) cynicism (CY). Moreover, 38.1% (95% CI 43%–49%; margin of error 1.6%) scored beyond the cut-off point in all the three MBI-GS scales, thus displaying a burnout condition.

Stratifying by the main personal and professional characteristics, the proportion of participants scoring above the cut-off points in the various outcome domains differed widely.

As shown in Table 4a, women, nurses and staff working in ICUs or sub-intensive COVID-19 units reported higher percentages of anxiety and depression. Specifically, 61.5% of women displayed severe anxiety and 44.3% displayed severe depression. In addition, 69.5% of nurses showed severe anxiety and 49.8% showed severe depression. HCWs working in ICUs reported symptoms of severe anxiety in 65.8% of cases and of severe depression in 58% of cases; similarly, staff working in sub-intensive COVID-19 wards reported higher percentages of severe anxiety and depression, respectively in 64.8% and 45.3% of cases. Interestingly, anxiety and depression were more frequent among HCWs who had experienced a COVID-19-related traumatic event at work (76.4% and 62.2%, respectively).

Regarding the MBI-GS scales (Table 4b), respondents scoring beyond the cut-off score were more frequent among staff working in both ICUs (EX 71.6%; EF 53.4%; CY 57.8%) and sub-intensive COVID-19 wards (EX 61.7%) and, with respect to the occupational profile, among residents (EX 48.3%; 59.1% EF; CY 33.6%) and nurses (EX 59.8%; EF 47.7%; CY 45.2%). HCWs scoring beyond the cut-off score were also more frequent among those who had experienced a COVID-19-related traumatic event at work (73.5% EX; 47.3% EF; 50.5% CY).

Differences in Adverse Mental Health Outcomes Between 2020 and 2021

Figure 1 reports the percentages of participants scoring above the cut-off point across the various outcome domains in 2020 and 2021.

Overall, the percentage of hospital workers scoring above the cut-off increased from 2020 to 2021 in all the outcome domains considered, except for post-traumatic distress, for which the percentage of those scoring above the cut-off remained substantially similar across the two assessment points (Figure 1). The increase in percentages of participants scoring above the cut-off score across the two assessment points was detected consistently in all the outcome domains when stratified by occupation (Figure 2) and workplace (Figure 3), with a greater increase in the percentages of those showing depression, emotional exhaustion and cynicism.

Risk Factors for Adverse Mental Health Outcomes 1 Year After the Pandemic Onset

Table 5a reports the multivariate regression models for the various psychopathological domains (i.e. post-traumatic distress, anxiety and depression) assessed among Verona hospital workers 1 year after the onset of the pandemic. Adjusted ORs showed that being older was associated with increased risk of developing severe symptoms of post-traumatic stress (it was the only significant variable). With respect to anxiety, being a woman, a nurse and having had experienced a COVID-19-related traumatic event were associated with an increased risk. Regarding depression, an increased risk was associated with being female, being a nurse or a resident and having had experienced a traumatic event related to COVID-19.

With regard to the MBI-GS (Table 5b), working in ICUs (compared with working in the other hospital wards) and having had experienced a COVID-19-related traumatic event increased the risk of developing higher levels of emotional exhaustion and cynicism; being a resident was the only factor that increased the risk of displaying lower professional efficacy.

Overall, being a nurse (compared with being a physician) increased the risk of developing anxiety and depression (adjusted ORs 3 and 2, respectively); being a resident (compared with being a physician) increased the risk of developing anxiety, depression and low professional efficacy (adjusted ORs 1.9, 2 and 2.9, respectively); and having had experienced a COVID-19-related traumatic event increased the risk of anxiety, depression, emotional exhaustion and cynicism, with adjusted ORs ranging from 2.4 (for cynicism) to 4.4 (for anxiety). Finally, working in ICUs (compared with working in all the other hospital wards) increased the risk of emotional exhaustion and cynicism.

Discussion

As far as we know, this is the first study that has assessed the psychopathological status of the full range of professional profiles of HCWs working within a large tertiary hospital 1 year after the onset of the COVID-19 pandemic. Overall, we found that the mental health of HCWs working in a large academic hospital in

north-east Italy further deteriorated over the 1 year since the COVID-19 pandemic onset. The extension of the health care emergency – which required sustained high workload levels within a context of persistent uncertainty on the effectiveness of safety procedures and clinical management protocols – has led to a significant increase in symptoms of depression and burnout among HCWs of the Verona academic hospital. This is consistent with other reports from Italy carried out, for example, on staff working in ICUs (Magnavita et al., 2021a, 2021b).

The Verona Academic hospital has been designated a 'COVID-19 hospital' since the beginning of the pandemic, and HCWs have continued to provide care to both patients with COVID-19 and all other patients presenting with various medical and surgical conditions in a very difficult context characterised by at least two subsequent pandemic waves (second wave, October 2020–February 2021; third wave, March–May 2021). It should be noted that in Italy, the second and third pandemic waves have been more severe and deadly than the first one (Chirico et al., 2021). Due to an overall higher number of hospitalised subjects, the second wave of the COVID-19 pandemic had a greater global impact on the health care system in Italy with respect to the first one (Bongiovanni, 2021). In this context, Veneto was one of the northern Italian regions to be more severely affected by the second pandemic wave (Carletti & Pancrazi, 2021). On the other hand, after the first pandemic wave, significant changes occurred over the subsequent months within the Italian health care system that improved the response to the pandemic and the confidence of HCWs in dealing with patients with COVID-19. For example, the total number of ICU beds was increased in several Italian hospitals and primary care physicians were involved directly in the initial management of patients COVID-19. Furthermore, there were more nasopharyngeal swabs available to test all subjects with symptoms potentially related to COVID-19 infection (Bongiovanni et al., 2021). Moreover, from the beginning of January 2021, Italian HCWs were the first occupational category to be offered anti-SARS-CoV-2 vaccination, and from April 2021, the vaccination was made mandatory for all HCWs in order to contain the third wave of the disease.

Interestingly, changes in epidemiological patterns of infection and improvements in the health care system occurred during the first pandemic year are reflected by the

ranking of the stressful or traumatic events reported by HCWs participating in this study. One year after the onset of the pandemic, the most frequently reported topic by Verona hospital workers was that of 'death and dying' (e.g. having to deal with a great number of deaths in a relatively short time, to see patients dying alone as relatives were not allowed to enter the restricted areas or to communicate by telephone the death of a beloved one to relatives), whereas during the 2020 evaluation it was ranked third (this is consistent with the fact that in Italy the mortality of the COVID-19 pandemic was higher in the second wave than in the first one). Similarly to the 2020 evaluation, 'working under pressure' remained the second most frequent topic in the 2021 evaluation (burdensome working conditions of HCWs was indeed a major issue throughout the first pandemic year), whereas 'fear of contagion' (e.g. fear of being infected with COVID-19 and/or to infect family/relatives or other colleagues at work) was ranked third after 1 year (probably due to better tracing protocols and improved personal protective measures, including vaccination). However, both advances in diagnostic procedures/clinical management and improvement in protective/preventive measures do not seem to have produced significant effects in mitigating the strain placed by the pandemic on the health care system and reducing adverse mental health outcomes among HCWs. We found that 1 year after the onset of the pandemic, HCWs (especially nurses, residents and staff working in ICUs) still reported high levels of post-traumatic distress, anxiety, depression and burnout. Indeed, our findings indicate that 1 year after the beginning of the COVID-19 health care emergency the prevalence of depression and burnout (specifically in its components of emotional exhaustion and cynicism) further increased among Verona hospital workers.

Multivariate analyses revealed that nursing staff, irrespective of the hospital unit in which they worked, represent the professional category at greatest risk of developing anxiety and depression. This finding parallels the results obtained from the same hospital population during the first pandemic wave (Lasalvia et al., 2021c). Nurses are particularly vulnerable to psychological distress in the workplace, as during the COVID-19 pandemic most of them have experienced sudden and dramatic challenges in terms of increased workload, reassignment/redeployment to other roles or duties, infection threat, COVID-19-

related traumatic events and frustration with the death of patients for whom they provided care (Al Maqbali et al., 2021). We also found that sustained engagement with severely (or critically) ill patients with COVID-19 requiring intensive care is a risk factor for developing burnout, specifically in terms of increased emotional exhaustion, and of a detached cynical attitudes towards work and the patients who receive care (Gualano et al., 2021). A substantial overlapping finding has been reported in the survey conducted at the time of first pandemic wave (Lasalvia et al., 2021a). Finally, we found that 1 year after the onset of the pandemic, resident physicians were more severely burdened by burnout than any other professional category. Specifically, they were at higher risk of experiencing a reduced sense of professional efficacy. This is not an unexpected finding: researchers have shown that residents are at increased risk of burnout, in light of the position they have within the organisation and the tasks they are generally assigned. This might have been amplified during the COVID-19 pandemic.

It is interesting that only a small proportion of participants in this study (8%) reported having had received some kind of mental health treatment over the previous year. It is worth noting that this proportion is substantially similar to the percentage of respondents who at the time of first assessment reported having had received treatment for mental health problems developed before the outbreak (6%) (Lasalvia et al., 2021c). This is a relevant finding as the proportion of respondents scoring above the cut-off – for example, in the anxiety (56%) and depressive (41%) domains (reflecting people with a mental health condition that deserves timely and careful clinical attention) – was nearly seven times higher than those reporting having had received mental health treatment over the previous year. This suggests that most HCWs in need of mental health care either did not ask for specialised help or were unwilling to admit having such problems. Reluctance to seek mental health treatment or disclose their own mental health problems is common among health care professionals, particularly physicians (Brower, 2021). Concerns about stigma contribute to reluctance to seek treatment, which has the effect of delaying treatment, especially among those with the most severe symptoms (Wijeratne et al., 2021). Moreover, researchers have reported that HCWs with higher burnout levels are more likely to perceive stigma associated with seeking help for their distress,

making them a particularly vulnerable population (Dyrbye et al., 2021; A. K. Weiss et al., 2021). Strategies to reduce stigma and promote a culture of well-being among health care professionals are needed.

This study has several limitations. The first is the relatively low response rate. However, web-based surveys generally have lower response rates than face-to-face or telephone interviews or mail surveys, and the response rates that have been reported are very similar to our response rate (Cook et al., 2000). In addition, some surveys involving physicians had even lower response rates than ours (Cunningham et al., 2015). A second limitation is the sample addressed in this study may be biased because those workers more engaged with critically ill patients with COVID-19 and/or more psychologically distressed have been more likely to participate (thus resulting in an overestimation of HCWs with adverse mental health outcomes). A third limitation is related to the study design. Although the group evaluated in the present study might have been composed of essentially the same subjects assessed during the first pandemic wave (as they were drawn from the same hospital population), the two time point, cross-sectional design implies that we are unable to follow-up change in individual participants from the first assessment to the second; however, this was unavoidable because we needed to ensure absolute anonymity in the face of stigma and potential compensation lawsuits. A fourth limitation regards the multivariate logistic regression assumptions: the sample size for each regression model is about 900, with the only exception for IES-R (n=335). A general guideline is that a minimum of 10 cases with the least frequent outcome for each independent variable is needed. The IES-R does not respect this rule in one category for occupation (i.e., ‘administrative staff’) and two categories for workplace (i.e., ‘laboratory diagnostic services’; ‘administration’); regarding multi-collinearity among the independent variables, the Chi-square tests between each couple of them showed that they were all significantly correlated ($p<0.05$), with the exception of (gender, age), (gender, traumatic event) and (age, traumatic event). Finally, the possibility of applying our findings to other nations should be taken with caution, as the study was conducted within the specificity of the Italian national health care system.

Overall, the findings of this study – together with the results obtained from the same hospital population during the first pandemic wave (Lasalvia et al., 2021a; Lasalvia et al., 2021c) – seem to suggest that the psychological reaction of HCWs to the challenge posed by the COVID-19 outbreak may be different according to the specific stage of the pandemic. At the beginning (during the first wave), an 'acute stress' reaction was observed, characterised by, for example, post-traumatic response, fear of contagion and anxiety. One year after the pandemic onset (after having had faced enduring and challenging work conditions determined by the second and third pandemic waves), a 'chronic stress' reaction seems to have emerged, characterised by depressive and burnout responses. This 'chronic' job-related stress reaction displayed by HCWs represents a relevant issue, both in terms of personal suffering and of reduced quality and safety of care provided to patients. Health care systems will need to address the psychological impact of the pandemic on HCWs by monitoring reactions and performance, paying careful attention to assignments and schedules, modifying expectations, assessing occupational risk, promoting effective work-life balance support mechanisms and providing psychological support services for those more in need of mental health care (Khatatbeh et al., 2021). However, specific types of intervention will depend on the stage of the pandemic and the specific mental health care needs displayed by HCWs.

As a future development of this research, we are designing an intervention study on hospital staff at greater risk of adverse psychological outcomes (e.g. nurses, residents and those working in ICUs). The implementation will comprise mindfulness-based stress reduction protocols that have had some promising effects on burnout of frontline HCWs during the current COVID-19 pandemic (Rodriguez-Vega et al., 2020).

The mental health of health care professionals has further deteriorated in the year since the COVID-19 pandemic onset. The long duration of the pandemic has exposed HCWs to an unprecedented strain. Excessive and prolonged workload, isolation, uncertainty about clinical management protocols and safety measures have resulted in sustained psychological distress among hospital workers that should be expeditiously addressed by health care administrations.

Tables and figures (Lasalvia, Bodini, Amaddeo et al., 2021)

Table 1. Personal and professional characteristics of participants assessed in April–May 2021 (n = 1,033)

	n	%
Gender (19 missing)		
Male	234	23.1
Female	780	76.9
Age (years) (3 missing)		
<36	332	32.2
36–55	503	48.8
>55	195	18.9
Occupation (11 missing)		
Physicians	138	13.5
Residents	171	16.7
Nurses	379	36.7
Other health care staff	233	22.6
Administrative staff	101	9.8
Work place (40 missing)		
Intensive care units	135	13.6
Sub-intensive COVID-19 wards[1]	157	15.8
Frontline services dealing with COVID-19[2]	114	11.5
Non-COVID-19 wards	400	40.3
Laboratory diagnostic services[3]	88	8.9
Administration	99	10.0

[1] Infectious Disease Unit, Pulmonary Medicine, Internal Medicine units converted to COVID-19 units
[2] Radiology and Emergency Departments
[3] Laboratory Medicine, Transfusion Medicine, Immunology, *Pathology, Microbiology*

Table 2. Treatment for mental health (MH) problems reported by participants assessed in April–May 2021 (n = 1,033)

	n	%
HCWs having had received MH treatment (10 missing)		
Yes	86	8.4
No	937	91.6
HCWs still in MH treatment (10 missing)		
Yes	59	68.6
No	27	31.4
Type of mental health provider (10 missing)		
Private	59	68.6
Public	27	31.4
Type of MH intervention received (10 missing)		
Pharmacological treatment	9	10.5
Psychotherapy	40	46.5
Both	24	27.9
Other	13	15.1
Perceived efficacy of MH treatment (11 missing)		
Yes	76	89.4
No	9	10.6

HCWs, health care workers

Table 3. Comparison of traumatic events reported by respondents in the first (April–May 2020) and second (April–May 2021) assessment points

	First assessment			**Second assessment**			
	n	**%**	**rank**	**n**	**%**	**rank**	**Δ rank**
High number of deaths, patients dying alone, use of telephone to communicate the death of loved ones	73	18.9	3	71	31.1	1	+2
Feeling under pressure due to time and staff constraints	102	26.4	1	56	24.6	2	-1
Fear of being infected and/or infecting others	82	21.2	2	25	11.0	3	-1
Insufficient supervision, unclear guidelines, shortage of PPE	44	11.4	4	20	8.8	4	0
Reassigned to a COVID-19 unit	31	8.0	5	15	6.6	5	0
Infection or death of a relative, friend or colleague	13	3.4	8	14	6.1	6	+2
Difficult ethical decisions in a short time	16	4.1	6	12	5.3	7	-1
Being infected with COVID-19	14	3.6	7	9	3.9	8	-1
Difficulty of balancing work and family life	11	2.8	9	6	2.6	9	0
	386	**100.0**		**228**	**100.0**		

Note. Chi-square test: χ^2 (8) = 51.06, p < 0.001
PPE, personal protective equipment

Table 4a. Participants scoring below and above the cut-off scores in the various psychopathological domains (IES-R, SAS and PHQ) at the second assessment point (April-May 2021) by main personal and professional characteristics.

	Post-traumatic distress * (n = 335)			**Anxiety** (n = 932)			**Depression** (n = 917)		
	<24 IES-R n (%)	**≥24 IES-R** n (%)	**p**	**<36 SAS** n (%)	**≥36 SAS** n (%)	**p**	**<10 PHQ** n (%)	**≥10 PHQ** n (%)	**p**
Gender									
Male	22 (31.9)	47 (68.1)	0.364	129 (62.9)	76 (37.1)	<0.001	142 (70.0)	61 (30.0)	<0.001
Female	69 (26.1)	195 (73.9)		273 (38.5)	437 (61.5)		389 (55.7)	309 (44.3)	
Age (years)									
<36	41 (36.9)	70 (63.1)	0.030	146 (47.7)	160 (52.3)	0.038	176 (58.7)	124 (41.3)	0.321
36–55	38 (22.8)	129 (77.2)		177 (39.9)	267 (60.1)		252 (57.8)	184 (42.2)	
>55	14 (24.6)	43 (75.4)		88 (48.9)	92 (51.1)		115 (64.2)	64 (35.8)	
Occupation									
Physicians	18 (36.0)	32 (64.0)	0.143	79 (62.2)	48 (37.8)	<0.001	90 (70.9)	37 (29.1)	<0.001
Residents	18 (34.6)	34 (65.4)		80 (51.6)	75 (48.4)		91 (59.5)	62 (40.5)	
Nurses	31 (21.2)	115 (78.8)		102 (30.5)	232 (69.5)		164 (50.2)	163 (49.8)	
Other health care staff	22 (31.9)	47 (68.1)		96 (44.9)	118 (55.1)		130 (61.9)	80 (38.1)	
Administrative staff	3 (21.4)	11 (78.6)		49 (53.3)	43 (46.7)		65 (72.2)	25 (27.8)	
Work place									
Intensive care units	16 (23.9)	51 (76.1)	0.870	41 (34.2)	79 (65.8)	0.006	49 (41.9)	68 (58.1)	<0.001
Sub-intensive COVID-19 wards[1]	27 (30.7)	61 (69.3)		50 (35.2)	92 (64.8)		75 (54.7)	62 (45.3)	
Frontline services dealing with COVID-19[2]	10 (22.7)	34 (77.3)		54 (51.9)	50 (48.1)		59 (56.7)	45 (43.3)	
Non-COVID-19 wards	27 (30.3)	62 (69.7)		178 (49.7)	180 (50.3)		228 (64.6)	125 (35.4)	
Laboratory diagnostic services [3]	6 (31.6)	13 (68.4)		35 (43.8)	45 (56.3)		47 (58.8)	33 (41.3)	
Administration	5 (27.8)	13 (72.2)		42 (46.2)	49 (53.8)		65 (73.0)	24 (27.0)	
Experienced traumatic event									
Yes	93 (27.8)	242 (72.2)	-	78 (23.6)	253 (76.4)	<0.001	123 (37.8)	202 (62.2)	<0.001
No	-	-		335 (55.7)	266 (44.3)		422 (71.3)	170 (28.7)	

***** Completed only by participants who experienced a COVID-19-related traumatic event

[1] Infectious Disease Unit, Pulmonary Medicine, Internal Medicine units converted specifically to COVID-19; [2] Radiology and Emergency Departments; [3] Laboratory Medicine, Transfusion Medicine, Immunology, *Pathology, Microbiology*

IES-R, Impact of Event Scale-Revised; PHQ, Patient Health Questionnaire; SAS, Self-Rating Anxiety Scale

Table 4b. Participants scoring below and above the cut-off scores in the various MBI-GS subscales at the second assessment point (April–May 2021) by main personal and professional characteristics

	Emotional Exhaustion (n = 897)			**Professional Efficacy** (n = 897)			**Cynicism** (n = 897)		
	≤2.20 n (%)	**>2.20** n (%)	**p**	**≥3.66** n (%)	**<3.66** n (%)	**p**	**≤2.00** n (%)	**>2.00** n (%)	**p**
Gender									
Male	113 (56.5)	87 (43.5)	0.016	113 (56.5)	87 (43.5)	0.404	126 (63.0)	74 (37.0)	0.791
Female	319 (46.8)	362 (53.2)		362 (53.2)	319 (46.8)		436 (64.0)	245 (36.0)	
Age (years)									
<36	146 (49.3)	150 (50.7)	0.158	145 (49.0)	151 (51.0)	0.063	189 (63.9)	107 (36.1)	0.664
36–55	201 (47.4)	223 (52.6)		231 (54.5)	193 (45.5)		267 (63.0)	157 (37.0)	
>55	98 (56.0)	77 (44.0)		105 (60.0)	70 (40.0)		117 (66.9)	58 (33.1)	
Work place									
Intensive care units	33 (28.4)	83 (71.6)	<0.001	54 (46.6)	62 (53.4)	0.342	49 (42.2)	67 (57.8)	<0.001
Sub-intensive COVID-19 wards[1]	51 (38.3)	82 (61.7)		76 (57.1)	57 (42.9)		88 (66.2)	45 (33.8)	
Wards/services dealing with COVID-19[2]	53 (52.5)	48 (47.5)		52 (51.5)	49 (48.5)		57 (56.4)	44 (43.6)	
Non-COVID-19 wards	185 (53.6)	160 (46.4)		193 (55.9)	152 (44.1)		239 (69.3)	106 (30.7)	
Laboratory diagnostic services[3]	45 (56.3)	35 (43.8)		38 (47.5)	42 (52.5)		57 (71.3)	23 (28.7)	
Administration	58 (66.7)	29 (33.3)		50 (57.5)	37 (42.5)		63 (72.4)	24 (27.6)	
Occupation									
Physicians	68 (54.8)	56 (45.2)	<0.001	78 (62.9)	46 (37.1)	0.002	86 (69.4)	38 (30.6)	<0.001
Residents	77 (51.7)	72 (48.3)		61 (40.9)	88 (59.1)		99 (66.4)	50 (336)	
Nurses	130 (40.2)	193 (59.8)		169 (52.3)	154 (47.7)		177 (54.8)	146 (45.2)	
Other health care staff	109 (53.7)	94 (46.3)		119 (58.6)	84 (41.4)		142 (70.0)	61 (30.0)	
Administrative staff	59 (67.0)	29 (33.0)		50 (56.8)	38 (43.2)		65 (73.9)	23 (26.1)	
Experienced traumatic event									
No	361 (62.2)	219 (37.8)	<0.001	316 (54.5)	264 (45.5)	0.605	418 (72.1)	162 (27.9)	<0.001
Yes	84 (26.5)	233 (73.5)		167 (52.7)	150 (47.3)		157 (49.5)	160 (50.5)	

[1] Infectious Disease Unit, Pulmonary Medicine, Internal Medicine units converted specifically to COVID-19

[2] Radiology and Emergency Departments

[3] Laboratory Medicine, Transfusion Medicine, Immunology, *Pathology, Microbiology*

MBI-GS, Maslach Burnout Inventory-General Survey

Table 5a. Multivariate logistic regressions for post-traumatic distress, anxiety and depression assessed among Verona hospital workers 1 year after the onset of the pandemic (n = 1,033)

	Post-traumatic distress			Anxiety			Depression		
	Adj OR (95% CI)	p		Adj OR (95% CI)	p		Adj OR (95% CI)	p	
		Category	Overall LR test		Category	Overall LR test		Category	Overall LR test
Gender									
Male	1		0.300	1		<0.001	1		0.007
Female	1.40 (0.74–2.66)	0.296		2.40 (1.66–3.47)	<0.001		1.68 (1.15–2.45)	0.007	
Age (years)									
<36	1		0.009	1		0.130	1		0.569
36–55	2.86 (1.42–5.76)	0.003		1.45 (0.95–2.22)	0.082		1.25 (0.82–1.91)	0.290	
>55	3.05 (1.25–7.44)	0.014		1.08 (0.65–1.80)	0.762		1.19 (0.71–1.99)	0.510	
Work place									
Intensive care units	1		0.441	1		0.094	1		0.099
Sub-intensive COVID-19 wards	0.53 (0.24–1.18)	0.119		0.95 (0.53–1.70)	0.856		0.50 (0.29–0.88)	0.015	
Frontline wards/services	0.89 (0.34–2.30)	0.805		0.58 (0.31–1.06)	0.074		0.65 (0.36–1.17)	0.149	
Non-COVID-19 wards	0.51 (0.23–1.14)	0.103		0.86 (0.52–1.43)	0.569		0.57 (0.35–0.92)	0.022	
Laboratory diagnostic services	0.47 (0.13–1.70)	0.252		1.25 (0.62–2.54)	0.535		0.78 (0.39–1.56)	0.488	
Administration	0.31 (0.06–1.56)	0.156		1.79 (0.74–4.32)	0.197		0.40 (0.17–0.96)	0.041	
Occupation									
Physician	1		0.203	1		<0.001	1		0.034
Resident	2.04 (0.74–5.65)	0.170		1.88 (1.00–3.54)	0.051		2.00 (1.04–3.81)	0.036	
Nurse	2.03 (0.92–4.46)	0.078		3.08 (1.87–5.07)	<0.001		2.14 (1.30–3.54)	0.003	
Other health care staff	1.07 (0.45–2.51)	0.882		1.65 (0.98–2.78)	0.061		1.42 (0.83–2.44)	0.200	
Administrative staff	3.69 (0.54–25.15)	0.182		0.99 (0.42–2.31)	0.974		1.58 (0.67–3.75)	0.296	
Experienced traumatic event									
No	-	-	-	1		<0.001	1		<0.001
Yes	-	-		4.42 (3.13–6.25)	<0.001		3.74 (2.72–5.14)	<0.001	
Number of observations	319			874			860		
LR test **p**	$\chi^2(12) = 18.94$ 0.090			$\chi^2(13) = 165.58$ <0.001			$\chi^2(13) = 120.02$ <0.001		
Pearson goodness-of-fit **Number of covariate patterns** **χ^2(df)** **p**	 77 $\chi^2(64) = 62.36$ 0.535			 170 $\chi^2(156) = 174.11$ 0.153			 170 $\chi^2(156) = 169.31$ 0.220		
Area under ROC curve	0.641			0.742			0.709		

Adj OR, adjusted odds ratio; CI, confidence interval; df, degrees of freedom; LR, linear regression; ROC, receiver operating characteristics

Table 5b. Multivariate logistic regressions for the MBI-GS domains (Emotional Exhaustion, Professional Efficacy and Cynicism) assessed among Verona hospital workers 1 year after the onset of the pandemic (n=1,033)

	Emotional Exhaustion			Professional Efficacy			Cynicism		
	Adj OR (95% CI)	p		Adj OR (95% CI)	p		Adj OR (95% CI)	p	
		Category	Overall LR test		Category	Overall LR test		Category	Overall LR test
Gender									
Male	1		0.097	1		0.492	1		0.589
Female	1.36 (0.94–1.96)	0.098		1.13 (0.80–1.59)	0.492		0.90 (0.63–1.30)	0.588	
Age (years)									
<36	1		0.364	1		0.564	1		0.619
36–55	1.29 (0.85–1.96)	0.235		1.22 (0.82–1.80)	0.329		1.15 (0.75–1.76)	0.511	
>55	1.04 (0.63–1.72)	0.880		1.07 (0.66–1.73)	0.783		1.29 (0.77–2.16)	0.329	
Work place									
Intensive care units	1		0.037	1		0.152	1		0.004
Sub-intensive COVID-19 wards	0.56 (0.31–1.01)	0.053		0.68 (0.40–1.15)	0.155		0.35 (0.20–0.61)	<0.001	
Frontline wards/Services	0.39 (0.21–0.72)	0.003		0.88 (0.58–1.54)	0.660		0.64 (0.37–1.13)	0.123	
Non-COVID-19 wards	0.50 (0.30–0.83)	0.008		0.71 (0.44–1.12)	0.142		0.43 (0.30–0.70)	0.001	
Laboratory diagnostic services	0.44 (0.22–0.88)	0.021		1.32 (0.68–2.54)	0.407		0.48 (0.24–0.96)	0.037	
Administration	0.34 (0.14–0.81)	0.015		0.68 (0.30–1.50)	0.339		0.46 (0.20–1.08)	0.076	
Occupation									
Physician	1		0.585	1		0.001	1		0.115
Resident	1.21 (0.65–2.27)	0.542		2.95 (1.62–5.37)	<0.001		1.33 (0.70–2.54)	0.384	
Nurse	1.40 (0.86–2.28)	0.178		1.56 (0.98–2.49)	0.060		1.70 (1.04–2.79)	0.036	
Other health care staff	1.12 (0.66–1.88)	0.676		1.01 (0.61–1.67)	0.971		1.06 (0.62–1.82)	0.835	
Administrative staff	0.90 (0.39–2.08)	0.815		1.52 (0.69–3.33)	0.299		1.02 (0.43–2.43)	0.960	
Experienced traumatic event									
No	1		<0.001	1		0.895	1		<0.001
Yes	3.91 (2.82–5.42)	<0.001		1.02 (0.75–1.39)	0.895		2.41 (1.75–3.30)	<0.001	
Number of observations	842			842			842		
LR test **p**	$\chi^2(13) = 127.09$ <0.001			$\chi^2(13) = 29.03$ 0.006			$\chi^2(13) = 72.51$ <0.001		
Pearson goodness-of-fit **Number of covariate patterns** **χ^2(df)** **p**	 169 $\chi^2(155) = 166.68$ 0.247			 169 $\chi^2(155) = 157.00$ 0.440			 169 $\chi^2(155) = 161.08$ 0.352		
Area under ROC curve	0.717			0.606			0.668		

Adj OR, adjusted odds ratio; CI, confidence interval; df, degrees of freedom; LR, linear regression; MBI-GS, Maslach Burnout Inventory-General Survey; ROC, receiver operating characteristics

Figure 1. Percentage of respondents scoring above the cut-off score in the various outcome domains across the two cross-sectional assessment points (April–May 2020; April–May 2021) in the overall sample. * $p < 0.05$, ** $p < 0.001$, chi-square test. # Computed only on those who reported having had definitely experienced a traumatic event related to COVID-19 [2020, n = 739 (34.3%); 2021, n = 335 (34.8%)].

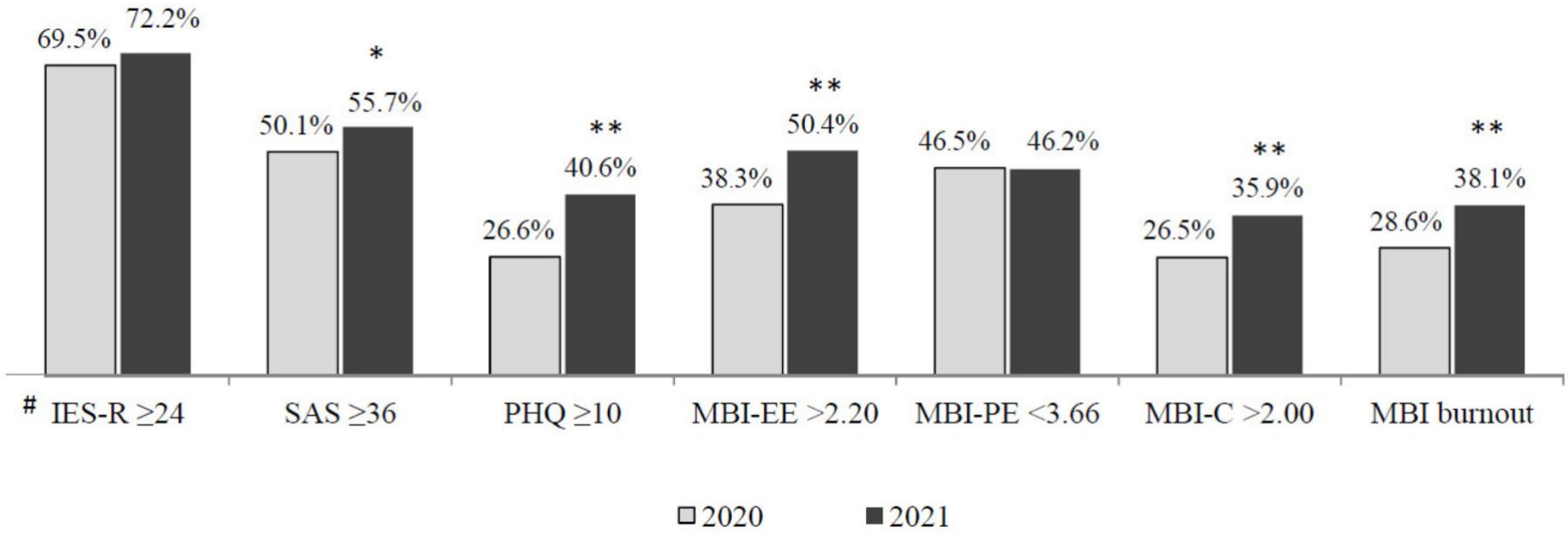


Figure 2. Percentage of respondents scoring above the cut-off score in the various outcome domains across the two cross-sectional assessment points (April–May 2020 and April–May 2021) by occupation.

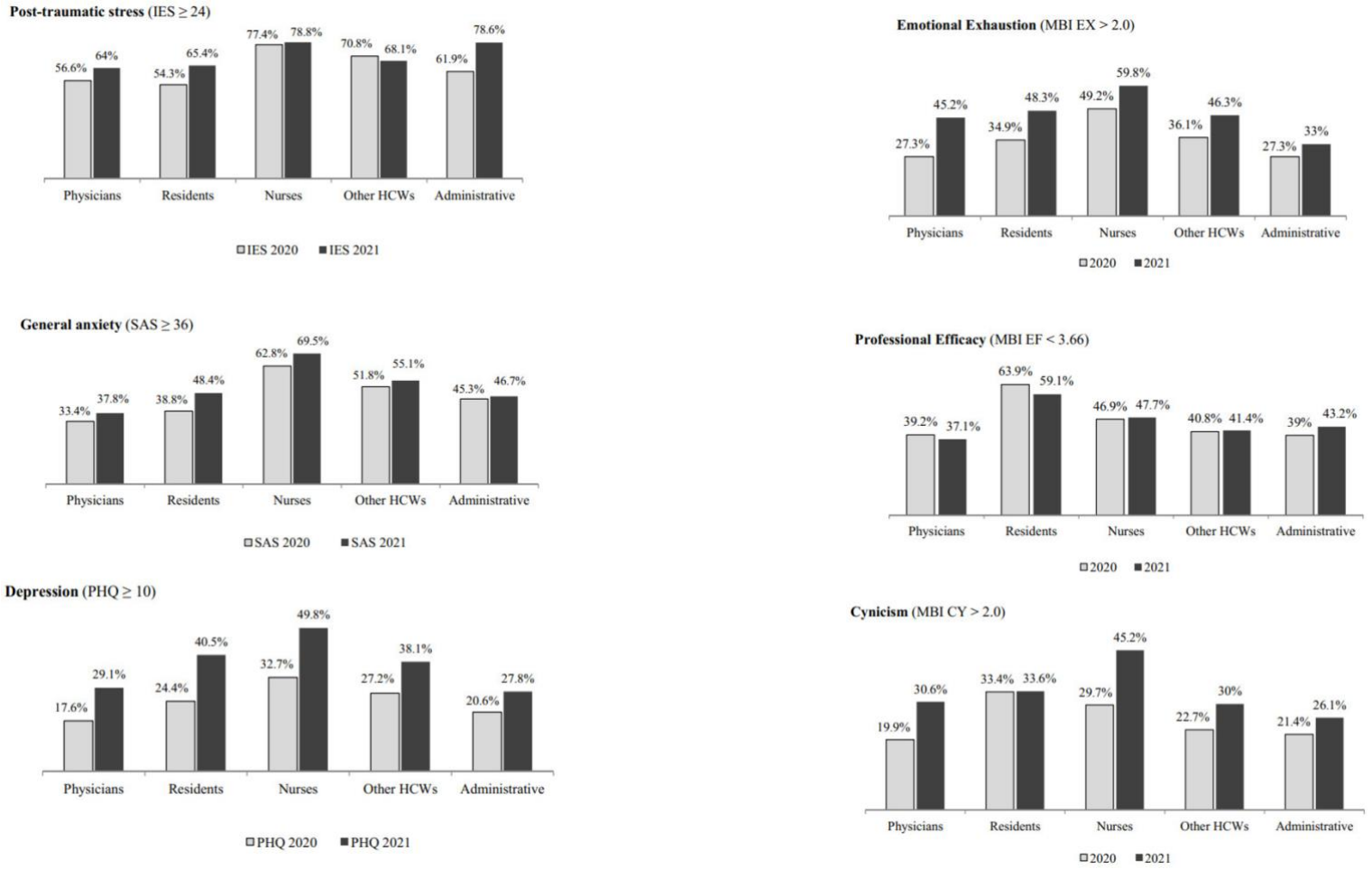
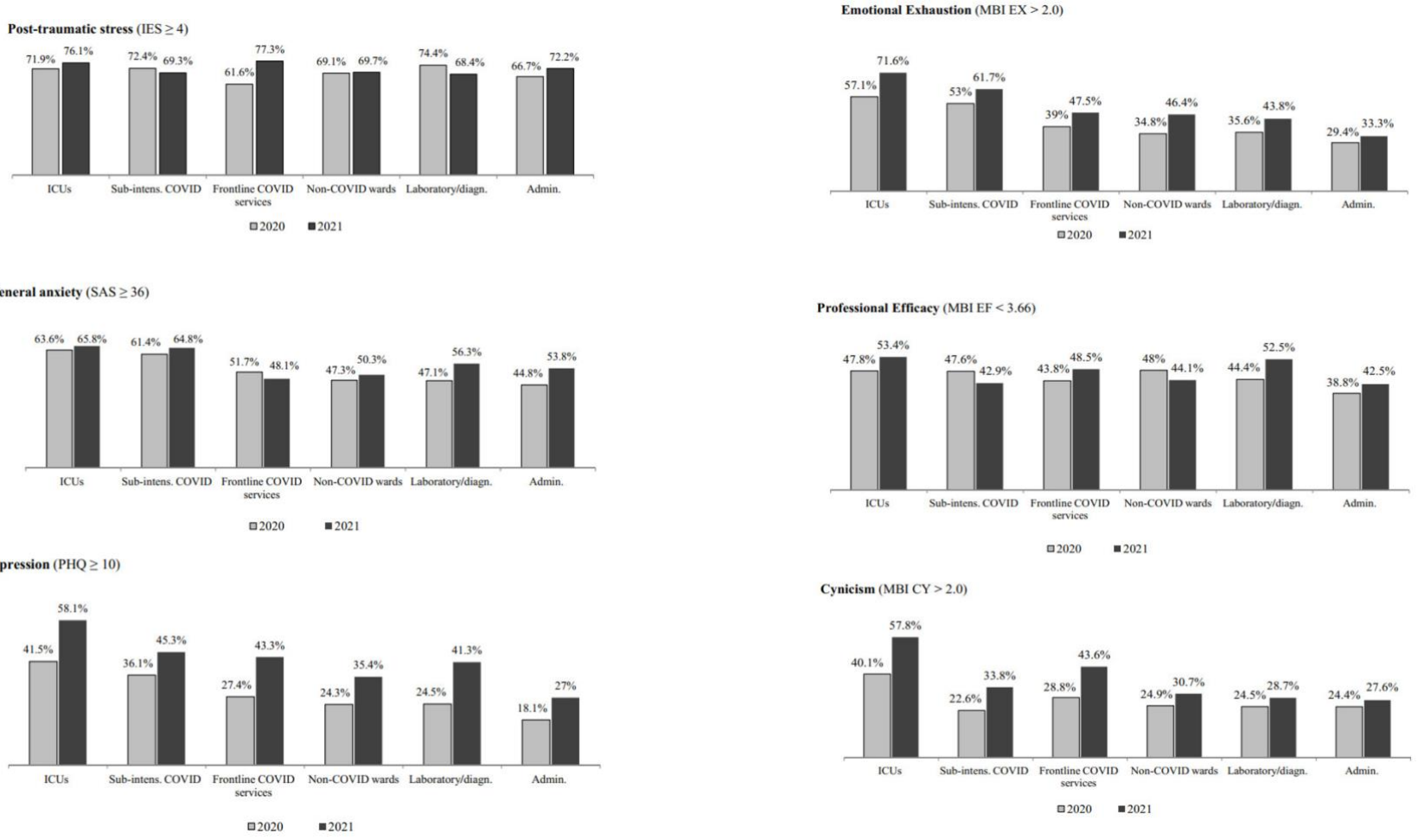


Figure 3. Percentage of respondents scoring above the cut-off score in the various outcome domains across the two cross-sectional assessment points (April–May 2020 and April–May 2021) by workplace.



Psychological Interventions for Healthcare Workers

The COVID-19 pandemic has exacerbated mental health challenges for healthcare workers (HCWs), who have faced extreme stress, long working hours, and the emotional toll of witnessing a high patient mortality rate. This surge cases of anxiety, depression, burnout, and PTSD has underscored the critical need of psychological interventions to protect the mental health and resilience of healthcare professionals. Various studies have highlighted the effectiveness of tailored psychological interventions, emphasizing the importance of both immediate support and long-term mental health strategies (Heath et al., 2020; Hooper et al., 2021).

In a review by Kunzler et al. (2020), 44 randomized controlled trials (RCTs) involving 6,892 participants – mainly HCWs in hospital settings, such as nurses, physicians, and allied healthcare staff – were analyzed to evaluate resilience interventions (Kunzler et al., 2020). The review assessed their impact on mental health outcomes, including resilience, stress, anxiety, depression, and overall well-being. Several psychological interventions emerged as effective tools for enhancing HCWs' well-being during the pandemic.

Positive Psychology Interventions (PPIs) are among the most researched approaches, focusing on fostering positive emotions, resilience, and coping mechanisms. Common PPIs include mindfulness practices, gratitude exercises, and resilience training. Mindfulness-Based Stress Reduction (MBSR) (Kabat-Zinn, 2003) has been particularly effective, with studies showing significant reductions in stress, anxiety, and burnout among HCWs who participated in MBSR programs. Participants also reported improved self-compassion, job satisfaction, and quality of life following these interventions (Kunzler et al., 2020; Townsley et al., 2023).

In addition to MBSR, gratitude-based interventions like the "Three Good Things" exercise have shown positive outcomes. In this exercise involves documenting three positive events each day and reflecting on their causes. Research indicates that gratitude exercises lead to reductions in depressive symptoms and anxiety, along with improved job and life satisfaction. These low-cost, accessible interventions are practical for integration into daily routines and scalable for implementation within healthcare settings (Townsley et al., 2023).

Cognitive-Behavioral Therapy (CBT) have also been adapted for group and individual interventions in healthcare environments. These techniques focus on challenging negative thought patterns and developing coping strategies, helping HCWs manage the psychological strain of high-stress environments. CBT-based interventions have shown moderate to strong effects in reducing symptoms of anxiety, depression, and PTSD, particularly when combined with mindfulness practices (Heath et al., 2020; Kunzler et al., 2020).

Resilience-focused interventions, such as Psychological First Aid (PFA) and Trauma Risk Management (TRiM), provide immediate psychological support to frontline workers exposed to traumatic events. These structured, brief interventions aim to mitigate the immediate impact of trauma and prevent long-term mental health issues like PTSD. Studies suggest that PFA and TRiM improv coping mechanisms, enhance feelings of control, and reduce acute stress reactions in healthcare settings (Hooper et al., 2021).

The review by Kunzler et al. (2020) concluded that mindfulness-based and resilience-based programs moderately improve resilience, reduce stress perception, and alleviate depressive symptoms in healthcare staff. Programs combining multiple therapeutic approaches- such as mindfulness, CBT, and stress management training- delivered, over several weeks with multiple sessions were found to yield the most sustainable benefits. Multi-session, high-intensity programs generally showed stronger effects compared to single-session interventions.

A notable example is the “Resilience and Coping for the Healthcare Community” program, designed to address the specific stressors faced by HCWs during the COVID-19 pandemic. This program integrates mindfulness, CBT, and peer support to create a supportive community environment that fosters resilience. Pilot studies report reduced burnout, improved well-being, and enhanced coping skills among participants (Hooper et al., 2021).

Despite their potential, implementing psychological interventions in healthcare settings faces several challenges. Many studies have methodological limitations, including small sample sizes, lack of randomization, and insufficient long-term follow-up, which constraints the generalizability of findings. For instance, while MBSR and gratitude exercises demonstrate immediate benefits, evidence on their

long-term effectiveness in sustaining mental health improvements is limited (Kunzler et al., 2020; Townsley et al., 2023).

The diversity of interventions also complicates evaluation. Studies vary widely in intervention type, duration, and delivery format, ranging from short, self-guided online sessions to intensive, in-person workshops. This heterogeneity makes it difficult to compare results and determine the most effective models for different healthcare settings. Organizational factors, such as management support, time availability for training, and workplace culture, further influence the success of these interventions (Heath et al., 2020; Hooper et al., 2021).

Additionally, stigma around mental health remains a significant barrier. Many HCWs hesitate to seek help due to fear of judgment or potential career repercussions. To address this, some organizations have implemented anonymous support services, peer support programs, and mental health literacy campaigns to encourage help-seeking behaviors among staff (Hooper et al., 2021).

In conclusion, psychological interventions - including Positive Psychology Interventions, resilience training, and early psychological support programs – offer valuable tools for mitigating the mental health impact of the COVID-19 pandemic on HCWs. These approaches effectively reduce stress, enhance resilience, and improve overall well-being. However, optimizing their implementation requires addressing organizational barriers, standardizing intervention methodologies, and conducting further research on their long-term effectiveness.

Effectiveness of a Mindful Compassion Care Program in reducing burnout and psychological distress amongst frontline hospital nurses during the COVID-19 pandemic: a study protocol for a randomized controlled trial (Bodini, Bonetto, Cheli et al., *Trials*, 2022)*

Bodini *et al. Trials* (2022) 23:734
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Trials

STUDY PROTOCOL Open Access

Effectiveness of a Mindful Compassion Care Program in reducing burnout and psychological distress amongst frontline hospital nurses during the COVID-19 pandemic: a study protocol for a randomized controlled trial

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Abstract

Background: Recent studies have shown that nurses have been more affected by the COVID-19 pandemic than any other group of hospital workers in terms of anxiety, depression, and burnout. Several clinical studies had previously demonstrated the effectiveness of mindfulness and compassion interventions in reducing burnout and emotional distress amongst healthcare professionals.

Methods and analysis: A parallel-group randomized controlled trial will assess the feasibility, acceptability, and efficacy of a mindfulness and compassion-focused programme on frontline nurses who had been working during the COVID-19 pandemic. Seventy-two participants will be recruited from Verona University Hospital Trust (Veneto Region, north-east Italy) and will be divided equally into an intervention group and a control group. Primary outcome will be assessed using the Emotional Exhaustion subscale of the Maslach Burnout Inventory General Survey (MBI-GS). Secondary outcomes will be measured by the Cynicism and Professional Efficacy subscales of the MBI-GS, the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder (GAD-7), the Insomnia Severity Index (ISI), the Impact of Stressful Events (IES-R), the Perceived Stress Scale (PSS), the Five Facet Mindfulness Questionnaire (FFMQ), and the Forms of Self-Criticising/attacking and Self-Reassuring Scale (FSCRS).

Discussion: The study aims to fill a gap in the literature and present a scientifically validated intervention for those healthcare professionals most exposed to the stressful conditions of working during the COVID-19 pandemic.

Trial registration: ClinicalTrials.gov; Identifier: NCT05308537

Keywords: COVID-19, Mindfulness, Compassion, Burnout, Healthcare workers, Nurse

** The study has been published (Bodini et al., 2022) and is reproduced with permission.*

ABSTRACT

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INTRODUCTION

Background and rationale

From the beginning of the COVID-19 pandemic, healthcare workers (HCWs) worldwide experienced overwork, increased health risks in the absence of clear guidelines, and the reorganisation of their activities. These factors, combined with exposure to a condition of increased mortality and a sense of uncontrollability, have led to growing incidences of burnout, anxiety, depressive symptoms, and a reduced investment of energy in the professional sphere (Lasalvia et al., 2021a; Lasalvia et al., 2021c; Sultana et al., 2020). Nurses were amongst the HCWs most exposed to the negative psychological effects of the COVID-19 pandemic, particularly those working in departments most involved in the treatment of COVID-19 patients, such as intensive care, infectious disease, and pulmonary units and emergency rooms (Lasalvia et al., 2021a; Lasalvia et al., 2021b; Lasalvia et al., 2021c).

Currently several groups across the world are working to develop initiatives aimed at supporting the well-being of HCWs facing the psychological impacts of the COVID-19 pandemic, through easy-to-access supportive psychological services (Fukuti et al., 2021; Gonzalez et al., 2020; Miotto et al., 2020). However, there is a lack of evidence from randomised trials testing interventions with a sound base of evidence that can inform the selection of treatments that may be beneficial to the mental health of frontline HCWs facing the current pandemic (Pollock et al., 2020). Previous research has shown the effects of certain intervention strategies in reducing burnout and emotional distress among HCWs in the pre-COVID 19 era. These interventions included mindfulness, stress management, and small group discussion (Behan, 2020; Luberto et al., 2020; Rodriguez-Vega et al., 2020; Van der Riet et al., 2018; West et al., 2016). Over the past 20 years, studies have shown that mindfulness-based interventions are effective in reducing stress, anxiety, depression, and obsessive disorders (Baer, 2003; Chiesa & Malinowski, 2011; Didonna, 2009b, 2019; La Torre et al., 2020). Mindfulness can be defined as an awareness of present-moment thoughts, feelings, and bodily sensations through intentional and non-judgemental attention (Kabat-Zinn, 2003). It is a state of consciousness that allows the mind and body to build a relationship of harmony and balance, a predisposing element for the condition of well-being (R. A. Baer, 2003).

The most scientific mindfulness-based interventions, such as MBSR (mindfulness-based stress reduction) (Kabat-Zinn, 2003) and MBCT (mindfulness-based cognitive therapy) (Segal et al., 2004) consist of weekly group meetings of 2 hours and 30 minutes for a period of 8 weeks, with an intensive day in the middle of the programme.

Studies investigating the diffusion of clinical models based on mindfulness have allowed us to hypothesize that it can play an important role in emotional self-regulation (Dahl et al., 2015). It can, therefore, be argued that mindfulness allows one to reduce suffering and create a healthy mind by using self-processing processes (Vago & David, 2012) and modulating awareness of self and one's emotional states, behaviours, as well as relationships with others. The ability to manage suffering, for example of patients and caregivers, stems from an empathic and emotional attunement known as compassion to the suffering of the another person (Gilbert, 2013). Compassion can be defined as the awareness of one's own and others' suffering and the intention or motivation to alleviate it (Gilbert, 2020). It has been associated with the capacity to adjust to distressful experiences during dramatic events such as pandemics (Matos et al., 2021, 2022), and amongst HCWs in particular (Boellinghaus et al., 2014; Fotaki, 2015). From this compassion-focused point of view, the distress a HCW may experience may be targeted and reduced by balancing the capacity to be compassionate with the others together with the capacity to receive compassion from oneself and others (Matos et al., 2022; McEwan et al., 2021). This theoretical stance is consistent with the clinical practice of supporting HCWs in finding a sustainable work-life balance, promoting teamwork and valuing their professional commitment in caring their patients.

Compassion arises when an individual feels a deep connection to the suffering of others (Gilbert, 2009a). It facilitates emotional regulation, psychological flexibility and promotes relational and ethical skills (Gilbert, 2009a; Tirch et al., 2014; Vago & David, 2012). Several studies have indicated that efficacious results can be achieved through 4-week or 6-week programmes (Cheli et al., 2020a; Bergen-Cico et al., 2013; Mackenzie et al., 2006). These seem to be equally effective as longer programmes in terms of reducing burnout and improving the well-being and quality of life of HCWs. They are also more easily implemented in organizational settings,

are less costly, and have a higher likelihood of participation and a lower risk of dropout (La Torre et al., 2020).

Studies evaluating the efficacy of mindfulness among HCWs working during the current COVID-19 pandemic are rare, though some are in progress (Rodriguez-Vega et al., 2020). Results from mindfulness protocols lead us to hypothesize that such interventions may be a valuable therapeutic tool for HCWs who are working under pandemic conditions and are at risk of experiencing burnout and psychological problems. The present project is based on the results of a longitudinal study that assessed the psychological impact of the COVID-19 pandemic on HCWs at the Verona University Hospital Trust during the lockdown phase (March-May 2020) and after one year later (Lasalvia et al., 2021a; Lasalvia et al., 2021b). The study found a good number of hospital staff displayed clinically significant symptoms of post-traumatic distress, anxiety, depression, and burnout; moreover, hospital staff, particularly nurses and those working in intensive care units and COVID-19 sub-intensive wards, experienced a further increase in burnout and depression after one year (Lasalvia et al., 2021a). The findings indicate the need to implement and test an intervention study aimed at mitigating the sustained psychological impact of the pandemic on those at greater risk of adverse psychological outcomes.

The present project proposed here aims to implement and evaluate the feasibility, acceptability, and effectiveness of a preliminarily tested intervention (Cheli et al., 2020a, 2022) that integrates the most widely used and scientifically validated mindfulness protocols such as mindfulness-based stress reduction (Kabat-Zinn, 2003), mindfulness-based cognitive therapy (Didonna, 2019; Segal et al., 2004), and compassion focused therapy (Gilbert, 2009a), in a healthcare context (the Verona University Hospital Trust) during the COVID-19 pandemic. The purpose of the intervention is to reduce burnout and psychological distress among frontline nurses involved in the clinical management of COVID-19 patients.

METHODS

Trial design

A randomized controlled trial (RCT) parallel groups waiting list design will be used to assess the efficacy of a mindful and compassion program for nurses (superiority trial). Participants will be randomly assigned to one of two groups: the experimental group will receive the Mindful Compassion Care Program (MCCP) (Cheli et al., 2020a, 2022), and the control group will be allocated to a waiting list (WL) with an allocation ratio of 1:1. The effectiveness of the experimental intervention will be assessed by comparing the changes in the level of burnout at the end of the treatment and after 1-month later (this follow-up interval has been set due to organizational and time constraints). Other psychological dimensions will also be investigated (i.e., anxiety and depressive symptoms, posttraumatic symptoms, insomnia, perception of stress, mindfulness skills and evaluation of self-criticism and self-reassurance).

Study setting

The study will be conducted at the Verona University Hospital Trust (Azienda Ospedaliera Universitaria Integrata [AOUI]), the second-largest hospital in Italy in terms of the number of beds and the fifth largest in terms of admissions. The trust employs 6,000 people, including nearly 2,000 nurses. On 17 March 2020, the Veneto regional government converted part of the hospital into a COVID-19 hospital. Dedicated pathways for both suspected and confirmed COVID-19 cases were established within the hospital, as well as in other hospital units located in clearly restricted areas devoted to the treatment of COVID-19 patients.

Eligibility criteria

The population under investigation comprises frontline nurses who have been engaged over the two years of the pandemic in the clinical management of the most severe or critical COVID-19 cases (chief nurses and nurse managers will not be involved). Nurses will be recruited from intensive care units (ICUs) and sub-intensive COVID-19 wards (i.e., infectious disease unit, pulmonary medicine, internal medicine units converted to COVID-19 units). Eligible participants will be contacted by email by the research group and will receive an invitation to participate voluntarily.

To be included in the study, a participant/s will have to be: (1) a nurse employed at AOUI for the past two years; (2) working within ICUs, infectious disease unit, pulmonary medicine and internal medicine units that have been converted to COVID-19 sub-intensive units; (3) scoring above the cut-off score for the Emotional Exhaustion sub-scale (EX) of the MBI-GS (equal to or greater than 2.20) in accordance with Italian norms (3).

Respondents will be excluded if they: (1) have participated in mindfulness-based interventions in the previous 6 months; (2) show a score < 2.20 in the EX subscale of the MBI-GS; or (3) are receiving psychosocial or psychiatric treatment. Participants allocated to the WL will be requested not to participate in a mindfulness course offered elsewhere.

INTERVENTIONS

The MCCP comprises six regular 1 hour and 30-minute sessions and 1 all-day class lasting 4 hours and 30 minutes. The intervention is a proven effective mindfulness programme (Cheli et al., 2020a, 2022) based on well-known scientific programmes such as mindfulness-based stress reduction (MBSR) (Kabat-Zinn, 2003), mindfulness-based cognitive therapy (MBCT) (Segal et al., 2004) and compassion focused therapy (CFT) (Gilbert, 2009a). It was pilot-tested in a non-randomized controlled trial of nursing students (n = 82) and exhibited medium to very large effect sizes (with Cohen's d ranging from 0.57 to 1.25) in changes in burnout symptoms between both pre- and post-assessment in the experimental group, as well as control and experimental group in the post-assessment (Cheli et al., 2020a). Two recent cases studies of nurses recruited during the pandemic showed reliable changes in several outcomes by the end of the intervention (Cheli et al., 2022).

The MCCP consists of a theoretical component and standard mindfulness practices (i.e., mindfulness meditation exercises) along with a few bespoke practices. It aims to explain the foundations and the applications of a more mindful and compassionate approach to health care. It has three specific objectives: (a) to explore the concept of reflexivity as a tool in monitoring and revising nursing practice and illness experience, (b) to explain useful strategies that prevent burnout and promote engagement, and (c) to explain useful strategies that facilitate and

foster compliance in patients (Skovholt & Trotter-Mathison, 2016). The purpose of the intervention is to reformulate these general objectives through the lens and within the framework of mindful compassion.

The practice of mindfulness involves a series of formal exercises led by an experienced instructor. The participant will learn to bring their attention to the present moment through an awareness of their body, breathing, and senses; gradually relate to their inner and external experience in a more welcoming and non-judgmental way; and carry out informal exercises (e.g. they learn to extend to different moments in their day a the state of present-orientated awareness that they experience during their formal practices, e.g. by paying full attention to what they are doing at a certain point in time). Daily home practice is conducted through guided audio tracks and the completion and reading of a number of worksheets and materials.

Course activities will include mindfulness exercises led by an instructor that can be carried out every day, yoga practices with gentle body movements that are accessible to all, and group dialogue. Table 1 shows how the programme is to be structured.

Exercises conducted during the intervention programme include a body exploration exercise, which consists of focusing the attention on different parts of the body (e.g. toes, back, and head) and physical sensations (e.g., pain or muscle tension) in the present moment; breath awareness meditation, which consists of turning the attention to the breath, noticing how bodily sensations change during inhalation and exhalation; slow walking meditation, in which participants become aware of their steps, from beginning to end. Throughout, participants will be trained to maintain an attitude of acceptance, non-judgementalism, and equanimity, and foster attention, awareness, recognition, and emotional regulation. The mindful compassion sessions will allow participants to share their experience of practice or difficulties they have encountered. These will be followed by feedback from the teacher. The course will have a maximum of 12 participants.

If participants of either group report any adverse events during the trial, this will be registered in the electronic database system. Serious adverse events will be reported to the ethics committee. If participants require additional mental health support,

they will be referred to the regular services, but it is also possible for participants to consult with an appointed psychologist if they so request, or if the trainer so advises.

Each session will focus on topics that will be explored through specific exercises, presented by a licensed psychologists with demonstrated experience in the application of mindfulness-based protocols and who meets the criteria of the internationally agreed good practice guidelines of the UK network for mindfulness-based teachers.

If a given participant at the end of the trial continues to display high or higher levels of distress, they will be referred to the Psychiatric Consultation Service at the UOC of Psychosomatics, Verona Hospital Trust. This service has provided an individual help pathway for HCWs with psychological distress since the beginning of the pandemic. The WL is the control group planned for this study. It will remain in place for the entire period of the intervention. Details on the rationale of the study are shown in the flowchart (Figure 1).

Outcomes

As the proposed intervention aims to mitigate the prolonged strain on hospital staff by working with the most severe or critical COVID-19 patients, burnout – a specific indicator of chronic work-related dysfunctional response – was selected as the main outcome of interest. In particular, any change in the sub-subscale of emotional exhaustion (EX) between pre-treatment and 1-month post-treatment was chosen as the primary outcome of burnout (Maslach et al., 1997). Emotional exhaustion is a psychological construct that explores the perception of physical and emotional fatigue. It is characterized specifically by a lack of energy required to handle daily life and the prevalence of feelings of apathy and emotional detachment at work. It is the central dimension in burnout (Maslach et al., 2001) and correlates strongly with job performance, absenteeism, higher psychopathological risk, and poor organizational effectiveness (Koutsimani et al., 2019). Numerous studies have found EX in HCWs to be associated with acute depressive symptoms, anxiety disorders, sleep problems, and poor quality relationships with patients (Lasalvia et al., 2021a; Raižiene & Endriulaitiene, 2007; Tourigny et al., 2010; Xu et al., 2020).

The secondary outcomes of the intervention will be to observe any change between pre-treatment and post-treatment and between pre-treatment and 1-month post-treatment, in:

- professional efficacy (MBI-GS) (Maslach et al., 1997);
- cynicism (MBI-GS) (Maslach et al., 1997);
- depressive symptoms (PHQ-9) (Kroenke et al., 2001);
- anxiety symptoms (GAD-7) (Spitzer et al., 2006);
- post-traumatic symptoms (IES-R) (D. S. Weiss & Marmar, 1997a);
- insomnia (ISI) (Bastien et al., 2001);
- perception of stress (PSS) (Cohen et al., 1994);
- mindfulness skills (FFMQ) (R. A. Baer et al., 2008);
- evaluation of self-criticism and self-reassurance (FSCRS) (Gilbert et al., 2004);

The assessment instruments to be used are as follows:

- Personal socio-demographic information will be collected by using an ad hoc schedule, addressing personal (gender, age, having had psychological problems developed before the COVID-19 outbreak, having received psychological treatment other than mindfulness over the past 2 years) and job-related characteristics (place of work within hospital, working experience, monthly night shifts).
- The Maslach Burnout Inventory–General Survey (MBI-GS) is a self-rated scale that explores the individual's relationship with work with respect to burnout in particular. It is a modified and shortened version of the original MBI (Maslach et al., 1997) and consists of 16 items and three subscales: emotional exhaustion (5 items), which measures feelings of being overextended and exhausted by one's work; cynicism (5 items), which measures an indifference or a distant attitude towards your work; professional efficacy (6 items), which measures satisfaction with past and present accomplishments, and it explicitly assesses an individual's expectations of continued effectiveness at work. Responses to the MBI-GS items are on a 6-point Likert scale, ranging from 0 (*never*) to 6 (*always*).

- Patient Health Questionnaire (PHQ-9) is a nine-question self-report measure of depression symptoms. It asks about the American Psychiatric Association's Diagnostic and Statistical Manual (DSM) nine diagnostic symptoms of major depressive disorder and scores on each symptom range from 0 (*not at all*) to 3 (*nearly every day*) (Kroenke et al., 2001).
- Generalized Anxiety Disorder (GAD-7) is a self-rated questionnaire consisting of seven items that investigate the level of anxiety and worry felt by the respondent over the previous 2 weeks (Spitzer et al., 2006).
- Insomnia Severity Index (ISI) is a seven-item questionnaire that asks respondents to rate the nature and symptoms of their sleep problems (Bastien et al., 2001).
- Impact of Events Scale – Revised version (IES-R) is a 22-item self-report that assesses subjective distress caused by traumatic events (D. S. Weiss & Marmar, 1997a). The IES-R contains seven additional items related to the hyperarousal symptoms of PTSD that were not included in the original IES. Respondents are asked to identify a specific stressful life event and indicate how distressed or bothered they had been during the previous 7 days according to each "difficulty" listed. Items are rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). The IES-R yields a total score (ranging from 0 to 88). Subscale scores can be calculated for the Intrusion, Avoidance, and Hyperarousal subscales.
- Perceived Stress Scale (PSS) is a 10-item questionnaire to measure the degree to which life situations are appraised as stressful. Psychological stress has been defined as the extent to which persons perceive (or appraise) that demands upon them exceed their ability to cope (Cohen et al., 1994).
- The Five Facet Mindfulness Questionnaire (FFMQ) is a self-report measure consisting of 39 items based on a five-facet model (i.e., observe, describe, act with awareness, nonjudgement, and nonreaction) (R. A. Baer et al., 2008). It is widely used for dispositional mindfulness (R. A. Baer, 2003).
- Forms of Self-Criticising/attacking and Self-Reassuring Scale (FSCRS) is a self-administered tool for the assessment of three forms of self-to-self

relating as a process measure (Gilbert et al., 2004). Two subscales represent maladaptive forms of self-to-self relating, namely, self-criticism induced by the desire to correct or improve certain aspects of the self – which is referred to as inadequate self (IS) – and self-criticism arising from the desire to hurt, persecute, and attack the self – which is referred to as hated self (HS). A third subscale, RS, reflects the ability to reassure oneself. The questionnaire consists of 22 items.

Participant timeline

Information on enrolment, intervention, and assessment in the trial can be found in Table 2.

Primary and secondary outcomes will be measured at baseline (T1), at the end of the intervention (T2), and 1 month after the end of intervention (T3). Adverse events and untoward effects will be assessed during each treatment. Table 1 contains a summary of all the measures in the trial.

Sample size

Sample size calculation was performed a priori according to the primary outcome on an intention-to-treat basis. A total of 72 nurses (36 nurses per treatment condition) achieves 80% power to reject the null hypothesis of equal means when the population mean difference is -1.21 with a standard deviation for both groups of 1.8 and a significance level of 0.05 using a two-sided two-sample equal-variance *t*-test (PASS 2021). Both the expected mean change and the standard deviation were found by exploring data (which are available from the authors) regarding the distress of nurses working in COVID-19 wards (Lasalvia et al., 2021a; Lasalvia et al., 2021b).

Recruitment

The study description and the invitation to participate will be published in the hospital's newsletter and will be emailed to the nurses' address by the Verona Hospital Trust Administration. If the study does not obtain enough responses from the newsletter advert, the research group will organize in-person meetings with all

nursing staff working within the selected hospital units to present the study, to explain its rationale and to ask their availability to participate. This may allow to increase the number of potential participants. All nurses who express an interest in participating will receive (via e-mail) an information sheet containing all the project details together with a link to the online screening questionnaire. They will find the participant consent form and the consent form for the use and processing of personal data on the same page. The screening questionnaire will allow us to assess whether the participant meets the inclusion criteria. If they do, they will be added to a temporary list of candidates; if they do not, they will be excluded from the trial. However, those participants not meeting inclusion criteria but requiring psychological support will may seek specialized mental health care through the Psychiatric Consultation Liaison Service based at the Psychosomatics Unit within the Verona Academic Hospital Trust.

Assignment of interventions: allocation

Participants will be randomly allocated to the intervention or the WL control group with an allocation ratio of 1:1. Participants allocated to the experimental group will receive the intervention immediately after randomization, and those assigned to the control group will be offered the same intervention 6 months after. The experimental intervention will take place over 6-weeks. The pre-test, post-test, and 1-month follow-up will be carried out at the same time for both study groups.

The trial statistician will prepare the sequence of treatments randomly permuted into blocks of 2. The randomization schedule will be generated with Stata software (version 17.0; Stata Corp, Corp, College Station, TX, USA) using the 'ralloc' command for random allocation of treatments balanced in blocks. The Emotional Exhaustion sub-scale (EX) score of the MBI-GS assessed at the screening phase will be used to perform a stratified randomization based on the median value (EX $\geq$ median vs. EX< median). Two lists of randomizations will be generated according to the levels of the stratification variable. The trial statistician will communicate by email the randomization results to the responsible for trial, who will notify to the participants by email if they belong to the intervention or the WL control group.

The trial will begin in September 2022. Enrolment will end as soon as the expected

number is reached (36 for the intervention group and 36 for the control group). Before the intervention, participants randomly assigned to the intervention group will be divided into three subgroups consisting of 12 individuals. Each subgroup will follow the mindfulness courses (led by the same instructor) for 6 weeks. The courses will be delivered every Monday for subgroup 1, Tuesday for subgroup 2, and Wednesday for subgroup 3. Nurses will attend the intervention during working hours as part of the continuing professional education (CPE) courses provided by the Verona Hospital Trust Administration.

Assignment of interventions: blinding

Participants will be screened by an independent psychologist after completing the MBI-GS. The randomization will be independently conducted by the trial statistician. The assessments pre-treatment, post-treatment, and at 1-month post-treatment will be completed online. The participants and the treatment psychologist will not be blind.

Data collection and management

All research data will be retained in the psychiatry section of the University of Verona. Participants scoring above the cut-off score of the screening questionnaire will enter the study and will complete the assessments through a web-based system. Online questionnaire completion time is estimated at approximately 30 minutes and will be easily carried out using a PC, tablet, or smartphone. The battery of questionnaires will be compiled using the online system Lime Survey (www.limesurvey.com). Data will be stored on the cloud and passwords protected. At the baseline evaluation, each participant will be required to generate a password that should have been used also at the subsequent follow-ups; this was required for the research team to longitudinally link the questionnaires completed by a given nurse at each evaluation point. The study description and the invitation to participate as well as the link to the online questionnaire will be sent via e-mail to all nurses who meet the criteria by the trust administration. A reminder for completing the questionnaire was sent around after one week. The survey will be anonymous, and confidentiality of information will be guaranteed. The data

collected will be downloaded and managed by the person responsible for data management and statistical analysis (Chiara Bonetto). Antonio Lasalvia will be responsible for data retention. In accordance with the Declaration of Helsinki, participant confidentiality will be fully preserved throughout the study. It will not be possible to associate the results with the single compiler of the questionnaires or with the single structure to which they refer in any published papers.

Statistical methods

Statistical analysis will be based on an intention-to-treat (ITT) basis, comparing outcomes from all nurses allocated to the two trial arms. Findings will be reported according to the CONSORT guidelines for parallel-group randomized trials (Schulz et al., 2010).

Personal socio-demographic information and job-related characteristics will be summarized descriptively according to the treatment arms. Categorical data will be presented as frequencies and percentages. Means, standard deviations, medians, interquartile ranges, and minima and maxima will be presented for continuous data. To verify the success of randomization, the baseline characteristics of the two treatment groups will be compared: continuous variables will be compared with a *t*-test (for normally distributed variables) or the Mann–Whitney U test (for non-normally distributed variables). Categorical variables will be evaluated with the chi-square or 2-tailed Fisher exact test. Change scores will be calculated. Data will be presented as percentages for categorical data and means and standard deviations for continuous data; 95% CIs will be used to indicate uncertainty around the estimates. Follow-up data will be analysed using mixed models to establish the correlation between repeated measurements and examine main effects and their interaction, adjusting for the baseline score. The presence of multi-collinearity, interaction, and higher power terms will be assessed to check final model validity. Statistical significance will be defined at two-sided $p < .05$. All analyses will be carried out using Stata 17.0 for Windows.

The effects of baseline covariates expected to have an important influence on the primary outcome will be controlled for by comparing covariate-adjusted analyses with unadjusted analyses. Certain covariates that will be considered at baseline will

refer to demographic variables (e.g., gender, age, and education level), the organizational context, and participation in non-mindfulness support courses.

The ITT principle will allow for potential biases arising from loss to follow-up, under the assumption that missing outcomes are missing at random (MAR) using Little and Rubin's terminology (2002) (Little & Rubin, 2002). Mixed models will allow for the inclusion of data from nurses with incomplete observations at follow-up. We will allow for the presence of missing outcome data on the assumption that the data are missing completely at random, conditional on the covariates included in the models (i.e., missing at random), again using Little and Rubins' terminology (Little & Rubin, 2002). Multiple imputation methods will be applied in the event of missing data.

Oversight and monitoring

As has been noted, participants who experience (serious) adverse events and harm resulting from the intervention or those allocated in the waiting list who experience a worsening of their mental health status will be referred to the Psychiatric Consultation Service at the Psychosomatics Unit and the project management group; they, however, will be excluded from the study. The ethics committees will be also informed.

Dissemination of findings

The results will be presented in international peer-reviewed journals if accepted. The principal investigators, co-investigators, and other professionals involved in the proposed intervention will be the authors of any publications. The criteria established by the International Committee of Medical Journal Editors will be adopted. Entitlement to authorship will be based on the participants' substantive contribution to the study design, data analysis, and interpretation, the writing of the article, its critical revision, and final approval before submission.

DISCUSSION

The proposed trial is the first to evaluate the effectiveness of a mindfulness and compassion-focused intervention for the reduction of levels of burnout and distress in nurses working during the COVID-19 pandemic. Mental health in HCWs is a sensitive subject because the pandemic has had serious consequences for them. These include higher levels of burnout, depression, anxiety, insomnia, and post-traumatic symptoms than those of the pre-pandemic period. Several studies indicate that symptomatology did not spontaneously resolve 1 year after the onset of the pandemic (Lasalvia et al., 2021b). Indeed, mental health outcomes amongst HCWs deteriorated (Lasalvia et al., 2021b). The most stressful factors include having experienced sudden and dramatic challenges in terms of increased workload, reassignment/redeployment to other roles or duties, infection threat, COVID-19-related traumatic events and frustration with the death of patients for whom they provided care (Lasalvia et al., 2021b; Lasalvia et al., 2021c). An effective and replicable psychosocial intervention must be provided to HCWs who are most in need of help.

It should however be acknowledged that the intervention tested in this research will target only intrapsychic psychological factors of burnout. It is well known that burnout *arises* as a result of multiple factors, where contextual factors play a relevant role. In this regard, to mitigate the effect of burnout it is important that any psychological intervention provided at individual level should be also supplemented by other interventions at the system level aimed at improving working conditions, providing safety and protection in the workplace, and implementing safe staffing ratios and workloads.

The trial presents potential risks. In particular, the sample is characterized by high levels of stress and is therefore at greater risk of psychiatric comorbidities. This may lead to difficulties in recruitment, data collection, and treatment adherence. However, the existing literature on harm in evidence-based mindfulness interventions is sparse, and there is no evidence that suggests any side effects (R. Baer et al., 2019).

Tables and figures (Bodini, Bonetto, Cheli et al., 2022)

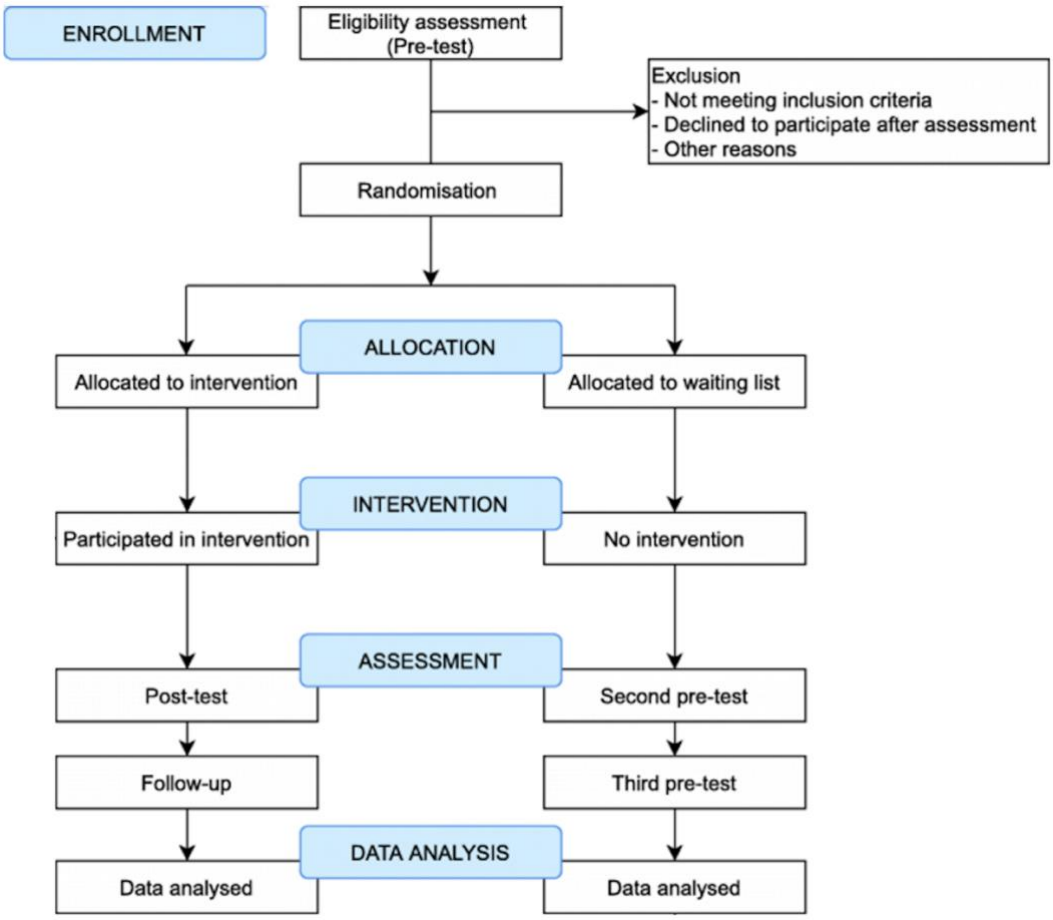
Table 1. Themes and Program of the MCCP

	Mindfulness exercises	**Mindfulness psychoeducation**
Week 1	Automatic pilot; soothing breath; standing yoga	Mindfulness practice and programs; automatic pilot
Week 2	Automatic pilot: the day I suffered; soothing breath	Mind-wandering; thoughts and feelings
Week 3	Automatic pilot; experiential acceptance; standing yoga	Automatic thoughts; acceptance
Week 4	Soothing breath; compassionate self	Psychological flexibility; compassionate mind
Week 5	Sitting meditation; three pillars of death; mindful walking	Self-compassion; loving kindness
Week 6	Sitting meditation; loving kindness; compassion flowing out	Compassionate care
Final Session	Automatic pilot; sitting meditation; sitting yoga; breath meditation; mindful walking; loving kindness; compassion flowing in; compassion flowing out; breathing group	Summary

Table 2. Enrolment, interventions and assessments of the MCCP

	Study period				
	Enrolment	Allocation	Pre-treatment	Post-treatment	Follow-up
	$-T_1$	T_0	T_1	T_2	T_3
Eligibility screening	X				
Informed consent	X				
Randomization		X			
Allocation		X			
Socio-demographics		X			
Job-related characteristics		X			
INTERVENTIONS					
Treatment			X	X	
Waiting list			X	X	
ASSESSMENTS					
Burnout			X	X	X
Depression symptoms			X	X	X
Anxiety symptoms			X	X	X
Post-traumatic symptoms			X	X	X
Insomnia			X	X	X
Perception of stress			X	X	X
Mindfulness skills			X	X	X
Self-criticism and self-reassurance			X	X	X

Figure 1. Flowchart of the trial design



A Mindful Compassion Care Program to Reduce Burnout and Work-related Distress among Frontline Nurses who Cared for Patients with COVID-19: A Pilot Study (Bonetto, Cheli, Bodini et al., *In preparation*, 2024)

Abstract

This pilot study aimed to assess the feasibility and effectiveness of the Mindful Compassion Care Program (MCCP) in reducing burnout and work-related distress among frontline nurses working with COVID-19 patients. The study also explored emotional exhaustion, cynicism, perceived stress, and mindfulness skills. This was a non-randomized controlled pilot study using a mixed-methods approach. The quantitative component involved repeated measures ANOVA and mixed-effects linear models to assess group-by-time interactions.

The study took place in a large hospital in northern Italy, with participants recruited from COVID-19 units where they had worked during the pandemic.

Thirty-three nurses participated, all having worked in COVID-19 units for at least two years. No drop-outs were recorded, and the sample was predominantly female. The intervention group participated in the Mindful Compassion Care Program (MCCP), a seven-week group-based mindfulness and compassion-focused intervention designed to address burnout and work-related distress. The control group did not receive any intervention during the study period. Primary outcomes included emotional exhaustion, cynicism, and perceived stress. Secondary outcomes were improvements in mindfulness skills and self-reassurance.

Significant group-by-time interactions were found for emotional exhaustion (partial $\eta 2=0.249$), cynicism (partial $\eta 2=0.174$), perceived stress (partial $\eta 2=0.166$), and mindfulness skills (partial $\eta 2=0.216$). The mixed-effects linear model confirmed the significance of perceived stress, mindfulness skills, and self-reassurance.

The MCCP was feasible and effective in reducing burnout and distress. Further research with larger randomized trials is recommended to confirm these findings and examine long-term outcomes.

Introduction

The COVID-19 pandemic has impacted the healthcare systems worldwide, dramatically changing the routine utilization of services (Kaye et al., 2021; Moynihan et al., 2021). This complex and unexpected transformation - together with the psychosocial distress generated by the pandemic in the general population (Ashtari et al., 2023) - has exposed healthcare professionals to an extremely high risk for burnout and work-related distress. Nurses represent a subgroup of healthcare workers at high risk for burnout and work-related sitress during the COVID-19 pandemic (Adanaqué-Bravo et al., 2023).

Recent meta-analyses reported high levels of burnout among nurses during the pandemic, with the estimated prevalence of emotional exhaustion - a key dimension of burnout - ranging between 22.8% and 34.1% (Caruso et al., 2021; Galanis et al., 2021). Moreover, a meta-analytic time-series analysis suggest that the annual burnout rates among nurses raised from 0.16-0.31 during the 2010-2019 years to 0.47-0.81 during the pandemic (Ge et al., 2023). Nurses working in intensive care units or emergency wards appear to be especially burdened by the demands of the pandemic (Busch et al., 2021; Gualano et al., 2021). A repeated cross-sectional survey conducted in April-May 2021 in a tertiary hospital of north-east Italy (Lasalvia et al., 2021b) revealed a significant increase in mental health issues among healthcare workers, with nurses and ICU staff showing the sharpest rise in anxiety, depression, and burnout rates one year after the onset of coronavirus pandemic.

These studies support the need of developing interventions aimed at reducing burnout among nurses and providing strategies to tackle the distressful long-term consequensces of the COVID-19 pandemic and possible future pandemics.

Mindfulness-Based Interventions (MBIs) aimed to promote the ability to decenter from painful thoughts or feelings and engage with a self-compassionate stance might be effective programs for nurses working with COVID-19 patients (Othman et al., 2023; Rodriguez-Vega et al., 2020). Indeed, MBIs have previously proven effective in reducing psychosocial distress, emotional burden, and burnout in nurses (Ramachandran et al., 2023; Suleiman-Martos et al., 2020). A recent meta-analysis confirms that mindfulness skills are effective for nurses' mental health during the

pandemic (Wong et al., 2024). While few attempts were made to integrate MBIs with compassion-focused interventions before COVID-19 (Conversano et al., 2020), no studies have yet combined compassion with MBIs for healthcare workers during the coronavirus pandemic. Compassion involves the awareness of suffering and the intention to alleviate it, which is beneficial for healthcare workers and their patients (Crawford et al., 2014; Gilbert, 2019). Adding compassion-focused practices could enhance empathy and emotional resilience in nurses, helping them manage emotional demands and creating a supportive work environment (Neff & Germer, 2013; Raab, 2014). Compassion training could also help nurses deal with moral distress and ethical dilemmas exacerbated by the pandemic, reducing the risk of long-term psychological harm (Rushton, 2016).

The present pilot study was designed to investigate the feasibility, the acceptability, and the effectiveness of the recently developed Mindful Compassion Care Program (MCCP) (Cheli, 2023; Cheli et al., 2020b, 2023) in reducing symptoms of burnout and symptoms of work-related distress among hospital frontline nurses. MCCP has been tested among nursing students, nurses, and physicians.

We anticipate that the results of this pilot study will inform future large-scale randomized controlled trials aimed at addressing the public demand for enhancing the resilience of frontline healthcare workers (Pollock et al., 2020).

Method

Participants

Data were obtained from frontline nurses (n=33) who were engaged in the clinical management of the most severe or critical COVID-19 cases during the two years of the pandemic. All the participants signed the informed consent. The approval of the local Ethical Committee was obtained (Reference number: 3717CESC). Consistent with the previous definition of at-risk frontline nurses, inclusion criteria were (i) being nurses in either intensive care units (ICUs), sub-intensive COVID-19 units (e.g., infectious disease units, pulmonary medicine, internal medicine units converted to COVID-19 units), or emergency units; (ii) being employed in Azienda Ospedaliera Universitaria Integrata (AOUI) of Verona for the previous two years.

Exclusion criteria were (i) having participated in mindfulness-based interventions in the previous six months, and (ii) receiving psychosocial or psychiatric treatment.

Study setting

The study was conducted at Azienda Ospedaliera Universitaria Integrata (AOUI) of Verona, the second-largest hospital in Italy and the first-largest hospital in northern Italy regarding the number of beds. The hospital trust employs nearly 6000 people, including almost 2000 nurses. On March 17, 2020, the local regional government converted part of the hospital into a COVID-19 hospital. The hospital is organized into two facilities located in different areas of the city.

Measures

Personal socio-demographic information was collected by using an ad hoc schedule, addressing personal (gender, age, psychological problems before the pandemic, psychological treatment received other than mindfulness over the past 2 years) and job-related characteristics (place of work within hospital, working experience, monthly night shifts).

Maslach Burnout Inventory–General Survey (MBI-GS) is a self-rated scale assesing burnout in relation to work. It's a shortened version of the original MBI (Maslach et al., 1997) and includes 16 items across three subscales: emotional exhaustion (5 items), which measures feelings of being overextended and exhausted by one's work; cynicism (5 items), which measures an indifference or a distant attitude towards one's work; professional efficacy (6 items), which measures satisfaction with past and present accomplishments. Responses are rated on a 6-point Likert, with higher scores indicating higher burnout levels. Cronbach's Alpha ranges from 0.81 to 0.90 and McDonald's Omega ranges from 0.82 to 0.92, indicating good to excellent internal consistency (Wheeler et al., 2011).

Patient Health Questionnaire (PHQ-9) is a nine-question self-report measure of depression symptoms. The scale explores nine diagnostic criteria for major depressive disorder, with each item scoring from 0 to 3 (Kroenke et al., 2001). The total score ranges from 0 to 27, with higher scores indicating more severe depressive

symptoms. The PHQ-9 has good internal consistency (Cronbach's α=0.89) and excellent test-retest reliability (r=0.84).

Generalized Anxiety Disorder (GAD-7) is a seven-item self-rated questionnaire assessing anxiety and worry over the past two weeks (Spitzer et al., 2006). Scores range from 0 to 21, with higher scores indicating higher levels of anxiety symptoms. The GAD-7 demonstrates excellent internal consistency (Cronbach's α=0.92) and test-retest reliability (r=0.83).

Insomnia Severity Index (ISI) is a seven-item questionnaire that asks respondents to rate the nature and symptoms of their sleep problems (Bastien et al., 2001). Each item is scored 0-4 with a total between 0-28 (absence of insomnia to severe insomnia). The Italian version of the ISI demonstrated acceptable internal consistency (Cronbach's α=0.75).

Impact of Events Scale – Revised version (IES-R) is a 22-item self-report assessing distress from traumatic events, including hyperarousal symptoms of PTSD (D. S. Weiss & Marmar, 1997b). Respondents rate their distress over the past 7 days on a 5-point scale. The total score ranges from 0 to 88, with higher scores indicating greater distress. The IES-R has good internal consistency (Cronbach's α=0.80), and high test-retest reliability (r=0.93).

Perceived Stress Scale (PSS) is a 10-item questionnaire that measures how stressful individuals perceive their life situations (Cohen et al., 1997). Scores range from 0 to 40 (the highest severity). The PSS has demonstrated strong reliability, with a Cronbach's alpha of 0.89 (Roberti et al., 2006).

The Five Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report measure using 5-point Likert scale to assess mindfulness across five facets: observe, describe, act with awareness, nonjudgement, and nonreaction (R. A. Baer et al., 2008). It is widely used for dispositional mindfulness (R. A. Baer, 2003). Higher scores indicate a greater level of mindfulness. The FFMQ shows acceptable to excellent internal consistency, with Cronbach's Alpha values ranging from 0.66 to 0.88 (Didonna & Bosio, 2012).

Forms of Self-Criticising/attacking and Self-Reassuring Scale (FSCRS) is a 22-item self-report tool assessing three forms of self-relating: inadequate self (IS), hated self (HS), and self.-reassurance (RS) (Gilbert et al., 2004). Higher scores

indicate greater self-criticism. The scale shows good internal consistency with Cronbach's alphas of 0.86 for HS and RS, and 0.90 for IS (Gilbert et al. 2004).

Post-Hoc Open Questions (POQ) were four open questions that the intervention group participants were asked to answer at the end of the intervention. This qualitative questionnaire aimed to explore the perceived satisfaction with and safety of the MCCP. The four questions were: (i) How do you evaluate the course in terms of its usefulness for you? (ii) What were the critical or problematic moments during the course and how do you think they were addressed by the group and the leader? (iii) What were the fundamental or turning points during the course, and how do you think they were addressed by the group and the leader the group and leader addressed them? (iv) How do you evaluate the group experience in terms of your relationship with others?

Procedures

Eligible participants were contacted through repeated e-mails by the research team and were invited to participate voluntarily. The intervention was not part of annual training, not recognized as work hours, and participation was free. Meetings with nurses were organized to raise awareness of the importance of this initiative.

Nurses who expressed an interest were contacted by telephone to assess their level of motivation to participate in the program, explain the program structure and rationale, understand any critical issues in their participation, and receive feedback on how this proposal was perceived by their colleagues. Participants generally considered this proposal necessary and useful. However, some critical issues emerged, including adding this course to already demanding work shifts, no acknowledgment of the study as training or work hours, and having already received psychological or psychiatric help over the past two years.

Participating nurses completed a sociodemographic form the questionnaires MBI-GS (burnout), PHQ-9 (depression), GAD-7 (anxiety), ISI (insomnia), PSS-10 (stress perception), IES-R (traumatic symptoms), FFMQ (mindfulness skills), and FSCRS (self-criticism/attack and self-reassurance). The measures were reassessed at the end of the intervention (6 weeks) (t1) and 1-month follow-up (t2). Finally,

between the end of the intervention and follow-up, participants were asked to answer the four open questions (POQ).

Adherence to the intervention was assessed weekly by the research team. The trainer was responsible for managing the intervention and delivering the practices. The co-trainer supported the trainer in managing the organization of the session and assessed the trainer's adherence to the protocol and the participant's adherence to the proposed intervention. After the session, the adherence was evaluated by the research team by discussing the trainer's and co-trainer's feedback. The inclusion criteria for being the trainer were being a clinical psychologist, having at least 5 years of experience in MBIs and CFT, and having conducted at least five times an MCCP with healthcare professionals. The inclusion criteria for being the co-trainer were being a clinical psychologist and having previous experience in MBIs, CFT, and MCCP.

The study involved nurses working in two different hospital facilities. Due to the logistical challenges expressed by the nurses, such as the difficulty of working in one facility while participating in sessions at the other, the researchers decided to assign the groups based on the facility where the nurses worked. As a result, all nurses from one facility were placed in the Intervention Group (IG), while the nurses from the other facility were assigned to the Control Group (CG).

Outcomes

Outcomes were the differences between the two groups (IG, CG) across the three measurements (t0-t1-t2) in terms of score changes in (a) MBI-GS (Emotional Exhaustion, Cynicism, and Professional Efficacy), (b) mental health outcomes (depression, anxiety, traumatic events, insomnia, traumatic symptoms), (c) psychological facets (perceived stress, mindfulness skills, self-criticism/attack and self-reassurance). Moreover, the feasibility was explored by assessing attendance and completion (missing data and sessions and drop-outs in the two groups), plus the perceived acceptability of the intervention in the IG solely through the answers to the POQ.

Treatment conditions

Intervention group (IG). All the nurses allocated in the IG accessed the MCCP, a 7-week group intervention that integrates components of MBIs with Compassion Focused Therapy (CFT) (Gilbert, 2009b, 2019). The MCCP comprises six regular 1 h and 30-min sessions and one all-day class lasting 4 h and 30 min (Cheli et al., 2020b). It is offered in a group format (7-12 participants) with a trainer and a co-trainer. The primary goals of MCCP are to (i) increase the understanding of how distress arises in one's own professional life and (ii) foster the ability to soothe this distress through different experiential techniques (e.g. breathing exercises, imagery techniques, etc.). In the first and second sessions the basic concepts of mindfulness and compassion are introduced to explain how repetitive thinking and critical beliefs about self and others may increase the perceived distress and fuel an alarm state in dealing with professional challenges. Since the very beginning of the program, experiential techniques (e.g., soothing breathing, grounding) are introduced in terms of progressive and gradual training to recover the ability to soothe one's distress. In the third and fourth sessions the basic conceptualization of CFT is introduced, highlighting how the soothing system - a mammalian affect regulation system - is usually triggered by cues of intra- and inter-personal safeness (Gilbert, 2019). In this phase, the trainer introduces imagery techniques (e.g., compassionate place) aimed at training this very effective regulation system. In the last two regular sessions (5^{th} and 6^{th}) this training is fostered using diverse practices such as the compassionate creature and self. Finally, during the final intensive session (all-day class), specifically designed couple and group exercises are proposed to suggest the importance of teamwork in supporting the individual.

The intervention is a proven, effective, mindful compassion program (Cheli et al., 2020b, 2023) based on well-known scientific programs such as MBCT (Segal et al., 2004) and CFT (Gilbert, 2009b). On the one hand, mindfulness exercises are aimed at promoting decentering from disturbing thoughts and feelings by accepting the natural tendency of the human mind to be distracted and perturbed (Teasdale et al., 2002). On the other hand, the CFT practices are supposed to train the soothing system, which is triggered by cues of social safeness and capable of calming responses to both internal (e.g., self-criticism) and external (e.g., a negative judgment from others) threats (Gilbert, 1993, 2001). MCCP was investigated in

nursing students (n = 82) and exhibited medium to very large effect sizes (with Cohen's *d* ranging from 0.57 to 1.25) in reducing burnout symptoms (Cheli et al., 2020b).

Control group (CG). The participants allocated to the CG entered a waitlist. During the recruitment phase, all the potential participants were informed about the activation of two consequent interventions and the allocation procedure at the facility level. Those who were allocated to the wait list did not receive any treatment; they joined two meetings with the trainer and co-trainer, one at the beginning of the study and one at the end. During these meetings, the trainers explained the research procedure and the goal of the interventions, and the participants were invited to ask questions. Nurses enrolled in the CG were allowed to access the MCCP after the completion of the research study.

Feasibility Analysis

Feasibility has been defined in terms of lack of adverse events (i.e. drop-outs, discontinuous interventions) and perceived acceptability (i.e. positive evaluation by the participants). Specifically, drop-outs and missing data were counted for IG and CG. Then, the open questions of the POQ were explored through an inductive approach based on thematic analysis (Braun & Clarke, 2006). Participants' evaluation of the intervention was assessed by an analytic process comprised of six phases: (i) familiarizing with the narratives of the dataset; (ii) generating initial codes, that is identifying semantic or latent features of the dataset; (iii) sorting the codes into potential and broader themes; (iv) reviewing and refining the themes in terms of internal homogeneity and external heterogeneity; (v) defining and labeling themes; (vi) producing a report of the analytic method and resulting themes. A researcher with expertise in the field conducted the thematic analysis, and then a second researcher revised it. Discrepancies between the two were discussed and solved by the research team.

Effectiveness Analysis

Sample characteristics at baseline (t0) were described by n (%) and the comparison between the two groups (IG and CG) was performed by Chi-square test. Each self-

reported measure score was described by mean (SD). The comparison at t0 between IG and CG was done by t-test for independent samples. The missing data pattern was explored and a repeated measures ANOVA on the complete data sample (Complete Case Analysis CCA) was estimated. After that, each self-reported measure score was then entered as the dependent variable in a multilevel mixed-effects linear regression model with the group (IG, CG), the time (t0, t1, t2), and their interaction as the independent variables. Analyses were performed by Jamovi version 2.3.28.0 (Repeated Measures ANOVA) and Stata 17 (Chi-square test and t-test, 'xtmixed' command) for Windows.

Results

Characteristics of the sample

The majority of participants were females with an age of 36-55 years and a working experience of more than 20 years. No differences resulted statistically significant between the two groups (IG, CG) (Table 1).

Feasibility

Eligible nurses (n=373) were contacted, and of these, only 56 (15%) expressed interest in the project. Many declined due to the course being outside work hours or frustrated with the hospital for not offering it earlier. The nurses who agreed to participate in the study were 33, of whom 13 worked in one of the two hospital facilities (named 'Borgo Roma' facility) and 20 in the other one (named 'Borgo Trento' facility). Due to the difficulty of working in one facility and participating in the sessions in the other facility, the allocation to the group was performed at the facility level (IG n=13 and CG n=20). Among the 23 nurses who did not participate, 14 refused (8 overlapping with work shifts, 4 were too busy, 1 traveling away, 1 dismissed from work) and 9 did not respond to calls and e-mail messages.

Assessments were completed by all nurses (IG n=13 and CG n=20) at t0. At t1, 13 nurses in the IG and 16 in the CG completed the assessments; at t2, 10 nurses in the IG and 11 in the CG completed the assessments.

One of the nurses allocated in the IG did not participate in the intervention due to physical problems, and therefore 12 participants joined the MCCP. The research team's meetings indicated a good adherence to the MCCP protocol.

All the participants in the IG who received the intervention (n =12) completed the four questions of the POQ. The 20.8% (10/48) of the answers were composed of only one sentence, whereas most of the answers (38/48; 79.2%) comprised extensive narratives articulated in several sentences. All participants found the course useful, with 41.6% (5/12) highlighting the importance of self-care and self-compassion. In the other cases, nurses described a reduction in stress or burnout and the transferability of the experiential practices learned ("I will definitely use them in the future"). Three out of twelve (25%) responses to the second question (critical incidents) did not identify critical or problematic moments in the group, suggesting that the progression of exercises and the management of the group facilitated a viable adaptation. The first session was identified as the critical moment in the remaining 75% (9/12) of cases. Everyone agreed that the initial phase of the course - characterized by the re-emergence of painful memories of the pandemic - upset everyone ("it was painful to remember those first burdens, not only for me but also for others"). Some (5/12; 41.6%) also suggested that during the first meeting, usual avoidance strategies had failed, exposing participants to the suffering of such memories ("it was as if 'pretending nothing had happened' had worked perfectly until that day, even if we later discovered that this wasn't the case"). The third question (turning points) brought out two main themes and turning points: either (7/12; 58.3%) the group itself and the continuity of practicing together or (5/12; 41.6%) the final all-day session with several group practices such as the group breathing exercise (see Appendix in Cheli et al., 2020). Both of these themes identified (consistently with the answers to the fourth question) how the group experience was central to the change process ("in managing the emotions here and now the group was supportive and the leader attentive to the needs of the individuals"). Indeed, all the answers to the fourth question (relational experience) suggested how the connectedness with the other participants increased session by session, was stimulated by the trainers and supported the process of change. Some

nurses (4/12; 25%) have highlighted the importance of this course with all their colleagues from the unit they belong to.

Effectiveness

No significant differences between the two groups were found at baseline (t0) in any of the collected self-reported measures (Table 2).

In the IG, the 10 participants who completed all the assessments and entered the complete case analysis were compared with the 3 participants who were excluded from the complete case analysis because they were not re-evaluated at t2. The comparisons of the mean values of the instruments at t0 showed a statistically significant difference only for anxiety symptoms (completers 9.80 SE 1.21 vs not completers 3.67 SE 1.20, p=0.024 t-test). In the CG, the 11 participants who completed all the assessments and entered the complete case analysis were compared with the 9 participants who were excluded from the complete case analysis because they were not re-evaluated at t1 (n=1) or t2 (n=5), or both (n=3). The comparisons of the mean values of the instruments at t0 showed a statistically significant difference only for inadequate self (completers 2.31 SE 0.32 vs not completers 1.32 SE 0.31, p=0.043 t-test).

The Complete Case Analysis by the Repeated measures ANOVA revealed that there was a statistically significant interaction group-by-time on emotional exhaustion [$F(2,38) = 6.29$; $p=0.004$; partial $\eta^2 = 0.249$], cynicism [$F(2,38) = 3.99$; $p=0.027$; partial $\eta^2 = 0.174$], perceived stress [$F(2,38)=3.79$; $p=0.032$; partial $\eta^2 = 0.166$], and mindfulness skills [$F(2,38)=5.24$; $p=0.010$; partial $\eta^2=0.216$] (Table 3).

The mixed-effects linear regression models confirmed a significant group-by-time interaction only for perceived stress (p=0.007) and mindfulness skills (p=0.009). Reassuring self, which was very close to significance in the ANOVA (p=0.052), reached the statistical significance (p=0.013) (Figure 1).

Discussion

This pilot study explores the feasibility and effectiveness of MCCP in reducing burnout and work-related distress among hospital nurses working with COVID-19

patients. Despite the very limited sample size, the group-by-time interactions in the Complete Case Analysis suggest that MCCP might be an effective intervention in reducing emotional exhaustion, cynicism, and perceived stress, and increasing mindfulness skills. We did not find an effect over time on professional efficacy, depression, anxiety, insomnia, post-traumatic symptoms, inadequate self, hated self, and reassuring self. The multilevel mixed-effects linear regression models confirmed these results for perceived stress and mindfulness skills and permitted the reassuring self to reach statistical significance. Emotional exhaustion and cynicism were not confirmed.

Qualitative analysis of the feasibility of the MCCP yielded three main results. First, the intervention proved safe, as all participants completed the course, except for one who was absent due to illness. Second, the thematic analysis indicated a high level of satisfaction, with all the nurses describing the MCCP as useful. They attributed this usefulness to the group format and the experiential techniques employed in the program. However, the third finding was a significant challenge: the recruitment rate was very low, with 84% of the target population not responding to the invitation and fewer than half of those eligible choosing partecipate.

Although the MCCP intervention was feasible and well-received, its low acceptability highlighted significant recruitment challenges within an already stressed and burnt-out population. Studies show that healthcare workers often underreport psychological issues, which can hinder them from seeking help (Prins et al., 2010) due to concerns about confidentiality and the stigma associated with mental health issues. This reluctance to acknowledge or address mental health problems can lead to an over-reliance on self-treatment, reduced peer support, and even increased risks of suicide (Zaman et al., 2022). For these reasons, hospital administrators should consider adopting innovative strategies to enhance employee well-being, such as integrating interventions into the annual training programs or recognizing participation in such interventions as part of the employees' working hours.

Despite these challenges, the study’s preliminary results are promising. Both the quantitative and qualitative data suggest that MCCP may effectively reduce burnout and distress among frontline nurses caring for COVID-19 patients. A group-by-

time interaction effect suggested a reduction over time in perceived stress, emotional exhaustion, and cynicism, although the latter two were not fully confirmed by linear regression analysis. These decreases were accompanied by improvements in mindfulness and self-reassurance skills. Additionally, thematic analysis revealed a recurrent theme of high satisfaction among participants.

We attribute these positive results of the MCCP to its structure, which aligns with its theoretical foundation. This intervention is specifically designed to help participants decenter from disturbing thoughts and emotions while also fostering the ability to soothe their own suffering. These dual objectives are integrated into the context of their daily nursing activity. Instead of framing burnout as an inevitable consequence of the emotional toll of working with patients, the trainers approach it as a challenge in maintaining a balance in the flow of compassion: compassion for oneself, compassion for others and receiving compassion from others (Gilbert, 2009b). Burnout may become the only strategy available to nurses: by failing to manage their own emotional distress, they may distance themselves from patients, even at the risk of becoming cynical and losing sight of the meaning of their work. According to Gilbert, the developer of CFT, this approach aims to promote a sense of reducing perceived threats and should be differentiated from compassion-focused practices, which emphasize the ability to soothe one's own suffering and foster a sense of connectedness. Compassion, in this context, is defined as the awareness of one's own and others' suffering, combined with the intention to engage with and alleviate that suffering (Gilbert, 1993, 2020). Balancing the flow of compassion involves enhancing the nurse's ability to manage their own suffering while also accepting support from colleagues and loved ones. Participants appreciated that the intervention acknowledged the emotional burden rather than ignoring it, providing practical tools to address it within a peer group setting.

The intervention also improved mindfulness and self-reassurance skills. Research indicates that mindfulness can alleviate work-related stress by fostering awareness of one's thoughts and emotions (Gu et al., 2015). Additionally, improvements in self-reassurance skills appear to be associated with the development of self-compassion (Gilbert, 2020). Self-compassion enables individuals to be more

forgiving and supportive of themselves, particularly in high-stress situations. For nurses working in demanding frontline environments, increased self-compassion and self-reassurance are vital. These skills bolster coping mechanisms, allowing nurses to better recognize and address their physical and emotional needs.

Additionally, the reduction in stress may have been influenced by the group setting, which likely facilitated emotional expression and normalization of experiences. This environment may have made participants feel understood and less isolated (S.-L. Huang et al., 2015), as reflected in their feedback.

While the feasibility of the intervention appeared adequate – evidenced by no drop-outs, no missed sessions, a reduction in work-related stress outcomes, and high perceived satisfaction – its acceptability was limited. Fewer than 20% responded to the invitation, and less than half of those who completed the baseline assessment continued the study. We interpret these data in light of two intertwined factors that likely contributed to the nurses' negative perception of the intervention. First, due to administrative issues, the intervention was not incorporated into regular work hours, requiring nurses to participate during their personal time. Second, the project began two years after the initial lockdown, despite repeated feedback from nurses that it should have been initiated during the early stages of the pandemic. This hypothesis is supported by reasons expressed by non-participating nurses via email, telephone, and during presentation meetings, as well as reflections shared by participants during the sessions. Moreover, this aligns with existing studies highlighting the high levels of burnout among Italian healthcare workers and underscores the need for targeted interventions in the two years following the spread of COVID-19 pandemic in Europe (Di Trani et al., 2023; Epifanio et al., 2023).

This study has several limitations. First, its pilot nature and small sample size limit the generalizability of the results, highlighting the need for further research. Second, the use of a wait-list control design may introduce bias, and future studies should an active control group for more robust validation. Third, the low recruitment rate suggests potential feasibility issues, possibly due to participants' critical attitudes toward healthcare institutions, though this is not strongly supported by data. Fourth, the study's participant pool was predominantly female, which

aligns with other studies on healthcare workers conducted in our healthcare settings (Lasalvia et al., 2021a; Lasalvia et al., 2021b; Lasalvia et al., 2021c), may affect outcomes and generalizability. Lastly, the study's cross-cultural validity is limited, being conducted in a single center in one country.

Future research should address these limitations by 1) evaluating the MCCP with a larger sample in a randomized controlled trial with an active control group; 2) integrating the MCCP into regular work activities to reduce confounding variables; 3) investigating organizational factors affecting recruitment through correlational studies and interventions (Maslach & Leiter, 2017).

Conclusion

In conclusion, the COVID-19 pandemic has underscored the urgent need for effective interventions to prevent and manage burnout among frontline workers, such as nurses. Developing and implementing such interventions is more critical than ever. The MCCP shows promise as a candidate for rigorous trials to assess its potential in alleviating burnout and work-related stress among frontline healthcare workers during pandemics. However, due to the small sample size and potential biases, our findings should be interpreted with caution and considered preliminary rather than conclusive. Further research with larger, more representative samples is necessary to validate these results.

Tables and figures (Bonetto, Cheli, Bodini et al., 2024)

Table 1. Characteristics of participants at T0

	Intervention Group (n=13)		Control Group (n=20)		p-value Chi-square
	n	%	n	%	
Gender					
Male	1	7.7	6	30.0	0.126
Female	12	92.3	14	70.0	
Age					
< 36	4	30.8	7	35.0	0.598
36-55	7	53.8	12	60.0	
> 55	2	15.4	1	5.0	
Length of working experience					
< 6 years	1	7.7	4	20.0	0.625
6-20 years	5	38.5	8	35.0	
> 20 years	7	53.8	8	45.0	
Work period in COVID units					
First wave (March-May 2020)	10	76.9	16	80.0	0.833
Second wave (October-December 2020)	11	84.6	18	90.0	0.643
Third wave (January-March 2021)	9	69.2	17	85.0	0.279
Fourth wave (October-March 2022)	11	84.6	14	70.0	0.338

Table 2. Assessments at T0 by group.

Outcomes at T0	Intervention Group (n=13)	Control Group (n=20)	p-value t-test
	Mean (SE)	Mean (SE)	
Emotional exhaustion	3.09 (0.45)	2.41 (0.29)	0.188
Cynicism	2.25 (0.43)	2.00 0.26)	0.605
Professional efficacy	3.53 (0.28)	3.32 (0.27)	0.617
Depression	8.77 (1.45)	8.45 (1.15)	0.863
Anxiety	8.38 (1.21)	9.35 (1.24)	0.601
Insomnia	11.69 (1.90)	8.25 (1.28)	0.128
Stress	19.54 (2.39)	20.15 (1.84)	0.839
Post-traumatic*	5.13 (0.92)	4.06 (0.85)	0.414
Mindfulness skills	119.08 (5.15)	118.65 (5.31)	0.957
Inadequate self	1.86 (0.29)	1.86 (0.25)	0.993
Hated self	0.35 (0.10)	0.69 (0.16)	0.122
Reassuring self	2.12 (0.27)	1.99 (0.18)	0.672

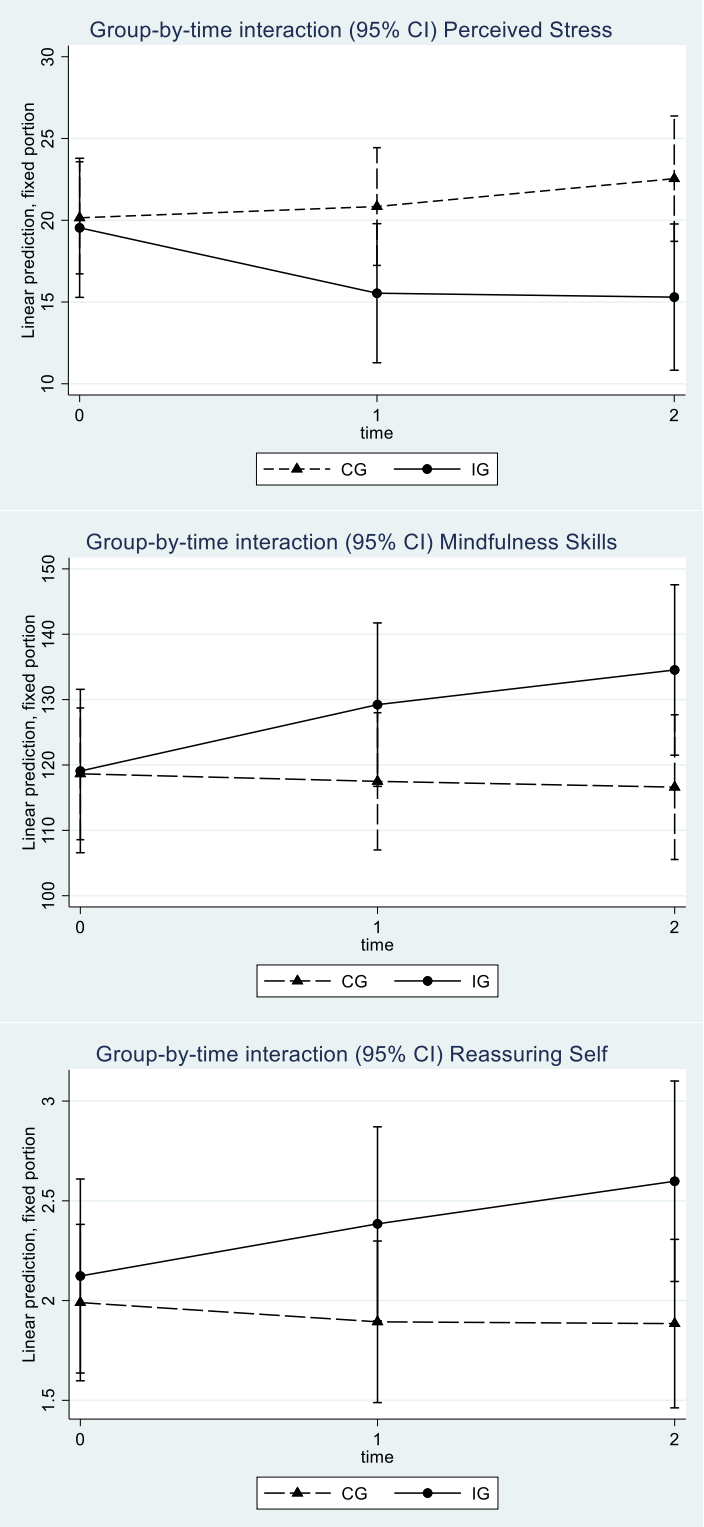
* Participants who experienced a stressful life event and were assessed by IES-R: n=9 (69.2%) in the intervention group and n=13 (65.0%) in the control group (p=0.801 Chi-square test)

Table 3. Repeated Measures ANOVA Group-by-time interaction effect on outcomes (Complete Case Analysis: Intervention group n=10, Control group n=11)

Outcome	Intervention Group, mean (SE)			Control Group, mean (SE)			Group-by-time interaction		
	T0	T1	T2	T0	T1	T2	F (2,38)	p	η_p^2
Emotional exhaustion	3.36 (0.44)	2.30 (0.42)	2.46 (0.43)	2.62 (0.42)	2.89 (0.40)	3.15 (0.41)	6.29	0.004	0.249
Cynicism	2.60 (0.42)	2.20 (0.48)	2.14 (0.45)	2.40 (0.40)	2.56 (0.46)	3.02 (0.42)	3.99	0.027	0.174
Professional efficacy	3.49 (0.26)	3.69 (0.31)	3.32 (0.29)	2.99 (0.25)	2.93 (0.29)	2.90 (0.28)	0.53	0.591	0.027
Depression	9.80 (1.38)	7.70 (1.31)	7.60 (1.55)	8.45 (1.32)	9.55 (1.25)	9.55 (1.48)	2.91	0.067	0.133
Anxiety	9.80 (1.29)	5.60 (1.30)	6.60 (1.24)	10.45 (1.23)	9.36 (1.24)	10.64 (1.18)	3.13	0.055	0.141
Insomnia	13.30 (1.67)	10.30 (1.82)	10.00 (2.02)	9.64 (1.59)	11.00 (1.74)	10.64 (1.93)	3.06	0.058	0.139
Stress	21.60 (2.29)	16.50 (2.26)	16.60 (1.98)	23.00 (2.19)	22.20 (2.15)	24.60 (1.89)	3.79	0.032	0.166
Post-traumatic	5.00 (1.29)	4.52 (1.32)	4.59 (1.42)	5.90 (1.09)	5.55 (1.12)	5.87 (1.20)	0.10	0.905	0.010
Mindfulness skills	115.00 (5.37)	129.00 (6.47)	132.00 (6.71)	112.00 (5.12)	110.00 (6.17)	110.00 (6.40)	5.24	0.010	0.216
Inadequate self	1.98 (0.35)	1.63 (0.30)	1.56 (0.29)	2.31 (0.34)	2.41 (0.29)	2.25 (0.27)	1.32	0.280	0.065
Hated self	0.38 (0.20)	0.42 (0.20)	0.34 (0.24)	0.93 (0.19)	0.96 (0.19)	1.13 (0.23)	1.04	0.365	0.052
Reassuring self	1.99 (0.26)	2.26 (0.24)	2.48 (0.25)	1.84 (0.24)	1.84 (0.23)	1.86 (0.24)	3.21	0.052	0.145

Note. Mauchly's Test of Sphericity indicated that the assumption of sphericity has not been violated ($p<0.05$ for all outcomes). Partial eta squared η_p^2 was calculated: values higher than 0.14 are indicative of a large effect size

Figure 1. Significant group-by-time interactions estimated by mixed-effects linear regression models [perceived stress p=0.007, mindfulness skills p=0.009, reassuring self (p=0.013)]



Digital Mindfulness Program for Healthcare Workers: a pilot feasibility study for the self-management of work-related stress and burnout

Introduction

Healthcare workers (HCWs) have faced significant psychological challenges during the COVID-19 pandemic, with studies reporting heightened levels of stress, anxiety, depression, and burnout, especially among those in high-risk units. Traditional psychological interventions, though valuable, often fall short in meeting HCWs needs due to barriers such as time constraints, stigma, and limited accessibility. Many HCWs avoid in-person counseling or support services because of confidentiality concerns or rigid schedules, leading critical gaps in mental health care for this population. These limitations highlight the need for more flexible and accessible solutions tailored to the unique demands of HCWs in high-stress environments.

To address these challenges, the present study proposes a pilot feasibility project to be conducted at the Azienda Ospedaliera Universitaria Integrata (AOUI) of Verona, Italy. This study aims to develop and evaluate a digital intervention designed to help HCWs manage work-related stress and burnout through a user-friendly online platform. Recruitment for this study will begin in January 2025.

The intervention, delivered entirely online, integrates techniques from Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), Compassion-Focused Therapy (CFT) and Mindful Compassion Care Program (MCCP). These approaches are combined to enhance well-being, foster self-compassion, and improve emotional regulation among HCWs.

Methods

The program is structured into five core sections: (1) Introduction to Mindfulness - provides foundational mindfulness practices to develop awareness and focus.; (2) Understanding Emotions - covers common emotional responses to stress and techniques for emotional regulation ; (3) Managing Work-Related Stress and Burnout - offers practical advice on maintaining a healthy lifestyle, incorporating relaxation exercises; (4) Acceptance as a Foundation for Change - , explores the role of acceptance in stress management and personal growth; and (5) Self-

Compassion and Compassion - focuses on cultivating compassion for oneself and others.

The digital platform offers HCWs access to guided audio sessions, videos, and written materials that they can use at their convenience, addressing accessibility barriers. Daily notifications and temporary 24-hour modules encourage engagement by providing tailored recommendations, mental health monitoring, and mindfulness prompts.

This quasi-experimental pre-post study will evaluate the program's feasibility, participant satisfaction, and preliminary effects on mental health outcomes. These outcomes include burnout, stress, anxiety, depression, insomnia, and post-traumatic stress symptoms. Participants will complete assessments at three time-points, baseline (T0), immediately post-intervention (T1), and one month later (T2), using validated self-report questionnaires. If successful, this pilot study will lay the groundwork for a future randomized controlled trial (RCT) to rigorously assess the efficacy of the digital intervention in supporting the mental health of HCWs in high-stress environments.

Questionnaires used and data collection methodology

Participants will complete a series of ad-hoc questions and self-report questionnaires via the digital platform. All collected data will be securely gathered, downloaded, and stored at the Section of Psychiatry, University of Verona.

The battery standardized instruments used to assess psychological dimensions is widely recognized in international literature, facilitating comparisons with data from other studies. Completing the online questionnaires is estimated to take approximately 60 minutes. Details of the data collection are outlined in Table 1.

The following tools will be employes:

- Personal Information Form. This ad-hoc form gathers demographics and professional details, including gender, age group, marital status, education level, current living arrangement, years of healthcare experience, professional profile, work unit, mental health treatment history, and mindfulness practice in the past six months. Administered at T0.

- Maslach Burnout Inventory-General Survey (MBI-GS) (Maslach et al., 1997): A self-administered scale that explores the individual's relationship with work, specifically burnout. This modified and abbreviated version of the original MBI contains 16 items covering three subscales: emotional exhaustion, measuring feelings of being overwhelmed and drained by work; cynicism, indicating detachment or indifference toward work; and professional efficacy, assessing satisfaction with past and present achievements and expectations of continued efficacy at work. Higher scores in emotional exhaustion and cynicism and lower scores in professional efficacy indicate burnout. Administered at T0, T1, and T2.
- Satisfaction and Enjoyment Questionnaire: An ad-hoc questionnaire with six open-ended questions about various aspects of the intervention, such as expectations, motivation, learning, engagement, difficulties, and exercises. It includes a question on the program's usefulness (rated on a scale from 1 - not useful at all - to 10 - extremely useful) and a section for comments and suggestions. Administered at T1.
- Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001): A standardized self-administered questionnaire with nine items assessing depressive symptoms over the past two weeks, such as reduced interest in daily activities, feelings of sadness, inadequacy, low energy, and sleep or appetite changes. Higher scores indicate more severe depression. Administered at T0, T1, and T2.
- Generalized Anxiety Disorder (GAD-7) scale (Spitzer et al., 2006): A standardized self-administered questionnaire with seven items that assess the level of anxiety and worry experienced in the past two weeks. Higher scores indicate higher anxiety levels. Administered at T0, T1, and T2.
- Perceived Stress Scale (PSS) (Cohen et al., 1994): A 10-item self-administered questionnaire that assesses perceived stress. Psychological stress is defined as the degree to which individuals feel that demands exceed their coping resources. Scores range from 0 (no symptoms) to 40 (maximum severity). Administered at T0, T1, and T2.
- Insomnia Severity Index (ISI) (Bastien et al., 2001): A brief self-administered questionnaire that assesses insomnia severity and its impact on daily life. The

scale includes seven items covering aspects like symptom severity, interference with daily functioning, and satisfaction with sleep patterns. Higher scores indicate greater insomnia issues. The questionnaire refers to the past two weeks. It will be administered at T0, T1, and T2.

- Impact of Events Scale - Revised (IES-R) (Weiss and Marmar, 1997): A standardized self-administered questionnaire with 22 items used to assess post-traumatic stress symptoms related to one or more stressful or traumatic experiences indicated by the respondent. The tool generates three subscales corresponding to the main PTSD symptom dimensions: re-experiencing, avoidance, and hyperarousal. Higher scores indicate a stronger stress reaction. Administered at T0, T1, and T2.
- Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2008): A self-administered questionnaire with 39 items that generate five mindfulness subscales: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience. Higher scores reflect greater mindfulness levels. Administered at T0, T1, and T2.
- Forms of Self-Criticising/Attacking and Self-Reassuring Scale (FSCRS) (Gilbert et al., 2004): A self-administered questionnaire with 22 items that evaluates self-criticism and the relationship with oneself. It includes three dimensions: inadequate self (self-criticism motivated by a desire for improvement), hated self (self-criticism motivated by a desire to harm oneself), and self-reassurance (the ability to reassure oneself). Administered at T0, T1, and T2.

Sample Size and Statistical Analysis

The target population for this research consists of healthcare personnel (nurses, OSS, and technical healthcare staff) working at AOUI Verona at the time of the study's initiation. As this is a pilot feasibility study exploring potential changes in various psychological outcomes among users of an mHealth intervention, a power analysis was not conducted, and no minimum sample size was defined a priori. Once data collection is complete, the adherence and dropout rates for this type of intervention will be assessed. A power analysis will be performed retrospectively to

validate the results obtained from the exploration of any changes following the intervention.

Categorical variables will be described using absolute and percentage frequency distributions, while continuous variables will be presented with means (standard deviations) or medians (interquartile ranges), depending on the type of distribution observed. The comparison between independent groups, defined based on relevant characteristics within the recruited sample (e.g., professional profile, department, years of service), will be conducted using the Chi-square test (or Fisher's exact test for 2x2 tables) for categorical outcomes, the t-test (or Mann-Whitney test when appropriate; for comparisons between two groups), and ANOVA (or Kruskal-Wallis test when appropriate; for comparisons between more than two groups) for continuous outcomes.

The exploration of changes in continuous outcomes between pre-treatment (T0) and post-treatment (T1) will be carried out using the paired t-test (or Wilcoxon signed-rank test when appropriate). The additional measurement one month after the end of treatment (T2) will allow for the exploration of changes using repeated-measures ANOVA (or Friedman test when appropriate). Correlations between continuous variables will be estimated using Pearson's correlation coefficient (or Spearman's non-parametric coefficient when appropriate). All tests conducted will be two-tailed with a significance level set at 0.05. The analysis software used will be Stata 17 for Windows.

Recruitment

The study description and invitation to participate will be announced through the hospital newsletter and displayed on bulletin boards accessible to all healthcare staff. Additionally, the hospital administration will send an email to each healthcare professional containing a registration link for the platform. Participation in the study will be entirely voluntary. HWCs interested in participating will follow a registration process via the provided link, which includes the following preliminary steps (Figure 1):

- Review of the study information sheet: Participants will be provided with detailed information about the study objectives, procedures, and expectations.
- Review of the consent form: this includes information on the use and processing of personal data. Participants will have option to indicate their consent by selecting either 'I accept' or 'I do not accept'.
- Participants who consent will be required to provide an email address and create a username. This username, combined with a platform-generated password, will serve as the participants' unique credential throughout the study, granting access to intervention materials and assessment at T0, T1, and T2.
- The platform will automatically generate a secure, unique 8-character alphanumeric password for each user. This password will include at least one special character and a mix of uppercase and lowercase letters. It will be sent to the participants registered email address.
- Upon the first login, users will have the option to change their password to one of their choosing, ensuring it remains known only to them.

These credentials will allow participants access to: 1) access the platform, including psychological assessments and multimedia materials (audio, video, text); 2) . link their data across various study stages e.g., completed interventions, time spent accessing materials, and longitudinal assessments);3) Request the deletion of their data at any time.

The platform will also incorporate a tracking mechanism to monitor user engagement, including the frequency of access and time spent viewing the provided materials. Participants who experience undesirable effects from the intervention and wish to withdraw from the study can contact the study coordinator using the details provided in the information sheet. Upon request, participants will be referred to the UOC of Psychosomatics at AOUI Verona for further support. Any such cases will be reported to the Ethics Committee.

Discussion

This pilot study is an important step in evaluating the feasibility and acceptability of a digital mindfulness intervention for HCWs experiencing high levels of work-related stress and burnout. By providing a flexible and accessible mHealth solution, this study aims to address traditional barriers to mental health support in healthcare settings, such as time constraints, confidentiality concerns, and stigma. The findings will offer preliminary insight into user engagement, satisfaction, and the intervention's potential effects on key psychological outcomes, including burnout, stress, and overall mental well-being.

As telemedicine and digital health interventions continue to grow in popularity for mental health support, rigorous studies like this are essential to assess their effectiveness and scalability. This pilot study will serve as a foundation for a larger randomized controlled trial, ultimately aiming to integrate evidence-based digital tools that enhance mental well-being across healthcare organizations.

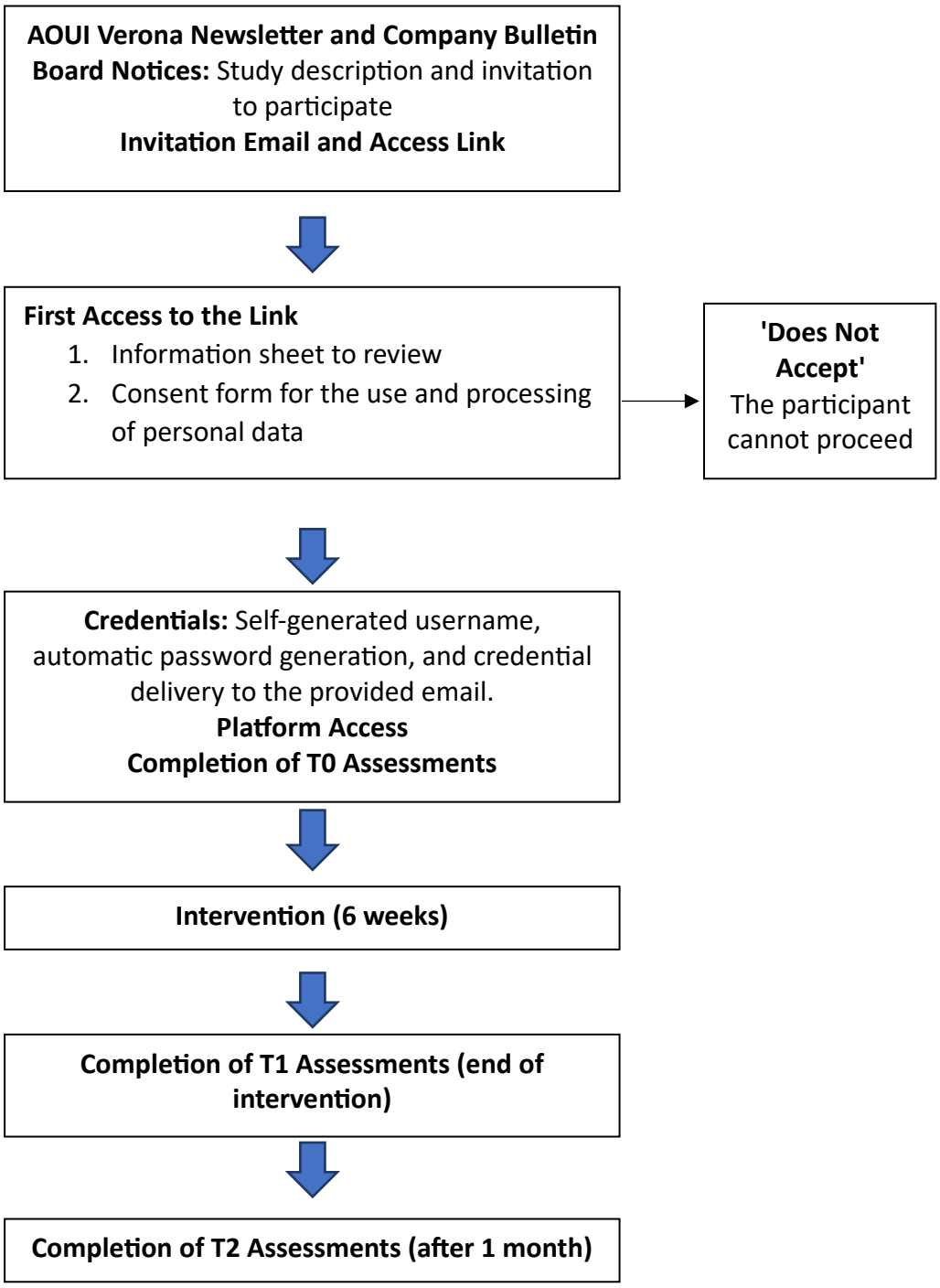
Our hope is that the insights gained from this research will contribute to fostering supportive work environments that prioritize the mental health and resilience of healthcare professionals, thereby benefiting both staff well-being and the quality of patient care they deliver.

Tables and figures Digital Mindfulness Program for Healthcare Workers

Table 1. Information collected through self-report questionnaire

Information	**Assessment Tool**	**Completion Time**	**Administration**
Personal Information Form	Ad hoc	5	T0
Satisfaction and Enjoyment Questionnaire	Ad hoc	5	T1
Work Burnout	MBI-GS	5	T0-T1-T2
Depressive Symptoms	PHQ-9	5	T0-T1-T2
Anxiety Symptoms	GAD-7	5	T0-T1-T2
Perceived Stress	PSS	5	T0-T1-T2
Insomnia	ISI	5	T0-T1-T2
Post-Traumatic Stress Symptoms	IES-R	10	T0-T1-T2
Mindfulness Skills	FFMQ	10	T0-T1-T2
Self-Criticism	FSCRS	10	T0-T1-T2

Figure 1. Recruitment and Study Enrollment Procedure



CHAPTER 2 – MENTAL HEALTH SERVICES DURING COVID-19 PANDEMIC

Chapter 2 of the Thesis examines the challenges faced by mental health services during the COVID-19 pandemic. The increased prevalence of mental health issues, coupled with worsening symptoms among patients with pre-existing conditions, necessitated urgent intervention strategies. Telepsychiatry emerged as critical solution to ensure continuity of care; however, its implementation posed challenges related to technology access and privacy, particularly for older adults or individuals in remote areas. Mental health professionals, already operating under significant strain, faced heightened workloads, which often resulted in burnout and increased anxiety.

In psychiatric residential facilities, containment measures imposed severe restrictions including the suspension of external activities, isolation from family members, and limitations on group therapies and outdoor rehabilitation programs. These constrains disrupted residents' recovery processes, exacerbating social isolation and psychological discomfort. A study conducted in mental health residential facilities in the Verona area highlighted that these changes were perceived as particularly challenging by both staff and residents.

The Chapter underscores the necessity of flexible care models capable of adapting to crisis situations and highlights the critical need for psychological support for healthcare providers. The findings reinforce the importance of maintaining consistent rehabilitative interventions to prevent long-term deterioration in patients with severe mental disorders.

Challenges faced by Mental Health Services during COVID-19 Pandemic: an overview

The COVID-19 pandemic created significant challenges across healthcare systems worldwide, with mental health services facing particularly complex and urgent issues. As lockdowns, social isolation, and fear of infection became part of daily life, mental health demands surged, affecting individuals' mental well-being globally. People with pre-existing mental health disorders experienced worsening symptoms, while new cases of anxiety, depression, and other disorders rose sharply (Kumar & Nayar, 2021; Murphy et al., 2021).

COVID-19 significantly increased mental health issues in diverse populations, from healthcare workers to the general public. Many people experienced intense stress, anxiety, and depression due to social isolation, economic instability, and health concerns (Kumar & Nayar, 2021) . For individuals with pre-existing mental health conditions, symptoms often worsened due to disrupted care and increased isolation (Murphy et al., 2021). Research highlighted the need for proactive strategies to support vulnerable groups, such as increased monitoring and early intervention, alongside more accessible healthcare services (Moreno et al., 2020). To address the urgent need for continuity of care amid restrictions, mental health services rapidly adopted telepsychiatry and other virtual methods (Di Carlo et al., 2021). Although telehealth enabled continued access to care, technological and accessibility barriers emerged, particularly for older patients and those in rural areas (E. Byrne & Watkinson, 2021). Privacy concerns in telemedicine also affected the quality of engagement, as many patients lacked private spaces for therapy sessions (E. Byrne & Watkinson, 2021). Despite its limitations, telehealth played a crucial role in providing access to mental health services during the pandemic and is likely to remain integral in the future of mental health care.

Mental health professionals faced significant stress as they managed rising patient needs with limited resources. Many staff were redirected to frontline COVID-19 care, reducing mental health service capacity and increasing burnout risks among remaining workers (Gruber et al., 2021). Mental health workers themselves experienced heightened anxiety, compassion fatigue, and burnout due to increased caseloads and the emotional toll of supporting patients in crisis (E. Byrne &

Watkinson, 2021). Studies recommend improved support systems for healthcare workers, emphasizing the importance of mental health services for the providers themselves (Kumar & Nayar, 2021).

Accessibility to mental health care diminished sharply during the pandemic, with physical service closures, limited mobility, and fear of infection acting as barriers to in-person visits (Di Carlo et al., 2021). Vulnerable groups, such as those in lower-income brackets and remote areas, faced particular challenges, which telepsychiatry partially addressed but could not fully overcome due to technological and resource limitations (Moreno et al., 2020). This access issue underscores the importance of establishing flexible, resilient service models that can adapt to crisis contexts.

Mental health services observed significant symptom exacerbation in people with pre-existing mental health conditions due to pandemic-related stressors. Isolation, uncertainty, and restricted healthcare access led to deteriorating mental health outcomes for these patients, highlighting the urgent need for consistent and adaptable mental health services (Murphy et al., 2021). Effective mental health responses in future crises will require enhanced strategies for ensuring continuity of care and tailored support for those most at risk of worsening symptoms.

The pandemic raised ethical issues for mental health providers, including dilemmas around prioritizing patient and provider safety (Moreno et al., 2020). Additionally, privacy and data security concerns in telepsychiatry required mental health services to carefully balance patient confidentiality with the necessity of remote care (Di Carlo et al., 2021).

The COVID-19 pandemic underscored the need for adaptable, resilient mental health care systems. Recommendations for future improvements include increased funding for telepsychiatry, expanded support for healthcare workers, and the development of integrated care models that address both physical and mental health needs (Byrne & Watkinson, 2021). In addition, services must implement strategies for monitoring patient well-being over time to mitigate the risk of symptom exacerbation during crises (Murphy et al., 2021).

Changes in emergency psychiatric consultations in time of COVID-19: a retrospective observational study in the Verona Academic Hospital over the two pandemic years 2020–2021 (Bodini, Bonetto, Maccagnani et al., *BMC Emergency Medicine*, 2023)*

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Changes in emergency psychiatric consultations in time of COVID-19: a retrospective observational study in the Verona Academic Hospital over the two pandemic years 2020–2021

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Abstract

Background During the first months of the COVID-19 pandemic, local health authorities in most Italian regions prescribed a reduction of ordinary outpatient and community mental health care. The aim of this study was to assess the impact of the COVID-19 pandemic on access to the emergency departments (ED) for psychiatric consultation in the pandemic years 2020 and 2021 compared to 2019.

Methods This is a retrospective study conducted by using routinely collected administrative data of the two EDs of the Verona Academic Hospital Trust (Verona, Italy). All ED psychiatry consultations registered from 01.01.2020 to 31.12.2021 were compared with those registered in the pre-pandemic year (01.01.2019 to 31.12.2019). The association between each recorded characteristic and the year considered was estimated by chi-square or Fisher's exact test.

Results A significant reduction was observed between 2020 and 2019 (-23.3%) and between 2021 and 2019 (-16.3%). This reduction was most evident in the lockdown period of 2020 (-40.3%) and in the phase corresponding to the second and third pandemic waves (-36.1%). In 2021, young adults and people with diagnosis of psychosis showed an increase in requests for psychiatric consultation.

Conclusions Fear of contagion may have been an important factor in the overall reduction in psychiatric consultations. However, psychiatric consultations for people with psychosis and for young adults increased. This finding underlines the need for mental health services to implement alternative outreach strategies aimed to support, in times of crisis, these vulnerable segments of the population.

Keywords Coronavirus, COVID-19, Mental health, Lockdown, Outbreak, Emergency department

** The study has been published (Bodini et al., 2023) and is reproduced with permission.*

Abstract

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Conclusions: Fear of contagion may have been an important factor in the overall reduction in psychiatric consultations. However, psychiatric consultations for people with psychosis and for young adults increased. This finding underlines the need for mental health services to implement alternative outreach strategies aimed to support, in times of crisis, these vulnerable segments of the population.

Background

Italy was the first nation among Western countries to be affected by the COVID-19 outbreak. Due to the rapid spread of the pandemic within the country, on March 8th, 2020, the Italian government established stringent containment measures in Lombardy, Veneto, and some neighbouring provinces of Emilia-Romagna. On March 11th, 2020, the Italian government imposed a nationwide lockdown. This extraordinary containment measures restricted movement of all people across the national territory, except for work or health reasons or in an exceptional case of necessity. Starting from mid-March 2020, activities within hospitals in the most affected regions, such as Lombardy, Veneto and Emilia Romagna, underwent a rapid and profound reorganization *i*n order to preserve beds *and* staff *for* COVID-19 patients (Faccincani et al., 2020; Marcon et al., 2020).

As a result, many hospital wards had to reorganize their activity, thus becoming COVID-19 wards. In this context, mental health care also underwent significant changes: some psychiatric inpatient units across the country were closed and a significant proportion of psychiatrists, mental health nurses, and other health-care workers were transferred to new COVID-19 wards (Carpiniello et al., 2020).

During the lockdown period, local health authorities in most Italian regions, following national regulations, prescribed a reduction of ordinary outpatient and community mental health care; only mental health care for most urgent cases was ensured. Starting from mid-March 2020, day-care facilities for psychiatric patients were temporarily closed (in most regions they were reopened only in June/July 2020), whereas patients receiving residential care were confined within facilities with no possibility to follow outdoor rehabilitative interventions. In addition, the lockdown and the subsequent quarantine measures significantly impacted on the psychological status of the general population, thus leading to the onset of new mental disorders or to the exacerbation of pre-existing sub-threshold psychiatric conditions (Brooks et al., 2020; Courtney et al., 2020; Kelly, 2020).

Taken together, the reduction of outpatient mental health care established by national and regional containment measures and the increase in the incidence of mental disorders in the general population might have led to increased numbers of

access to emergency departments for psychiatric consultations during the first pandemic year.

On the contrary, research carried out in the first lockdown period both in Italy and in other countries reported a decrease in emergency department (ED) psychiatric consultations, with a reduction varying between 31% and 52% according to different studies (Balestrieri et al., 2021; M. Beghi et al., 2021; Capuzzi et al., 2020; Clerici et al., 2020; Gonçalves-Pinho et al., 2021; Pignon et al., 2020). The overall reduction of ED psychiatric consultations was mainly due to the reduction of consultations for anxiety and depressive disorders, whereas consultations for psychotic disorders did seem to have shown a substantial reduction (E. Beghi et al., 2020).

Within this scenario, it is necessary to understand the dynamics that might have affected ED psychiatric consultations during the different pandemic phases. Studies conducted so far only considered limited periods of time, as they generally focused on the lockdown period or the post-lockdown periods of 2020 (Balestrieri et al., 2021). No study has so far monitored ED psychiatric consultations throughout the first (2020) and the second pandemic year (2021). To fill this knowledge gap, the aim of the following study is to evaluate the changes in ED psychiatric consultations for the years 2019, 2020 and 2021, and to assess whether significant differences exist stratifying by gender, age, and psychiatric diagnoses. In addition, by using the Interrupted Time Series Analysis (ITSA) technique, we aimed to assess whether restrictive measures had some role in changing the trend of ED psychiatric consultations over the years considered.

Methods

Setting

This study was conducted within the Verona Academic Hospital Trust [Azienda Ospedaliera Universitaria Integrata (AUOI) of Verona], the second largest hospital in Italy in terms of bed numbers (1384 ordinary and 138 day-hospital beds), and the fifth largest in terms of admissions. AOUI is a tertiary hospital trust composed of two hospitals, “Ospedale Civile Maggiore” and “Policlinico G.B. Rossi”, located respectively in the northern and southern part of the city of Verona (Veneto region,

north-east Italy). Each hospital has its own specific ED. In the pre-pandemic era, the overall number of yearly accesses to both EDs was around 100,000.

Study design and data collection

We conducted a retrospective observational study using an electronic administrative database (the ED information system) that collects routine information of all the emergency visits occurring within the two EDs operating in the Verona Academic Hospital Trust. For the specific study aims, we selected all ED psychiatric consultations for the adult population (≥18 years) that were registered by the ED information system in 2019, 2020 and 2021. For each ED psychiatric consultation, the following variables were collected: admission date; sex; age group; admission to any hospital ward for psychiatric reasons; primary psychiatric diagnosis. Psychiatric diagnoses were made on clinical basis by ED physicians (together with psychiatrists called for the consultation) using the International Classification of Diseases version 9 - Clinical Modification (ICD-9-CM) codes. For the purposes of analysis, ICD-9-CM codes were grouped within macro categories (anxiety disorders; schizophrenia and other psychotic disorders; depression and mood disorders; adjustment disorders; personality disorders; suicide and intentional self-inflicted injury; poisoning by medications and drugs; delirium, dementia, amnestic and other cognitive disorders) using the Agency for Health Care Quality and Research (AHRQ) Clinical Classifications Software (CCS) for ICD-9-CM [11].

Data were *anonymized* and all patient identification details were removed by an independent administrator *before data extraction* to secure patients' personal information in accordance with Data Protection Act (EU Regulation 679/2016). Therefore, r*esearch team* members had no *access to personal patient data.* Informed *consent to participate was waived* by the Ethics Committee of the Provinces of Verona and Rovigo due to the retrospective nature of the study and to the fact the patient data were anonymized/de-identified. The study was approved by the Ethics Committee of the Provinces of Verona and Rovigo (approval No. 14892; March 15, 2021).

Time period

This study analysed three consecutive years: 2019 (the "pre-pandemic year", considered as the "control" condition), 2020 (the "first pandemic year"), 2021 (the "second pandemic year"). Within the two pandemic years, we identified some periods defined based on the pandemic stage and characterized by specific containment measures as enforced by the Italian legislation. Specifically, for 2020 we defined the following periods: (1) the "pre-lockdown phase" (January 1–March 8); (2) the "lockdown phase" (March 9–May 3); (3) the period of "loosened restrictions" (May 4–June 14); (4) the period of "relaxing restrictions" (June 15–October 12); (5) the period of "new restrictive measures due to the second pandemic wave" (October 13–December 31). For 2021, we identified the following periods: (1) the period of "restrictions due to the second and third pandemic wave" (January 1–April 25); (2) the period of "loosened restrictions" (April 26–June 6); (3) the period of "relaxing restrictions" (June 7–December 17); (4) the period of "new restrictions due to the fourth pandemic wave" (December 18–December 31).

Data analysis

Descriptive statistics were performed, with ED psychiatric consultations presented as absolute numbers and percentages. Percentage scores from the pre-pandemic year 2019 were calculated for 2020 and 2021. Confidence intervals at 95% were estimated by assuming a Poisson distribution for the number of consultations. The association between each characteristic (gender, age bands, admission to a psychiatric ward, diagnosis) and the year was estimated by chi-square or Fisher's exact test. Using the 'itsa' Stata command, a monthly interrupted time-series analysis (ITSA) with a single-group design and multiple treatment periods was estimated to assess whether the introduction of restrictive measures (9 March 2020: lockdown for the first pandemic wave; 13 October 2020: new restrictive measures for the second and third pandemic waves) resulted in a shift in the level and trend over time of ED psychiatric consultations (Linden, 2015). Newey-West standard errors were estimated to adjust the standard errors to handle possible heteroskedasticity and a maximum number of lags of 1 to handle any auto correlation.

All tests were bilateral at a significance level of 0.05. Analyses were performed by Stata 17 for Windows.

Results

With respect to the pre-pandemic year (2019), the overall number of ED visits within the Verona Hospital Trust decreased by 23% in 2020 (from 99,829 in 2019 to 77,191 in 2020) and by 15% in 2021 (from 84,530 to 77,191).

As regards ED psychiatric consultations, changes occurring over the two pandemic years followed the same pattern observed for overall ED visits (see Table 1).

With respect to the pre-pandemic year, ED psychiatric consultations also decreased by 23% in 2020. The greatest reduction was observed, as expected, during the lockdown period (40.3%), followed by the period of new restrictions due to the second pandemic wave (33.7%), whereas the reduction during the period of relaxing restrictions (broadly corresponding to the summer season) was negligible (7.6%) [95% CI (-11.0; -5.1)] (Table 1, upper part).

With respect to the pre-pandemic year, the ED psychiatric consultations in 2021 were also reduced, but to a lesser degree than 2020 (16.3%) [95% CI: (-26.1; -20.6) vs (-18.7; -14.1)]. The greatest reduction in ED psychiatric consultations in 2021 was observed in the period of loosened restrictions following the second and third pandemic wave (36.1%); a relevant reduction was also detected in the periods of new restrictions due to the fourth (25%) and the second pandemic waves (24.5%). No reduction in ED psychiatric consultations was detected during the second part of 2021, except for the last two weeks of December (Table 1, bottom part).

Figure 1a reports percentage changes in the number of overall ED visits by month. As compared with the pre-pandemic year, the number of ED visits over the 12-month period was reduced during 2020, with the greatest reduction in April (44%), corresponding to the mid-lockdown phase. During the summer season 2020, reduction in ED visits never exceeded 16%. The second pandemic year displayed a less pronounced trend of reduction of ED visits, progressively approaching a reduction of 8.5% on June. In December 2021 the reduction of ED visits was only of 7.7% with respect to the pre-pandemic year.

Figure 1b reports percentage changes between 2020 and 2019 and between 2021 and 2019 in monthly ED psychiatric consultations. As compared to the pre-pandemic year, the greatest reduction in ED psychiatric consultation was first detected in March 2020 (38%), followed by October–November 2020 (respectively, 38.5% and 37.6%); the reduction in ED psychiatric consultations remained evident throughout the first pandemic year, with the only exception being August when the reduction reached a negligible level (3.7%). As compared to the pre-pandemic year, in January 2021 the greatest reduction was observed in ED psychiatric consultations since the beginning of the pandemic (46%), whereas the number of ED psychiatric consultations did not significantly change during the second half of 2021.

Table 2 shows the distribution of psychiatric consultations by year and key patients' characteristics (gender, age bands, admission to hospital, psychiatric diagnosis). No significant difference in the cohort composition was found between 2020 and 2019, while age and diagnosis significantly differed between 2021 and 2019, with a higher percentage of ED consultations for young patients (27.5% vs 22.3%) and patients with psychosis (22.9% vs 18.4%) in the second pandemic year.

Considering the percentage changes stratified by key characteristics, a reduction for all categories in all variables was observed in 2020 with respect to 2019. Specifically, females and males showed a similar reduction. As regards the age bands, both older (>70 yrs.) and middle-aged patients (31–50 yrs.) displayed a 30% reduction (95% CIs overlapping). A 28% reduction was observed in admissions to hospital following ED psychiatric consultations. Regarding diagnostic composition, ED consultations for anxiety, psychosis and mood disorders showed a reduction during 2020, ranging from 25% and 30%; on the other hand, ED consultations for suicide/self-poisoning increased up to nearly 7% (95% CI 2.3–16.2). The year 2021 was also characterized by a reduction in almost all categories for the considered characteristics, but to a lesser extent than 2020. Interestingly, young adults showed an increase of up to 3% with respect to 2019. Moreover, psychosis had a 4% increase in 2021, whereas ED consultations for suicide/self-poisoning displayed an 18% reduction in 2021. Finally, ED consultations for substance abuse disorders increased by 3% in 2021.

As shown in Table 3, the starting level of the ED psychiatric consultations was estimated at about 109, and consultations appeared to decrease significantly prior to lockdown (9 March 2020) by 1.5 every month (p=0.007).

In the first month after lockdown, a decrease in ED psychiatric consultations of 14 consultations emerged, although not statistically significant (p=0.167). It was followed by an increase in the trend of consultations (relative to the pre-lockdown trend) of 2.4 consultations per month, but still not significant (p=0.375). The post-trend estimation showed that, after the introduction of lockdown, ED psychiatric consultations did not change monthly (coefficient=0.94, p=0.722, CI = [-4.42, 6.30]).

The coefficients for the new restrictive measures period were compared with those of the lockdown period. In the first month of the new restrictions, there appeared to be a not significant decrease in ED psychiatric consultations of about 12 (p=0.392). It was followed by an increase in the monthly trend of consultations (relative to the lockdown trend) of 1.0 consultations per month (p=0.730), but it was not significant. The post trend estimation showed that, after the introduction of the new restrictive measures, ED psychiatric consultations increased monthly at a rate of 1.92 (p=0.002, CI = [0.75, 3.10]).

Monthly actual and predicted ED psychiatric consultations in relation to COVID-19 restrictive measures are shown in Figure 2.

Discussion

Overall, we found a significant reduction (nearly one-quarter) of ED psychiatric consultations in the first pandemic year (2020) as compared to 2019. This finding parallels the reductions of overall ED visits both in our hospital and in other geographical areas (Paganini et al., 2021; Pines et al., 2021; Radhakrishnan, 2022). Interestingly, the reduction of ED psychiatric consultations also occurred in the second pandemic year, even if to a lesser degree. We also found that the reduction of ED psychiatric consultations in the first pandemic year was mainly due to the reduction that occurred during the lockdown period. This finding is consistent with that reported by studies conducted in Italy (Balestrieri et al., 2021; E. Beghi et al., 2020; Clerici et al., 2020) and in other nations (Gonçalves-Pinho et al., 2021;

Pignon et al., 2020). The reduction of ED psychiatric consultations during the lockdown may be explained in the light of the government restrictive measures that limited (or avoided) free movement across the national territory, together with the self-limitation of patients in referring to emergency departments due to the fear of contagion (indeed, over the first months of the pandemic, hospitals represented the main source of contagion).

The overall number of ED psychiatric consultations over the first pandemic year never returned to that of pre-pandemic level either when, following the significant reduction of infections and deaths from COVID-19, the most stringent restrictive measures were lifted. In this period, September 2020, our data shows an opposite trend with an increase in the number of admissions for psychiatric consultations. Most interestingly, despite this trend inversion, the overall number of psychiatric consultations also remained substantially lower than that of the pre-pandemic year during the second pandemic year (2021). Our study also found that, with respect to the pre-pandemic year, ED psychiatric consultations in 2021 were more frequent than expected for people aged 18–30 years. This seems a particularly important finding, which is consistent with that observed in other studies reporting an exacerbation of mental disorders in young people, probably related to the wide-ranging effects of the pandemic on this specific age group (Pieh et al., 2021).

Finally, we found that the reduction of ED psychiatric consultations did not homogeneously affect all psychiatric diagnoses. Indeed, the observed reduction affected mainly common mental disorders (such as adjustment disorders, anxiety disorders, depression) and, to less extent, other diagnoses. On the contrary, most severe psychiatric conditions, such as psychoses, had registered an increase in 2021 with respect to 2019 (whereas the number of ED psychiatric consultations for psychosis in 2020 remained substantially stable in comparison to the pre-pandemic year).

The increase of ED psychiatric consultations for psychosis observed in 2021 is an interesting finding. Available literature seems to suggest that there might be an increased occurrence of psychotic episodes in people with established disorders during the COVID-19 pandemic (Barlati et al., 2021; D′ Agostino et al., 2021; Valdés-Florido et al., 2022), probably due to a number of precipitating factors,

including prolonged isolation, fear of contagion, presence of pandemic-related conspiracy theories and delusion-like beliefs (Barlati et al., 2021).

It is also interesting that ED consultations for anxiety and mood disorders were consistently reduced over the two years of pandemic, without returning to levels of pre-pandemic year. This finding may be counterintuitive, especially in the light of increased incidence of stress, anxiety and depressive disorders due to the psychological impact of the COVID-19 pandemic on the general population (Fiorillo et al., 2020; Safi-Keykaleh et al., 2022; Santomauro et al., 2021). We hypothesize, however, that the increased incidence of common mental disorders in the general population may related to mild or very mild conditions, most of which can be self-managed without necessarily the need for a specialist intervention. Moreover, the fear of contagion might have acted as a deterrent for many people with common mental disorders who, even in highly distressing situations, would have preferred to self-manage their distress rather than take the risk of being infected within crowded emergency departments.

Due to these avoidant and safety behaviours, the lockdown might have paradoxically improved the appropriateness of access to emergency departments by people with anxiety and stress disorders, thus leading to only those patients with severe urgent conditions seeking emergency care. Indeed, the inappropriate use of emergency departments by people with anxiety disorders has been found in some studies, reporting that only half of the anxiety-related ED psychiatric consultations are classified as “urgent” (Dark et al., 2017; Larkin et al., 2005). On the other hand, the fear of contagion may have deterred even those patients with real urgent care needs resulting in worsening of the disorder. Finally, we cannot exclude that the effect on the reduction of ED psychiatric consultations for common mental disorders might be due to a series of initiatives, delivered face-to-face or through an e-health approach (online counselling services, using social media platforms, e-mails or telephone), from public and/or private organizations in Italy aiming to provide psychological support to the general population or within workplaces (Orrù et al., 2020).

This study has several strengths. First, this study considers the whole years 2020 and 2021, rather than limited periods. Second, in addition to annual variations, this

study also considered different phases corresponding to different pandemic scenarios. Third, findings were stratified by diagnosis, sex and age groups. Fourth, this study employed an approach to data analysis (i.e. the ITSAs) that made it possible to analyse changes in ED psychiatric consultations during the different phases of the pandemic in statistical terms and not only in terms of graphical displays.

This study also has several limitations. First, ED psychiatric consultations were drawn from one single hospital trust located in northern Italy and thus cannot be considered representative of the national territory. Second, even though Verona Academic Hospital Trust is one of the largest in Italy, the overall number of ED psychiatric consultations is relatively small and thus little variations might have had a larger impact on findings. Third, our study only focused on the adult population and did not consider ED consultations for children and adolescents. Fourth, psychiatric diagnoses were made on clinical basis; this limitation, however, is inherent to the methodology used in this study, as it is well known that routinely collected healthcare data may potentially suffer from low diagnostic accuracy (F. Liu & Demosthenes, 2022). Finally, the database extracted did not allow us to establish whether people asking for ED psychiatric consultations had a recent onset psychiatric disorder or were patients already in contact with mental health services.

Conclusions

This observational study found a marked decline of ED psychiatric consultations during the lockdown, the post-lockdown phases and the phases corresponding to the second and third pandemic waves in 2021. However, this reduction impacted exclusively on milder psychiatric conditions (e.g., adjustment, anxiety, stress, and depressive disorders), whereas ED consultations for severe mental disorders (such as psychoses) did not reduce, but rather increased during the second pandemic year. Interestingly, during this period, ED psychiatric consultations also increased for young adults. The increase in emergency consultations for patients with psychosis and for young adults raises concerns on the overall capacity of mental health services in the community to manage and to provide appropriate care to the most vulnerable segments of the population in times of crisis. Mental health services

should be prepared to implement alternative outreach strategies, such as telepsychiatry or domiciliary services, to support these populations requiring special attention. Future research should aim to monitor the long-term impact of the pandemic on the mental health system as a whole, by conducting ad hoc longitudinal analyses on ED psychiatric consultations and by correlating the dynamics of emergency psychiatric consultations with the response of mental health services at the community and outpatient level.

Tables and figures (Bodini, Bonetto, Maccagnani et al., 2023)

Table 1. ED psychiatric consultations: comparisons between 2020 and 2021 with 2019 by different pandemic periods.

Comparison between 2020 and 2019					
Period	**Description**	**2019**	**2020**	**Change in 2020–2019[#]**	**Poisson 95% CI**
		n (%)	**n (%)**	**%**	
1 Jan–8 Mar	Pre-lockdown	246 (20.3)	194 (20.9)	-21.1	(-27.7; -15.8)
9 Mar–3 May	Lockdown	181 (14.9)	108 (11.6)$^{\downarrow}$	-40.3	(-50.7; -31.6)
4 May–14 Jun	Loosened restrictions	163 (13.4)	120 (12.9)	-26.4	(-35.5; -19.1)
15 Jun–12 Oct	Relaxed restrictions	367 (30.4)	339 (36.4) $^{\uparrow}$	-7.6	(-11.0; -5.1)
13 Oct–31 Dec	New restrictive measures for the second pandemic wave	255 (21.0)	169 (18.2)	-33.7	(-41.7; -27.0)
Whole period		1212	930	-23.3	(-26.1; -20.6)
Comparison between 2021 and 2019					
Period	**Description**	**2019**	**2021**	**Change in 2021-2019°**	**Poisson 95% CI**
		n (%)	**n (%)**	**%**	
1 Jan–25 Apr	Restrictions due to the second and third pandemic wave	391 (32.3)	295 (29.1)	-24.6	(-30.0; -19.9)
26 Apr–6 Jun	Loosened restrictions	155 (12.8)	99 (9.8)$^{\downarrow}$	-36.1	(-46.9; -27.3)
7 Jun–17 Dec	Relaxed restrictions	618 (51.0)	585 (57.6) $^{\uparrow}$	-5.3	(-7.5; -3.7)
18 Dec–31 Dec	New restrictions due to the fourth pandemic wave	48 (4.0)	36 (3.5)	-25.0	(-43.7; -12.9)
Whole period		1212	1015	-16.3	(-18.7; -14.1)

[#] (Number of consultations 2020–Number of consultations 2019)/Number of consultations 2019.
° (Number of consultations 2021–Number of consultations 2019)/Number of consultations 2019.
Chi-square test for the distribution of the number of consultations by period and year: 2019–2020 p=0.012; 2019–2021 p=0.011; $^{\downarrow}$ adjusted residual <-1.96 (the number of consultations is significantly smaller than would be expected if the year and the period are independent); $^{\uparrow}$ adjusted residual >+1.96 (the number of consultations is significantly larger than would be expected if the year and the period are independent).

Table 2. ED psychiatric consultations by socio-demographics and diagnosis by year (2019-2020-2021)

Characteristics	2019	2020	2021	p-value* 2020 vs 2019	p-value* 2021 vs 2019	Change in 2020 with respect to 2019[#]	Change in 2021 with respect to 2019[°]
	N (%)	N (%)	N (%)			% (Poisson 95% CI)	% (Poisson 95% CI)
Gender, n (%)	(7 missing)	(4 missing)	(1 missing)				
Female	646 (53.6)	491 (53.0)	526 (51.9)	0.793	0.418	-24.0 (-28.1; -20.4)	-18.6 (-22.2; -15.4)
Male	559 (46.4)	435 (47.0)	488 (48.1)			-22.2 (-26.4; -18.5)	-12.7 (-16.0; -9-9)
Age, n (%)							
18–30	270 (22.3)	222 (23.9)	279 (27.5)[↑]	0.201	0.036	-17.8 (-23.6; -13.1)	+3.3 (+1.5; +6.3)
31–50	435 (35.9)	304 (32.7)	328 (32.3)			-30.1 (-35.7; -25.2)	-24.6 (-29.7; -20.2)
51–70	370 (30.5)	312 (33.5)	295 (29.1)			-15.7 (-20.3; -11.9)	-20.3 (-25.4; -15.9)
>70	137 (11.3)	92 (9.9)	113 (11.1)			-32.8 (-44.0; -24.0)	-17.5 (-26.1; -11.2)
Admission, n (%)							
No	675 (55.7)	544 (58.5)	533 (52.5)	0.202	0.135	-19.4 (-23.0; -16.2)	-21.0 (-24.8; -17.7)
Yes	537 (44.3)	386 (41.5)	482 (47.5)			-28.1 (-33.0; -23.8)	-10.2 (-13.3; -7.7)
Diagnosis, n (%)							
Anxiety	423 (34.9)	296 (31.8)	319 (31.4)	0.213	0.035	-30.0 (-35.7; -25.0)	-24.6 (-29.8; -20.1)
Psychosis	223 (18.4)	168 (18.1)	232 (22.9)[↑]			-24.7 (-32.1; -18.6)	+4.0 (+1.8; +7.7)
Mood	205 (16.9)	148 (15.9)	142 (14.0)			-27.8 (-36.0; -21.1)	-30.7 (-39.3; -23.6)
Suicide, poisoning	72 (5.9)	77 (8.3)	59 (5.8)			+6.9 (+2.3; +16.2)	-18.1 (-30.9; -9.6)
Substance abuse	61 (5.0)	55 (5.9)	63 (6.2)			-9.8 (-21.4; -3.6)	+3.3 (+0.4; +11.8)
Other	228 (18.8)	186 (20.0)	200 (19.7)			-18.4 (-24.9; -13.3)	-12.3 (-17.7; -8.2)

[#] (Number of consultations 2020–Number of consultations 2019)/Number of consultations 2019.
[°] (Number of consultations 2021–Number of consultations 2019)/Number of consultations 2019.
***** Chi-square or Fisher's exact test.
[↑] adjusted residual >+1.96 (the number of consultations is significantly larger than would be expected if the year and the characteristic are independent); [↓] adjusted residual <-1.96 (the number of consultations is significantly smaller than would be expected if the year and the characteristic are independent).

Table 3. Interrupted time-series analysis to assess the effect of restrictive measures[*] for monthly ED psychiatric consultations[#]

ED psychiatric consultations	Coefficient	Newey-West standard error	t	p-value	95% CI
Slope or trajectory of monthly consultations until the introduction of COVID-19 restrictions	-1.49	0.51	-2.90	0.007	(-2.53; -0.44)
Change in the level of consultations in the period immediately following the lockdown	-13.77	9.73	-1.42	0.167	(-33.64; 6.09)
Change in the monthly trend of consultations relative to the pre-lockdown period	2.43	2.69	0.90	0.375	(-3.07; 7.92)
Change in the level of consultations in the period immediately following the new restrictions	-11.84	13.62	-0.87	0.392	(-39.66; 15.99)
Change in the monthly trend of consultations relative to the lockdown period	0.98	2.83	0.35	0.730	(-4.80; 6.76)
Starting level of consultations	108.66	5.46	19.90	<0.001	(97.51; 119.81)

[*] First intervention: 9 March 2020 (lockdown for the first pandemic wave); second intervention: 13 October 2020 (new restrictive measures for the second and third pandemic waves)
[#] No. of months: 36 (from January 2019 to December 2021)

Figure 1a. Changes (%) in the number of overall ED consultations by month (2020-2021 vs 2019)

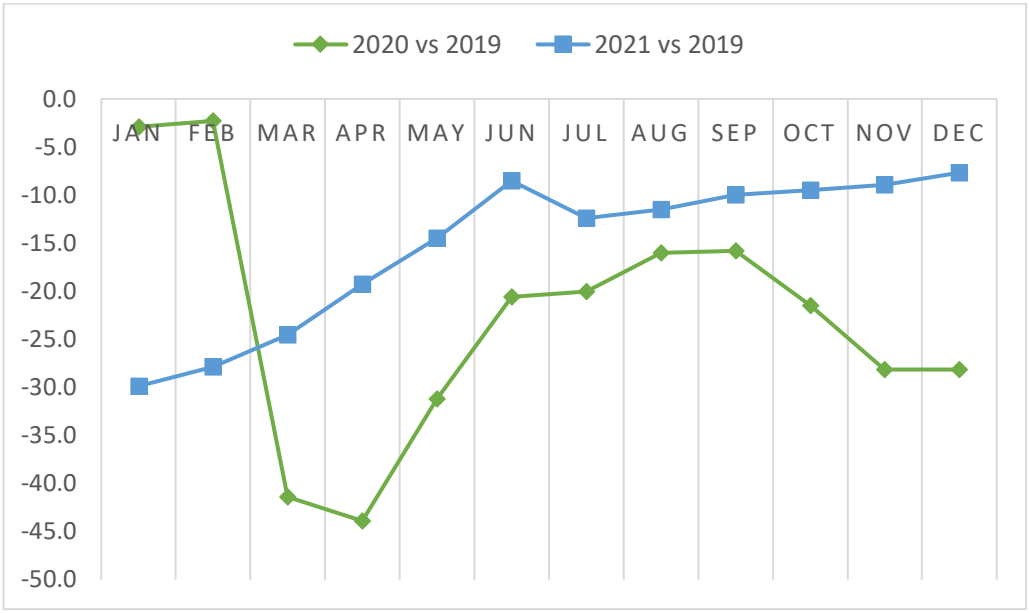


Figure 1b. Changes (%) in the number of ED psychiatric consultations by month (2020-2021 vs 2019)

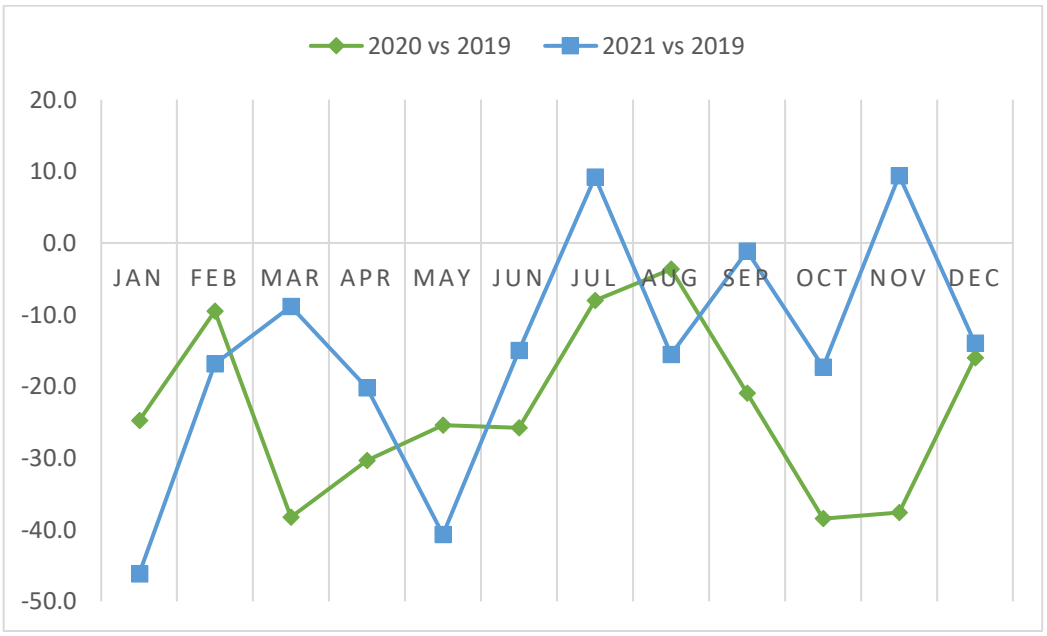
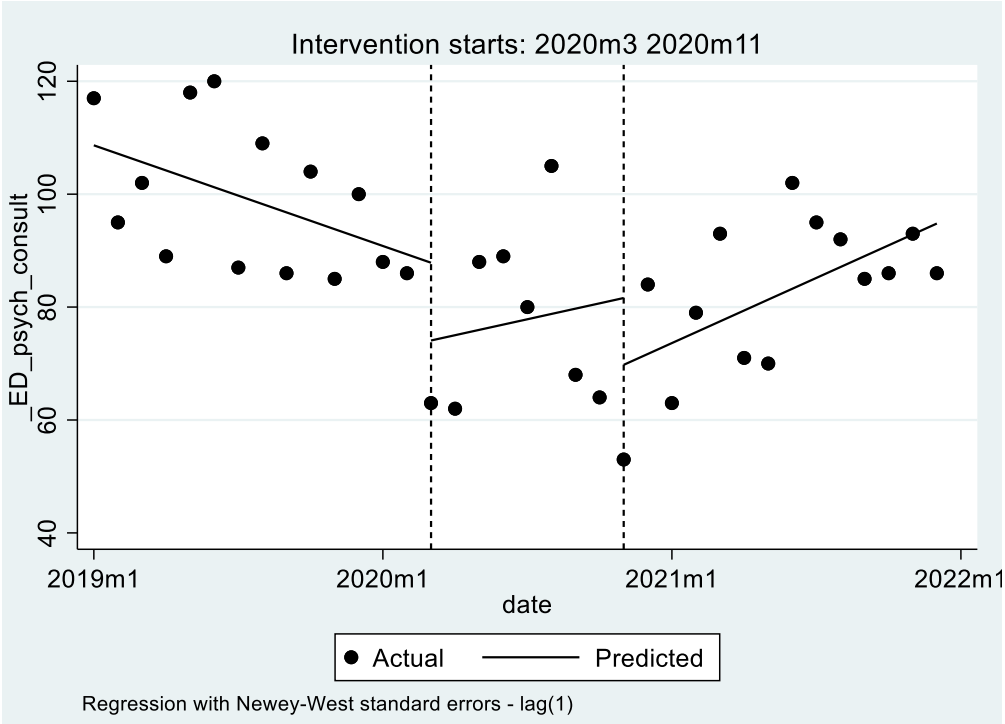


Figure 2. Monthly actual and predicted (by ITSA) ED psychiatric consultations in relation to COVID-19 restrictive measures*



* First intervention: 9 March 2020 (lockdown for the first pandemic wave); second intervention: 13 October 2020 (new restrictive measures for the second and third pandemic waves)

The impact of COVID-19 pandemic on psychiatric rehabilitation in residential facilities: Perspectives of staff and residents (Lasalvia, Bodini, D'Astore et al., *Journal of Psychosocial Rehabilitation and Mental Health*, 2024)*

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ORIGINAL ARTICLE

The Impact of COVID-19 Pandemic on Psychiatric Rehabilitation in Residential Facilities: Perspectives of Staff and Residents

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Abstract The coronavirus pandemic imposed significant changes in the care of patients in psychiatric residential facilities, especially during lockdown periods. The aim of this study was to assess the impact of the pandemic on patients and staff of psychiatric residential facilities (RFs). This cross-sectional survey was conducted between 30 June and 30 July 2021 and involved 31 RFs located in the province of Verona (Italy). In total, 170 staff members and 272 residents participated in this study. Staff showing clinically significant symptoms of anxiety, depression and burnout were, respectively, 7.7%, 14.2% and 6%. Staff were concerned about the risk that COVID-19 infection might spread among residents (67.6%) and that residents could not receive an acceptable service due to service reconfiguration because of the pandemic (50.3%). Residents found it very unpleasant not to be permitted to attend family members (85.3%), and not to be allowed to engage in outdoor activities due to the restrictions (84%). Both staff and residents agree that the main problematic areas for the residents was the interdiction to meet family members or friends and the interdiction to outdoor activities, whereas problems related to the COVID-19 infection were considered by the staff members as more frequently problematic than reported by residents. The COVID-19 pandemic had a significant impact on the rehabilitation care and recovery journeys of the residents of psychiatric RFs. Therefore, sustained, and careful attention is needed to ensure that the rehabilitation needs of people with severe mental disorders are not neglected in time of pandemics.

Keywords Psychiatric residential facilities · Coronavirus · Healthcare workers · Mental disorder · Serious mental illness

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Introduction

** The study has been published (Lasalvia et al., 2024) and is reproduced with permission.*

Abstract

The coronavirus pandemic imposed significant changes in the care of patients in psychiatric residential facilities, especially during lockdown periods. The aim of this study was to assess the impact of the pandemic on patients and staff of psychiatric residential facilities (RFs). This cross-sectional survey was conducted between 30 June and 30 July 2021 and involved 31 RFs located in the province of Verona (Italy). In total, 170 staff members and 272 residents participated in this study. Staff showing clinically significant symptoms of anxiety, depression, and burnout were, respectively, 7.7%, 14.2%, and 6%. Staff were concerned about the risk that COVID-19 infection might spread among residents (67.6%) and that residents could not receive an acceptable service due to service reconfiguration because of the pandemic (50.3%). Residents found it very unpleasant not to be permitted to attend family members (85.3%) and not to be allowed to engage in outdoor activities due to the restrictions (84%). Both staff and residents agree that the main problematic areas for the residents were the interdiction to meet family members or friends and the interdiction to outdoor activities, whereas problems related to COVID-19 infection were considered by the staff members as more frequently problematic than reported by residents. The COVID-19 pandemic had a significant impact on the rehabilitation care and recovery journeys of the residents of psychiatric RFs. Therefore, sustained and careful attention is needed to ensure that the rehabilitation needs of people with severe mental disorders are not neglected in times of pandemics.

Introduction

Italy was the first nation among Western countries to be affected by the COVID-19 outbreak. Due to the rapid spread of the pandemic within the country, on 8 March 2020, the Italian government established stringent containment measures in Lombardy, Veneto, and some neighboring provinces of Emilia-Romagna. On 11 March 2020, the Italian government imposed a nationwide lockdown. These extraordinary containment measures restricted movement across the country, except for work, health reasons, or in cases of necessity.

Starting from mid-March 2020, activities within hospitals in the most affected regions (e.g., Lombardy, Veneto, and Emilia-Romagna) underwent rapid reorganization to preserve beds and staff for COVID-19 patients (Faccincani et al., 2020; Marcon et al., 2020). Consequently, many hospital wards were repurposed as COVID-19 wards. The pandemic posed an extraordinary strain on healthcare professionals in secondary and tertiary hospitals, especially those in close contact with COVID-19 patients. Limited resources, longer shifts, disrupted sleep, work–life balance, and occupational hazards led to adverse psychological outcomes among healthcare workers, including burnout, post-traumatic stress, insomnia, anxiety, and depression (de Filippis et al., 2022; Fagiolini et al., 2020; Lasalvia, 2020).

In this context, mental health care also faced significant changes. Most psychiatric inpatient units—particularly in Lombardy, Emilia-Romagna, and Veneto—were closed, with a significant proportion of psychiatrists, mental health nurses, and other healthcare workers transferred to COVID-19 wards (Carpiniello et al., 2020). During the lockdown, local health authorities in most Italian regions, following national regulations, prescribed a reduction in ordinary outpatient and community mental health care to prevent COVID-19 spread, maintaining only services for urgent cases (Percudani et al., 2020). Consequently, many patients with chronic mental disorders requiring regular monitoring were deprived of these services. Additionally, from mid-March 2020, day-care facilities for psychiatric patients were temporarily closed (with most regions reopening them with restrictions only in July 2020). Patients receiving residential mental health care were confined within facilities, with no access to outdoor rehabilitative interventions (Martinelli et al.,

2019). These measures significantly disrupted patients' vocational and psychosocial rehabilitation pathways. Mental health rehabilitation focuses on helping individuals with social skills deficits through training, social interaction, and reducing social distance (Chaturvedi, 2020). Forced confinement within facilities likely impacted these patients' clinical outcomes, with risks of symptom aggravation and potential relapses. Furthermore, psychiatric residential facilities (RFs) were at high infection risk, similar to other long-term residential care facilities (De Girolamo et al., 2020; Xiong et al., 2020). Staff had to swiftly implement various containment measures to prevent virus spread, often without prior experience or training in using personal protective equipment, posing a high strain on them and impacting their psychological well-being.

The evaluation of COVID-19's impact on psychiatric RFs has been largely overlooked by research internationally. To our knowledge, the only report addressing this impact was a survey of perspectives and experiences of staff working in inpatient and community settings across the UK health and social care sectors (Johnson et al., 2021). However, this survey did not assess the pandemic's impact as perceived by RF residents. A study conducted on a small group of patients in a psychiatric RF near Rome focused only on their mental health status, without detailing changes in rehabilitation pathways due to the pandemic (Cordellieri et al., 2021). This paper aims to fill this gap by analyzing the COVID-19 pandemic's impact on psychiatric RFs in the province of Verona, Italy, based on the perceptions of both staff and residents.

Psychiatric RFs in Italy and in Veneto Region

Psychiatric RFs represent a crucial component of the Italian mental health care system. Healthcare in Italy is provided by the National Health System on a regional basis, with mental health care also organized regionally and based on a community-oriented model. In each region, the Mental Health Department (MHD) is responsible for psychiatric care for adults within a defined geographical area and offers a variety of services and facilities, including community mental health centers, day-care facilities, general hospital psychiatric units, and residential

facilities (RFs). These community-based facilities, functionally linked to the MHD, generally serve patients from the local or neighboring areas.

Psychiatric RFs focus on providing residential rehabilitation, aiming to develop practical living skills, promote personal recovery, independence, and social inclusion. Rehabilitative programs are individualized, periodically updated, and designed to go beyond daily care and nursing by engaging patients in meaningful activities and social participation (Martinelli & Ruggeri, 2020). The residents of psychiatric RFs typically have severe and complex mental health conditions, such as schizophrenia and other psychoses, often coupled with cognitive difficulties that affect their ability to perform daily tasks (Martinelli et al., 2019). According to the Italian Mental Health Report, at the time of this survey, approximately 27,800 individuals were residents of psychiatric RFs in Italy (Ministero Della Salute, 2021).

In Italy, psychiatric RFs can be broadly categorized into three main types based on care intensity and staffing. In the Veneto region, the most intensive type is the Comunità Terapeutica Riabilitativa Protetta (CTRP), designed for younger patients needing short- or medium-term rehabilitative care. These facilities, generally housing 8 to 14 residents, have on-site staff available 24 hours a day. The second type is the Comunità Alloggio (community sheltered houses), further divided into Comunità Alloggio Estensiva (CAE) and Comunità Alloggio di Base (CAB), which offer varying levels of support depending on the residents' needs. CABs cater to more independent residents, generally with 4-6 beds, and have staff available for up to 12 hours daily. CAEs provide intermediate-high intensity support, serving 12-20 residents with more chronic and stable conditions, and staff are available around the clock (Martinelli et al., 2022).

The third type is Gruppo Appartamento Protetto (GAP), small apartments located in community settings designed for the most autonomous residents (usually 3 or 4 per apartment). GAP residents are encouraged to take an active role in household maintenance, such as managing chores and budgeting. Staff support in GAPs is minimal, typically no more than 4 hours a day.

Method

Study Design

A cross-sectional survey was conducted between 30 June and 30 July 2021 within psychiatric RFs located in the province of Verona (Veneto region, northeast Italy), an area of approximately 925,000 inhabitants. Data collection on staff working in RFs was conducted using a web-based questionnaire hosted on the Lime survey platform. The online survey required about 15 to 20 min to be completed. The study description, invitation to participate, and a link to the online questionnaire were sent via e-mail to all staff. Three reminders for completing the questionnaire were sent after the first, the second, and the third week. The survey was anonymous, and confidentiality of information was granted. All participants provided informed consent.

Residents receiving care within each participating RF were approached by a member of the research staff who explained the purpose of the study, gave full details in writing, and made it clear that participation was voluntary—the participants were told that they could choose whether to participate or not, or to participate and withdraw later. The residents were included in the study only after informed written consent had been gained. Those consenting to participate responded anonymously to the questionnaire that, once completed, was consigned to the facility coordinator in a closed envelope that was sent by mail to the research staff. Therefore, confidentiality was fully preserved. The residents' questionnaires required about 10 to 15 min to be completed. The survey was approved by the Ethics Committee of the Provinces of Verona and Rovigo (approval No. 31656, 25th May 2021).

Study Samples

At the time of the investigation, 44 psychiatric RFs were operating in the province of Verona. Specifically, 8 were CTRP, 9 were CAE, 6 were CAB, and 21 were GAP. Overall, 70.5% RFs (n = 31) participated in this study (8 CTRP, 8 CAE, 6 CAB, and 9 GAP). As compared to the total number RFs, GAPs were underrepresented in this survey. Regarding the staff, the eligible population was composed of 310 workers, of whom 170 (54.8%) participated in this survey. As regards residents, 407

were receiving rehabilitation care within psychiatric RFs in the province of Verona. Specifically, at the time of investigation, 109 residents (26.8%) were receiving treatment within CTRP, 150 (36.9%) in CAE, 55 (13.5%) in CAB, and 93 (22.8%) in GAP. Overall, 272 (66.8%) residents consented to participate. Of these, 78 (20.7%) were in CTRP, 104 (38.2%) in CAE, 44 (16.9%) in CAB, and 46 (16.2%) in GAP. Percentages of residents stratified by type of RF substantially overlap between participating sample and the eligible population.

Assessment Measures

Information Collected Among Staff

A set of standardized measures was used to assess the mental health of staff working within RFs participating in the study.

Anxiety was assessed by the General Anxiety Disorder scale (GAD-7) (Spitzer et al., 2006), a 7-item self-rated questionnaire where each item is rated on a four-point scale, ranging from 0 (not at all) to 3 (nearly every day). In this study, we adopted a cut-off score of 10 that represents a reasonable cut point for identifying those showing at least moderate symptoms of anxiety.

Depression was assessed by the Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001), a self-rated 9-item scale that asks if the subject has experienced symptoms of depression in the previous two weeks. Subjects are asked to rate how often each symptom occurred, ranging from 0 (not at all) to 3 (nearly every day). We used a cut-off score of 10 to indicate a condition potentially deserving clinical attention.

Burnout was assessed by the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli & Van Dierendonck, 1993), a modified version of the original MBI that was designed to be used in a wide range of occupational settings. MBI-GS consists of 16 items constituting three subscales: Emotional Exhaustion (EX), Cynicism (CY), and Professional Efficacy (EF). All MBI-GS items are scored on a 7-point rating scale ranging from 0 (never) to 6 (always). The cut-off scores for the three MBI-GS subscales, tested on large sample of Italian healthcare professionals (Lasalvia et al., 2021a), were, respectively, [2.20 for EX, [2.00 for CY, and \ 3.66

for EF. Burnout was defined as having a high EX and, at the same time, a high CY or a low EF.

Two ad hoc questionnaires were used to collect information on challenges found at work by staff of RFs during the COVID-19 pandemic (19 items) and problems faced by residents of RFs from a staff perspective (8 items). Both questionnaires (whose responses were rated on a 5-point Likert scale ranging from 1 "not relevant" to 5 "extremely relevant") were developed by the research staff based on the instruments produced by the COVID-19 Mental Health Policy Research Unit Group (Johnson et al., 2021). Personal socio-demographic information and job-related characteristics were also collected, including gender, age, living condition, having psychological problems developed before the COVID-19 outbreak requiring specialized help, occupation, length of working experience, and place of work.

Information Collected Among Residents

Information on the residents' perspective on the changes that occurred within RFs during the COVID-19 pandemic was collected by using an ad hoc schedule that was developed by the research group together with four members of a users' association based in south Verona—Il Cerchio Aperto (The Open Circle). Item generation was performed within structured focus groups sessions, which were run by experienced clinicians and researchers. This is a self-reported schedule that is composed of 17 items, exploring the residents' perceptions of a range of circumstances of daily life within RFs that might have been affected by the pandemic. Responses are rated on a three-point scale (1-unpleasant, 2-neutral, 3-pleasant).

Statistical Analysis

Categorical variables were described by frequencies and percentages; for continuous variables, means (standard deviations) and ranges were given. The association between categorical characteristics was checked by using Chi-square test (or Fisher's exact test in the case of 2 x 2 contingency tables), with a significant p-value of 0.05. For staff, percentages of those scoring above the cut-off score in each mental health outcome [GAD-7 $\geq$ 10; PHQ-9 $\geq$ 10, MBI-EX > 2.2, MBI-CY > 2.0, MBI-EF < 3.66 and MBI total (EX > 2.2, CY > 2.0, and EF < 3.66)] were

stratified by personal (sex, age, living condition, marital status, education) and job characteristics [type of occupation, length of working experience (< 6 yrs., 6–20 yrs., > 20 yrs.), workplace (CAB, CAE, CTRP, GAP)]. For residents, percentages of those reporting unpleasant perceptions related to COVID-19 pandemic in the various daily life domains (i.e., scoring "1" in the ad hoc questionnaire) were stratified for sex, years since illness onset (≤ 10 yrs, 11–20 yrs., 21–30, > 30 yrs.), length of stay in residential facility (≤ 5 yrs., 6–10 yrs., 11–15 yrs., > 15 yrs.) and typology of residential facility (CAB, CAE, CTRP, GAP). Analyses were performed by SPSS 28 for Windows.

Results

Characteristics of the Participating Staff

The personal and job-related characteristics of participating staff (n = 170) are given in Table 1. In brief, nearly three-quarters of the respondents were females (71%), half were aged 36 to 55 years (56.5%), most were married or cohabiting (64.9%) and lived with other people (84.7%). Most staff described themselves as healthcare assistants (60.6%), 16.5% as unqualified healthcare staff, 14.1% as psychiatric rehabilitation therapists, and 8.8% as psychiatric nurses. Overall, the participants were experienced staff because most (72.9%) had been working in the mental health sector for at least 6 years.

Mental Health Outcomes of Participating Staff

Overall, 7.7% of participating staff had developed clinically significant symptoms of anxiety (GAD-7 ≥ 10; 15 missing) and 14.2% symptoms of at least moderate depression (PHQ-9 ≥ 10; 15 missing). Regarding MBI-GS, high scores on emotional exhaustion (EX > 2.20; 19 missing) and cynicism (CY > 2.00; 19 missing) were reported, respectively, by 12.6% and 11.3%, while low scores on professional efficacy (EF < 3.66; 19 missing) by 31.1%; only 6% (n = 19 missing) displayed a condition of burnout. No significant differences were found across the mental health outcomes considered by stratifying for personal, job-related characteristics and place of work (i.e., typology of residential facility).

Staff Perception of Changes Related to the COVID-19 Pandemic

Table 2 shows challenges faced at work by participating staff due to the pandemic. Most participants (67.6%) were extremely or very concerned about the risk that COVID-19 infection might spread among residents, whereas half of them (50.3%) were extremely or very concerned that residents could not receive an acceptable service due to service reconfiguration because of the COVID-19 pandemic. Other extremely or very relevant issues reported by participants were related to the more challenging environment within the facilities because the residents could not go out and engage in outdoor activities (45.8%); working in a new condition with unusual organizational, emotional, and care problems (45.1%); lack of support due to reduction in other services in the community (42.4%); difficulty in maintaining infection control as residents could not be segregated from one another (41.9%); lack of support because of closure or reduction in community mental health services (41.5%); increased difficulty managing work-life balance (40.9%); and having to adapt too quickly to new ways of working (40.9%).

Staff Perceptions of the Main Problems Faced by Residents Due to the Pandemic

Table 3 shows the staff perceptions of the main problems faced by residents due to the pandemic.

Most of the participating staff (72.1%) agreed that the lack of access to usual support networks of family and friends might represent an extremely or very relevant problem for residents. Furthermore, more than half of participants (54.2%) reported that lack of usual work and outdoor activities due to the COVID-19 restrictions represented an extremely or very relevant problem for residents. Nearly half of the participants (47.4%) believed that worries about getting COVID-19 infection was an extremely or very relevant problem for residents. Nearly 32% of staff were also extremely or highly concerned that COVID-related stress might trigger relapse and/or deterioration in the residents' mental health.

Characteristics of the Participating Residents

Table 4 reports the socio-demographic and clinical information of the participating residents (n = 272).

Most participating residents were male (61.8%), aged over 41 years (80.1%). Their average length of stay within RFs was nearly 6 years, whereas average illness duration was 20 years. The most represented diagnostic groups, as reported by the residents themselves, were schizophrenia and related disorders (40.8%), bipolar disorders (12.9%) and personality disorders (11.1%).

Residents' Perceptions of the Challenges Related to the COVID-19 Pandemic

Table 5 shows the residents' perceptions of the main problems that they faced within RFs due to the pandemic.

The great majority of the residents found that it was very unpleasant that they were not allowed to join family gatherings, family celebrations or outdoor activities organized by friends and/or family members (85.3%), and that they were not allowed to meet their friends and/or family members (84%) due to the pandemic restrictions. Moreover, most residents found that it was very unpleasant to spend all the time locked in the facility (81.2%), to not be allowed to go shopping to practice social skills learned in therapy sessions (81.2%), to not be allowed to engage in outdoor activities to generalize social skills in community settings (78.3%), to not be allowed to use public transport to practice social skills learned in therapy sessions (75.5%). Overall, nearly 80% reported that restrictive measures adopted during the pandemic had a significant negative impact on their quality of life.

By stratifying the percentages of dissatisfaction in the various areas by personal and clinical characteristics of residents or by type of residential facility, some significant associations emerged. Specifically, dissatisfaction was more frequent in the questions evaluating: (a) interdiction to go shopping for females, for those with less than 10 or between 21 and 30 years since illness onset and for those living in CTRPs; (b) interdiction to have leisure activities together with other residents within facility for those with 11–20 years since illness onset and for those living in CABs; (c) interdiction to engage in outdoor activities for females and for those with 11–20 years since illness onset; (d) interdiction to attend work, education or vocational training for those with length of stay of 6–10 years in RFs and for those

living in CABs; (e) interdiction to use public transport for females; (f) interdiction to attend activities at day centres for those with less than 10 years since illness onset; (g) engagement with remote consultations with GPs, psychiatrists, or other therapists for those with length of stay of 6–15 years in RFs; (h) obligation to regularly undergo nasopharyngeal swabs for residents of CABs (Fisher's exact or Chi-square tests where appropriate, $p < 0.05$).

Comparison Between the Perceptions of the Staff and Residents

Figure 1 shows a comparison of the staff perception of main problems faced by residents and the problems reported by residents themselves on the three main comparable domains.

Both staff and residents agree that the main problematic areas for residents was the interdiction to meet family members or friends (nearly 85%) and the interdiction to outdoor activities (nearly 81%), whereas problems related to the COVID-19 infection were considered by the staff members to be more frequently problematic (82.5%) than reported by residents (59.4%) (comparison on this latter domain it should be taken with caution as the corresponding items of the two questionnaires are not exactly the same).

Discussion

This study helps to shed some light on the impact of the COVID-19 pandemic on psychiatric RFs, as perceived by staff and residents. To the best of our knowledge, this is the first study to address this issue. Most research on the impact of the pandemic on healthcare workers was conducted on hospital workers (more frequently those at frontline with COVID-19) (Sanghera et al., 2020) or other healthcare professionals working in the community, such as general practitioners (Jefferson et al., 2022) or staff working within nursing homes for elderly people (Palacios-Ceña et al., 2021) or long-term residential facilities for people with intellectual disabilities (Chen et al., 2022). Unfortunately, the mental health of healthcare professionals working within psychiatric RFs has been neglected. Similarly, the impact of the COVID-19 pandemic on patients receiving residential

mental health rehabilitation—who represent one of the most vulnerable segments of the population—has been largely neglected by research.

We found that the COVID-19 pandemic did not significantly impact on mental health of staff working within psychiatric RFs. Only a small fraction of staff in our study reported symptoms of clinically meaningful depression, anxiety, and burnout. The percentages of staff reporting clinically significant symptoms of general anxiety, depression and burnout in this study were remarkably lower than those found among healthcare staff working in a tertiary hospital located in the same geographical area during the pandemic (Lasalvia, 2020) and among a sample of general practitioners (Lasalvia et al., 2022) working in the same area. This is not an unexpected finding because healthcare workers, particularly those at the frontline with COVID-19 patients, experienced a wide range of stressful and/or definitely traumatic events at work (e.g., undergoing sudden reassignment to other hospital units or new unfamiliar tasks, working under increased workload conditions, having to deal with a great number of deaths in a relatively short time, seeing patients dying alone as relatives were not allowed to enter the restricted areas or communicating by telephone the death of a beloved one to relatives, etc.) that might significantly impact on their mental health (Sanghera et al., 2020). It is noteworthy that the percentage of RF staff showing clinically significant symptoms of anxiety and depression was far lower than that found in the general population in Italy (Amerio et al., 2021), which suggests that these professionals display good resilience skills. Alternatively, given that this study was conducted in a period when the number of new COVID-19 cases were relatively low and the Italian epidemic curve had flattened, we may hypothesize that our findings are more conservative and optimistic than those collected during the lockdown or post-lockdown periods.

The COVID-19 pandemic was challenging in many ways for staff working in psychiatric RFs, who had to face several organizational changes and adapt to them quickly. We found that one major concern reported by staff was to implement all the required containment measures within their facilities to prevent or reduce infections among the residents. This was a problematic issue indeed because most of the staff working in psychiatric RFs were unqualified healthcare workers who had no previous experience or sufficient training on how to use personal protective

equipment or to apply and follow appropriate infection control practices and procedures. Moreover, to prevent contagion within the facilities, the staff had to minimize personal contact with the residents and had to ensure that the residents would respect social distancing measures (thus avoiding any personal interaction), which had a negative impact on the perception of quality of care provided. In fact, most staff expressed concerns that residents would not receive an acceptable service due to service reconfiguration during to the COVID-19 pandemic. A further burden on staff working within psychiatric RFs was the lack of support by other services in the community (e.g., primary care, social care, voluntary sector) and/or by community mental health services. Unfortunately, most community-based mental health services in northern Italy were requested to stay closed or to reduce their activity during the COVID-19 pandemic, with a drastic reduction of home visits or visits to patients within RFs (Carpiniello & Vita, 2022). Increased difficulty in managing work-life balance was another theme that was expressed as a major concern by staff. This is a relevant issue because the many of the workers reported that it was difficult to balance work and leisure time, which represents a main factor for developing job-related distress and burnout (Pattnaik et al., 2022). Organizations are responsible for providing a conducive, positive and healthy work environment for their employees, especially in a time of crisis.

We found that the COVID-19 pandemic was particularly burdensome for residents of psychiatric RFs. The main problem for most residents was the interpersonal isolation that they were requested by the restrictive measures adopted to prevent the spread of infection. This implied the prohibition of visits by friends or relatives, or to join family meetings and outdoor gatherings with friends. The prohibition of outdoor activities (e.g., going to work, to school, training sessions or other occupational activities) was the other main problem reported by most residents. Another major problem reported by residents was the obligation to practice interpersonal distancing within the facilities. The residents reported that what they most missed during the COVID-19 restrictions period were group therapies, informal social activities with other residents and other forms of peer-interactions that together represent a central component of the personal recovery process (Slade et al., 2014). Thus, for residents of RFs, the challenges they have faced in the

COVID-19 pandemic mirror those reported for the general population in terms of a sense of isolation and of being locked down in their facilities (Rossi et al., 2020). They also reported specific impacts on their rehabilitation care and recovery journeys. Group interactions and outdoor projects are an inherent part of their treatment, such as when they walk the grounds, dine in communal areas, watch television together in day rooms, exercise and go to therapy together. Peer-support groups meetings (i.e., groups of residents who gather to share and discuss common problems and experiences, led by a professional or volunteer discussion leader or facilitator) and informal activities are a vital source of emotional and spiritual support to people who struggle to stay in personal recovery (Slade et al., 2014). Hence, isolation can be very dangerous for these patients and the fear of contracting a life-threatening illness is unlikely to promote personal recovery (Aamir et al., 2021). Having to stay within the facility would not only slow down the progress in social skills development but would also reduce their self-reliance and self-confidence and affect their vocational potential.

It is interestingly that some gender differences emerged when analyzing the various daily life domains within facilities that were most impacted by the pandemic, as female residents expressed more dissatisfaction with the impossibility to generalize the social skills learnt in therapy sessions to other settings (e.g., to go shopping, to attend work, education or vocational training, to use public transport) due to the interdiction of outdoor activities. This finding seems to provide further support to the importance of implementing gender-sensitive recovery-oriented interventions within rehabilitation services (Dixon et al., 2022; Mizock, 2019).

The staff responses had very similar themes to the residents' responses when asked what in their view might have impacted most on the residents. In fact, the staff was aware that a lack of access to the usual support networks of family and friends might have represented an extremely relevant problem for residents. Furthermore, staff shared with residents the worry about the negative impact of the restrictions on specific rehabilitation interventions, particularly the disruption of usual work, training and outdoor activities. This is a positive finding and is an indirect indicator of a good therapeutic relationship between staff and residents.

Limitations

This study has several limitations. First, it was not possible to establish whether both staff and resident samples were representative of the respective populations (this specifically applies to staff, as detailed information on characteristics of the eligible population was not available). Thus, caution should be exercised when generalizing our results. Second, the results from this study cannot be generalized to other mental health rehabilitation services (i.e., day-care services) or to the broader population of people with severe mental illness because the sample addressed here was recruited within residential rehabilitation services. Third, mental health status was assessed on staff members only, whereas no formal assessment of mental health status was performed on residents because we were only interested to evaluate the impact of the pandemic on their daily life and rehabilitation pathways. Fourth, organizational information on participating RFs was self-reported and may possess declaration biases. Fifth, the participants completed the survey retrospectively, which may have introduced the risk of recall bias. Finally, the ad hoc questionnaire used to collect information on the residents' perspective on the changes occurring within RFs during the COVID-19 pandemic did not undergo formal validation.

Clinical Implications and Future Directions

Once the containment measures prescribed the closure of outdoor activities and the interpersonal distancing, the different types of RFs lost any specificity. In fact, the most problematic issue posed by the pandemic as perceived by both the staff and the residents was the burden of being locked away from family, friends and loved ones, without any possibility to meet anyone else except their treating staff. This was common across the different typologies of RFs. None of the other problematic issues due to the pandemic differed across the typology of RFs. Indeed, the different typology of RFs in Veneto are supposed to have substantial specificities in terms of intensity of rehabilitative care and staffing level (with CTRPs having the highest, while GAPs the lowest) and in terms of type of interventions provided (mainly healthcare interventions within CTRPs, mainly forms of social support in GAPs). It thus seems that the pandemic, with its closures and containment measures,

somehow homogenized the different typologies of the RFs. This represents a sort of natural experiment that reminds us of the sense and meaning of psychiatric residential rehabilitation—without any projection toward the outside, toward the community they are in, psychiatric RFs are likely to lose any specificity and any real rehabilitative potential (De Girolamo et al., 2005). Psychiatric RFs, which in Italy are conceived and designed as non-hospital community facilities where residents are free to come and go during the day, must be open to the outside world to promote full social integration and personal recovery. Otherwise, they would only be useless closed boxes, some sort of seclusion facility or a new form of institutionalization. On the other hand, it should be underlined that in times of healthcare crisis, such as the COVID-19 pandemic, any effort to avoid the spread of infection by reducing social contacts and by closing facilities to the outside world might also have had a positive effect as it probably saved lives of many residents. Further studies are needed to help policymakers and administrators to balance the pros and cons of closing this kind of facilities, taking into consideration the therapeutic and psychological consequences for residents.

Conclusion

The COVID-19 pandemic had a significant impact on rehabilitation care and recovery journeys of residents of psychiatric RFs. This is a particularly relevant issue. The substantial decrease in psychosocial and rehabilitative interventions for such a prolonged time is not likely to be without consequences for the mental health status of this population. However, the detrimental effect of disruption of rehabilitative interventions will probably manifest in a later stage, in the long run. Therefore, sustained and careful attention is needed to ensure that the rehabilitation needs of people with severe mental disorders are not neglected in the focus on maintaining the health and well-being of the population and of other vulnerable groups in time of pandemics.

Tables and figures (Lasalvia, Bodini, D'Astore et al., 2024)

Table 1. Personal and job characteristics of staff working in RFs (n = 170)

		n	%
Sex (1 missing)	Female	120	71.0
Age	< 36 yrs	35	20.6
	36–55 yrs	96	56.5
	> 55 yrs	39	22.9
Living condition	With partner and children	66	38.8
	With partner	44	25.9
	Alone	26	15.3
	With other relatives	18	10.6
	With children but no partner	16	9.4
Marital status (2 missing)	Married or cohabiting	109	64.9
	Single or non-cohabiting partner	37	22.0
	Widowed, separated or divorced	22	13.1
Education	Primary or secondary school	31	18.2
	Diploma	78	45.9
	Degree or postgraduate qualification	61	35.9
Occupation	Healthcare assistant	103	60.6
	Support worker	24	14.1
	Other healthcare staff	20	11.8
	Nurse	15	8.8
	Psychiatric rehabilitation therapist	8	4.7
Length of working experience	< 6 yrs	46	27.1
	6-20 yrs	71	41.7
	> 20 yrs	53	31.2
Workplace*	GAP	23	13.5
	CAB	21	12.4
	CAE	67	39.4
	CTRP	59	34.7

Note. *GAP home groups; CAB basic community sheltered houses; CAE extensive community sheltered houses; CTRP sheltered therapeutic rehabilitation facility

Table 2. Challenges faced by staff of RFs during the COVID-19 pandemic (n = 170)

	Extremely relevant	Very relevant	Moderately relevant	Slightly relevant	Not relevant
	n (%)	n (%)	n (%)	n (%)	n (%)
Organisational and job-related issues					
Increased difficulty managing work-life balance(missing 16)	14 (19.5)	30 (21.4)	44 (28.6)	33 (21.4)	33 (21.4)
Increased workload due to staff shortages (missing17)	24 (15.7)	30 (19.6)	37 (24.2)	40 (26.1)	22 (14.4)
Having to adapt too quickly to new ways of working(missing 16)	21 (13.6)	42 (27.3)	50 (32.5)	27 (17.5)	14 (9.1)
Pressures resulting from the need to support colleagues through the stresses associated with the pandemic (missing 15)	18 (11.6)	36 (23.2)	50 (32.3)	28 (18.1)	23 (14.8)
Working in a new condition with different organisational, emotional and care problems fromusual (missing 15)	16 (10.3)	54 (34.8)	50 (32.3)	28 (18.1)	7 (4.5)
Having to learn to use new technologies too quicklyand/or without sufficient training and support (missing 16)	7 (4.5)	25 (16.2)	37 (24.0)	47 (30.5)	38 (24.7)
Pressure to accept redeployment to a setting where Idon't feel happy to work (missing 19)	2 (1.3)	4 (2.6)	8 (5.3)	19 (12.6)	118 (78.1)
Control of infection					
The risk that COVID-19 would spread amongresidents (missing 16)	36 (23.4)	68 (44.2)	35 (22.7)	7 (4.5)	8 (5.2)
Difficulty maintaining infection control because residents did not understand or were too unwell to follow procedures (missing 15)	21 (13.5)	38 (24.5)	56 (36.1)	26 (16.8)	14 (9.0)
Difficulty maintaining infection control because residents could not be effectively segregated fromone another in this environment (missing 15)	18 (11.6)	47 (30.3)	53 (34.2)	27 (17.4)	10 (6.5)
Difficulty managing communal areas ofaccommodation safely (missing 15)	14 (9.0)	46 (29.7)	55 (35.5)	25 (16.1)	15 (9.7)
Challenges supporting residents who were very worried about COVID-19 infection (missing 16)	6 (3.9)	32 (20.8)	62 (40.3)	36 (23.4)	18 (11.7)
Difficulty getting appropriate medical care for residents who are ill with COVID-19 infections(missing 21)	2 (1.3)	14 (9.4)	30 (20.1)	29 (19.5)	74 (49.7)
Consequences on residents					
Residents not getting an acceptable service due toservice reconfiguration because of COVID-19 (missing 15)	20 (12.9)	58 (37.4)	49 (31.6)	20 (12.9)	8 (5.2)
More challenging environment because residents could not go out and engage in outdoor activitiesas usual (missing 15)	18 (11.6)	53 (34.2)	61 (39.4)	20 (12.9)	3 (1.9)
Not being able to have as much contact as usual with residents due to staff shortages or changes inservice offered (missing 15)	9 (5.8)	33 (21.3)	51 (32.9)	34 (21.9)	28 (18.1)
Relationship with other services					
Lack of support because of closure of or reduction in community mental health services (missing 18)	15 (9.9)	48 (31.6)	38 (25.0)	29 (19.1)	22 (14.5)
Lack of support due to reduction in other services in the community e.g., primary care. social care. voluntary sector services (missing 17)	12 (7.8)	53 (34.6)	43 (28.1)	28 (18.3)	17 (11.1)
Lack of support and expertise by healthcare services in managing physical health problems in patients infected with Covid-19 (missing 22)	6 (4.1)	21 (14.2)	34 (23.0)	29 (19.6)	58 (39.2)

Table 3. Staff perspectives of the problems faced by the residents (n = 170)

	Extremely relevant	Very relevant	Moderately relevant	Slightly relevant	Not relevant
	N (%)	N (%)	N (%)	N (%)	N (%)
Lack of access to usual support networks of family and friends (16 missing)	42 (27.3)	69 (44.8)	21 (13.6)	16 (10.4)	6 (3.9)
Worries about getting COVID-19 infection (16 missing)	26 (16.9)	47 (30.5)	54 (35.1)	17 (11.0)	10 (6.5)
Lack of usual work and outdoor activities (17 missing)	21 (13.7)	62 (40.5)	41 (26.8)	21 (13.7)	8 (5.2)
Relapse and/or deterioration in mental health triggered by the COVID-19 stress (16 missing)	11 (7.1)	38 (24.7)	52 (33.8)	29 (18.8)	24 (15.6)
High personal risk of severe consequences of COVID-19 infection (e.g., due to physical health comorbidities) (18 missing)	9 (5.9)	29 (19.1)	32 (21.1)	39 (25.7)	43 (28.3)
Effects of COVID-19-related trauma (17 missing)	8 (5.2)	27 (17.6)	51 (33.3)	37 (24.2)	30 (19.6)
Problems with neighbours because of lack of understanding of/ability to stick to government requirements (16 missing)	2 (1.3)	11 (7.1)	12 (7.8)	39 (25.3)	90 (58.4)
Problems with police or other authorities because of lack of understanding of/ability to stick to government requirements (16 missing)	0 (0.0)	1 (0.6)	18 (11.7)	31 (20.1)	104 (67.5)

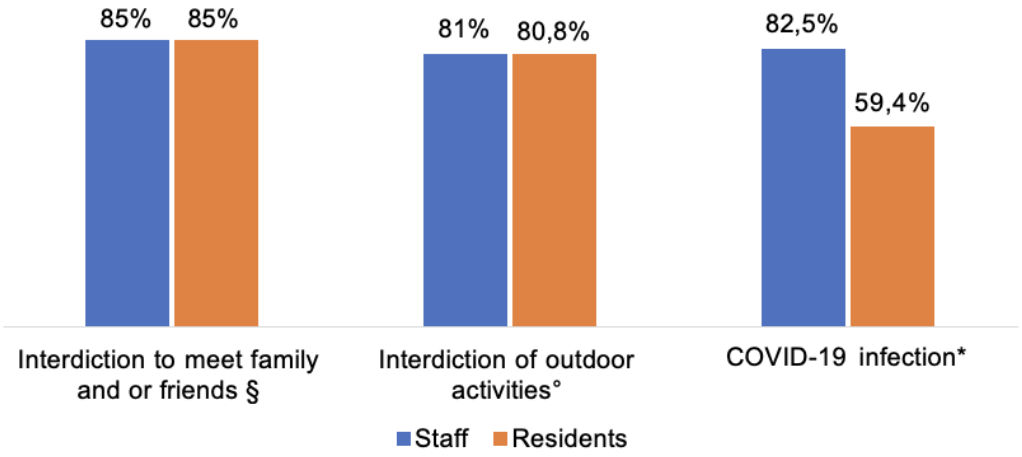
Table 4. Socio-demographic and clinical characteristics of residents participating in the study (n = 272)

Sex, n (%)	
Male	168 (61.8)
Age, n (%)	
≤ 40 yrs	54 (19.9)
41–50 yrs	53 (19.5)
51–60 yrs	116 (42.6)
> 60 yrs	49 (18.0)
Self-reported clinical diagnosis, n (%)	
Schizophrenia	111 (40.8)
Bipolar disorder	35 (12.9)
Personality disorder	30 (11.1)
Non-schizophrenic psychosis	47 (17.3)
Schizoaffective disorder	21 (7.7)
Delusional disorder	10 (3.7)
Major depression	8 (2.9)
Obsessive compulsive disorder	5 (1.8)
Other	5 (1.8)
Length of stay in RF (yrs.), mean (SD); min–max	5.8 (5.2); 0–23
Years since illness onset, mean (SD); min–max	20.2 (11.1); 1–51

Table 5. Residents' perspectives of the changes that occurred within psychiatric RFs during the COVID-19 pandemic ("How did you consider….?") (n = 272)

	Unpleasant n (%)	Neutral n (%)	Pleasant n (%)
Relationship with family and/or friends			
Not being allowed to join family gatherings/family celebrations (e.g., holidays, anniversary, birthday parties) or outdoor activities organised by friends and/or family (NA 12, missing 1)	221 (85.3)	24 (9.3)	14 (5.4)
Not being allowed to meet friends and/or family members (NA 4)	225 (84.0)	29 (10.8)	14 (5.2)
Outdoor activities			
To spend all the time within the facility (or in your room) due to interdiction of outdooractivities (NA 6)	216 (81.2)	34 (12.8)	16 (6.0)
Not being allowed to go shopping to practice and improve social skills trained duringrehabilitation activities provided within the facility (NA 54, missing 5)	173 (81.2)	28 (13.1)	12 (5.6)
Not being allowed to engage in outdoor activities (walking/hiking. volunteering. sports.cycling trips. day trip/excursions) (NA 6, missing 1)	214 (80.8)	37 (14.0)	14 (5.3)
Not being allowed to attend work, education or vocational training programmes due tointerdiction of outdoor activities (NA 183, missing 6)	65 (78.3)	13 (15.7)	5 (6.0)
Not being allowed to use public transport to practice and improve social skills trained duringrehabilitation activities provided within the facility (NA 157, missing 5)	83 (75.5)	19 (17.3)	8 (7.3)
Not being able to attend usual planned activities at day centres due to closure of facilities (NA 179, missing 8)	50 (58.8)	19 (22.4)	16 (18.8)
Indoor activities			
Not being allowed to have leisure activities together with other residents within the facility(e.g., playing games, watching movies/TV, listening to music, eating together, having a party) due to physical distancing measures (NA 33)	168 (70.3)	52 (21.8)	19 (7.9)
Not being allowed to do something helpful for other residents due to physical distancingmeasures (NA 104, missing 3)	107 (64.8)	40 (24.2)	18 (10.9)
To have been requested to adopt physical distancing of at least 1 m from others whileparticipating to rehabilitation activities within the facility (NA 17, missing 2)	151 (59.7)	76 (30.0)	26 (10.3)
Organisational changes			
The overall impact of the COVID-19 pandemic and related restrictive measures on the qualityof your life (NA 9, missing 3)	202 (77.7)	34 (13.1)	24 (9.2)
To engage with remote consultations by phone or via digital platforms with GPs, treatingpsychiatrists or other therapists (NA 130, missing 2)	82 (58.6)	28 (20.0)	30 (21.4)
To be exclusively engaged in indoor rehabilitation activities due to interdiction of outdooractivities (NA 13, missing 3)	149 (58.2)	54 (21.1)	53 (20.7)
Control of infection			
To adopt preventive measures within the facility, such as wear facial mask. use hand sanitizer gel undergo triage procedures (NA 4, missing 2)	158 (59.4)	76 (28.6)	32 (12.0)
To regularly undergo nasopharyngeal swab (NA 12, missing 3)	120 (46.7)	70 (27.2)	67 (26.1)
To have the chance of being first in line for COVID-19 vaccination as a resident of ahealthcare facility (NA 10, missing 2)	43 (16.5)	42 (16.2)	175 (67.3)

Figure 1. Comparison of staff's perspectives of the problems of the residents and the problems reported by residents on the most three challenging areas (percentages of subjects reporting challenges/problems in the three considered areas are given).



§ For staff, the item considered was "Lack of access to usual support networks of family and friends" (responses "Extremely relevant", "Very relevant" and "Moderately relevant" were summed). For residents, the item considered was "How did you consider not being allowed to join family gatherings/ family celebrations or outdoor activities organised by friends and /or family?" (response "Unpleasant").
° For staff the item considered was "Lack of usual work and outdoor activities" (responses "Extremely relevant". "Very relevant" and "Moderately relevant" were summed). For residents the item considered was "How did you consider not being allowed to engage in outdoor activities?" (response "Unpleasant").
* For staff the item considered was "Worries about getting COVID-19 infection" (responses "Extremely relevant". "Very relevant" and "Moderately relevant" were summed). For residents the item considered was "How did you consider adopting preventive measures within the facility, such as wear facial mask, use hand sanitiser gel, undergo triage procedures?" (response "Unpleasant")

CHAPTER 3 – PSYCHOLOGICAL DISTRESS IN COVID-19 SURVIVORS AND LONG-COVID PATIENTS

This Chapter explores the psychological distress experienced by COVID-19 survivors, emphasizing the effect of discrimination, trauma, and stigma on mental health. Many survivors report symptoms of anxiety, depression, and PTSD, which are often exacerbated by long COVID symptoms and difficulties in social integration. Social discrimination, fueled by fear and prejudice, intensifies isolation and limits support network, contributing to feelings of shame and self-devaluation. To address these issues, is study developed and validated two psychometric scales to measure perceived discrimination and internalized stigma in COVID-19 patients: the CEDISC and COINS. These scales, adapted from HIV/AIDS stigma assessments and grounded in a solid theoretical framework, assess social discrimination and personal stigma. Both instruments demonstrated strong reliability and validity, enabling accurate assessments of distress and the role of stigma in disease management.

A survey conducted on an Italian sample found that about a quarter of participants reported experiencing discrimination or stigma, which correlated with higher levels of anxiety, depression, and insomnia. Analysis revealed a significant relationship between internalized stigma and psychological disturbances, highlighting the need for targeted support strategies for this vulnerable population.

This research underscores the urgency of addressing stigma through tailored interventions to mitigate the long-term psychological effects of COVID-19 and support full recovery. Further studies are necessary to better understand the link between stigma and psychological distress, facilitate social reintegration, and promote resilience among survivors.

Psychological distress in COVID-19 survivors between discrimination, trauma and adaptive factors

COVID-19 pandemic has profoundly impacted the mental health of survivors, who frequently experience psychological distress, trauma-related symptoms, and a reduced quality of life. This chapter explores the psychological sequelae faced by COVID-19 survivors, emphasizing the interplay between discrimination, trauma, and resilience mechanisms. The psychological repercussions are vast, influenced by factors such as the severity of illness, social stigma, and available coping resources.

Survivors of COVID-19 are often left grappling with mental health challenges, including anxiety, depression, and post-traumatic stress disorder (PTSD). Studies indicate that approximately 38% of survivors report significant symptoms of depression and anxiety (Cai et al., 2020), while PTSD prevalence ranges from 12% to 21%, depending on the severity of their COVID-19 experience (Dorri et al., 2021). Long-haul symptoms—such as persisting fatigue, difficulty breathing, and cognitive issues—compound psychological burdens, as survivors struggle with both the direct effects of the virus and the social environment surrounding their recovery (Aghaei et al., 2022). These "long COVID" symptoms create ongoing stress, as individuals face limitations in their daily activities and uncertainty regarding their long-term health. The sustained nature of these symptoms can lead to feelings of frustration, hopelessness, and a sense of losing control over their bodies, further amplifying psychological distress.

Insomnia is another common challenge among survivors, with approximately 24% experiencing sleep disturbances that further amplify psychological distress. This lack of restorative sleep exacerbates fatigue and reduces mental resilience, creating a cycle of psychological and physical exhaustion (Cénat et al., 2021). Sleep disturbances often correlate with increased anxiety and depressive symptoms, as survivors struggle with intrusive thoughts and hyperarousal. The interrelation of these symptoms not only lowers survivors' quality of life but also complicates their return to pre-illness functioning, perpetuating feelings of helplessness and diminished self-efficacy.

COVID-19 survivors also face discrimination that can heighten psychological distress. Stigmatization is often rooted in fear and misinformation, leading to social exclusion and prejudice (Bhanot et al., 2021). This "othering" marks survivors as potential contagion sources, intensifying their isolation and discouraging them from seeking necessary support (Ransing et al., 2020). The pervasive social stigma surrounding COVID-19 has resulted in both overt and covert discrimination, which impedes survivors' reintegration into society and negatively impacts their mental well-being (Singh & Subedi, 2020). For some, stigma has led to significant social withdrawal and anxiety, further compounding the psychological toll of their illness. The experience of stigmatization can result in increased self-stigmatization, where individuals internalize negative perceptions and begin to see themselves as "tainted" or "contagious," exacerbating feelings of worthlessness and depression.

Multiple factors influence the likelihood and severity of psychological distress among COVID-19 survivors. Key predictors include demographic, social, and medical factors that contribute to varying levels of anxiety, depression, and PTSD in this population.

Certain demographic factors, such as age, gender, and socioeconomic status, have been associated with higher levels of psychological distress among COVID-19 survivors. Younger individuals often experience more pronounced symptoms of distress, possibly due to the disruption of their social and occupational lives, which can lead to concerns about future stability and personal growth (Cai et al., 2020). Gender differences also play a role, with female survivors frequently reporting higher rates of anxiety and depression than their male counterparts (Cénat et al., 2021). This disparity may stem from a combination of biological vulnerabilities and social pressures that heighten stress responses in women. The economic impact of the pandemic, with job loss or financial insecurity, may disproportionately affect younger individuals and women, intensifying feelings of vulnerability and distress. The severity of COVID-19 symptoms and the level of medical intervention required during the acute phase significantly affect psychological outcomes. Survivors who experienced severe illness, required ICU care, or were intubated are at an increased risk for PTSD and ongoing psychological distress. The trauma associated with invasive procedures, such as mechanical ventilation, contributes to lasting

psychological effects, including PTSD symptoms like flashbacks, avoidance, and hypervigilance (Kaseda & Levine, 2020). Physical sequelae, such as fatigue, breathing difficulties, and cognitive impairments commonly seen in “long COVID” cases, further exacerbate distress by creating a constant reminder of the illness and impeding a return to normal life (Dorri et al., 2021). For many survivors, the presence of long-term physical symptoms reinforces a state of hypervigilance and fear of reinfection, intensifying their psychological distress.

The social environment during and after recovery also predicts psychological distress. Survivors who experience social isolation, either due to quarantine measures or perceived rejection by others, are more likely to suffer from anxiety and depression. Stigmatization and the lack of social support often lead to an intensified feeling of loneliness, which exacerbates mental health struggles. For some, the isolation of quarantine and the societal fears surrounding COVID-19 create a perception of "being contagious," which fuels internalized stigma and withdrawal. Survivors with limited social support networks, such as single individuals or those estranged from family and friends, report higher levels of distress and fewer resources for coping (Bhanot et al., 2021).

Pre-existing mental health conditions significantly increase vulnerability to psychological distress among COVID-19 survivors. Those with histories of anxiety, depression, or trauma-related disorders are more likely to experience intensified symptoms in the wake of COVID-19, often due to the compounding effect of pandemic-related isolation, fear, and uncertainty (Cénat et al., 2021). This heightened vulnerability underscores the importance of addressing mental health proactively in COVID-19 recovery plans, with targeted interventions for those with pre-existing conditions.

The pandemic has led to significant losses beyond health, including the death of loved ones, loss of financial security, and a diminished sense of personal safety. COVID-19 survivors who have lost family members or friends are often confronted with compounded grief, which can impede recovery and exacerbate psychological distress. Unresolved grief, especially when survivors could not be physically present during a loved one’s final moments, can lead to persistent feelings of guilt, regret, and prolonged sadness. For these individuals, bereavement-related trauma

intersects with the pandemic's emotional toll, creating a complex layer of psychological challenges that require sensitive intervention.

The broader socioeconomic impact of the pandemic, including job loss, financial insecurity, and lack of access to healthcare, serves as a major predictor of distress among survivors. Individuals who face economic instability report greater anxiety and depressive symptoms, often stemming from worries about future security and limited resources for managing health issues (Cénat et al., 2021). Survivors from low-income backgrounds are disproportionately affected, as financial hardship restricts their ability to seek mental health support and maintain a stable recovery environment (Aghaei et al., 2022).

Despite these challenges, resilience plays a crucial role in mitigating the psychological impact of COVID-19. Resilience is shaped by individual, community, and societal resources, encompassing psychological traits like optimism, support networks, and access to mental health services (Kaye-Kauderer et al., 2021). Social support systems, especially online support groups and counseling, have proven instrumental in fostering resilience among survivors (Aghaei et al., 2022). This support can buffer against mental health decline and promote adaptive coping strategies, helping survivors rebuild their lives despite ongoing challenges (Kaye-Kauderer et al., 2021). Additionally, interventions focused on enhancing individual coping strategies, such as mindfulness and problem-solving skills, show promise in reducing psychological distress and fostering resilience.

Development and psychometric validation of new questionnaires assessing experienced discrimination and internalized stigma among people with COVID-19 (Bonetto, Pace, Bodini et al., *Epidemiology and Psychiatric Sciences*, 2022)*

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Development and psychometric validation of new questionnaires assessing experienced discrimination and internalised stigma among people with Covid-19

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Abstract

Aims. To develop and validate two new standardised measures assessing, respectively, experienced discrimination (Covid-19 Experienced DISCrimination scale, CEDISC) and internalised stigma (COvid-19 INternalised Stigma scale, COINS) in people who had been infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) or had developed coronavirus disease 2019 (Covid-19) disease.

Methods. Both the CEDISC and the COINS were developed in Italian and tested for ease of use, comprehension, acceptability, the relevance of items and response options within a focus group session. Online cross-sectional validation survey was conducted among adults infected with SARS-CoV-2 or who developed Covid-19 disease, members of a closed Facebook discussion group in Italy. Exploratory factor analysis (EFA) with Promax oblique rotation; the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were used to assess the suitability of the sample for factor analysis. Reliability was assessed as internal consistency using Cronbach's alpha and as test–retest reliability using weighted kappa and intraclass correlation coefficient (ICC). Precision was examined by Kendall's tau-b coefficient.

Results. Overall, 579 participants completed the CEDISC, 519 also completed the COINS, 155 completed the retest for both scales after two weeks. The 12 items of the CEDISC converged over a 2-factor solution ('social life' and 'close relations') accounting for 49.2% of the variance (KMO = 0.894; Bartlett's test $p < 0.001$); the 13 items of the COINS converged over a 3-factor solution ('self-perception', 'close relations' and 'social life') accounting for 67.7% (KMO = 0.827; Bartlett's test $p < 0.001$). Cronbach's α was 0.848 for the CEDISC, and 0.837 for the COINS. The CEDISC showed three items (25%) with kappa between 0.61 and 0.80 and seven (58.4%) between 0.41 and 0.60, with only two items scoring 0.21 and 0.40; the COINS had ten items (76.9%) with kappa ranging from 0.41 to 0.60, and three items below 0.31. ICC was 0.906 (95% CI, 0.871–0.932) for the, CEDISC and 0.860 (95% CI, 0.808–0.898) for the COINS. Kendall's tau-b ranged from 0.360 to 0.556 ($p < 0.001$) for the CEDISC and from 0.290 to 0.606 ($p < 0.001$) for the COINS.

Conclusions. Both the CEDISC and the COINS are two valid and reliable scales to be used in studies examining the role of stigma and discrimination of people infected with SARS-CoV-2 and Covid-19 patients, and in research evaluating interventions designed to mitigate stigma in this population.

** The study has been published (Bonetto et al., 2022) and is reproduced with permission.*

INTRODUCTION

The worldwide spread of the Covid-19 pandemic has resulted in several psychosocial consequences, including stigmatisation and discriminatory behaviours against people who have, or might have, the disease (Bagcchi, 2020; He et al., 2020; Kousoulis et al., 2020).

Literature on previous viral outbreaks and epidemics reports that infected patients have often been labelled, stereotyped, discriminated against, treated separately, and experienced loss of status because of a perceived link with the disease (Baldassarre et al., 2020; Gronholm et al., 2021; Lasalvia, 2020; Van Bortel et al., 2016). Worryingly, it has been found that social stigma often persists even after outbreaks have ended (James et al., 2020; Overholt et al., 2018) .

Social stigma may be experienced by an individual in three forms: enacted stigma (overt behaviours), perceived stigma (awareness of stereotype), and internalized stigma (personal value) (Pescosolido & Martin, 2015). Enacted stigma refers to overt acts of discrimination and humiliation directed at a person because of his or her stigmatized status, which captures the interpersonal aspect of stigma. The process of rejection and unfair treatment experienced by the stigmatised person overlaps with the concept of "experienced discrimination" (Thornicroft et al., 2007). By contrast, perceived stigma and internalized stigma captures the intrapersonal aspect of stigma, i.e., perceived stigma refers to the subjective awareness of social stigma, whereas internalized stigma (also known as self-stigma) describes the process of an individual accepting society's negative evaluation and incorporating this into personal value and sense of self (in this process, perceived stigma represents a precondition for the development of internalised stigma).

In the context of the Covid-19 pandemic, experienced discrimination refers to instances during which a given person with suspected or confirmed Covid-19 experiences devaluation, unfair treatment, or exclusion from others due to a perceived link with the disease, whereas internalized stigma refers to the awareness of devaluation or a stereotype of oneself because of a perceived linkage with Covid-19. Due to internalised stigma, people with Covid-19 may discredit themselves and accept that they deserve to be treated unequally and expect to be stigmatised further (Ransing et al., 2020). Both experienced discrimination and internalised stigma are

interrelated and play a crucial role in the personal and psychological adjustment to the disease. The way stigmatised people respond to stigma - by either conforming to it (self-stigmatisation) or resisting it - can affect the impact of stigma in a community, irrespective of the actual level of enacted stigma or discrimination (Deacon, 2005). High levels of internalised stigma reduce the incentives to challenge stigmatisation, which has negative consequences for both the individual and public health programmes. In fact, in order to avoid discrimination, people infected with SARS-CoV-2 may be reluctant to seek healthcare or may try to hide the disease or misreport symptoms, thus reducing early detection and treatment (Des Jarlais et al., 2006; Stangl et al., 2019) and posing difficulties in controlling the spread of the infection (Van Bortel et al., 2016). Social stigma may also affect the mental health of stigmatised people. Initial evidence suggests that stigma is associated with PTSD symptoms, depression, and anxiety among patients hospitalized with Covid-19 (H. Liu et al., 2020). The experience of being treated differently from others due to Covid-19 may be also indirectly associated with anxiety, depression, and insomnia through the mediating effect of shame and internalized stigma (J. Li et al., 2020) .

However, the issue of Covid-19 related stigma and its relationships with mental health outcomes in people infected with SARS-CoV-2 has not been sufficiently addressed in the literature and empirical evidence on the extent and severity of stigmatization among persons surviving Covid-19 is still lacking. This research gap is substantially due to the lack of standardized measures specifically designed to measure interpersonal and intrapersonal aspects of stigma in people with Covid-19. Recently, a measure adapted for Covid-19 patients and based on a previous HIV/AIDS stigma scale has been published. However, this scale does not specifically address the different components of interpersonal (experienced discrimination) and intrapersonal stigma (internalised) (F. Huang et al., 2022) and it seems to lack a sound theoretical basis.

The present paper aims to fill this research gap by reporting on the development and psychometric properties testing of two standardized multidimensional measures assessing, respectively, experienced discrimination and internalized

stigma in persons infected with SARS-CoV-2 or who have had full blown Covid-19 disease.

METHODS

Item generation and pre-testing

A two-phase process was carried out for the development of the scales. In the first phase (February-March 2021), candidate items were identified through a comprehensive literature review of relevant sources addressing personal stigma in patients with infectious diseases (MERS, SARS, Ebola virus and HIV/AIDS). We did not find psychometrically validated scales addressing personal stigma among Covid-19 patients. On the other hand, a series of psychometrically tested scales designed to assess stigma in people with HIV/AIDS were found which represented the basis for item generation in the present study. Specifically, items for the experienced discrimination scale were drawn from Berger et al. (2001), whereas for the self-stigma scale were drawn from Sayles et al. (2008), which represent the most frequently used measures in the literature for assessing, respectively, HIV related experienced stigma and self-stigma (Earnshaw & Chaudoir, 2009; McAteer et al., 2016; Wanjala et al., 2021). Moreover, for both experienced discrimination and self-stigma, items were also drawn from Visser et al. (2008), who developed three parallel stigma scales to assess personal views of HIV related stigma. With regard the item selection process, for the experienced discrimination scale items were chosen in order to cover all the potential everyday life domains where respondents might have experienced negative reactions from others due to their Covid-19 infection; for the internalized stigma scale, items were chosen in order to cover all the possible negative feelings that respondents might have experienced in relation to their Covid-19 infection or all the public stereotypes related to Covid-19 that respondents might have internalized. In the item generating process, we did not translate any specific item from the original English version of the scales taken into account, but we only extrapolated their thematic elements; therefore, items composing both the newly developed scales were directly produced in Italian This phase led to the development of two drafted versions of the scales, with one addressing experienced discrimination and the other exploring internalised stigma.

Both scales, developed in Italian, were designed as self-administered scales. The two drafted versions contained, respectively, 24 items and 19 items. Respondents indicate their degree of agreement on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree". In the second phase (April 2021), face and content validity of the new scales developed in the previous phase were tested in a focus group session with subjects recovered from Covid-19. This phase aimed to use results obtained from the focus group to decide on final, definitive versions for validation work. Eligible participants for the focus group were identified by the research team. The focus group comprised a purposefully selected sample (Palinkas et al., 2015) of nine participants (four women and five men), aged between 25 and 55 years (average age 35,3). They all had developed full blown Covid-19, with two of them having been hospitalised and seven having been treated at home. Participants were asked to discuss aspects of the scales related to ease of use, comprehension, acceptability, relevance of items and response options, time taken to complete and recommendations for improvement. The focus group session took place using an online video conferencing tool and was led by an experienced moderator (A.L.). A previously prepared semi-structured topic guide was followed during the session. The focus group was video recorded (with participant consent) and transcribed for analysis. Based on the learnings and insights from the focus group, minor changes were made to the wording of the items of both questionnaires. Furthermore, in both questionnaires, the various item statements were turned into questions (e.g., from "My friends and family members were ashamed of me because I have had Covid-19;" to "How much were your friends and family members ashamed of you because you have had Covid-19?"), responses were categorised using a 4-point Likert scale from 'not at all' to 'a lot', a 'Not applicable' option was added; finally, regarding the experienced discrimination scale items were reduced to 14 and for the internalised stigma scale items were reduced to 17.

Piloting the questionnaires

The two scales developed according to the steps mentioned above were tested in an online cross-sectional survey conducted between 10th September and 10th November 2021. The newly developed stigma scales were hosted on the web-based

survey platform SurveyMonkey and could be self-rated by participants through their PCs, smartphones, or other mobile devices. Participants were adults (≥ 18 yrs.) who had been infected with SARS-CoV-2 or had developed Covid-19. The online survey was conducted within a closed Facebook discussion group comprising people who had been infected with SARS-CoV-2 or had developed Covid-19, which at time of the study had more than 10,000 members across Italy. The study description and invitation to participate, as well as the link to the online questionnaires, were posted to all members by the group administrator (M.C.). Participants were aware of the purpose of the study and gave informed consent before participating. They completed the survey anonymously, voluntarily, and without any remuneration. To assess test-retest reliability upon completion of all questionnaires, participants were asked to leave their email address if they wished to do so. This subsample was invited to complete the questionnaires again after two weeks.

The questionnaires

The CEDISC (Covid-19 Experienced DISCrimination scale) and COINS (COvid-19 INternalized Stigma scale), both developed in Italian, were designed to measure, respectively, experienced discrimination and internalized stigma among people infected with SARS-CoV-2 or who had survived Covid-19. The CEDISC starts with an opening question asking participants whether they might have been treated unfairly (e.g., with hostility, avoidance, rejection, prejudice) by other people as they were infected with SARS-CoV-2 or diagnosed with Covid-19 in a series of everyday situations. In order to avoid any possible misunderstanding with the specific content that the scale was aiming to address, a guiding note was given explaining that the situations listed in the questionnaire referred to the period following recovery from Covid-19 (or following isolation due to a positive test), once the respondent had returned to her/his usual social life. The COINS also starts with an opening question asking participants if they might have felt uncomfortable (e.g., embarrassed, ashamed, guilty) as they were infected with SARS-CoV-2 or diagnosed with Covid-19 across a series of possible situations. For both scales, all items are scored on a 4-point Likert scale: 0=not at all, 1=a little, 2=moderately and

3=a lot. A 'Not applicable' option is available. The CEDISC version that was completed in the online survey included 14 questions; however, two items were removed after data analysis as one item had a high number of 'Not applicable' responses (36.3%) and the other one had a factor loading <0.40. Thus, the final version of the questionnaire for perceived stigma presented here constitutes 12 items (an English translation of the original Italian scale is shown in Appendix A). The COINS version completed in the online survey included 17 questions, but four items were removed after factor analysis as they had factor loadings <0.40. The final version of the internalized stigma questionnaire therefore comprises 13 items (an English translation of the original Italian scale is shown in Appendix B).

For both questionnaires, a mean score is calculated for the global scale and each subscale. No items are reverse coded. A higher score indicates a higher experienced discrimination and, respectively, internalized stigma level. A strategy for the interpretation of scores may be addressed by applying the midpoint of 1.5, thus identifying four stigma categories: <1 minimal; 1-1.5 low; 1.5-2 moderate; and 2+ high (Brohan et al., 2013). In addition, a total score may be calculated by counting the number of items in which individuals scored 1, 2 or 3.

Statistical analysis

Descriptives were given by absolute frequencies and percentages for categorical variables and means and standard deviations for continuous variables. All analyses were performed with SPSS 26 and Stata 17.

Construct validity

Construct validity was established by conducting an Exploratory Factor Analysis (EFA) based on the principal component factoring with Promax rotations. Kaiser-Meyer-Olkin's measure of sampling adequacy (KMO) and Bartlett's test of sphericity were estimated to explore the model's adequacy. Factors with eigenvalues greater than one were retained. Only items with factor loadings >0.4 were considered in the final model. No correlation with other scales that measure similar constructs was performed by considering that validated instruments

assessing experienced discrimination and internalized stigma for Covid-19 were not available.

Reliability

The reliability was assessed by considering: (1) consistency over subscales (internal consistency) and (2) consistency over time (test-retest reliability). The internal consistency was assessed using Cronbach's α with a criterion of 0.70 for a good internal consistency (Cronbach, 1951). To assess test-retest reliability of items, weighted kappa coefficients were calculated with values >0.41 indicating a moderate agreement (Landis & Koch, 1977). Two-way mixed effect Intraclass Correlation Coefficient (ICC) was used to calculate the test-retest reliability for the global mean score and the subscales. A criterion of 0.75 was used to indicate acceptable reliability (Koo and Li, 2016).

Precision

The precision (i.e., how well each item fits within the scale) was examined by Kendall's tau-b coefficient. A correlation <0.30 was indicative of unacceptable fit (Furr, 2021).

Acceptability

In order to establish the extent to which the scale was acceptable for the target population, the following aspects were examined: 1) maximum endorsement frequencies (MEF), and 2) aggregate adjacent endorsement frequencies (AEF) (Furr, 2021). In considering MEF, the n (%) of respondents endorsing each response category was established. MEF >80% in any category indicates that the item may need further consideration. AEF assesses the proportion of responses in two or more adjacent scale points of an item, where the criterion of >10% was considered acceptable.

Feasibility

The feasibility was assessed by registering the time taken to complete each online questionnaire. More than 20 minutes was considered indicative of an unbearable

participant burden. Finally, the percentage of participants who completed each questionnaire was calculated.

RESULTS

Participants' characteristics

The online survey involved 579 participants who completed the CEDISC questionnaire, 519 (89.6%) of whom also completed the COINS questionnaire. In terms of socio-demographic and SARS-CoV-2 characteristics, the 60 participants who refused to complete the COINS did not differ from the 519 who completed it, with the only exception of Covid-19 symptoms, which occurred more frequently in people who completed the assessment (93.1% vs. 81.7%, p=0.005 Fisher's exact test). One hundred and fifty-five participants completed the retest after two weeks. No differences were found with respect to socio-demographics and SARS-CoV-2 infection characteristics between the test and the retest samples (Table 1).

Scoring

The distribution of items pertaining to the final version of both CEDISC and COINS scales are given in Table 2.

Construct validity

By considering the CEDISC scale, 12 items converged over a 2-factor solution accounting for 49.2% of the variance (KMO 0.894; Bartlett's test $p<0.001$). The first factor, namely 'Social life', accounted for 39.7% of the variance and constituted 7 items, while the second factor, namely 'Close relations', accounted for 9.5% of the variance and constituted 5 items. Regarding the COINS questionnaire, 13 items converged over a 3-factor solution accounting for a variance of 67.7% (KMO 0.827; Bartlett's test $p<0.001$). The first factor, namely 'Self-perception', accounted for 34.5% of the variance and comprised 7 items. The second factor, namely 'Close relations', accounted for 22.7% of the variance and included 4 items. Finally, the third factor, namely 'Social life', accounted for 10.5% of the variance and consisted of 3 items (Table 3).

Reliability

By considering the CEDISC questionnaire, the Cronbach's alpha value for the global score was 0.848 indicating a good internal consistency. The alpha value for the items ranged from 0.831 to 0.850. By considering the two subscales, the Cronbach's alpha was 0.770 and 0.777, respectively. Regarding the COINS questionnaire, the Cronbach's alpha value for the global score was 0.837 indicating a good internal consistency. The alpha value for the items ranged from 0.815 to 0.832. By considering the three subscales, the Cronbach's alpha was 0.855, 0.924 and 0.868, respectively (Table 4).

The COINS subscale 'Close relations' showed a value exceeding 0.90 due to the presence of one item ('*I would understand if my neighbours avoided me because I have had COVID-19*') with a Cronbach's alpha of 0.927. This item was retained, despite the possible redundancy, because it addresses a relevant aspect of participants' close relations.

By considering test-retest reliability, three items (25%) in the CEDISC questionnaire had kappa values between 0.61 and 0.80 (substantial agreement) and seven (58.4%) between 0.41 and 0.60 (moderate agreement). Only two items showed a fair agreement (values between 0.21 and 0.40). By considering the COINS questionnaire, ten items (76.9%) had a weighted Cohen's kappa value indicating a moderate agreement (0.41-0.60). The three items in the 'Social life' subscale showed 86.6%, 75.6% and 83.0% of agreement on the category 'not at all', thus generating a test-retest cross-tabulation which is a sparse matrix.

Finally, ICC calculated for the CEDISC questionnaire showed that the global mean score and the 'Close relationships' subscale had an excellent test-retest reliability, while the 'Social life' had a good reliability. Regarding the COINS questionnaire, ICC indicated a good test-retest reliability for the global score and the two subscales 'Self-perception' and 'Close relations'. For the subscale 'Social life' the ICC value was low due to the very high agreement on the same category ('Not at all') for all the pertaining items (Table 5).

Precision

By considering the CEDISC questionnaire, the Kendall's tau-b coefficients for the global scale ranged from 0.360 to 0.556 ($p<0.001$), thus indicating that all items fit well with the score of the scale. Moreover, the two subscales showed values ranging from 0.506 to 0.567 and from 0.469 to 0.705, respectively. The COINS questionnaire showed Kendall's tau-b coefficients ranging from 0.290 to 0.606 ($p<0.001$) for the global scale score (the lowest value 0.290 pertain to one of the three items which constitute the subscale 'Social life'). The correlations within each subscale were very good.

Acceptability

Regarding the CEDISC questionnaire, the MEF criterion was slightly violated only by one item, with the 'not at all' category showing a frequency of 80.7%. The AEF criterion was violated when considering the adjacent categories of 'moderately' and 'a lot' for five items, ranging from 6.5% to 9.1%. By considering the COINS questionnaire, the MEF criterion was violated by one item on the category 'not at all' (83.8%). The AEF criterion was violated when considering the adjacent categories of 'a little' and 'moderately' for one item (6.3%) and the categories 'moderately' and 'a lot' for three items (5.7%, 6.4% and 7.3%).

Feasibility

The mean completion times for the CEDISC and COINS were, respectively, 4.5 minutes (SD 2; range 2-16) and 3.5 minutes (SD 2.5; range 1.5-18). All participants completed the CEDISC scale, while 10.4% refused to fill in the COINS scale.

DISCUSSION

To our knowledge, this is the first study to develop and validate two questionnaires assessing, respectively, experienced discrimination (CEDISC) and internalised stigma (COINS) among people who had been infected by SARS-CoV-2 or who survived Covid-19.

Research so far has developed specific scales measuring public stigma (stereotypes and misconceptions endorsed by the public in relation to Covid-19) (Kantor & Kantor, 2021; Nochaiwong et al., 2021) and perceived social stigma (awareness of

public stigma or belief that others hold stigmatizing thoughts or stereotypes about Covid-19) (F. Huang et al., 2022). As far as we know, specific standardised scales addressing experienced discrimination (actual experiences of being treated unfairly by others) and internalised stigma (internalization of the negative *stereotypes about Covid-19 endorsed by the general population)* are still lacking. With specific regard to internalised stigma, the few research published on this topic suggests that this represents a crucial dimension in predicting adverse mental health outcomes (specifically, PTSD, anxiety, depression, demoralization, low self-esteem) in patients surviving Covid-19 (H. Li et al., 2020; J. Li et al., 2020), thus deserving special attention. Since social stigma predicts long-term adverse mental health outcomes in people infected with Covid-19, it is critical for Covid-19 interventions to target stigma in order to both reduce its psychosocial impact on people infected with SARS-CoV-2 or who developed the disease and to remove a key factor that may potentially hamper full recovery in those surviving Covid-19 (Ransing et al., 2020). Yet, stigma-reduction interventions tailored around people infected with Covid-19 are non-existent. Thus, there is a need for research to generate knowledge to address Covid-19 related stigma and discrimination.

The psychometric evaluation conducted in this study shows that the 12-item CEDISC, with its 2-factor structure, is a reliable and valid self-report measure for assessing experienced discrimination among people who tested positive for SARS-CoV-2 or survived Covid-19. The factor analysis showed that the CEDISC can adequately measure experienced discrimination as a whole and through the two dimensions of 'Social life' and 'Close relations'.

Similarly, the psychometric properties of the 13-item COINS, with a 3-factor structure, reveal that this questionnaire is a reliable and valid self-report measure for assessing internalized stigma in the same population. In detail, the factor analysis showed that the COINS measures internalized stigma as a whole and through the three dimensions 'Self-perception', 'Close relations' and 'Social life'. The reliability analysis revealed a good internal consistency and most of the items showed at least moderate agreement in the test-retest comparison for both scales. The precision demonstrates that all items fit well with the scores in both

questionnaires. The acceptability, assessed by MEF and AEF, was slightly violated in a minimal number of items.

Finally, both scales were completed within five minutes by most participants, thus proving to be feasible instruments.

These standardised measures, focusing on interpersonal and intrapersonal aspects of social stigma, will allow to gain a more in-depth knowledge on the psychosocial consequences of the Covid-19 pandemic and to promote more research in this field.

Strengths and limitations

A major strength of this study lies in the sample size of nearly 600 participants, which allowed us to validate the two scales relying on a statistically robust sample. The second strength relates to the inclusion of people who became positive or were diagnosed with Covid-19 in different pandemic waves, which could have reflected a different pattern of stigmatization. The third strength pertains to the pre-testing phase, which was conducted by engaging a group of participants representing a wide range of characteristics (age, gender and working status). This study has also some limitations. First, the sample used in developing and validating the two scales may not be representative of the overall population of interest, both in terms of socio-demographic composition and in terms of Covid-19 severity: in fact, female gender in our sample is overrepresented, while elderly people are under-represented. Moreover, symptomatic Covid-19 patients or people admitted to hospital for Covid-19 are probably overrepresented (whereas, e.g., those asymptomatic tested positives are underrepresented). Second, as the study was conducted among members of a social media community, selection bias might have been occurred, thus limiting participation of those who do not regularly access to social media and, in general, of all people affected by "digital poverty" and "digital inequality". Third, both scales were developed in Italian and validated within an Italian sample, thus limiting their use in other cultural and geographical contexts. Fourth, both scales did not include open-ended questions, so the study did not collect qualitative data that might have provided more insights into participants' experiences. Fifth, as with any study that relies on online data collection, biases such as response bias and social desirability bias might have affected the results.

Finally, due to the time of data collection, participants tested positive or diagnosed in the early pandemic stages were being asked to recall a period that occurred months earlier; thus, their recollections might not be accurate.

Conclusions and future research

The present study indicates that both the CEDISC and the COINS represent two valid and reliable measures that may be used in studies examining the role of stigma and discrimination in Covid-19 patients, and in research evaluating interventions designed to mitigate stigma and discrimination in this population. Both scales, therefore, could be incorporated into public health surveys as a part of clinical and intervention research. These newly developed scales were specifically designed for Covid-19, but they might be also used in relation to other (similar) types of infections/pandemics in the future.

The factorial structure of both scales should also be replicated by a Confirmative Factor Analysis in a different sample of people infected with SARS-CoV-2 or with Covid-19. Moreover, future studies are needed on the changing dynamics of stigma in different stages of the pandemic. Finally, further research will be necessary to assess the psychometric properties of both scales in different populations and among people from different cultural backgrounds, as there are relevant differences in attitudes towards illness and experiences of illness, health, and stigma across cultures. With this latter regard, a cultural adaptation of the scales will be needed as they were developed within a specific geographical context.

Tables and figures (Bonetto, Pace, Bodini et al., 2022)

Table 1. Socio-demographics and clinical characteristics for the test sample (n=579) and the retest sample (n=155)

	Test sample n=579	**Retest sample n=155**	p-value Chi-square or Fisher's exact test
Gender, n (%)	(33 missing)	(2 missing)	
Male	83 (15.2)	19 (12.4)	0.438
Female	463 (84.8)	134 (87.6)	
Age, n (%)			
18-35 yrs.	107 (18.5)	26 (16.8)	0.877
36-55 yrs.	315 (54.4)	87 (56.1)	
56+ yrs.	157 (27.1)	42 (27.1)	
Education, n (%)	(1 missing)		
Up to secondary education	115 (19.9)	32 (20.6)	0.971
Tertiary education	253 (43.8)	68 (43.9)	
Degree/Postgraduate degree	210 (36.3)	55 (35.5)	
Employment, n (%)	(5 missing)		
No	175 (30.5)	44 (28.4)	0.693
Yes	399 (69.5)	111 (71.6)	
Marital status, n (%)	(6 missing)		
Single	141 (24.6)	36 (23.4)	0.435
Married/In civil partnership	340 (59.3)	99 (64.3)	
Divorced/Widowed	92 (16.1)	19 (12.3)	
Period SARS-CoV-2 infection, n (%)			
January-September 2020	111 (19.2)	38 (24.5)	0.170
October-December 2020	223 (38.5)	63 (40.6)	
From January 2021	245 (42.3)	54 (34.8)	
Covid-19 symptoms, n (%)			
No	47 (8.1)	8 (5.2)	0.301
Yes	532 (91.9)	147 (94.8)	
Hospitalised for Covid-19, n (%)	(47 NA)	(8 NA)	
No	413 (77.6)	114 (77.6)	1.000
Yes	119 (22.4)	33 (22.4)	

Table 2. Response frequencies and percentages of the CEDISC (n=579) (top part) and the COINS (n=519) (bottom part)

CEDISC items	**Not at all**	**A little**	**Moderately**	**A lot**	**Not applicable**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**
1 Must have done something wrong	286 (49.4%)	141 (24.4%)	67 (11.6%)	49 (8.5%)	36 (6.2%)
2 Mistake to share with others my Covid	347 (59.9%)	97 (16.8%)	47 (8.1%)	35 (6.1%)	53 (9.2%)
3 Friends and family ashamed of me	449 (77.5%)	65 (11.2%)	21 (3.6%)	17 (2.9%)	27 (4.7%)
4 Treated unfairly by family members	467 (80.7%)	55 (9.5%)	25 (4.3%)	18 (3.1%)	14 (2.4%)
5 Treated unfairly by friends	441 (76.2%)	75 (13.0%)	27 (4.7%)	21 (3.6%)	15 (2.6%)
6 Treated unfairly in areas of public life	372 (64.2%)	79 (13.6%)	28 (4.8%)	23 (4.0%)	77 (13.3%)
7 Treated unfairly at work/at school	321 (55.4%)	79 (13.6%)	41 (7.1%)	47 (8.1%)	91 (15.7%)
8 Treated unfairly by healthcare profess.	230 (39.7%)	114 (19.7%)	77 (13.3%)	136 (23.5%)	22 (3.8%)
9 Treated unfairly on social media	356 (61.5%)	67 (11.6%)	25 (4.3%)	28 (4.8%)	103 (17.8%)
10 Media shape negative attitudes	160 (27.6%)	71 (12.3%)	95 (16.4%)	133 (22.6%)	122 (21.1%)
11 Difficulty returning to work/p. active.	293 (50.6%)	110 (19.0%)	53 (9.2%)	63 (10.9%)	60 (10.4%)
12 Avoided showing mild resp. symptoms	272 (47.0%)	133 (23.0%)	71 (12.3%)	60 (10.4%)	43 (7.4%)
COINS items	**Not at all**	**A little**	**Moderately**	**A lot**	**Not applicable**
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**
1 I am not as good a person as others	325 (62.6%)	63 (12.1%)	57 (11.0%)	60 (11.6%)	14 (2.7%)
2 I feel ashamed	353 (68.0%)	80 (15.4%)	43 (8.3%)	38 (7.3%)	5 (1.0%)
3 I feel that it is my fault	258 (49.7%)	91 (17.5%)	75 (14.5%)	94 (18.1%)	1 (0.2%)
4 I feel embarrassed	227 (43.7%)	124 (23.9%)	77 (14.8%)	86 (16.6%)	5 (1.0%)
5 Avoid telling others my Covid	328 (63.2%)	101 (19.5%)	38 (7.3%)	38 (7.3%)	14 (2.7%)
6 Stop socializing for negative reactions	314 (60.5%)	86 (16.6%)	53 (10.2%)	53 (10.2%)	13 (2.5%)
7 Uncomfortable to go outside of house	241 (46.4%)	122 (23.5%)	77 (14.8%)	73 (14.1%)	6 (1.2%)
8 Understand if my family avoids me	328 (63.2%)	106 (20.4%)	45 (8.7%)	18 (3.5%9	22 (4.2%)
9 Understand if friends avoid me	346 (66.7%)	96 (18.5%)	41 (7.9%)	19 (3.7)	17 (3.3)
10 Understand if neighbours avoid me	302 (58.2%)	124 (23.9%)	41 (7.9%)	17 (3.3%)	35 (6.7%)
11 Agree if employers do not employ me	405 (78.0%)	25 (4.8%)	8 (1.5%)	22 (4.2%)	59 (11.4%)
12 Understand exclusion from public life	364 (70.1%)	44 (8.5%)	15 (2.9%)	18 (3.5%)	78 (15.0%)
13 Understand unavailability of doctors	435 (83.8%)	37 (7.1%)	17 (3.3%)	21 (4.0%)	9 (1.7%)

Table 3. Factor loadings from the Exploratory Factor Analysis (Principal component extraction; Promax rotations; factor loadings >0.4 were retained) for the CEDISC (n=579) (top part) and the COINS (n=519) (bottom part)

CEDISC items	**Factor 1 Social life**	**Factor 2 Close relations**	**-**	**Communalities**
1 Must have done something wrong	0.120	**0.602**		0.460
2 Mistake to share with others my Covid	0.203	**0.586**		0.522
3 Friends and family ashamed of me	-0.104	**0.895**		0.704
4 Treated unfairly by family members	-0.192	**0.847**		0.566
5 Treated unfairly by friends	0.359	**0.468**		0.544
6 Treated unfairly in areas of public life	**0.597**	0.174		0.508
7 Treated unfairly at work/at school	**0.626**	0.134		0.507
8 Treated unfairly by healthcare profess.	**0.453**	0.068		0.245
9 Treated unfairly on social media	**0.732**	-0.078		0.476
10 Media shape negative attitudes	**0.694**	-0.024		0.463
11 Difficulty returning to work/p. active.	**0.818**	-0.218		0.509
12 Avoided showing mild resp. symptoms	**0.578**	0.085		0.398
Eigenvalue	4.8	1.1		
% Variance explained	39.7%	9.5%		
COINS items	**Factor 1 Self-perception**	**Factor 2 Close relations**	**Factor 3 Social life**	**Communalities**
1 I am not as good a person as others	**0.732**	0.006	-0.046	0.528
2 I feel ashamed	**0.840**	-0.124	0.041	0.692
3 I feel that it is my fault	**0.627**	-0.047	0.107	0.413
4 I feel embarrassed	**0.804**	-0.021	0.040	0.652
5 Avoid telling others my Covid	**0.678**	-0.106	0.049	0.453
6 Stop socializing for negative reactions	**0.720**	0.223	-0.122	0.589
7 Uncomfortable to go outside of house	**0.715**	0.085	-0.064	0.526
8 Understand if my family avoids me	-0.025	**0.930**	0.016	0.870
9 Understand if friends avoid me	0.025	**0.918**	0.039	0.884
10 Understand if neighbours avoid me	-0.026	**0.892**	0.003	0.790
11 Agree if employers do not employ me	-0.023	-0.007	**0.915**	0.826
12 Understand exclusion from public life	0.036	0.099	**0.848**	0.815
13 Understand unavailability of doctors	0.007	-0.020	**0.878**	0.759
Eigenvalue	4.5	3.0	1.4	
% Variance explained	34.5%	22.7%	10.5%	

Table 4. Internal consistency for the global score and the subscales (Cronbach's alpha) for the CEDISC (n=579) (top part) and the COINS (n=519) (bottom part)

	Cronbach's alpha			
CEDISC items	**Global score**	**Social life**	**Close relations**	**-**
1 Must have done something wrong	0.836		0.758	
2 Mistake to share with others my Covid	0.832		0.739	
3 Friends and family ashamed of me	0.836		0.709	
4 Treated unfairly by family members	0.842		0.756	
5 Treated unfairly by friends	0.832		0.720	
6 Treated unfairly in areas of public life	0.833	0.735		
7 Treated unfairly at work/at school	0.831	0.730		
8 Treated unfairly by healthcare profess.	0.850	0.772		
9 Treated unfairly on social media	0.836	0.734		
10 Media shape negative attitudes	0.837	0.735		
11 Difficulty returning to work/p. active.	0.840	0.745		
12 Avoided showing mild resp. symptoms	0.837	0.740		
All items	0.848	0.770	0.777	
COINS items	**Global score**	**Self-perception**	**Close relations**	**Social life**
1 I am not as good a person as others	0.824	0.833		
2 I feel ashamed	0.817	0.821		
3 I feel that it is my fault	0.828	0.855		
4 I feel embarrassed	0.815	0.821		
5 Avoid telling others my Covid	0.827	0.847		
6 Stop socializing for negative reactions	0.817	0.830		
7 Uncomfortable to go outside of house	0.822	0.834		
8 Understand if my family avoids me	0.829		0.878	
9 Understand if friends avoid me	0.826		0.863	
10 Understand if neighbours avoid me	0.830		0.927	
11 Agree if employers do not employ me	0.832			0.780
12 Understand exclusion from public life	0.828			0.790
13 Understand unavailability of doctors	0.832			0.870
All items	0.837	0.855	0.924	0.868

Table 5. Test-retest reliability for the global score and the subscales (Intraclass Correlation Coefficient ICC) for the CEDISC (top part) and the COINS (bottom part) (n=155)

	Intraclass Correlation Coefficient		
CEDISC	**Value**	**95% CI**	**Test-retest Reliability[§]**
Global score	0.906	0.871-0.932	Excellent
Social role	0.854	0.799-0.893	Good
Close relationships	0.905	0.869-0.931	Excellent
COINS	**Value**	**95% CI**	**Test-retest Reliability[§]**
Global score	0.860	0.808-0.898	Good
Self-perception	0.885	0.842-0.916	Good
Close relationships	0.730	0.626-0.806	Moderate/Good
Social role	0.231[#]	-0.063-0.444	-

[§] 0.51-0.75 moderate; 0.76-0.90 good; 0.91-1 excellent (Koo & Li, 2016)
[#] The items pertaining to this subscale agree on the category 'Not at all' (86.6%, 75.6% and 83.0%, respectively)

Experienced discrimination and internalized stigma among people infected with SARS-CoV-2 and surviving COVID-19: Association with anxiety, depression, and insomnia symptoms (Lasalvia, Bodini, Pace et al., Journal of Community Psychology, 2024)*

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RESEARCH ARTICLE

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Experienced discrimination and internalized stigma among people infected with SARS-CoV-2 and surviving COVID-19: Association with anxiety, depression, and insomnia symptoms

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Abstract

People surviving COVID-19 may experience social stigma related to their condition even after clinical recovery. This study aimed to: (1) investigate COVID-19-related experienced discrimination and internalized stigma, and (2) explore their association with symptoms of anxiety, depression, and insomnia. We conducted an online survey of people who survived COVID-19. Perception of stigma was assessed using the COVID-19 Experienced Discrimination Scale and the COVID-19 Internalized Stigma Scale. Depression, anxiety, and insomnia were assessed using, respectively, the Patient Health Questionnaire-9, the General Anxiety Disorder Scale-7, and the Insomnia Severity Index. Multivariable logistic regression analyses for each psychopathological domain were performed. A total of 579 participants participated in this study. Overall, 25% reported some degree of experienced discrimination, and 23% reported some degree of internalized stigma. Adjusted odds ratio showed that scoring

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ABSTRACT

People surviving COVID-19 may experience social stigma related to their condition even after clinical recovery. This study aimed to: (1) investigate COVID-19-related experienced discrimination and internalized stigma, and (2) explore their association with symptoms of anxiety, depression, and insomnia. We conducted an online survey of people who survived COVID-19. Perception of stigma was assessed using the COVID-19 Experienced Discrimination Scale (CEDISC) and the COVID-19 Internalized Stigma Scale (COINS). Depression, anxiety, and insomnia were assessed using the Patient Health Questionnaire (PHQ-9), General Anxiety Disorder scale (GAD-7) and Insomnia Severity Index (ISI). Multivariable logistic regression analyses for each psychopathological domain were performed. A total of 579 participants participated in this study. Overall, 25% reported some degree of experienced discrimination, and 23% reported some degree of internalised stigma. Adjusted ORs showed that scoring higher on internalised stigma related significantly to higher symptoms of depression (2.14; 95%CI, 1.35-3.39), anxiety (2.30; 95%CI, 1.48-3.59) and insomnia (2.54; 95%CI, 1.64-3.95), whereas experienced discrimination was associated to anxiety (1.55; 95%CI, 1.06-2.28) and insomnia (1.82; 95% CI, 1.24-2.69). Experiences of social stigmatization are frequent among people surviving COVID-19 and seem to be associated with levels of psychological disturbances. Further research is required to elucidate the direction of these relationships to implement effective treatment strategies.

INTRODUCTION

Research conducted during previous epidemics, such as SARS, MERS, or Ebola, has revealed that individuals who contracted these infections often faced social stigma. They were subjected to differential treatment, labeling, stereotyping, and discrimination due to their perceived connection to the disease (Lasalvia, 2020). This negative treatment significantly affected not only their mental well-being but also that of their caregivers, family members, and friends (Baldassarre et al., 2020). Social stigma associated with infectious diseases is accompanied by the fear of rejection and exclusion, leading to feelings of shame, self-evaluation, demoralization, and anxiety (Clucas et al., 2011; Overholt et al., 2018; Van Bortel et al., 2016).

Overall, social stigma can manifest in the two main forms of enacted and internalized stigma (Pescosolido & Martin, 2015). Enacted stigma encompasses overt acts of discrimination and humiliation directed at stigmatized individuals, highlighting the interpersonal dimensions of stigma. This concept aligns with the notion of “experienced discrimination”, which encompasses the process of facing rejection and unfair treatment because of one's stigmatized status (Thornicroft et al., 2007). The experience of discrimination is deeply rooted in the interplay between stigmatized individuals and the surrounding social environment. For instance, individuals with mental disorders may encounter discrimination across various settings, such as employment, education, healthcare, housing, and interpersonal relationships (Lasalvia et al., 2013; Thornicroft et al., 2009). Stigmatized individuals may face obstacles and disadvantages that impede their full participation and equal opportunities in these domains. The consequences of experienced discrimination are far-reaching and can significantly impact an individual's psychological well-being, social integration, and overall quality of life (Chan & Fung, 2019). Persistent exposure to discrimination can lead to feelings of anger, frustration, and a sense of injustice, contributing to heightened stress levels and psychological distress across several stigmatized groups (Chan & Fung, 2021; Chan & Tsui, 2023).

In contrast, internalized stigma, also known as self-stigma, characterizes the process of an individual internalizing society's negative evaluations and stereotypes, and

integrating them into their personal values and self-concept (Link & Phelan, 2001). Internalized stigma can have profound implications for individuals' mental health, well-being, and social functioning. For example, when individuals with mental disorders internalize societal prejudices, they may start to believe that they are inferior, flawed, or unworthy due to their stigmatized identity (Corrigan & Watson, 2002). Negative self-perception can lead to feelings of shame, guilt, and self-blame. It can also foster a sense of isolation and detachment from others, as individuals may fear rejection or anticipate negative judgments based on their stigmatizing status (Corrigan et al., 2019).

The COVID-19 pandemic has highlighted the possibility of experienced discrimination and internalized stigma among individuals who have been infected with the virus. Indeed, several incidents of stigmatization among COVID-19 patients and survivors have emerged during the pandemic (Bagcchi, 2020), and the social virus of stigma, at least in the early phases of the pandemic, spread more rapidly than the SARS-CoV-2 infection itself (Van Daalen et al., 2021). Survivors of COVID-19 have reported experiences of avoidance, insults, rejection, and ostracization in various aspects of life, including social activities and family relationships, even after recovery (Brooks et al., 2020; Dar et al., 2020; F. Huang et al., 2022). The unique circumstances surrounding COVID-19, characterized by its rapid transmission, uncertainties, and fear, have contributed to the emergence of discriminatory attitudes and stigmatizing behaviors directed towards infected individuals (Dar et al., 2020). Experienced discrimination in the context of COVID-19 pertains to overt acts of discrimination, prejudice, and unfair treatment that individuals infected with the virus may encounter due to their stigmatized status as COVID-19 patients (Ransing et al., 2020). Such forms of discrimination can manifest in diverse ways, including social rejection, exclusion, verbal abuse, and even physical assault (Sacco et al., 2022). The fear and misinformation surrounding the virus have amplified discriminatory conduct, leading to scapegoating and attributing blame to infected individuals for the spread of the disease (Van Daalen et al., 2021). The experience of discrimination can have detrimental consequences on the psychological well-being of COVID-19 patients in terms of anxiety, depression, and post-traumatic symptoms (Campo-Arias et al., 2022; Chen et al.,

2022; Fan et al., 2021; Liu et al., 2020). This can induce feelings of isolation, shame, and stigmatization, exacerbating distress and impeding their ability to seek appropriate medical care or disclose their infection status to others (Mokhtari & Golitaleb, 2021).

On the other hand, internalized stigma refers to "the awareness of devaluation or a stereotype of oneself because of a linkage with the disease" (Ransing et al., 2020). Internalized stigma has been less explored in this population. Infected individuals may internalize societal perceptions that being infected makes them unclean, dangerous, or culpable during the outbreak (Bruns et al., 2020). Internalization can result in self-blame, shame, and diminished self-esteem (Bruns et al., 2020; Turner-Musa et al., 2020). The presence of internalized stigma among COVID-19 patients can result in significant psychological consequences. They may experience heightened levels of anxiety, depression, and emotional distress (Huang et al., 2022; Mahmoudi et al., 2021). Negative self-perceptions stemming from internalized stigma can impede effective coping with the challenges posed by the illness and recovery process. This may manifest as social withdrawal, reluctance to seek support, and hesitancy to disclose their infection status due to fear of judgment or rejection (Adjaottor et al., 2022).

The literature on the relationship between symptoms of psychological disturbances and stigma among individuals recovering from COVID-19 is somewhat limited. Mahmoudi et al. (2021) demonstrated, among COVID-19 survivors in Iran, a significant correlation between internalized stigma scores and symptoms of insomnia and post-traumatic stress. Campos Arias et al. (2022), in their study among COVID-19 survivors in Colombia, observed that after adjusting for age, gender, and income, depression, insomnia, and post-traumatic stress were significantly linked to perceived discrimination related to COVID-19. Similarly, Huang et al. (2022), in a cross-sectional survey conducted in Shanghai, found that COVID-19 survivors experiencing higher levels of anxiety and loneliness were more likely to report experiencing stigma. Additionally, they discovered that those who perceived more stigma tended to have more severe depressive symptoms. However, it is noteworthy that these studies either utilized COVID-19-related stigma measures that were not psychometrically validated (Campo-Arias et al.,

2022; Mahmoudi et al., 2021) or employed ad hoc developed measures that did not distinguish among the various components of stigma (experienced vs internalized). Therefore, the association of COVID-19 related stigma, considering both its components of perceived discrimination and internalized stigma, with symptoms of psychological disturbances in individuals with COVID-19 has not been adequately addressed thus far. This study aims to address this gap in the literature. Addressing the relationship between psychological disturbances and stigma among COVID-19 survivors is essential for promoting mental health, well-being, and social inclusion within this population.

Specifically, we aimed to: (1) investigate the frequency and levels of COVID-19 related experienced discrimination and internalized stigma in people infected with SARS-CoV-2 or surviving COVID-19, and (2) explore the association of experienced discrimination and internalized stigma with levels of psychological disturbances (i.e., anxiety, depression, and insomnia) while controlling for demographic and illness-related variables.

METHODS

Study design and participants

We conducted an online survey among members of the Facebook community "Noi che il Covid l'abbiamo sconfitto - Sindrome Long COVID" (We who have defeated Covid - Long COVID syndrome) composed of people who self-reported being infected with SARS-CoV-2 or having developed COVID-19. This group aimed to facilitate supportive interactions among its members by using listings, chat rooms, bulletin boards, and personal e-mail exchanges with people who might have had similar problems or challenges related to COVID-19. The survey was conducted between September 10, 2021, and November 10, 2021. At the time of this study, the Facebook community had over 10,000 members across Italy. Potential participants were invited to complete a set of self-rated questionnaires on the online platform 'SurveyMonkey'. The description of the study, together with the proposal to participate in the survey, was circulated among all the members by the group administrator. Potential participants received the online questionnaire link within the same post. Written informed consent was obtained from each participant prior

to participation. The study questionnaires were completed anonymously, voluntarily, and without remuneration. The literature has shown that online surveys conducted within Facebook communities represent efficient and cost-effective strategies for psychosocial research (Thornton et al., 2016). This study was conducted in accordance with the principles of the Declaration of Helsinki. Approval was granted by the Verona University Committee on Research (CARP) (n.32.R1_2021). All the participants provided written informed consent.

Assessment measures

Experienced discrimination related to COVID-19 was assessed using the COVID-19 Experienced Discrimination Scale (CEDISC), a newly developed self-rated questionnaire. The scale comprises 12 items and asks participants if they were treated unfairly (e.g., with avoidance, hostility, prejudice, rejection) by others in several life domains when they were infected with SARS-CoV-2 or had COVID-19. Items were rated on a 4-point Likert scale, ranging from 0 ('not at all') to 3 ('a lot'). The scale consists of two subscales: "social life' (seven items) and "close relations" (five items). The CEDISC has proven to be a valid and reliable scale for specifically assessing experienced discrimination in patients infected with SARS-CoV-2 and COVID-19, with a Cronbach's α of 0.848 for the overall scale and 0.770 and 0.777 for its two subscales, respectively (Bonetto et al., 2022). Internalized stigma related to COVID-19 was measured using the COVID-19 Internalized Stigma Scale (COINS), a newly developed self-rated questionnaire. The scale, comprising 13 items, asks respondents whether they felt uncomfortable (e.g., guilty, ashamed, or embarrassed) across a series of possible situations while they were infected with SARS-CoV-2 or diagnosed with COVID-19. Items are rated on a 4-point Likert scale, ranging from 0 ('not at all') to 3 ('a lot'). The scale consists of three subscales: "self-perception" (seven items), "close relations" (four items), and "social life" (three items). The COINS has also proven to be a valid and reliable scale for assessing internalized stigma in individuals infected with SARS-CoV-2 and/or COVID-19, with a Cronbach's α of 0.837 for the overall scale and 0.855, 0.924 and 0.868 for its three subscales, respectively (Bonetto et al., 2022). For both the CEDISC and COINS, mean global scale and mean subscale scores were

calculated, with higher scores indicating higher stigma. The reliability study for both the CEDISC and COINS scale was undertaken on the same sample addressed in this research.

Depression symptoms were evaluated using the Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001), a 9-item self-rated questionnaire with excellent psychometric properties. Respondents were asked to rate how frequently, in the past two weeks, symptoms occurred; responses were rated on a 4-point scale ranging from 0 ('not at all'), 1 ('several days'), 2 ('more than half of the days'), 3 ('nearly every day'). Total PHQ-9 scores range from 0 ('absence of depressive symptoms') to 27 ('most severe depressive symptoms'). A cutoff of 10, indicating a condition possibly in need of clinical care, was used (Kroenke et al., 2001).

Symptoms of anxiety were evaluated using the General Anxiety Disorder Scale (GAD-7) (Spitzer et al., 2006), a 7-item self-rated questionnaire with good psychometric properties. Items are rated on a 4-point scale ranging from 0 ('not at all'), 1 ('several days'), 2 ('more than half of the days'), and 3 ('nearly every day'). A cutoff score of 10, identifying cases that deserve clinical attention, was adopted.

Symptoms of insomnia were assessed using the Insomnia Severity Index (ISI) (Bastien et al., 2001), a 7-items self-rated survey evaluating the occurrence and severity of sleep disturbance in the past fortnight; items were rated on a 5-point scale. A cut-off score of 15, indicating at least moderate insomnia, was adopted.

Personal information was collected using participants' self-reports. Specifically, they included sex, age, education (up to secondary education vs. tertiary education or degree or postgraduate education), nationality (Italian vs. other), employment (employed vs. unemployed), marital status (single vs. married or in a civil partnership vs. divorced or widowed), living condition (alone vs. with parents or other relatives vs. with partner and/or children), living place (city vs. town with more than 10,000 inhabitants vs. village with less than 10,000 inhabitants), and current co-morbid physical chronic conditions or physical disabilities (no vs. yes).

Finally, COVID-related characteristics were collected also using participants' self-reports and included month and year of SARS-CoV-2 infection, duration of SARS-CoV-2 infection (< 2 weeks vs. ≥ 2 weeks), and severity of COVID-19 disease (asymptomatic or mildly symptomatic/ requiring no treatment vs. symptomatic

treatment at home vs. symptomatic admitted to hospital – treated within ICUs, or in sub-intensive units or in ordinary wards).

Statistical analyses

Categorical variables were analyzed using frequencies and percentages. In order to determine the prevalence of participants showing meaningful levels of experienced discrimination or internalized stigma, we categorized the CEDISC and COINS mean scores by applying the midpoint of 1.5 and, accordingly, identifying four categories: 'minimal stigma (<1), 'low stigma' (1-1.5), 'moderate stigma' (1.5-2), and 'high stigma' (>2). The methodology adopted for categorization stemmed from established methodologies in prior research utilizing similar scales, such as the Discrimination and Stigma Scale (DISC) (Brohan et al., 2013) to assess experienced discrimination among individuals with mental disorders or the Internalized Stigma of Mental Illness (ISMI) scale, which is one of the most widely used instruments for assessing internalized stigma among individuals with mental disorders (Ritsher et al., 2003). Logistic regression analysis was employed to identify variables associated with clinically meaningful levels of psychological disturbances (i.e., anxiety, depression, and insomnia), defined based on validated cutoffs in the literature. Unadjusted associations between each domain of psychological disturbances (PHQ-9≥10, GAD-7≥10, ISI≥15, respectively) and the various personal characteristics COVID-related characteristics, experienced discrimination and internalized stigma were estimated by univariable logistic regression models. Only those independent variables which unadjusted ORs with a p-value <0.10 were entered into the final multivariable logistic regression models, thus giving adjusted ORs and 95%CIs. Goodness-of-fit measures were estimated for these three models. Statistical analyses were carried out in Stata 17.

RESULTS

Characteristics of the sample

A total of 579 individuals took part in this online survey. Table 1 (upper section) displays their personal characteristics. Most participants were of Italian nationality (97.6%), female (84.8%), aged over 36 years (81.5%), possessed at least a high

school education (80.1%), were employed (69.5%), and resided with others (89.3%). A significant portion were either married or in stable cohabitation relationships (59.3%). Approximately 75% of the respondents lived in towns or villages. More than 30% reported having chronic illnesses or physical disabilities. The study sample substantially overlaps with the overall members of the Facebook community in terms of both gender (75% female vs. 25% males) and age bands (18-35 yrs. 23%; 36-55 yrs. 56%; ≥56 yrs. 21%) composition.

The COVID-related characteristics of the participants are reported in Table 1 (bottom part). Overall, 58% had a SARS-CoV-2 infection over the nine months preceding the assessment, 78.5% had a SARS-CoV2 infection that lasted more than two weeks, 54% had developed a symptomatic infection, and among these, 38% had been admitted to the hospital due to COVID-19.

Experienced discrimination

Table 2 (upper part) displays the mean (SD) and percentage distribution of respondents reporting minimal, low, and moderate/high scores on the experienced discrimination scale (CEDISC) and its two subscales. Overall, 25% reported a score on the CEDISC that reflected some degree of discrimination, and among these, 51% reported at least a moderate level of discrimination. The subscale where more respondents scored at least a moderate level of discrimination was "Social life" (19.8%).

Figure 1a shows the percentages of participants scoring "moderately" or "a lot" across the various individual items of the CEDISC.

Overall, 39% reported that mass media played a crucial role in shaping negative public perceptions of patients with COVID-19. Nearly 37% said that they had been treated unfairly or in a prejudicial way by healthcare professionals during medical visits because of their COVID-19 infection; 23% reported that they felt avoided or treated with suspicion by other people while showing mild upper respiratory symptoms; 20% reported having perceived hostility and rejection by their colleagues when returning to work after a period of isolation or hospitalization due to COVID-19; and a similar percentage felt that they should have done something wrong that caused their COVID-19 infection.

Internalised stigma

Table 2 (lower part) displays the mean (SD) and the percentage distribution of respondents reporting minimal, low, and moderate/high scores on the internalized stigma scale (COINS) and on its three subscales. Overall, nearly 23% reported a score on the COINS that reflected some degree of internalized stigma, and among these, 33.6% reported at least a moderate level of internalized stigma. The subscale where more respondents scored at least a moderate level of internalized stigma was "Self-perception" (17.3%), followed by "Close relations" (12.1%).

Figure 1b shows the percentage of participants scoring 'moderately' or 'a lot' across the various individual items of the COINS.

Overall, 32% of participants felt guilty about becoming infected with COVID-19, 31% felt embarrassed to share with other people their COVID-19 infection, 29% felt uncomfortable going outside their home even after being tested negative and completely recovered from the disease, 22.6% reported feelings of reduced self-worth or worthlessness, and 20% avoided social interactions due to the fear of being unfairly rejected by other people.

Levels of psychological disturbances

Regarding depressive symptoms, 55.4% of participants (n=279) scored above the PHQ cut-off point (≥ 10), thus displaying at least a moderate clinical condition [44.6% (n=225) scored below the cut-off and 75 did not provide any response to the PHQ]. Regarding anxiety symptoms, 42.5% (n=213) scored above the GAD cut-off point (≥ 10), thus showing a clinically significant condition [57.5% (n=288) scored below the cut-off and 78 did not respond to the GAD]. Finally, 27.5% (n=137) scored above the ISI cut-off point (≥15) displaying significant symptoms of insomnia [72.5% (n=361) scored lower than the cut-off point and 81 did not provide any response].

Association between experienced discrimination and internalised stigma with levels of psychological disturbances

Unadjusted odds ratios (ORs) estimating the association between each domain of psychological disturbances (i.e., symptoms of depression, anxiety, and insomnia) and personal characteristics, COVID-related characteristics, and levels of experienced discrimination and internalized stigma (as measured with CEDISC and COINS) are reported in the Online Supplementary Appendix.

In brief, among personal characteristics, being a woman was linked to higher insomnia, anxiety, and depression symptoms; suffering from other chronic conditions or physical disabilities was also linked to increased symptoms of depression, while having a high educational level was associated with higher symptoms of insomnia. Among COVID-19 related characteristics, longer COVID-19 infection (more than two weeks) was linked to increased symptoms of anxiety and depression; treatment at home (with respect to being asymptomatic) was linked to increased symptoms of insomnia, anxiety, and depression, and having been hospitalized for COVID-19 (with respect to being asymptomatic) was linked to increased symptoms of depression; and a more recent COVID-19 infection (within the last nine months) was linked to lower symptoms of insomnia. Regarding experienced discrimination and internalized stigma, higher scores on both scales were linked to increased symptoms of insomnia, anxiety, and depression. As regards experienced discrimination, both the subscale scores ("Social life" and "Close relations") were associated with levels of psychological disturbances in all the three domains considered, whereas for internalized stigma only the "Self-perception" subscale was associated with higher symptoms of psychological disturbances.

Table 3 shows the multivariable logistic regression models estimating the association between symptoms of depression, anxiety, and insomnia and potential independent variables.

Adjusted ORs showed that being female and scoring higher on the internalized stigma scale were linked to increased symptoms of depression. Being a woman, having developed a COVID-19 infection for more than two weeks, and scoring higher on both experienced discrimination and internalized stigma scales were all significantly associated with higher symptoms of anxiety. Symptoms of insomnia were associated with being female, having a higher education, and with higher experienced discrimination and internalized stigma, whereas a more recent

COVID-19 infection (i.e., over the previous nine months) was associated with lower symptoms of insomnia.

DISCUSSION

The most interesting finding is that a significant proportion of individuals infected with SARS-CoV-2 or surviving COVID-19 are burdened by social stigma related to their condition. Specifically, nearly one-fourth of the participants reported experiencing unfair treatment by other people (in terms of hostility, avoidance, rejection, and prejudice) when returning to their usual life once they recovered from the disease (or tested negative following a period of isolation). The perception of people who developed COVID-19 of being treated differently by others is paralleled by findings conducted among the general population, indicating that they hold more negative attitudes towards individuals who have recovered from COVID-19 than towards those with mental health problems (Economou, 2021). It is noteworthy that the most frequent source of unfair treatment for people with COVID-19 was by healthcare professionals during medical encounters and by colleagues in the workplace when patients returned to their jobs after a period of isolation or hospitalization. According to Attribution Theory (Weiner, 1995), people who become infected or develop COVID-19 might have been blamed by others for contracting the virus and therefore considered to blame for their condition. This is particularly problematic, as evidence from stigma research shows that when an illness or social condition is attributed to internal causes, it seems more likely that lay people hold stigmatizing attitudes (Corrigan et al., 2003; Economou et al., 2019).

Moreover, our study showed that a significant proportion of patients with COVID-19 became aware of the distorted public perceptions and stereotypes surrounding the new disease, tended to accept society's negative assessments, and incorporated this into their sense of self and value of oneself, thus leading to internalized stigma. Specifically, one-third to one-fourth of the participants in our study presented with high levels of internalized stigma, in terms of feelings of guilt or reduced self-worth for having had COVID-19, embarrassment to share with other people that they had COVID-19, and public unease once returned to their usual social life after being

recovered from the disease. Internalized stigma is a factor that leads to the adoption of dysfunctional coping strategies, a barrier to gaining successful social reintegration after having recovered from COVID-19 infection, and a precondition for developing emotional disturbances (Corrigan & Rao, 2012). It would be interesting to see in future research how these change over time and across different contexts, as there may be some cultural and contextual aspects at play that deserve specific attention.

A significant proportion of the participants showed clinically meaningful mental health disturbances (i.e., 55.4% depression, 42.5% anxiety, and 27.5% insomnia). This finding substantially overlaps with those reported in other studies conducted in similar populations. A meta-analysis by Deng et al. (2021) found that the pooled prevalence of depression, anxiety, and sleeping disorders among people surviving COVID-19 was 45 % (95% CI:37–54 %), 47% (95% CI:37–57%), and 34% (95% CI:19–50%), respectively.

The percentage of participants in our study reporting symptoms of depression and anxiety falls within the ranges of anxiety symptoms (6.33%-18.7%) and depressive symptoms (14.6%-32.8%) identified by a systematic review of studies conducted in both European and non-European countries among the general population during the COVID-19 pandemic (Xiong et al., 2020). However, upon examining the sole Italian study included in the review of Xiong et al (2020), it appears that the percentage of participants in our sample experiencing significant symptoms of depression or anxiety is higher than the corresponding percentages (18.7% and 32.4%) found in that study (Mazza et al., 2020). The prevalence of symptoms of depression and anxiety among the people in our sample was remarkably higher than that reported by other studies among the general population in Italy during the pandemic. Fiorillo et al. (2020) found that during the initial stage of the pandemic, 12.4% of the general population reported at least severe levels of depression and 17.6% reported clinically significant anxiety (Fiorillo et al., 2020). Another online survey carried out among Italy's general population during the lockdown period found rates of 17.3 %, 20.8 %, and 7.3% for depression, anxiety, and insomnia, respectively (Rossi et al., 2020). A third nationwide online survey conducted during the initial months of the pandemic reported rates of depression, anxiety, and

insomnia of 33.2 %, 41.5 %, and 38.8 %, respectively (Amerio et al., 2021). The higher rates of symptoms of insomnia, anxiety and depression found in our study could be due to the fact that the sample was composed of people infected with SARS-CoV-2 or who developed COVID-19 and who were all exposed, with respect to the general population, to a multitude of distressful conditions or traumatic events (e.g. fear of dying, uncertainty about their own condition, worry about transmitting the infection to others, physical discomfort, separation from loved ones during quarantine or hospitalization, etc.) (Toulabi et al., 2021). Moreover, it may be possible that recruitment from a Facebook support group in our study might have selected people who joined the group as they were frequently troubled by psychological symptoms.

Our multivariate analyses found that, except for gender (with females showing a significant association with increased levels of both depression and anxiety symptoms, consistent with the literature) and having a concurrent chronic condition (other chronic conditions associated with more severe depressive symptoms), no personal characteristic or COVID-19 related factor were associated with symptoms of psychological disturbances. However, we found that controlling for the effect of personal characteristics and indicators of COVID-19 clinical severity, levels of internalized stigma, and experienced discrimination were the main factors linked to mental health disturbances in this population. Indeed, experiences of being treated differently from others because of COVID-19 (i.e., experienced discrimination) were linked to more severe levels of anxiety, depression, and insomnia. This finding is consistent with earlier reports showing associations between social stigma and mental health disturbances among individuals surviving COVID-19 recruited in China (F. Huang et al., 2022; J. Li et al., 2020; H. Liu et al., 2020). We also found that internalized stigma (i.e., “the awareness of devaluation or stereotyping of oneself because of a perceived linkage with COVID-19” (Bonetto et al., 2022) was more strongly associated with levels of psychological disturbances, specifically symptoms of depression and insomnia. Unfortunately, the cross-sectional nature of this study prevents us from determining the direction of this association. It is possible that the perception of social rejection related to being infected with COVID-19 may result in lower self-esteem and feelings of worthlessness and guilt

among infected people (Shpigelman & HaGani, 2019). These symptoms, in turn, may further increase internalized stigma within a vicus cycle (Drapalski et al., 2013). However, it may be possible that individuals with mental health problems (e.g., depression) are more likely to experience internalized stigma in relation to COVID-19 (Saffari et al., 2022).

Strengths and limitations

The most notable strength of this study is the large sample size of nearly six-hundreds participants. The second strength is the use of two standardized validated scales specifically developed for assessing the two different, albeit conceptually related, constructs of experienced discrimination and internalized stigma in persons with COVID-19. The third strength is the inclusion of people who were infected with SARS-CoV-2 or diagnosed with COVID-19 across different pandemic waves, thus reflecting different patterns of stigmatization.

This study has several limitations that warrant consideration. First, participants self-reported their SARS-CoV-2 infection status, and details regarding the testing method and personnel involved were unavailable, introducing potential bias. Second, the absence of a control group limits contextual understanding of perceived and internalized stigma levels and precludes an assessment of whether observed psychological symptoms are solely linked to the infection or influenced by other factors. Third, the elevated levels of depressive symptoms and anxiety in our sample may suggest a bias towards individuals experiencing significant distress. Unfortunately, the lack of pre-infection psychopathology data prevents a precise determination of how the infection impacted psychopathological symptoms and subsequent experiences of discrimination and internalized stigma in our study. Fourth, the cross-sectional nature of the study does not allow to draw any conclusions on the directionality of the association between experienced discrimination, internalized stigma, and psychological symptoms. Fifth, this study's sample should not be seen as representative of the wider population of interest, as elderly people were under-represented and females were over-represented, together with people with symptomatic COVID-19 and those hospitalized for COVID-19. Sixth, a selection bias might have occurred, as the survey was carried out within an

online virtual community, thus potentially excluding people who do not use social media. Seventh, the CEDISC and COINS were developed in Italian and validated within an Italian sample, limiting generalizability to other geographical and cultural contexts. Finally, recall bias might have occurred for participants who were infected with SARS-CoV-2 or diagnosed with COVID-19 during the early stages of the pandemic.

Policy and practice implications

Experiences of social stigmatization are frequent among people who have tested positive for SARS-CoV-2 or have survived the COVID-19. Therefore, implementing screening measures for COVID-19-related stigma is required to design specific stigma-reducing interventions among this population. Without prompt implementation of tailored anti-stigma actions, there is a significant risk that prejudice may escalate into overt discriminatory behaviors, resulting in detrimental consequences at both individual and public health levels. Furthermore, our findings suggest that social stigma within this population is correlated with elevated levels of psychological disturbances, particularly insomnia and depressive symptoms. Should the cross-sectional associations identified in our study be corroborated by longitudinal research, addressing depression or insomnia could potentially mitigate or prevent stigmatization among individuals with COVID-19. Online psychotherapy might play a crucial role with this regard, as digital cognitive behavioral therapy, for example, has been found effective in treating depression (Komariah et al., 2022) and insomnia (Soh et al., 2020) stemming from the COVID-19 pandemic. Digital CBT provides numerous benefits including personalized information, interactive features, and convenient scheduling. However, this approach also has limitations such as the need for self-discipline, lack of therapist guidance, generic advice, technical difficulties, and privacy concerns. On the other hand, designing programs to improve mental health among people with COVID-19 should also include initiatives to reduce the negative effects of COVID-19-related discrimination and internalized stigma.

CONCLUSIONS

Experiences of social stigmatization are frequent among people surviving COVID-19 and seem to be associated with levels of psychological disturbances. As this study was conducted using a cross-sectional design, further investigations by using longitudinal methodology are needed to elucidate the direction of the association between these variables.

Tables and figures (Lasalvia, Bodini, Pace et al., 2024)

Table 1. Personal and COVID-19 related characteristics of the study sample (n=579)

	n (%)
PERSONAL CHARACTERISTICS	
Gender	(33 missing)
Male	83 (15.2)
Female	463 (84.8)
Age (years)	
18-35	107 (18.5)
36-55	315 (54.4)
≥ 56	157 (27.1)
Education	(1 missing)
Up to secondary education	115 (19.9)
Tertiary education/degree/postgraduate degree	463 (80.1)
Nationality	
Italian	565 (97.6)
Other	14 (2.4)
Employment	(5 missing)
No	175 (30.5)
Yes	399 (69.5)
Marital status	(6 missing)
Single	141 (24.6)
Married/In civil partnership	340 (59.3)
Divorced/Widowed	92 (16.1)
Living condition	
Alone	62 (10.7)
Parents/other relatives	397 (68.6)
Partner and/or children	120 (20.7)
Living place	(3 missing)
City	154 (26.7)
Town with more than 10,000 inhabitants	217 (37.7)
Village with less than 10,000 inhabitants	205 (35.6)
Suffering from chronic conditions or physical disabilities	(2 missing)
No	389 (67.4)
Yes	188 (32.6)
COVID-RELATED CHARACTERISTICS	
Period of SARS-CoV-2 infection	
January-September 2020	111 (19.2)
October-December 2020	223 (38.5)
From January 2021	245 (42.3)
Duration of SARS-CoV-2 infection	(2 missing)
< 2 weeks	124 (21.5)
≥ 2 weeks	453 (78.5)
Severity of COVID-19 disease	(1 missing)
Asymptomatic/mildly symptomatic (no treatment)	266 (46.0)
Symptomatic, treated at home	193 (33.4)
Symptomatic, admitted to hospital	119 (20.6)
ICU	25 (21.2)
Sub-intensive care	73 (61.9)
Ordinary wards	20 (16.9)

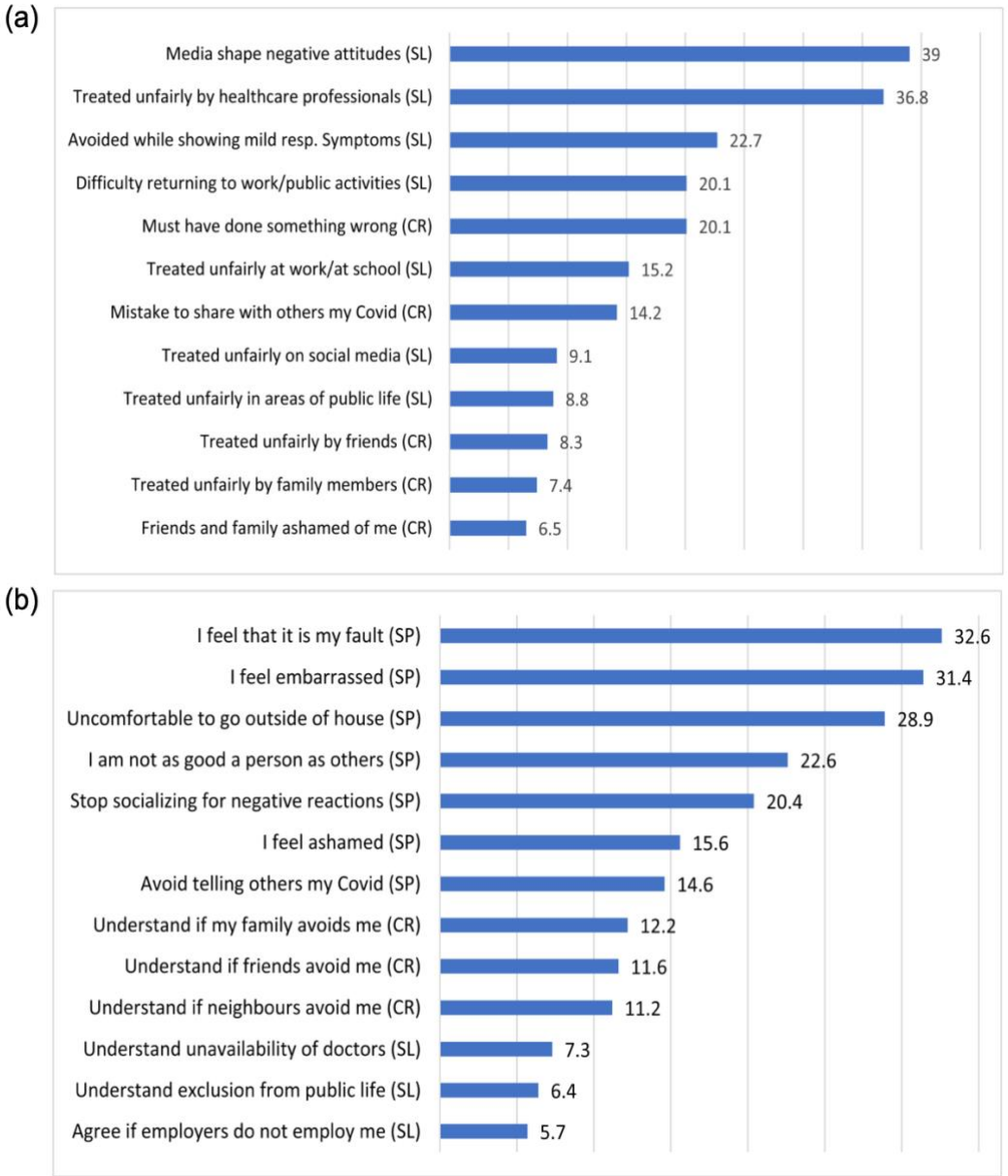
Table 2. Mean scores (SDs) and frequencies (%) of respondents reporting minimal, low and moderate/high scores in the experienced discrimination and internalized stigma scales and the respective sub-scales

	n (%)
EXPERIENCED DISCRIMINATION (CEDISC) (n=579)	
Total score, mean (sd)	0.66 (0.61)
<1 minimal	434 (75.0)
1-1.5 low	71 (12.2)
1.5+ moderate/high	74 (12.8)
Social life, mean (sd)	0.82 (0.72)
<1 minimal	368 (63.6)
1-1.5 low	96 (16.6)
1.5+ moderate/high	115 (19.8)
Close relations, mean (sd) (3 missing)	0.44 (0.59)
<1 minimal	474 (82.3)
1-1.5 low	59 (10.2)
1.5+ moderate/high	43 (7.5)
INTERNALIZED STIGMA (COINS) (n=519)	
Total score, mean (sd)	0.61 (0.55)
<1 minimal	400 (77.1)
1-1.5 low	79 (15.2)
1.5+ moderate/high	40 (7.7)
Self-perception, mean (sd)	0.79 (0.77)
<1 minimal	351 (67.6)
1-1.5 low	78 (15.1)
1.5+ moderate/high	90 (17.3)
Close relations, mean (sd) (16 missing)	0.50 (0.75)
<1 minimal	353 (70.2)
1-1.5 low	89 (17.7)
1.5+ moderate/high	61 (12.1)
Social life, mean (sd) (7 missing)	0.26 (0.63)
<1 minimal	452 (88.3)
1-1.5 low	28 (5.4)
1.5+ moderate/high	32 (6.3)

Table 3. Multivariable logistic regression models for depression (PHQ-9≥10), anxiety (GAD-7 ≥10) and insomnia (ISI≥15) (n=579)

	DEPRESSION			ANXIETY			INSOMNIA		
	Adj. OR (95% CI)	p-value		Adj. OR (95% CI)	p-value		Adj. OR (95% CI)	p-value	
								Category	Overall LR test
Gender									
Male	1			1			1		
Female	2.64 (1.46-4.76)	0.001		2.54 (1.33-4.85)	0.005		2.11 (1.04-4.28)	0.038	
Education									
Tertiary education/degree/postgraduate							1		
Up to secondary education							1.92 (1.13-3.26)	0.015	
Organic chronic conditions/disabilities									
No	1								
Yes	1.47 (0.95-2.28)	0.085							
Period SARS-CoV-2 infection									
January-September 2020							1		0.020
October-December 2020							0.81 (0.44-1.50)	0.504	
From January 2021							0.45 (0.24-0.86)	0.015	
Severity of Covid-19 disease									
Asymptomatic/mildly symptomatic	1			1			1		
Treated at home	1.18 (0.57-2.48)	0.652		0.99 (0.46-2.15)	0.981		1.93 (0.92-4.04)	0.080	
Admitted to hospital	1.59 (0.68-3.70)	0.281		0.61 (0.26-1.46)	0.269		1.53 (0.65-3.60)	0.333	
Duration of SARS-CoV-2 infection									
2 weeks or less	1			1					
More than 2 weeks	1.46 (0.89-2.38)	0.130		2.05 (1.23-3.42)	0.006				
Experienced discrimination									
Total score, mean	1.44 (0.89-2.38)	0.066		1.55 (1.06-2.28)	0.024		1.82 (1.24-2.69)	0.002	
Internalized stigma									
Total score, mean	2.14 (1.35-3.39)	0.001		2.30 (1.48-3.59)	<0.001		2.54 (1.64-3.95)	<0.001	
Number of observations	440			437			467		
LR test, p-value	Chi2(7)=50.47, <0.001			Chi2(6)=59.30, <0·001			Chi2(8)=68.47, <0·001		
Hosmer-Lemeshow goodness-of-fit (10 groups) Chi2(df), p-value	Chi2(8)=3.97, 0.860			Chi2(8)=5.07, 0.750			Chi2(8)=5.94, 0.653		
Pearson goodness-of-fit Number of covariate patterns Chi2(df), p-value	414 Chi2(406)=412.70, 0.398			396 Chi2(389)=388.70, 0.495			453 Chi2(444)=449.97, 0.412		
Area under ROC curve	0.690			0.696			0.743		

Figure 1. (a) Percentage of participants scoring "moderately"/"a lot" in the various items of the CEDISC scale (n = 579). (b) Percentage of participants scoring "moderately"/"a lot" in the various items of the COINS scale (n = 519). CEDISC, COVID-19 Experienced Discrimination Scale; COINS, COVID-19 Internalized Stigma Scale; CR, close relations; SL, social life; SP, self-perception.



Association between persistent dyspnea and psychological distress in COVID-19 survivors. A cross-sectional evaluation at 11 months after hospitalization (Bodini, Sartori, Bonetto et al., Respiratory Medicine and Research, 2023)*

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Letter to the Editor

Association between persistent dyspnea and psychological distress in COVID-19 survivors. A cross-sectional evaluation at 11 months after hospitalization

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Introduction

Three years after the onset of the COVID-19 pandemic, extensive research has revealed the enduring effects of SARS-CoV-2 infection in patients, manifesting as a wide range of subacute and chronic symptoms [1]. As a result, the National Institute for Health and Care Excellence (NICE) has coined the term "post-COVID-19 syndrome" to describe these persistent symptoms occurring beyond 12 weeks after SARS-CoV-2 infection, encompassing new or ongoing signs and symptoms [2]. Symptoms include general manifestations, such as asthenia, persistent fatigue, fever, pain, and organ-specific manifestations, including respiratory, cardiovascular, neurological, and psychiatric symptoms [1]. Recent studies have indicated a higher prevalence of long COVID among hospitalized patients than among those treated in outpatient or community settings [3]. Notably, individuals who experienced a more severe disease course during hospitalization exhibited more pronounced long-term respiratory complications [4]. Furthermore, hospitalization can lead to mental health complications including depression, anxiety, and insomnia. Dyspnea, a prevalent respiratory symptom, is reported in 11%–43% of patients with post-acute COVID-19 syndrome and may persist in up to 57% of patients six months after discharge [5]. A recent meta-analysis found that the prevalence of dyspnea did not significantly decline up to one year after acute COVID-19 infection [6]. Dyspnea is

Materials & methods

Data were collected from the RESPICOVID study, a prospective observational study conducted at the Respiratory Medicine Unit of the University of Verona and Azienda Ospedaliera Universitaria Integrata of Verona, involving 49 patients hospitalized for pneumonia COVID-19 related to high-intensity internal medicine during the first two waves of the COVID-19 pandemic emergency in Italy [7]. These patients were referred from a larger inpatient population of 194, and represented those who agreed to undergo a series of pulmonary functional assessments and completed a psychological assessment. This study was approved by the Ethics Committee of the Provinces of Verona and Rovigo (approval No. 2785). The evaluations included an in-depth medical examination and self-completion of standardized psychological questionnaires. To assess lung function, forced vital capacity (FVC), forced expiratory volume in the first second (FEV1), total lung capacity (TLC), and diffusion capacity of the lungs for carbon monoxide (DLCO) were recorded. Arterial blood gas (ABG) analysis was performed in room air. Venous sampling was performed. Six-minute walking test (6 MWT) was performed to obtain measures of functional exercise capacity and perceived symptoms at sub-maximal exertion; patients's perceived dyspnea and fatigue at baseline and at exertion were measured using a 10-point modified Borg scale and the administration of a questionnaire assessing perceived chronic dyspnea (the modified Medical Research Council [mMRC]). Symptoms of depression, anxiety, and insomnia were assessed using the Patient Health Questionnaire (PHQ-9), General Anxiety Disorder-7 (GAD-7), and Insomnia Severity Index (ISI) respectively. Analyses were performed using the JAMOVI software.

Results

A total of 49 patients were enrolled in this study. The median patient age was 69 years (IQR 61–74). All subjects were hospitalized following SARS- CoV2 pneumonia: the average length of hospitalization was 6 days (IQR 5–10), and 10.2% were admitted to the intensive care unit. The median time from the date of hospital discharge to the follow-up visit was 11.4 (IQR 7.5–14.1) months. The most frequent comorbidities were hypertension (36.7%) and diabetes mellitus (24.5%). More detailed characteristics of the sample can be found in Supplementary Tables 1 and 2.

** The study has been published (Bodini et al., 2023) and is reproduced with permission.*

Introduction

Three years after the onset of the COVID-19 pandemic, extensive research has revealed the enduring effects of SARS-CoV-2 infection in patients, manifesting as a wide range of subacute and chronic symptoms (Nalbandian et al., 2021). As a result, the National Institute for Health and Care Excellence (NICE) has coined the term "post-COVID-19 syndrome" to describe these persistent symptoms occurring beyond 12 weeks after SARS-CoV-2 infection, encompassing new or ongoing signs and symptoms (Venkatesan, 2021). Symptoms include general manifestations, such as asthenia, persistent fatigue, fever, pain, and organ-specific manifestations, including respiratory, cardiovascular, neurological, and psychiatric symptoms (Nalbandian et al., 2021). Recent studies have indicated a higher prevalence of long COVID among hospitalized patients than among those treated in outpatient or community settings (Pérez-González et al., 2022). Notably, individuals who experienced a more severe disease course during hospitalization exhibited more pronounced long-term respiratory complications (Huang et al., 2021). Furthermore, hospitalization can lead to mental health complications including depression, anxiety, and insomnia. Dyspnea, a prevalent respiratory symptom, is reported in 11%-43% of patients with post-acute COVID-19 syndrome and may persist in up to 57% of patients six months after discharge (Taboada et al., 2021). A recent meta-analysis found that the prevalence of dyspnea did not significantly decline up to one year after acute COVID-19 infection (Alkodaymi et al., 2022). Dyspnea is a multifactorial condition stemming from a combination of factors, including pulmonary parenchymal changes, deconditioning, cardiovascular dysfunction, and dysfunctional breathing patterns (Nalbandian et al., 2021). This study aimed to investigate the association between perceived dyspnea and psychological distress symptoms in a cohort of post-COVID-19 subjects. Specifically, we wanted to explore whether the subjects' perception (chronic dyspnea and dyspnea on submaximal exertion) may be associated with symptoms of psychological distress, defined as issues related to anxiety, depression, and insomnia, regardless of lung function impairment.

Materials & Methods

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Table 1 presents the correlation matrix. The correlation between DLCO and performance in the 6 MWT (distance walked and oxygen saturation at exertion) was positive (both $p<0.05$). Moreover, there was a positive correlation between the distance walked during the 6 MWT and SpO2 (at baseline and exertion, $p<0.05$). The 6 MWT showed a negative correlation between perceived dyspnea and SpO2 at exertion. Moreover, perceived dyspnea at exertion was positively correlated with perceived dyspnea, as evaluated by mMRC. Perceived dyspnea questionnaire (mMRC) showed a strong positive correlation with the depression ($p<0.01$) and anxiety ($p<0.01$) total scores. No significant correlation was found between dyspnea questionnaire scores and functional parameters.

Psychological and respiratory variables were compared in subgroups characterized by high or low perception of the mMRC dyspnea questionnaire. According to symptom perception, 6 MWT distance ($p=0.042$) and Borg Scale dyspnea ($p=0.005$) significantly differed among subjects reporting a worse perceived dyspnea level (mMRC ≥ 2) being able to perform a shorter distance walk and with a higher level of dyspnea perceived during the task. Regarding psychological variables, participants with higher dyspnea levels (mMRC ≥ 2) had higher depression and anxiety scores ($p=0.028$ and $p=0.009$, respectively).

Discussion

This study examined the persistence of residual symptoms following SARS-CoV-2 infection and their correlation in a small cohort of patients hospitalized for COVID-19 pneumonia. Our findings indicate that high subject-perceived dyspnea (mMRC) levels are not significantly correlated with objective respiratory measures, such as spirometry or blood gas analysis, in the study cohort. However, a correlation was observed between high levels of perceived dyspnea and psychological symptoms, such as anxiety and depression. Non-parametric statistical tests confirmed that participants reporting high levels of perceived dyspnea by the mMRC exhibited worse psychological symptoms, particularly anxiety and depression, and had a coexistent reduced walking capacity. Notably, perceived dyspnea was not associated with lung function impairment, as evaluated by spirometry or blood gas analysis. The existing literature suggests that greater DLCO

impairment in COVID-19 subjects during follow-up is associated with higher rates of depressive symptoms, anxiety, and insomnia (Beurnier et al., 2023; Vagheggini et al., 2022), another study found that psychiatric disorders are associated with long features, particularly respiratory complaints, but not with objective CT-scan abnormalities (Gasnier et al., 2022). However, our study did not find a correlation between DLCO impairment and the psychological questionnaires. Other studies have reported that persistent dyspnea, commonly experienced by subjects, is often linked to intense emotional responses, particularly fear and anxiety (Maley et al., 2022). The underlying hypotheses for this association may involve common pathogenetic mechanisms between the two processes, such as hypoxia or the influence of psychological factors (Neuman et al., 2006). In COVID-19, hypoxia arises because of viral proliferation in the lungs. SARS-CoV-2 triggers inflammatory exudation and edema, resulting in the formation of transparent membranes that disrupt alveolar gas exchange, leading to hypoxia (Wu et al., 2020). Additionally, mental distress, particularly anxiety, influences respiratory activity and vice versa. Anxiety is associated with reduced respiratory sensory gating, which may contribute to an altered perception of respiratory symptoms in individuals with anxiety (Chan et al., 2012). Psychological stress and breathing are interconnected and mutually influence each other, creating a vicious cycle: anxiety increases the respiratory rate, which further fuels anxiety. Persistent breathing difficulties can often lead to the development of psychological distress, such as anxiety and depression. Breathlessness and respiratory difficulties can be significant sources of stress in patients (Kunik et al., 2005). Dyspnea also contributes to functional limitations and reduced quality of life in our sample, as subjects with higher levels of dyspnea demonstrated shorter distances in the gait test despite similar saturation scores.

This present study exhibits several strengths as well as some limitations. One of the notable strengths is the study's ability to describe the characteristics of post-COVID-19 subjects accurately. Furthermore, the comprehensive collection of medical and psychological data enables a thorough examination of dyspnea. Nevertheless, this study is not without its limitations. Firstly, the absence of a subsequent follow-up period prevents a comprehensive understanding of the causal

mechanisms involved. Secondly, the study's small sample size limits the generalizability of the findings to the broader population. Thirdly, the lack of information regarding the psychological health of subjects prior to COVID-19 inhibits the assessment of pre-existing vulnerability to psychological problems, Fourthly, the lack of information on patients' CT scans and parenchymal lesions at baseline and at re-evaluation and fifthly, the absence of questionnaires for functional breathing disorders.

This finding underscores the impact of perceived dyspnea on the impairment of quality of life. Future studies should evaluate larger and more representative subject cohorts and compare the results among different groups based on age, sex, and severity of hospitalization.

Tables and figures (Bodini, Sartori, Bonetto et al., 2023)

Table 1. Bivariate correlations between each respiratory function and psychological variables in the sample (n=49) (Spearman rho correlation coefficients)

Variables	1	2	3	4	5	6	7	8	9	10
1. DL_{CO} (% predicted)	—									
2. 6MWT Distance (meters)	.455*	—								
3. 6MWT SpO_2 (baseline)	.170	.355*	—							
4. 6MWT SpO_2 (exertion)	.321*	.312*	.277	—						
5. 6MWT Borg D (baseline)	-.262	-.258	.084	-.187	—					
6. 6MWT Borg D (exertion)	-.251	-.201	-.052	-.357*	.406*	—				
7. Dyspnea (mMRC)	-.197	-.188	-.057	-.117	.071	.492*	—			
8. Depression (PHQ-9)	-.056	.006	-.121	-.108	.034	.281	.420*	—		
9. Anxiety (GAD-7)	.133	.183	-.155	-.006	.016	.269	.515**	.735**	—	
10. Insomnia (ISI)	.125	.218	-.015	.086	-.157	.019	.304	.591**	.534**	—

Note: * $p < .05$; ** $p < .001$. No correction was applied due to the explorative nature of the study. *Abbreviations:* DL_{CO}, diffusion capacity for carbon monoxide; 6MWT, six-minute walking test; Borg D, Borg Dyspnea Scale; SpO_2, oxygen saturation by pulse oximetry; mMRC, modified Medical Research Council questionnaire; PHQ-9, Patient health questionnaire; GAD-7, Generalized anxiety disorder; ISI, Insomnia severity index.

Is self-compassion associated with lower psychological distress in people with long COVID? Results from a cross-sectional survey (Bodini, Bonetto, Colombi et al., Cogent Psychology, 2024)*

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Is self-compassion associated with lower psychological distress in people with long COVID? Results from a cross-sectional survey

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ABSTRACT

Long COVID affects approximately 10–20% of COVID-19 patients and has a devastating impact on their quality of life and mental health. This study aimed to evaluate symptoms of psychological distress in people with long COVID and explore whether high levels of self-compassion are associated with low levels of psychological distress. An online cross-sectional survey of people with Long COVID was conducted. In total, 332 respondents participated in the survey. All dimensions of self-compassion were found to be significantly associated with depression, anxiety, and perceived stress, independent of symptom severity. Specifically, self-kindness, common humanity, and mindfulness were strongly negatively associated with distress, whereas self-judgment, isolation, and over-identification were strongly and positively associated with distress. Self-compassion seems to play a role in explaining levels of psychological distress in people with long COVID symptoms. The centrality of self-compassion may lead to the development of effective interventions to help patients with long COVID reduce self-judgmental and self-critical tendencies and improve their psychological well-being.

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Introduction

Approximately 10–20% of people infected with SARS-CoV-2 display a wide range of medium- and long-term symptoms once the acute phase of the infection has subsided (Diaz et al., 2021). This condi- more, and organ-specific symptoms, such as pulmonary (i.e. dyspnea, breathlessness, persistent cough), cardiovascular, neurological, gastrointestinal, and psychiatric symptoms (Raveendran et al., 2021). Recent qualitative studies have reported that these symptoms are debilitating for those affected, thus signifi-

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Abstract

Long COVID affects approximately 10-20% of COVID-19 patients and has a devastating impact on their quality of life and mental health. This study aimed to evaluate symptoms of psychological distress in people with long COVID and explore whether high levels of self-compassion are associated with low levels of psychological distress. An online cross-sectional survey of people with Long COVID was conducted. In total, 332 respondents participated in the survey. All dimensions of self-compassion were found to be significantly associated with depression, anxiety, and perceived stress, independent of symptom severity. Specifically, self-kindness, common humanity, and mindfulness were strongly negatively associated with distress, whereas self-judgment, isolation, and over-identification were strongly and positively associated with distress. Self-compassion seems to play a role in explaining levels of psychological distress in people with long COVID symptoms. The centrality of self-compassion may lead to the development of effective interventions to help patients with long COVID reduce self-judgmental and self-critical tendencies and improve their psychological well-being.

INTRODUCTION

Approximately 10-20% of people infected with SARS-CoV-2 display a wide range of medium- and long-term symptoms once the acute phase of the infection has subsided (Diaz et al., 2021). This condition is known as 'Post-COVID-19 syndrome' or 'Long COVID'. The World Health Organization (WHO) defines this ‘post COVID-19 condition’ (Long COVID) as a condition “that occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection (Diaz et al., 2021), usually three months from the onset of COVID-19. Symptoms last for at least two months and cannot be explained by an alternative diagnosis”.

Patients with long COVID generally show both general non-specific symptomatology, such as persistent fatigue/asthenia, excessive tiredness, fever, muscle weakness, widespread pain, myalgia, and more, and organ-specific symptoms, such as pulmonary (i.e., dyspnea, breathlessness, persistent cough), cardiovascular, neurological, gastrointestinal, and psychiatric symptoms (Raveendran et al., 2021). Recent qualitative studies have reported that these symptoms are debilitating for those affected, thus significantly reducing their quality of life (Garrigues et al., 2020; Malik et al., 2022). Furthermore, effective treatments for this disease are still lacking, and no clarity exists regarding the classification of this syndrome as a chronic disease. Finally, a lack of public awareness of the condition is associated with experiences of social stigma that patients often report (E. A. Byrne, 2022).

The most frequent Long COVID clinical manifestations are neuropsychiatric symptoms, which are reported in almost half of the patients (Lopez-Leon et al., 2021). These include fatigue, migraine, attention disorders, brain fog, neuropathy, anxiety and mood disorders, insomnia, and dementia. The etiology of neuropsychiatric symptoms of Long COVID has been explained by hypothesizing neurobiological or immunopsychological mechanisms (Crook et al., 2021; Penninx, 2021). However, neuropsychiatric symptoms of Long COVID may also be explained as a psychosocial reaction to a long-lasting, disabling, and unexplained condition.

Research on chronic illness has often focused on day-to-day management of the disease, particularly through the patient's active efforts to mitigate everyday

symptoms, such as following treatment, coping with the consequences of a chronic illness, and understanding the role these ways of coping with everyday difficulties can have on mental health (Dorrian et al., 2009; Gray & Rutter, 2007; Sharpe et al., 2001; Zyrianova et al., 2011). Another psychological construct that has gained relevance in the field of chronic diseases is illness perception (Broadbent et al., 2006). Illness perception involves cognitive elements like perceived disease consequences and understanding, and emotional factors such as fear and distress (Weinman et al., 1996). The common-sense model of self-regulation describes illness perception as being shaped by situational stimuli, such as symptoms and health information. Illness perception influences how individuals adjust to chronic conditions and adhere to medical guidelines, including during COVID-19. A recent study analyzed the role of illness representations in mental health in a sample of people with Long Covid (Bierbauer et al., 2022). The results showed that more symptoms, higher perceived consequences, and higher emotional representation correlated with worse adaptation. Another recent study on illness perception found that while objective physical health abnormalities due to COVID-19 play a role, persistent somatic symptoms and emotional responses have a more pronounced effect on illness perception (Hüfner et al., 2023).

A growing body of literature over the last decade has shown that other psychological constructs, not just illness perception, can also play a role in the mental health of those with a chronic illness. Studies based on self-compassion have highlighted how excessive self-criticism, self-blame, and shame are other mechanisms that may explain the development of anxiety, depression, or other forms of psychopathology in human beings (Gilbert, 2017; Neff, 2003a) and in patients with chronic illnesses (Hughes et al., 2021; Sirois et al., 2015). Self-compassion, which involves treating oneself with kindness, care, and affective closeness, is a skilled response that allows coping with a series of immutable challenges – not questioning the perception of adversity or encouraging unsuccessful efforts to overcome them, but inhibiting self-blame and self-criticism through compassionate acceptance of the self and reality (Hughes et al., 2021; Kirschner et al., 2019; Rockliff et al., 2011). The attitude of self-compassion could

be central in patients with Long Covid, as it is a disease whose course (chronic or acute) is currently unknown and for which no effective treatments are available.
In this exploratory study, we aimed to evaluate levels of psychological distress in terms of depression, anxiety, and perceived stress in a cohort of patients with Long Covid and explore whether high levels of self-compassion – adjusting for personal, pre-COVID, and SARS-CoV-2 infection characteristics – are associated with lower depression, anxiety, and perceived stress.

METHOD

Participants

This online cross-sectional survey was conducted from June 2022 to August 2022 on the web-based platform 'LimeSurvey' and were made available to participants who could self-rate them through their PCs, smartphones, or other mobile devices. To be eligible for the study, participants had to be adults (≥ 18 years of age) who had been infected with SARS-CoV-2 for at least 12 weeks before participating in the study and were currently experiencing persistent symptoms (Long COVID).

Procedure

The online survey was conducted within a closed Facebook (FB) discussion group ("Noi che il Covid l'abbiamo sconfitto - Sindrome Long COVID") comprising people who reported to have developed Long COVID. At the time of the evaluation, this virtual community had more than 30,000 members across Italy. Literature reports that Facebook is an effective and cost-efficient recruitment method for psychosocial research (Thornton et al., 2016). The study description and invitation to participate as well as the link to the online questionnaires were posted to all members by the group administrator (M.C.). The study protocol was reviewed and approved by the research ethics board of the Verona University Committee on Research (CARP) (n.16.R1/2022). Participants were aware of the purpose of the study and gave informed consent before participating. They completed the survey anonymously, voluntarily and without any remuneration.

Measures

Personal, pre-COVID and SARS-CoV-2 infection characteristics were collected using participants' self-reports. Specifically, they included the following: sex, age (18-35, 36-55, 56+ years), education (primary, secondary, tertiary/degree/postgraduate degree), nationality (Italian vs. other), employment (no vs. yes), marital status (single, married/in civil partnership, divorced/widowed), living condition (alone, with parents or other relatives, with partner and/or children), living place (city, town with more than 10,000 inhabitants, village with less than 10,000 inhabitants), suffering from chronic conditions or physical disabilities (no vs. yes), period of the first SARS-CoV-2 infection (Jan. 2020-Sep. 2020, Oct. 2020-Sep. 2021, Oct. 2021-May 2022), re-infection by SARS-CoV-2 (no vs yes), severity of COVID-19 disease (asymptomatic, mildly symptomatic with no treatment, symptomatic treated at home, symptomatic admitted to hospital), hospital ward (ICU, sub-intensive care, ordinary care), and Long COVID diagnosis (no vs. yes).

Information on Long COVID symptoms was also collected using participants' self-reports. A list of 27 symptoms most frequently experienced according to a recent meta-analysis (Lopez-Leon et al., 2021) was proposed to participants. For analysis, these symptoms were categorized based on the classification proposed by the Italian National Institute of Health (Giuliano et al., 2023). Specifically, symptoms were categorized as general, neurological, pulmonary, cardiovascular, dermatological, gastrointestinal, psychiatric/psychological, ENT, endocrine, hematological, or kidney.

Symptoms of depression were assessed using the Patient Health Questionnaire (PHQ-9) (Costantini et al., 2021; Kroenke et al., 2001), a self-rated 9-item scale that asks if the respondent had experienced symptoms of depression in the previous two weeks. Respondents are asked to rate how often each symptom occurred: 0 (not at all), 1 (several days), 2 (more than half the days), or 3 (nearly every day). The total PHQ-9 score ranges from 0 (absence of depressive symptoms) to 27 (most severe depressive symptoms). The internal reliability of the PHQ-9 was excellent, with Cronbach's α ranging from 0.70 to 0.93 (Kroenke et al., 2001).

General Anxiety symptoms were assessed by the Generalized Anxiety Disorder (GAD-7) (Bolgeo et al., 2023; Spitzer et al., 2006), a self-rated questionnaire that

consists of 7 items that investigate the level of anxiety and worry felt by the respondent over the previous 2 weeks. Respondents are asked how often they were bothered by each symptom during the last 2 weeks. The response options are “not at all,” “several days,” “more than half the days,” and “nearly every day,” scored as 0, 1, 2, and 3, respectively. The total GAD-7 score ranges from 0 (absence of anxiety symptoms) to 21 (most severe anxiety symptoms). Reliability of the GAD-7 in different populations ranges from good to excellent (Cronbach's α between 0.8 and 0.97).

Stress perception was assessed using the Perceived Stress Scale (PSS-10) (Cohen et al., 1994; Mondo et al., 2021). The PSS-10 is a psychological instrument frequently used to measure perceived stress. Respondents are asked to answer 10 questions pertaining to the frequency of stressful situations during the last month on a five-point scale ranging from 0 (never) to 4 (very often). Example items include “In the last month, how often have you been upset because of something that happened unexpectedly?”. The total PSS-10 score ranges from 0 (low perceived stress) to 40 (high perceived stress). The reliability of the PSS-10 was good, with internal consistency estimates using Cronbach’s alpha ranging from .67 to .91 (Mondo et al., 2021).

Self-compassion was measured through the Self Compassion Scale (SCS) (Neff, 2003b; Veneziani et al., 2017), that consists of 26 items measuring six facets of self-compassion: self-kindness (5 items, e.g., “I try to be loving towards myself when I’m feeling emotional pain”); common humanity (4 items, e.g., “I try to see my failings as part of the human condition”); mindfulness (4 items, e.g., “When something upsets me I try to keep my emotions in balance”); self-judgement (5 items, e.g., “I’m disapproving and judgmental about my own flaws and inadequacies”); isolation (4 items, e.g., “When I fail at something that’s important to me, I tend to feel alone in my failure”); and over-identification (4 items, e.g., “When I’m feeling down I tend to obsess and fixate on everything that’s wrong”). Respondents indicate how frequently they act on a 5-point Likert scale from 1 (almost never) to 5 (almost always). Mean scores are computed for each subscale. The total score showed a good internal consistency in the original version (Cronbach’s alpha = .92) (Veneziani et al., 2017).

Data analyses

Frequencies and percentages were given for categorical variables, whereas means and standard deviations were given for continuous variables. The unadjusted beta coefficients for the independent variables pertaining to personal characteristics (sex, age, education, employment, marital status, living conditions, and living place), pre-COVID conditions (suffering from chronic conditions or physical disabilities), COVID infection (period of the first SARS-CoV-2 infection, re-infection by SARS-CoV-2, severity of COVID-19 disease), Long COVID (Long COVID diagnosis, number of Long COVID symptoms), and SCS (total score and dimensions) were estimated using univariate linear regression models. Only those variables with $p<0.10$ entered the multivariate linear regression models estimating the adjusted beta coefficients. All the analyses were performed using Stata version 17 for Windows.

RESULTS

A total of 332 members of the Facebook (FB) community participated in the survey. Their personal characteristics are presented in Table 1. Most were Italian (97.3%), female (73.6%), older than 36 years (77.4%), with at least a high school qualification (79.5%), employed (68.3%) and lived with other people (86.2%). About half of the people in the sample were married or in a stable cohabiting relationship (51.8%), more than 65% lived in towns or villages, and approximately 45% suffered from chronic conditions or physical disabilities.

The socio-demographic characteristics of the respondents substantially overlap with those of the members of this FB community in terms of their gender (75% female vs. 25% males) and age (18-35 yrs. 23%; 36-55 yrs. 56%; ≥56 yrs. 21%) composition.

Table 2 presents the COVID-related characteristics. Overall, more than 50% of the respondents had been infected with SARS-CoV-2 in the third wave (Oct 2021-May 2022), 93% had developed a symptomatic infection, and 19.4% had been admitted to the hospital due to COVID-19. The mean number of Long COVID symptoms was 10 (S.D. 5), with a range from 1 to 25 (Interquartile range 7-14).

When ranking according to symptoms (Figure 1), 94.3% of participants reported having at least one general symptom (e.g. persistent fatigue, diffuse pain, myalgia, high temperature), 89.5% neurological symptoms (e.g. headache, brain fog, memory problems), 86.1% pulmonary (e.g. shortness of breath, persistent cough), 73.5% cardiovascular (e.g. chest tightness, chest pain, palpitations, tachycardia), 55.1% dermatological (e.g. erythema pernio, papulosquamous disorder, alopecia), 53.9% gastrointestinal (e.g. abdominal pain, nausea, vomiting), 37.3% psychiatric/psychological (e.g. depression, anxiety, post-traumatic stress disorder), and 15.1% ENT (e.g. tinnitus, earache, sore throat). Finally, only a small fraction reported endocrine (4.8%), hematological (0.6%), and kidney (0.3%) symptoms.

Table 3 displays symptoms of depression, anxiety and stress reported by participants.

Overall, 70% (n=175) of respondents reported moderate to severe depressive symptoms, 53.8% (n=134) moderate to severe anxiety symptoms, and 91.8% (n=236) moderate to high levels of perceived stress.

A total of 279 participants also completed the self-compassion scale (SCS). The mean overall score was 3.1 (S.D. 0.7). As regards the various scale dimensions, the mean score was 3.1 (SD 0.7) for self-kindness (SK), 2.4 (SD 1.0) for Self-Judgement (SJ), 2.6 (SD 0.9) for Common Humanity (CH), 2.5 (SD 1.0) for Isolation (IS), 2.7 (SD 1.0) for Mindfulness (MF), and 2.5 (SD 1.0) for Over-identification (OI).

Table 4 shows the adjusted beta coefficients estimated from the multivariate linear regression model for each psychological dimension, i.e., depression (PHQ-9), anxiety (GAD-7), and perceived stress (PSS-10). Only variables [personal characteristics (gender, age, education, employment, marital status, living condition, and living place), pre-COVID conditions (suffering from chronic conditions or physical disabilities), COVID infection (period of the first SARS-CoV-2 infection, re-infection by SARS-CoV-2, severity of COVID-19 disease), Long COVID (long-COVID diagnosis, number of long-COVID symptoms), and SCS (total score and dimensions)] with unadjusted beta coefficients at $p<0.10$ were included in the models (data available from the authors).

The specificity of the SCS dimensions was explored by re-estimating the models with each dimension as independent variable in place of SCS total score (Table 5). All SCS dimensions were significantly associated with all psychological dimensions. As expected, self-kindness, common humanity, and mindfulness were negatively associated (higher SCS levels were associated with lower distress levels), while self-judgment, isolation, and over-identification were positively associated (higher SCS levels were associated with higher distress levels). Interestingly, three main dimensions emerged that, adjusted for the other factors in the models, contributed to explaining the greatest variability in the psychological dimensions considered: over-identification explained the greatest variance in all three psychological dimensions (R-squared 22.6% for depression, 38.1% for anxiety, and 32.8% for perceived stress), isolation explained the greatest variance for perceived stress (R-squared 29.5%), whereas self-judgement explained the greatest variance for anxiety (R-squared 24.2%).

DISCUSSION

A growing body of literature over the last decade has investigated the impact of self-blame, self-criticizing, or shaming tendencies as determinants of mental health in patients with chronic illness (Neely et al., 2009; Sirois et al., 2015). The present study aimed to investigate the association between self-compassion and distress (particularly stress, anxiety, and depression) in people with Long COVID. To our knowledge, this is the first study to examine the effect of self-compassion in a sample of people with Long COVID and one of the few studies investigating the role of psychological constructs in this population (Bierbauer et al., 2022; Hüfner et al., 2023; Wang et al., 2022).

Regarding the clinical characteristics of the sample, the most frequently reported Long Covid symptoms were persistent fatigue, diffused pain, myalgia, and high temperature. Regarding depressive symptoms, participants reporting at least a moderate level were nearly 70%. A recent systematic review revealed that mood disorders in this population are reported by 13.66% of patients and anxiety disorders in 17.39% of patients (Efstathiou et al., 2022), in a meta-analysis the pooled prevalence of depression and anxiety among patients coping with Post COVID-19

symdrome was estimated to be 23% (Seighali et al., 2024). This seems to suggest that a self-selection bias might have occurred in our sample, which includes patients with high levels of distress. Participants with severe distress may also be over-represented because they are part of a social media community where people share the difficulties of living with Long COVID symptomatology.

Regarding psychological dimensions, all subcategories of self-compassion were found to be strongly associated with distress (i.e. depressive symptoms, anxiety symptoms and stress perception). In particular, the dimension of over-identification (excessively associating one's identity with one's emotional state or situation) accounted for the largest amount of variance in all three psychological dimensions (depression, anxiety, and perceived stress), with R-squared values of 22.6% for depression, 38.1% for anxiety, and 32.8% for perceived stress. Isolation explained the most variance in perceived stress (R-squared of 29.5%). Self-judgment explained the greatest variance in anxiety (R-squared of 24.2%). The relationship between distress and self-compassion is well known in the literature and has been found in previous studies on chronic illnesses (Baker et al., 2019; Brion et al., 2014; Gillanders et al., 2015; Hughes et al., 2021). Several studies have shown that the tendency to be kinder and warmer to oneself and the belief of not being the only one experiencing such suffering is associated with lower distress and more adaptive coping strategies (Sirois et al., 2015); no study before had shown this within a cohort of Long covid patients.

The positive association between over-identification, isolation, self-judgment and distress emphasises the role of self-critical attitudes and judgemental thoughts in dysfunctional adaptation to illness and suffering. Previous research has shown that people who tend to attribute illness-related changes to their past behaviours experience more personal failures, increased criticism, self-judgment, and blaming (Thompson et al., 1993). Moreover, over-identification, or the tendency to selectively focus only on the negative aspects of one's suffering, involves ruminating on one’s own suffering and is thought to result in a tunnel vision that prevents deep experiencing of the present moment (Gilbert & Procter, 2006; Neff & Vonk, 2009). People who tend to overidentify may magnify the significance of failures and suffering (Barnard & Curry, 2011; Neff et al., 2005; Shapiro et al.,

2007). These observations are supported by several studies of affective neuroscience within the model of affect regulation (Gilbert, 2009a), where focus on threat can lead to shame, self-criticism, and depression (Gilbert, 2017), and deactivating self-regulatory processes of self-reassurance and self-compassion (Gilbert et al., 2006).

Activation of the parasympathetic system, which is thought to be involved in self-compassion processes, is associated with more affiliative and mindful attitudes (Gilbert, 2017; Kirschner et al., 2019) and allows adaptive self-regulation through a clear and realistic view of internal and external experiences (Didonna, 2009a). Mindfulness, a component of self-compassion, involves being aware of one's present moment experience of suffering with clarity and balance, without being caught up in an exaggerated storyline about negative aspects of oneself or one's life experience, as occurs during over-identification and self-judgment (Neff, 2016). Self-compassion can promote self-regulation of health-related behaviors by lowering defensiveness and reducing negative emotional states and feelings of guilt that interfere with self-regulation (Terry & Leary, 2011).

Previous research with people with other chronic conditions has shown that high levels of self-compassion are associated with higher positive emotions and lower negative emotions, thus suggesting that self-compassion plays a central role in coping more positively with unpleasant and stressful events to unpleasant and stressful events (Allen et al., 2012; Brion et al., 2014; Neff et al., 2005, 2007).

Self-compassion may represent an interesting target for psychological interventions to reduce the impact of neuropsychiatric symptoms in this population. A growing body of research supports the effectiveness of self-compassion-based interventions in other populations. A recent meta-analysis of self-compassion-based interventions showed that these interventions have a significant effect on many psychological dimensions and populations, including people with physical illnesses (Ferrari et al., 2019). These findings suggest that compassion-based interventions may be effective in reducing distress in this type of population.

Strengths and limitations

The first strength of this study is the large sample size which exceeds more than 300 people. The second strength is the use of standardized validated scales

specifically developed to assess self-compassion and the different dimensions of distress. The third strength relates to the inclusion of people who became positive or were diagnosed with COVID-19 in different pandemic waves and who developed disabling symptoms related to Long COVID.

This study has several limitations. The first relates to the representativeness of the sample, which may not be representative of the population of interest, both in terms of sociodemographic composition and in terms of Long COVID symptom severity. This is because females were overrepresented in our sample. The recruitment method (through Facebook) might be one explanation, as, according to evidence in the literature, women are more frequent social media users, particularly for health and psychological issues (Bidmon & Terlutter, 2015; Kimbrough et al., 2013). Participants with severe Long COVID symptoms may also be over-represented because they are part of a social media community where people share the difficulties of living with Long COVID symptomatology. Moreover, about 70% have moderate to severe depressive symptoms, and about 55% have moderate to severe anxiety symptoms, the current scientific literature has attested to prevalence rates of anxiety and depression around 23% in this population, which leads to consider our sample as particularly distressed (Seighali et al., 2024). This could be explained by several reasons, e.g., only people with higher levels of distress may have responded to the survey, or another explanation could come from the recruitment method, i.e., a closed group dedicated to those suffering from Long Covid, which might over-represent patients with greater distress and impairment. In order to reduce these biases, it might be useful to replicate this study in a different setting, such as a hospital setting. Second, selection bias might have occurred, thus limiting the participation of those with non-disabling Long COVID symptoms and who do not regularly access social media and, in general, of all people affected by "digital poverty" and "digital inequality". A third limitation is the cross-sectional nature of the study which did not allow for the determination of causal relationships between Long COVID symptoms, distress, and self-compassion dimensions. Finally, as with any study that relied on online data collection, response and social desirability biases might have affected the results.

Future research directions should consider these findings to build more robust studies that can test the causality between low levels of self-compassion and suffering in this population. This could be particularly important in order to build psychological interventions that can directly impact such cognitive processes.

Conclusion

In summary, self-compassion seems to be negatively associated with depression, anxiety, and stress in people with Long COVID, and it may thus represent a treatment target for psychological interventions in this population. A more self-compassionate attitude may help reduce distress related to Long COVID and promote better adaptation to illness.

Tables and figures (Bodini, Bonetto, Colombi et al., 2024)

Table 1. Personal characteristics of the study sample (n=332).

Variable	**n**	**%**
Sex	(63 missing)	
Male	71	26.4
Female	198	73.6
Age (years)		
18-35	75	22.6
36-55	186	56.0
56+	71	21.4
Education	(1 missing)	
Primary education	68	20.5
Secondary education	142	42.9
Tertiary education/degree/postgraduate degree	121	36.6
Nationality		
Italian	323	97.3
Other	9	2.7
Employment	(1 missing)	
No	105	31.7
Yes	226	68.3
Marital status		
Single	117	35.2
Married/in civil partnership	172	51.8
Divorced/widowed	43	13.0
Living condition		
Alone	46	13.9
Parents/other relatives	75	22.6
Partner and/or children	211	63.6
Living place	(1 missing)	
City	112	33.8
Town with more than 10,000 inhabitants	126	38.1
Village with less than 10,000 inhabitants	93	28.1
Suffering from chronic conditions or physical disabilities	185	55.7
No	147	44.3
Yes		

Table 2. COVID-19 related characteristics of the study sample (n=332).

Variable	**n**	**%**
Period of the first SARS-CoV-2 infection		
First wave (Jan 2020-Sep 2020)	52	15.7
Second wave (Oct 2020-Sep 2021)	109	32.8
Third wave (Oct 2021-May 2022)	171	51.5
Re-infection by SARS-CoV-2		
No	299	90.1
Yes	33	9.9
Severity of COVID-19 disease	(2 missing)	(2 missing)
Asymptomatic	23	7.0
Mildly symptomatic (no treatment)	29	8.8
Symptomatic treated at home	214	64.8
Symptomatic admitted to hospital	64	19.4
ICU	11	17.5
Sub-intensive care	32	50.8
Ordinary wards	20	31.7
Variable	***M***	***SD***
Number of Long-COVID symptoms	10.5	4.9

Table 3. Mental health dimensions (depression, anxiety, perceived stress): mean (sd), range, n and percentage of participants by categories.

					Categories		
	n	*M*	*SD*	*Range*		*n*	*%*
Depression (PHQ-9)	250	13.1	5.8	0-27	0-4 no depression	13	5.2
					5-9 mild	62	24.8
					10-14 moderate	78	31.2
					15-19 moderately	63	25.2
					severe	34	13.6
					20-27 severe		
Anxiety (GAD-7)	249	10.7	5.6	0-21	0-4 no anxiety	32	12.9
					5-9 mild	83	33.3
					10-14 moderate	62	24.9
					15-21 severe	72	28.9
Perceived stress (PSS)	257	23.5	7.1	4-40	0-13 low stress	21	8.2
					14-26 moderate	153	59.2
					27-40 high	83	32.3

Note. PHQ-9 scores range from 0 to 27, GAD-7 scores range from 0 to 21, and PSS scores range from 0 to 40. As regards the PSS, the 257 participants who completed it differed from the 75 who did not complete only for age (18-35 yrs. 17.9% vs 38.7%, 36-55 yrs. 59.8% vs 46.7%, 56-80 yrs. 23.3% vs 14.7%; $p<0.001$ Chi-square test).

Table 4. Multivariate linear regression models for depression (PHQ-9), anxiety (GAD-7) and perceived stress (PSS) with self-compassion (SCS total score) among independent variables.

Personal and pre-covid characteristics	**Depression**		**Anxiety**		**Perceived stress**	
	Adj Beta (95% CI)	*p*	*Adj Beta (95% CI)*	*p*	*Adj Beta (95% CI)*	*p*
Gender						
Male	Ref.				Ref.	
Female	0.99 (-0.61; 2.58)	0.225			1.28 (-0.58; 3.14)	0.176
Age						
18-35			Ref.		Ref.	
36-55			-2.14 (-3.81; -0.47)	0.012	-1.43 (-3.54; 0.68)	0.182
56+			-1.11 (-3.05; 0.84)	0.264	-1.39 (-3.81; 1.03)	0.259
Education						
Primary	Ref.					
Secondary	-1.36 (-3.09; 0.37)	0.123				
Tertiary/degree/postgraduate degree	-2.56 (-4.36; -0.77)	0.005				
Living condition						
Alone			Ref.			
Parents/other relatives			1.80 (-0.25; 3.86)	0.084		
Partner and/or children			2.24 (0.61; 3.88)	0.007		
Organic chronic conditions/disabilities						
No	Ref.					
Yes	1.14 (-0.23; 2.50)	0.102				
Adjusted R-Squared	7.5%		3.5%		3.2%	
Long COVID						
Number of symptoms	0.29 (0.15; 0.44)	<0.001	0.23 (0.09; 0.37)	0.001	0.27 (0.11; 0.42)	0.001
Adjusted R-Squared	7.8%		3.6%		5.6%	
Self-Compassion						
SCS total score	-3.99 (-4.92; -3.06)	<0.001	-4.47 (-5.26; -3.68)	<0.001	-5.92 (-6.99; -4.86)	<0.001
Adjusted R-Squared	22.3%		31.4%		33.5%	
Number of observations	205		249		211	
F test, p-value	F(6, 198)=21.45, <0.001		F(6, 242)=26.91, <0.001		F(5, 205)=31.82, <0.001	
Model's Adjusted R-Squared	37.6%		38.5%		42.3%	

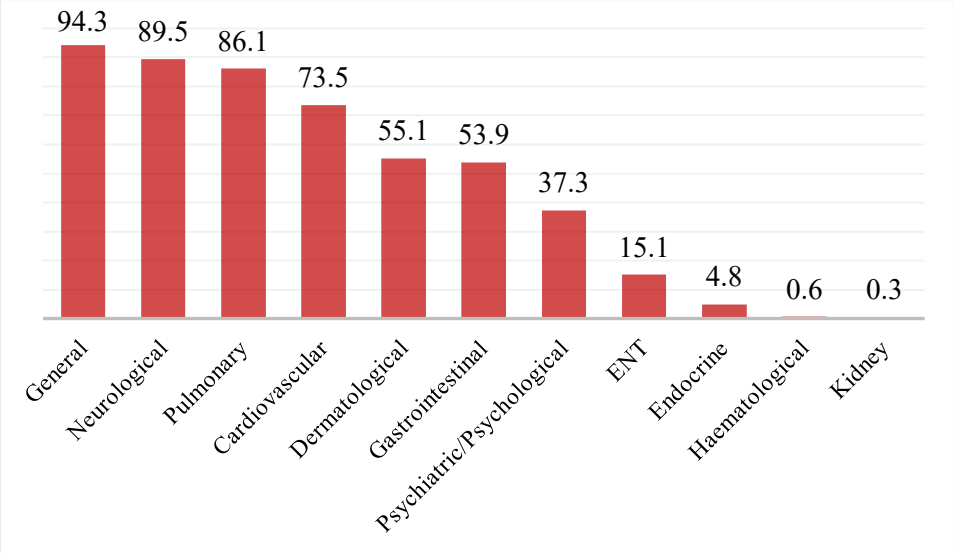
Note. Independent variables considered in the univariate linear regression model for PHQ-9, GAD-7, and PSS: personal and pre-COVID characteristics (gender, age, education, employment, marital status, living condition, living place, suffering from chronic conditions or physical disabilities), COVID infection (period of the first SARS-CoV-2 infection, re-infection by SARS-CoV-2, severity of COVID-19 disease), long-COVID (long-COVID diagnosis, number of Long-COVID symptoms), self-compassion (SCS total score). Only independent variables with $p<0.10$ entered the multivariate model for PHQ-9, GAD-7, and PSS.

Table 5. Contribution of each SCS dimension considered separately in the multivariate linear regression models for depression (PHQ-9), anxiety (GAD-7) and perceived stress (PSS): Adjusted Beta coefficient (95% CI), p-value and Adjusted R-squared are reported.

SCS dimension	**Depression**			**Anxiety**			**Perceived stress**		
	Adj Beta (95% CI)	p	Adj R^2	Adj Beta (95% CI)	p	Adj R^2	Adj Beta (95% CI)	p	Adj R^2
Self-kindness	-1.77 (-2.52; -1.01)	<0.001	7.9%	-1.90 (-2.56; -1.24)	<0.001	10.5%	-2.75 (-3.65; -1.85)	<0.001	13.2%
Self-judgment	2.67 (1.89; 3.44)	<0.001	15.8%	3.13 (2.47; 3.80)	<0.001	24.2%	3.61 (2.64; 4.58)	<0.001	18.7%
Common humanity	-1.49 (-2.36; -0.62)	0.001	4.3%	-1.15 (-1.91; -0.39)	0.003	2.9%	-2.04 (-3.09; -0.98)	<0.001	5.6%
Isolation	2.42 (1.76; 3.08)	<0.001	17.3%	2.69 (2.11; 3.28)	<0.001	23.5%	3.81 (3.06; 4.56)	<0.001	29.5%
Mindfulness	-1.96 (-2.72; -1.20)	<0.001	9.4%	-2.21 (-2.86; -1.56)	<0.001	14.1%	-3.21 (-4.10; -2.32)	<0.001	17.8%
Over-identification	2.85 (2.20; 3.51)	<0.001	22.6%	3.49 (2.96; 4.02)	<0.001	38.1%	4.20 (3.43; 4.96)	<0.001	32.8%

Note. Independent variables considered in the multivariate linear regression model for PHQ-9, GAD-7, and PSS are the same as models in Table 4.

Figure 1. Percentage of participants reporting Long Covid symptoms (n=332).



CONCLUSIONS

This thesis examines the profound psychological impact of the COVID-19 pandemic on various populations, including healthcare professionals, mental health services, and COVID-19 survivors. The research presented in each chapter provides an in-depth look at the unique psychological challenges these groups faced, as well as the targeted interventions designed to mitigate these effects.

The studies presented in Chapter 1 provide an analysis of the psychological impact of the COVID-19 pandemic on healthcare professionals, with a particular focus on the heightened stressors and long-term mental health challenges experienced by nurses and ICU staff. These findings highlight the significant burden placed on frontline workers and explore targeted interventions aimed at mitigating its effects. The repeated cross-sectional study conducted in a tertiary hospital in Verona demonstrated that one year after the pandemic's onset, symptoms of anxiety, depression, and burnout significantly increased among healthcare workers, particularly those in intensive care units and other frontline roles. Nurses, who represented the most affected group, reported higher levels of emotional exhaustion and depressive symptoms compared to other healthcare roles. Intervention studies, such as the evaluation of the Mindful Compassion Care Program (MCCP), revealed promising approaches for addressing these challenges. This study demonstrated the program's effectiveness in reducing emotional exhaustion, cynicism, and perceived stress while enhancing mindfulness and self-reassurance among participating nurses. These findings underscore the value of integrating mindfulness and compassion-based strategies into support systems for healthcare workers. While MCCP demonstrated promising results in enhance psychological wellbeing, stigma associated with seeking psychological support may have influenced participation rates and outcomes. This reluctance among healthcare workers, particularly those experiencing severe burnout, highlights the need for innovative approaches to overcome barriers to care. In response, a digital mindfulness program will be developed as a more accessible and flexible alternative to traditional in-person interventions. This online platform will aim to address stigma by enabling healthcare workers to engage in self-guided stress management practices privately, thereby reducing concerns about disclosure and professional judgment.

The lessons learned emphasize the necessity of designing interventions that account for systemic and personal barriers to mental health care, such as stigma, time constraints, and logistical challenges. Future efforts should focus on scaling such digital tools and integrating them into organizational support systems to ensure broader accessibility. Additionally, healthcare institutions must adopt proactive strategies to normalize mental health support, reduce stigma, and foster a workplace culture that prioritizes well-being. These steps are essential to sustaining the mental health of healthcare workers and maintaining the quality of care during ongoing and future public health emergencies.

The findings from the studies presented in Chapter 2 reveal the profound challenges faced by mental health services during the COVID-19 pandemic. These studies examined both emergency psychiatric consultations and the impact on psychiatric residential facilities, offering valuable insights into the systemic strain and adaptive responses required in such crises. The analysis of emergency psychiatric consultations conducted at the Verona Academic Hospital Trust demonstrated a significant reduction in psychiatric visits during the first and second pandemic years compared to pre-pandemic levels. The most notable declines occurred during lockdown periods, with consultations dropping by up to 40% in 2020. Fear of contagion and restricted mobility likely contributed to this reduction, particularly for cases involving anxiety and depressive disorders. However, consultations for psychotic disorders and those involving young adults showed an increase in later pandemic phases, underscoring the uneven distribution of mental health impacts and the need for targeted outreach strategies.

In psychiatric residential facilities, the pandemic imposed severe restrictions, such as suspending outdoor rehabilitative activities and limiting contact with family and friends. These measures significantly disrupted the rehabilitation and recovery processes for residents with severe mental disorders. Residents reported heightened feelings of isolation, while staff faced increased workload pressures and concerns about infection risks. The cross-sectional study highlighted that 14.2% of staff experienced moderate-to-severe depression, and 6% exhibited burnout symptoms. Both residents and staff identified the restrictions on social interactions and

activities as the most significant challenges, highlighting the need for balancing infection control with the preservation of therapeutic environments.

The studies illustrate the dual burden of the pandemic on mental health services: the strain on emergency response systems and the disruptions to ongoing rehabilitation care. For future health crises, several lessons emerge. Mental health services must prioritize flexible care models that maintain access to urgent care while supporting ongoing rehabilitative needs. The integration of telehealth services and community-based outreach programs can mitigate disruptions and expand access during emergencies. Further, targeted interventions are needed to address the specific vulnerabilities of both residents and staff in psychiatric facilities. These include measures to alleviate staff burnout, enhance infection control protocols without compromising therapeutic environments, and restore social and rehabilitative activities as early as possible. These findings underscore the importance of preparing mental health systems to adapt swiftly to crises while preserving the continuum of care. By applying these lessons, healthcare systems can better support the mental health needs of vulnerable populations during future pandemics or public health emergencies.

The findings from the studies presented in Chapter 3 underscore the multifaceted psychological challenges faced by COVID-19 survivors, particularly those affected by long-COVID. The research demonstrates significant associations between persistent physical symptoms, such as dyspnea, and psychological distress, including depression, anxiety, and insomnia. Moreover, the role of experienced discrimination and internalized stigma emerges as a critical factor exacerbating mental health outcomes, with higher levels of stigma correlating with elevated psychological distress. These studies highlight the intricate interplay between physical and psychological health. Persistent symptoms not only impair quality of life but also contribute significantly to psychological distress. Addressing these symptoms requires integrated approaches that simultaneously target physical recovery and mental health. Furthermore, the impact of stigma—both experienced and internalized—is particularly pronounced. Survivors who perceive higher levels of stigma are more likely to report elevated symptoms of anxiety, depression, and insomnia, indicating a pressing need for strategies to reduce societal stigma through

public health initiatives and supportive community structures. Additionally, the role of self-compassion as a protective factor offers a promising avenue for interventions aimed at fostering resilience and reducing distress. Public health responses must prioritize mental health as an essential component of pandemic management, recognizing the enduring psychological impact of infectious diseases. Tailored interventions that address both physical and psychological needs should be developed, focusing on stigma reduction and mental health promotion. In this context, mindful self-compassion could represent a valuable intervention to foster resilience, reduce self-stigma, and promote psychological well-being among COVID-19 survivors and other affected populations. Its emphasis on self-kindness and emotional regulation offers a practical approach to mitigating distress and enhancing recovery during and after public health emergencies.

In conclusion, the COVID-19 pandemic has exposed both the vulnerability of healthcare systems and the remarkable resilience of those affected. This thesis examines the psychological impact on healthcare workers, mental health systems, and COVID-19 survivors, emphasizing the need to integrate mental health into pandemic response strategies.

Through systematic research and evaluation, we've identified effective intervention approaches and gathered crucial insights for future crisis preparation. The path forward requires translating these findings into concrete actions to better protect both physical and mental well-being during future emergencies.

Evidence-based practices are essential for developing effective mental health interventions and optimizing resource allocation. The pandemic has highlighted how psychological research plays a vital role in addressing global health challenges. This requires sustained funding and institutional support, as investing in psychological research is fundamental to public health infrastructure. To prepare for future crises, we must prioritize the integration of psychological research into policy and practice. By building on these evidence-based insights and maintaining investment in mental health research, we can create a society better equipped to handle both the physical and psychological aspects of future challenges with expertise and compassion.

Although this thesis focused primarily on the psychological impact of the COVID-19 pandemic, many of the issues identified—such as burnout, emotional exhaustion, and inadequate organizational support—are not unique to pandemic situations. Similar conditions may arise in other high-stress healthcare contexts, such as emergency departments, oncology wards, or during prolonged healthcare crises. The findings from this thesis, particularly those regarding psychological interventions, organizational strategies, and resilience-building approaches, may therefore have broader applicability. The implementation of mindfulness-based or compassion-based interventions could be beneficial in a wide range of healthcare settings to prevent mental health deterioration, promote staff well-being, and ensure high-quality patient care even under persistent stress conditions.

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