La Medicina del Lavoro

Original article

Med Lav 2023; 114 (2): e2023012
DOI: 10.23749/mdl.v114i2.13829

Differences in the Long-term Impact of the COVID-19 Pandemic on Mental Health and Professional Quality of Life of Resident and Specialist Physicians

Valentina Delle Donne[1*], Valentina Massaroni[1], Nicoletta Ciccarelli[2], Alberto Borghetti[3], Arturo Ciccullo[4], Gianmaria Baldin[5], Gabriele Giuliano[3], Alex Dusina[3], Elena Visconti[3], Enrica Tamburrini[3], Simona Di Giambenedetto[1,3]

[1]Infectious Diseases Institute, Department of Safety and Bioethics, Catholic University of Sacred Heart, Rome, Italy
[2]Department of Psychology, Catholic University, Milan, Italy
[3]UOC Infectious Diseases, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome, Italy
[4]UOC Infectious Diseases, Ospedale San Salvatore, L'Aquila, Italy
[5]Olbia Mater Hospital, Olbia, Italy

Keywords: COVID-19, Healthcare Workers; Mental Health; Professional Quality of Life; Burnout

Abstract

Background: *The COVID-19 pandemic created a challenging situation for healthcare workers (HCWs) worldwide. We aimed to compare the mental health and professional quality of life of residents and specialist physicians in a cohort of Italian HCWs caring for patients with COVID-19 about two years after the start of the COVID-19 pandemic.* **Methods:** *Between November 2021 and November 2022, an online survey investigating the emotional states of depression, anxiety, stress, compassion satisfaction, and compassion fatigue was administered to HCWs (N=78) at the Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome.* **Results:** *Our findings suggest that from 5 to 20% of our HCWs still showed the effects of the adverse psychological impact of the pandemic, and more than half experienced medium levels of compassion fatigue and a medium level of compassion satisfaction. Our results also show that those with fewer years of clinical practice might be at greater risk of burnout (p=0.021), anxiety, and stress symptoms (both p=0.027). In addition, they might develop a lower level of compassion satisfaction (p=0.018). Moreover, the factors that potentially contribute to poor mental health, compassion fatigue, and compassion satisfaction differ between residents and specialist physicians.* **Conclusions:** *This overview presents one of the first pictures of the long-term effects of the pandemic on the mental health and professional quality of life of an Italian sample of HCWs. Moreover, it also helps identify professionals who most need support and emphasizes the importance of improving these individuals' psychological and professional well-being, especially during a pandemic-like crisis with long-lasting effects.*

1. Introduction

From the beginning, the Coronavirus Disease (COVID-19) pandemic created a challenging situation for healthcare workers worldwide (HCWs) [1]. They had to face unpredicted changes in their work, such as lack of proper guidelines, more significant workload, physical tension, solitude and lack of social support, inadequate personal protective equipment (PPE), ethical concerns about the rationing

Received 18.10.2022 - Accepted 22.02.2023
*Corresponding Author: Valentina Delle Donne, Infectious Diseases Institute, Department of Safety and Bioethics, Catholic University of Sacred Heart, Rome, Italy; E-mail: valentina.delledonne1@unicatt.it; Tel: +39 6301 55360

of treatments, and high-risk of infection [2-5]. This emergency also affected their physical and mental well-being [4-6]. On March 18, 2020, the WHO reported the psychosocial effects of the pandemic on the general population and in HCWs [1, 7]. Several studies also indicated that HCWs are particularly vulnerable to mental health issues resulting from the COVID-19 outbreak [8, 9]. For example, on May 14, 2020, a British Medical Association [10] survey showed that 45% of British UK doctors suffered from mental health problems related to or accentuated by the COVID-19 crisis.

Moreover, HCWs who were involved in handling the pandemic showed symptoms of stress and burnout [11]. Indeed, prolonged stress is a risk factor for developing burnout due to difficult working conditions and the personal characteristics of professionals [12]. In particular, stress related to the work context has been called compassion fatigue (CF) [4, 6]. CF has been described as physical and mental distress associated with the burden of helping [13]. It can lead to medical errors, deterioration of relationships with co-workers and patients, and low work satisfaction and quality of care [14, 15]. Recent studies have reported that HCWs responsible for patients whose outcome is potentially critical, such as those with COVID-19, seem at high risk of developing CF [16]. However, this issue received little attention during the pandemic. A few studies report medium CF levels during the first phase of the pandemic [4, 17].

However, COVID-19 also resulted in positive elements for HCWs (not just the burden of psychosocial issues), which need to be analyzed [4]. Indeed, during the pandemic, the public response toward HCWs was hot and seemed to be a critical positive reinforcement for them and led to a profound sense of self-efficacy [18, 19]. This positive side is called compassion satisfaction (CS), i.e., the gratification experienced by HCWs when performing their work accurately, in their relationships with colleagues, and when they perceive that their work has social worth [4]. During the COVID-19 pandemic, CS became a protective factor against developing CF [4]. Dosil et al. [17] reported that during the first phase of the pandemic, 90.6% of HCWs in Spain showed a high level of CS.

The equilibrium between CS and CF represents the level of professional quality of life [20], i.e., "the quality one feels concerning their work as a helper" [17]. Right from the beginning of the COVID-19 pandemic, Italy has been one of the countries most affected. This has had an enormous impact on the workload and mental health of HCWs [1], and several studies have investigated the psychological impact of the pandemic on these professionals.

One of these studies, i.e., De Sio et al. [1], reported a high prevalence of psychological distress (89%) and poor well-being (46%) in HCWs at the peak of the pandemic in Italy. Another study, i.e., Bettinsoli et al. [21], reported that almost 33.5% of HCWs in Italy showed psychiatric morbidity. Other studies also reported that HCWs working in COVID wards showed higher psychological issues than those working in non-COVID wards [22] and that they recognized that their current psychological well-being was worse during the COVID-19 emergency than before the outbreak [21-23]. However, Buselli et al. [4] reported that HCWS showed negative and positive psychological outcomes during the Italian lockdown. Indeed, they did not show significant levels of CF, and those who worked on the front line showed higher levels of CS.

Furthermore, there are reports in the recent literature that the significant burden of the pandemic on the National Healthcare system had a particularly negative effect on HCWs at an early career stage [24-26]. In fact, during the pandemic, residents had to deal with rescheduling clinical activities; suddenly, they found themselves with a central role in the care of COVID-19 patients, which adversely affected their psychological well-being [27-29]. Some studies report that resident doctors were at increased risk of burnout before the pandemic [30, 31] and showed more significant emotional distress, sleep disorders, depression, and anxiety during the COVID-19 emergency [32-34].

The scientific community has required high-quality data regarding the psychological impact of the COVID-19 pandemic across the whole population and on exposed groups such as HCWs [35]. Therefore, it is essential to investigate these aspects to understand better how to create a healthy, safe, and supportive work environment to ensure the mental health of HCWs [36].

To date, we need to summarize the large amount of data being reported on the mental health of HCWs. Also, few studies on this topic have been conducted in the European context, especially concerning resident doctors [17]. Additional follow-up studies seem necessary to understand the effects of the pandemic over time and on HCWs with different kinds and amounts of professional experience [1].

Thus, our study aimed to compare the mental health and professional quality of life of residents and specialist physicians in a cohort of HCWs in Central Southern Italy who cared for patients with COVID-19 about two years after the start of the COVID-19 pandemic and to analyze the factors potentially contributing to poor mental health, compassion fatigue, and compassion satisfaction in each group.

2. Methods

2.1. Participants

In November 2021, we conducted a cross-sectional survey in which we consecutively enrolled HCWs who treated COVID-19 patients at the Infectious Diseases Institute, Fondazione Policlinico Universitario A. Gemelli IRCCS, Rome. All participants were volunteers; they received no financial remuneration for their participation. In addition, we enrolled doctors (both residents and specialist physicians) who were treating patients with COVID-19. The institutional ethics committee approved the study, and all participants provided written informed consent before enrollment. We contacted participants using their institutional e-mail and enrolled subjects who consented to participate by replying to the e-mail. At this point, we have acquired informed consent and sent the link to the survey to be completed. All procedures performed in this study followed the institutional and national research committee's ethical standards, the 1964 Helsinki Declaration, and its later amendments or comparable ethical standards.

2.2. Procedure

Each participant completed an anonymous 65-item online survey. We collected information on sex, age range, commitment to a stable relationship, parenting, years of medical practice, and having been infected with COVID-19 during the pandemic. In addition, we gathered the following professional information related to the previous week: weekly working hours and weekly shifts that lasted more than 8 hours. We also collected a self-report judgment about increased work intensity after the outbreak of the pandemic (choosing yes or no as possible answers), perception of support from one's team in the workplace [using a Likert scale from 1 (no support) to 10 (great support)], concern about contracting COVID-19 and infecting family members [using a Likert scale from 1 (no concern) to 10 (extremely concerned)].

2.2.1. Professional Quality of Life Measure

To analyze the professional quality of life of our cohort of HCWs, we administered Stamm's [37] "Professional Quality of Life Scale" (ProQOL-5), which is often used with HCWs who are exposed to trauma and suffering. The ProQOL-5 is a 30-item self-report scale. Respondents assess how frequently they have experienced each work situation over the last 30 days on a Likert scale ranging from 1 (never) to 5 (very often).

The ProQOL-5 assesses two main areas: Compassion Satisfaction (CS) and Compassion Fatigue (CF); the latter is comprised of two subsets of symptoms: Burnout (BO) and secondary traumatic stress (STS), which is the additive effect of interaction with individuals who are going through a challenging emotional situation [38]. Therefore, higher scores on these scales indicate higher CS and CF (including BO and STS) values. Score ranges are also available for each category (low <22; medium: 23-41; high: >41) [38].

2.2.2. Mental Health Measure

The "Depression, Anxiety and Stress Scale" (DASS-21) was applied to measure Mental Health Status [39, 40]. The DASS-21 is a collection of three self-report scales that evaluate the emotional states of depression, anxiety, and stress. The first subscale (DASS-Depression) assesses lack of self-esteem/incentives and depressed mood. The second subscale (DASS-Anxiety) assesses fear and anticipation of

adverse events. The third subscale (DASS-Stress) assesses a persistent over-arousal condition and little frustration tolerance. Respondents assessed how often they had experienced symptoms of depression, anxiety, and stress during the past seven days on a Likert scale ranging from 0 (never) to 3 (almost always), where the higher score indicates more severe emotional distress. The subscales are scored as follows: normal (0-9), mild (10-12), moderate (13-20), severe (21-27), and extremely severe (28-42) for Depression; normal (0-6), mild (7-9), moderate (10-14), severe (15-19) and extremely severe (20-42) for Anxiety; and normal (0-10), mild (11-18), moderate (19-26), severe (27-34) and extremely severe (35-42) for Stress.

2.3. Statistical Analysis

Firstly, we tested the quantitative variables for normal distribution using Shapiro-Wilk Test, and all results were non-normally distributed. Descriptive statistics were computed for quantitative variables (median, interquartile range [IQR]) and qualitative variables (percent frequencies).

We compared the working and personal characteristics variables, the self-report measures, the three ProQOL subscales, and the DASS-21 scores of residents and specialist physicians. According to the nature of each variable, the comparison was performed using the $\chi 2$ test (or Fisher exact test when appropriate) or non-parametric test (Mann–Whitney U-test and Kruskal-Wallis test) due to the non-normality of the distributions.

Furthermore, we used the non-parametric test (Mann–Whitney U-test and Kruskal-Wallis test) to compare the three ProQOL subscales and the DASS-21 scores of the working and personal characteristics variables in each group (residents and specialist doctors) separately.

A two-tailed p-value of less than 0.05 was considered statistically significant. All analyses were performed using the SPSS version 21.0 software package (SPSS Inc., Chicago, IL).

3. Results

We enrolled 78 participants out of 100 subjects invited to participate through the institutional e-mail (response rate 78%); 42 (53.8%) were specialist physicians, and 36 (46.2%) were resident physicians. Complete demographic and professional characteristics are summarized in Table 1. The subjects in the two groups (specialist vs. resident physicians) differed significantly as to the percentage of subjects aged >35 years [p>0.001, 100% (n=42/42) vs. 11.1% (n=4/36)], committed to a stable relationship [p=0.016, 71.4%, (30/42) vs. 44.4% (16/36)] and having children [p=0.001, 71.4% (30/42) vs. 33.3% (n=12/36)].

All ProQOL-5 subscales (CS, BO, STS) and DASS-21 subscales (depression, anxiety, and stress) were non-normally distributed variables (p<0.001, p=0.001, p<0.001 and p=0.028, p<0.001, p=0.007, respectively). Also, the Likert scales regarding the self-report judgment about support from one's team in the workplace, concern about contracting COVID-19, and infecting family members emerged as non-normally distributed variables (all ps <0.001).

The mean concern about getting COVID-19 and infecting other family members was higher in resident physicians than specialist physicians (p< 0.001, 49.17 vs. 31.21 and p<0.001, 53.8 vs. 27.2, respectively). The mean support they perceived from their team in the workplace was lower in resident physicians than in specialist physicians (p=0.024, 33 vs. 44).

Regarding the DASS-21 scale, 25.6% (n=20), 5.1% (n=4), and 5.1% (n=4) of overall HCWs obtained a score that suggested the presence of mild to moderate levels of depression, anxiety, and stress, respectively; no participants scored in the "severe" or "extremely severe" range.

Regarding the ProQOL-5 subscales, most HCWs reported scores that suggested a medium level of CS (74.4%, n=58), BO (94.9%, n=74), and STS (61.5%, n= 48). No participant scored in the low range for CS or in the high range for BO and STS. Complete descriptive statistics of ProQOL-5 and DASS-21 item scales are shown in Table 2.

Specialist physicians obtained significantly higher mean scores on the CS subscale than resident physicians (p=0.018, 45 vs. 33). Furthermore, resident physicians reported significantly higher mean scores on the BO subscale than specialist physicians (p=0.021, 45 vs. 34).

Table 1. Demographic and professional characteristics of resident (N=36) and specialist HCWs (N=42).

	Resident HCWs	Specialist HCWs	
Variables	**N (%) or median (IQR)**	**N (%) or median (IQR)**	***p***
Sex			0.888
Male	16 (44.4)	18 (42.9)	
Female	20 (55.6)	24 (57.1)	
Age range, y			<0.001
<35	32 (88.9)	0 (0)	
35 or >35	4 (11.1)	42 (100)	
Commitment to a stable relationship			0.016
Yes	16 (44.4)	30 (71.4)	
No	20 (55.6)	12 (28.6)	
Children			0.001
Yes	24 (66.7)	30 (71.4)	
No	12 (33.3)	12 (28.6)	
Infected with COVID-19			0.771
Yes	6 (16.7)	6 (14.3)	
No	30 (83.3)	36 (85.7)	
Weekly working hours			0.389
25-40	12 (33.3)	18 (42.9)	
>40	24 (66.7)	24 (57.1)	
Weekly shifts >8 hours			0.528
Once/ twice	18 (50)	18 (42.9)	
3 or >3	18 (50)	24 (57.1)	
Support from one's team†, 0-10 scale	7 (6-8)	8 (7-8)	0.024
Concern about contracting COVID-19, 0-10 scale	6 (5-7)	3 (2-6)	<0.001
Concern about infecting family†, 0-10 scale	8 (8-10)	6 (4-8)	<0.001

Moreover, a significantly higher percentage of subjects in the residents' group obtained a score that suggested the existence of mild to moderate levels of anxiety and stress compared to specialist physicians [both ps= 0.027, 11.1% (n=4/36) vs. 0% (n=0/42)].

Considering the group of residents, HCWs with children obtained significantly higher mean scores on the CS (p=0.032, 23.8 vs. 15.8) and DASS-21 anxiety subscales (p<0.001, 28.5 vs. 13.5) compared to those who had no children. Moreover, HCWs committed to a stable relationship showed significantly higher mean scores for depression on the DASS-21 subscale [p=0.011, 23 vs. 14.5] compared to those not in a committed relationship.

Moreover, HCWs who obtained scores that suggested a medium level of BO and a mild to moderate range of anxiety reported lower support perceived from their team (p=0.008, 16.9 vs. 31 and p=0.012, 6.5 vs. 20, respectively) compared to those with a low level of BO and average levels of anxiety. Finally, HCWs with DASS-21 scale scores that corresponded to a mild to moderate range of depression and stress showed greater concern about getting COVID-19 (p=0.005, 27.5 vs. 15.93, and p=0.017, 30 vs. 17.06, respectively) and about infecting other family members (p=0.013, 26.5 vs. 16.21 and p=0.012, 30.5 vs. 17, respectively) compared to those with average levels.

Considering the group of specialist physicians, female HCWs obtained significantly higher mean

Table 2. Levels of Compassion Fatigue (Burnout and Secondary Traumatic Stress), Compassion Satisfaction, Depression, Anxiety, Stress, and Distress in the Study Population [resident (N=36) and specialist HCWs (N=42)].

	Resident HCWs	Specialist HCWs	
Variables	**N (%) o median (IQR) †**	**N (%) o median (IQR) †**	***p***
DASS-21 Depression Subscale†	7 (4-9)	7 (4-10)	0.809
Average (0-9)	28 (77.8)	30 (71.4)	
Mild (10-12)	2 (5.6)	12 (18.4)	
Moderate (13-20)	6 (17.7)	0 (0)	
Severe (21-27)	0 (0)	0 (0)	
Extremely Severe (28-42)	0 (0)	0 (0)	
DASS-21 Anxiety Subscale†	3 (1-4)	4 (2-4)	0.027
Average (0-6)	32 (88.9)	42 (100)	
Mild (7-9)	2 (5.6)	0 (0)	
Moderate (10-14)	2 (5.6)	0 (0)	
Severe (15-19)	0 (0)	0 (0)	
Extremely Severe (20-42)	0 (0)	0 (0)	
DASS-21 Stress Subscale†	8 (6-9)	7 (5-9)	0.027
Average (0-10)	32 (88.9)	42 (100)	
Mild (11-18)	4 (11.1)	0 (0)	
Moderate (19-26)	0 (0)	0 (0)	
Severe (27-34)	0 (0)	0 (0)	
Extremely Severe (35-42)	0 (0)	0 (0)	
ProQOL-5 BO Subscale†	28.5 (26-30)	24 (23-29)	0.021
Low (<22)	4 (11.1)	0 (0)	
Medium (23-41)	32 (88.9)	42 (100)	
High (>41)	0 (0)	0 (0)	
ProQOL-5 STS Subscale†	26.5 (19-30)	25 (20-27)	0.203
Low (<22)	12 (33.3)	18 (42.9)	
Medium (23-41)	24 (66.7)	24 (57.1)	
High (>41)	0 (0)	0 (0)	
ProQOL-5 CS Subscale†	34.5 (30-38)	41 (35-42)	0.021
Low (<22)	0 (0)	0 (0)	
Medium (23-41)	28 (77.8)	30 (71.4)	
High (>41)	8 (22.2)	12 (28.6)	

Abbreviations: N, number; IQR, interquartile range; DASS-21, Depression, Anxiety and Stress Scale; ProQOL-5, Professional Quality of Life Scale, BO burnout, STS secondary traumatic stress, CS compassion satisfaction.

scores than male HCWs on the BO and STS subscales (p=0.001, 26.75 vs. 14.5 and p<0.001, 29 vs. 11.5, respectively) and on the depression, anxiety, and stress DASS-21 subscales [p<0.001, 29.7 vs. 10.5, p<0.001, 30.5 vs. 9.5, and p>0.001, 29.7 vs. 10.5, respectively]. Moreover, female HCWs obtained lower mean scores on the CS subscale than males (p<0.001, 13.25 vs. 32.5).

Finally, HCWs with scores that suggested a medium level of CS and a mild to moderate range of depression showed greater concern about getting COVID-19 ($p=0.002$, 22.7 vs 18.5 and $p=0.011$, 29 vs. 18.5, respectively) and about infecting other family members ($p<0.001$, 29 vs 18.5 and $p<0.001$, 36.5 vs 15.5, respectively) compared to those with a high level of CS and average levels of depression.

4. Discussion

After the onset of the COVID-19 pandemic, many HCWs exhibited psychological distress and poor quality of life [41]. In addition, several studies have indicated the effects of some personal and work characteristics on their mental health and professional quality of life [42, 43].

As there is a need to recap the many data on the topic and are few scientific investigations available concerning resident doctors in the European context [17], our study aimed to explore better and compare the mental health and professional quality of the life of residents and specialist physicians in an Italian cohort of HCWs who were responsible for the care of patients with COVID-19 approximately two years after the start of the pandemic.

Our findings show that during this time frame, our cohort of HCWS experienced mild to moderate levels of depression (25.6%), anxiety and stress (both 5.1%), and medium levels of both compassion fatigue (BO 94.9% and STS 61.5%) and compassion satisfaction (74.4%).

The prevalence of psychological issues that emerged from our results is lower than that found in other Italian studies [22, 23]. However, these studies were related to an earlier time frame than ours, i.e., the pandemic's peak. Moreover, our less severe psychological outcomes may reflect the possible emotional issues of the 22% of invited subjects who did not complete the survey or a social desirability bias of those who participated.

However, our results seem to align with those of some earlier Italian studies. For example, Buselli et al. [4] reported that HCWs who faced the COVID-19 emergency simultaneously experienced negative and positive psychological consequences. Magnavita et al. [44] also reported the absence of extreme levels of compassion fatigue, probably because they were balanced by compassion satisfaction in this particular pandemic situation [17].

Furthermore, in China, there were reports of anxiety and depression peaks at the start of the outbreak that reduced with time from the outbreak [45].

Our results also show that resident physicians experienced more concern about getting COVID-19 and infecting other family members and lower support from their team in the workplace than specialist physicians. We also found that specialist physicians reported higher compassion satisfaction than resident physicians, whereas resident doctors experienced higher levels of burnout, anxiety, and stress symptoms than specialist physicians.

Many studies report similar results. First, Romiti et al. [32] argued that residents might be more vulnerable to the mental effects of COVID-19 because of the sudden escalation in their clinical responsibilities. Second, Huang et al. [46] also reported that younger professionals obtained significantly higher anxiety and depression scores, and other studies found higher resilience in HCWS who had been practicing longer [3, 48]. Third, less-experienced workers might be more easily affected by unexpected situations [42]. Moreover, Bozdag et al. [48] reported that those who have completed several years of professional practice are more resilient and readier to handle difficult situations. Fourth, Cai et al. [47] also suggested that younger HCWS were more concerned about their families as they were more likely to have young children and living parents. Finally, Dosil et al. [17] indicated that older professionals showed higher levels of compassion satisfaction due to their greater job security, which allowed them to enjoy helping patients more than their younger colleagues.

Our findings also show that HCWs with children experienced higher levels of compassion satisfaction and anxiety in the group of residents. Following our results, Bozdag et al. [48] indicated that psychological resilience decreases with more children.

Furthermore, we found that residents committed to a stable relationship suffered from higher levels of depression; this finding contrasts with previous data suggesting that a stable relationship might be a protective factor for good mental health in this

population [43], which might be explained at least in part by the quality of the couple's relationship. Although this was not the subject of our investigation, there is evidence that conditions created by COVID-19, such as isolation, separation, and the coexistence forced by the lockdown, increased the risks to the couple's relationship in terms of its quality and stability [50] and might have contributed to worsening relationship conflicts [51]. Thus, this factor is worthy of further investigation.

Our results also show that HCWs in the residents' group who perceived lower support from their team suffered from higher levels of burnout and anxiety. Sun et al. [52] identified team support as a protective factor for doctors' mental health, in line with our findings.

We also found that HCWs in both groups with more concern about infecting family members suffered from higher levels of depression and stress symptoms and lower levels of compassion satisfaction. Previous studies also reported this concern as one of the main stress factors [47] and a determinant of lowered psychological resilience [48].

Furthermore, we found that female specialist doctors reported more intense symptoms of burnout, secondary traumatic stress, depression, anxiety, and stress, and lower compassion satisfaction than males. Indeed, several international studies suggest that women are at higher risk for mental health issues such as depression, anxiety, and insomnia [47] and that males show higher psychological resilience [48]. This significant difference was also confirmed during the COVID-19 pandemic [17, 53-56].

Overall, our findings suggest that in our cohort of HCWs, those with fewer years of clinical practice needed particular care. Indeed, they might have been at greater risk of burnout, anxiety, and stress symptoms and might have had a lower level of compassion satisfaction. Moreover, the factors that potentially contribute to poor mental health, compassion fatigue, and compassion satisfaction seem to differ between residents and specialist physicians. For example, in the residents' group, those who seemed more vulnerable had children, were committed to a relationship, and felt less supported by their team. Finally, the women in the group of specialist doctors seemed the most prone to poor mental health and lower professional quality of life.

We acknowledge that our study has some limitations. First, this is a cross-sectional study, and unchecked biases can emerge in clinical routine. Thus, future longitudinal studies are necessary to check the validity of our findings. Second, because of the small sample size, our results should be cautiously assessed, and future studies with more subjects are needed to confirm our results. Indeed, based on a priori power analysis conducted in G-Power (for two-sample t-test, 0.05 significance level, a power of 0.80, a medium effect size (d=0.5), and one tail), the desired sample size would be 102 (51 in each group).

Furthermore, all of the subjects in our cohort were infectious disease specialists or residents and doctors who cared for COVID-19 patients. Future studies should include a more heterogeneous sample that includes doctors with other specialties who were not in charge of COVID-19 patients to obtain more complete results. Moreover, due to the anonymous nature of the survey, it was impossible to trace the year of specialization (lasting from 4 to 6 years in Italy) where the residents were, and thus the actual time they spent on pandemic management. Overall, the "seniority" of participants could generate a disparity between the two groups and within the residents' group. It is noteworthy that even if, hypothetically, a part of residents did not face the first wave of the pandemic and all the specialists did, residents still suffer from a higher level of burnout, anxiety, and stress than specialist physicians. In addition, our survey did not explore previous experiences during the pandemic, and we cannot describe the differences between the first and subsequent phases of the pandemic. Finally, a control group without HCWs is needed to strengthen and better understand our findings.

The present survey is a single-center study, and our data represent a specific cohort of HCWs in Central Southern Italy. It is well known that in Italy, there have been regional differences in the diffusion and burden of COVID-19 cases, especially during the first phase of the outbreak. Northern Regions recorded the highest hospitalization and admission rates to intensive care units (ICU) and

higher mortality rates than Southern ones due to socioeconomic and environmental factors and the management of the containment policy [57]. This heterogeneity affected the impact of the pandemic on HCWs' well-being. Furthermore, it is reported in the literature that HCWs from northern regions of Italy suffered from a higher burden of work-related symptoms [32]. Fondazione Policlinico Universitario A. Gemelli IRCCS has been one of the main reference centers in central Southern Italy in the fight against the pandemic since the beginning. On 16 March 2020, it was inaugurated the Columbus Covid 2 Hospital with the first 21 intensive care beds and with over 4,350 COVID-19 patients treated to date. On 21 April 2020, our center also opened Italy's first Day Hospital for post-COVID-19 check-ups and followed so far over 950 patients, receiving hundreds of new requests from all over Italy.

5. Conclusions

In conclusion, this study shows that almost two years after the outbreak of the COVID-19 pandemic, from 5 to 20% of an Italian cohort of HCWs still showed mild to moderate adverse psychological symptoms, and more than half of them experienced medium levels of compassion fatigue as well as a medium level of compassion satisfaction. Our results present a picture of the long-term effects of the pandemic on the mental health and professional quality of life of an Italian sample of HCWs.

Supporting the mental health of HCWs seems to be a crucial part of the public health response to the COVID-19 pandemic [58]. Indeed, the recent recommendations to optimize the professional well-being of HCWs could be separated into four main categories: "Social/structural support," "Work environment," "Communication/Information," and "Mental health support" [59]. For example, as proposed in previous studies, it seems important to promote compassion satisfaction among these professionals by adopting strategies to adequately manage sensitivity, empathy, and compassion to offset burnout and adverse psychological effects [2, 60-62]. Furthermore, recent studies have highlighted the need to develop resilience and its related skills [63], especially for workers who have leadership roles [64]. Higher levels of a negative emotional state seem to lower the psychological resilience level [39]. In addition, Morina et al. [65] underlined the usefulness of interventions based on cognitive behavioral therapy, i.e., psychoeducation, arousal reduction techniques, managing preoccupation, problem-solving skills, behavioral activation, and enhancement of meaningful activities. Moreover, most intervention programs proposed to date include psychosocial support, team training, and peer and institutional support [58].

Finally, this overview could help identify the professionals most in need of support. In addition, it highlights the importance of tailoring specific psychological interventions and creating a safe and supportive work environment to improve these individuals' psychological and professional well-being, especially during a pandemic-like crisis with effects that could persist for a long time.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of Catholic University of Sacred Heart of Rome (ID 4302, 21st September 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Declaration Of Interest: Alberto Borghetti received fee for advisory board by ViiV Healthcare, personal fee by Janssen Cilag. Simona Di Giambenedetto received speakers' honoraria and support for travel to meetings from Gilead, Janssen-Cilag (JC), Merck Sharp & Dohme (MSD) and ViiV Healthcare. Arturo Ciccullo received travel grants and congress' fee from ViiV Healthcare. All other authors: none to declare.

References

1. De Sio S, Buomprisco G, La Torre G, et al. The impact of COVID-19 on doctors' well-being: results of a web survey during the lockdown in Italy. *Eur Rev Med Pharmacol.* 2020;24(14):7869-7879. Doi: https://doi.org/10.26355/eurrev_202007_22292
2. Pérez-Chacón M, Chacón A, Borda-Mas M, Avargues-Navarro ML. Sensory Processing Sensitivity and Compassion Satisfaction as Risk/Protective Factors

from Burnout and Compassion Fatigue in Healthcare and Education Professionals. *Int J Env Res Pub Health*. 2021;18(2):611. Doi: https://doi.org/10.3390/ijerph18020611.
3. Nathiya D, Suman S, Singh P, Raj P, Tomar BS. Mental Health outcome and Professional quality of Life among Healthcare Worker during COVID-19 pandemic: A (FRONTLINE-COVID) survey. *Ann Med Psychol (Paris)*. 2021. Doi: 10.1016/j.amp.2020.12.017
4. Buselli R, Corsi M, Baldanzi S, et al. Professional Quality of Life and Mental Health Outcomes among Health Care Workers Exposed to Sars-Cov-2 (COVID-19). *Int J Env Res Pub Health*. 2020;17(17):6180. Doi: https://doi.org/10.3390/ijerph17176180
5. Cabarkapa S, Nadjidai SE, Murgier J, Ng CH. The psychological impact of COVID-19 and other viral epidemics on frontline healthcare workers and ways to address it: A rapid systematic review. *BBI-Health*. 2020;8:100144. Doi: https://doi.org/10.1016/j.bbih.2020.100144
6. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsi E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *BBI-Health*. 2020;88:901-907. Doi: https://doi.org/10.1016/j.bbi.2020.05.026
7. World Health Organization. Mental health and psychosocial considerations during the COVID-19 outbreak. 2020. Available at: https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf
8. Xiang YT, Yang Y, Li W, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiat*. 2020;7(3):228-229. Doi: https://doi.org/10.1016/S2215-0366(20)30046-8
9. Elbay RY, Kurtulmuş A, Arpacıoğlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in Covid-19 pandemics. *Psychiatry Res*. 2020;290:113130. Doi: https://doi.org/10.1016/j.psychres.2020.113130
10. British Medical Association. The mental health and wellbeing of the medical workforce – now and beyond COVID-19. 2020. Available at https://www.bma.org.uk/media/2475/bma-covid-19-and-nhs-staff-mental-healthwellbeing-report-may-2020.pdf
11. Salazar de Pablo G, Vaquerizo-Serrano J, Catalan A, et al. Impact of coronavirus syndromes on physical and mental health of health care workers: Systematic review and meta-analysis. *J Affect Disord*. 2020;275:48-57. Doi: https://doi.org/10.1016/j.jad.2020.06.022
12. Maslach C. Comprendiendo el burnout. *Cienc Trab*. 2009;11:37-43.
13. Figley CR. Compassion fatigue: psychotherapists' chronic lack of self care. *J Clin Psychol*. 2002;58(11):1433-1441. Doi: https://doi.org/10.1002/jclp.10090
14. Cocker F, Joss N. Compassion Fatigue among Healthcare, Emergency and Community Service Workers: A Systematic Review. *Int J Env Res Pub Health*. 2016;13(6):618. Doi: https://doi.org/10.3390/ijerph13060618
15. Brooks SK, Dunn R, Amlôt R, Rubin GJ, Greenberg N. A Systematic, Thematic Review of Social and Occupational Factors Associated with Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak. *J Occup Environ Med*. 2018;60(3):248-257. Doi: https://doi.org/10.1097/JOM.0000000000001235
16. Wallace CL, Wladkowski SP, Gibson A, White P. Grief During the COVID-19 Pandemic: Considerations for Palliative Care Providers. *J Pain Symptom Manag*. 2020;60(1):e70–e76. Doi: https://doi.org/10.1016/j.jpainsymman.2020.04.012
17. Dosil M, Ozamiz-Etxebarria N, Redondo I, Picaza M, Jaureguizar J. Psychological Symptoms in Health Professionals in Spain After the First Wave of the COVID-19 Pandemic. *Front Psychol*. 2020;11:606121. Doi: https://doi.org/10.3389/fpsyg.2020.606121
18. Salimi R, Gomar R, Heshmati B. The COVID-19 outbreak in Iran. *J Global Health*. 2020;10(1):010365. Doi: https://doi.org/10.7189/jogh.10.010365
19. Wu Y, Wang J, Luo C, et al. A Comparison of Burnout Frequency Among Oncology Physicians and Nurses Working on the Frontline and Usual Wards During the COVID-19 Epidemic in Wuhan, China. *J Pain Symptom Manag*. 2020;60(1):e60–e65. Doi: https://doi.org/10.1016/j.jpainsymman.2020.04.008
20. Ruiz-Fernández MD, Pérez-García E, Ortega-Galán ÁM. Quality of Life in Nursing Professionals: Burnout, Fatigue, and Compassion Satisfaction. *Int J Env Res Pub Health*. 2020;17(4):1253. Doi: https://doi.org/10.3390/ijerph17041253
21. Bettinsoli ML, Di Riso D, Napier JL, et al. Mental Health Conditions of Italian Healthcare Professionals during the COVID-19 Disease Outbreak. *Appl Psychol Health Well Being*. 2020;12(4):1054-1073. Doi: https://doi.org/10.1111/aphw.12239
22. Di Mattei VE, Perego G, Milano F, et al. The "Healthcare Workers' Wellbeing (Benessere Operatori)" Project: A Picture of the Mental Health Conditions of Italian Healthcare Workers during the First Wave of the COVID-19 Pandemic. *Int J Env Res Pub Health*. 2021;18(10):5267. Doi: https://doi.org/10.3390/ijerph18105267
23. Farì G, de Sire A, Giorgio V, et al. Impact of COVID-19 on the mental health in a cohort of Italian rehabilitation healthcare workers. *J Med Virol*. 2022;94(1):110-118. Doi: https://doi.org/10.1002/jmv.27272
24. Corradini E, Ventura P, Ageno W, et al. Clinical factors associated with death in 3044 COVID-19 patients managed in internal medicine wards in Italy: results from the SIMICOVID-19 study of the Italian society of internal medicine (SIMI). *Intern Emerg Med*. 2021;16(4):1005-1015. Doi: https:// doi. org/ 10. 1007 / s11739- 021- 02742-8
25. Cicco S, Guerra R, Leaci A, et al. Coronavirus disease 19 (CoViD-19) impact on cardiovascular disease in a

non-CoViD-19 emergency setting. *Intern Emerg Med.* 2021;16(5):1377-1379. Doi: https://doi.org/10. 1007 /s11739-020-02573-z
26. Li W, Frank E, Zhao Z, et al. Mental health of young physicians in china during the novel coronavirus disease 2019 outbreak. *JAMA Netw Open.* 2020;3(6):e2010705. Doi: https://doi.org/10. 1001/jamanetworkopen.2020. 10705
27. Farr S, Berry JA, Berry DK, et al. The impact of the COVID-19 pandemic on resident physicians well-being in the surgical and primary care specialties in the United States and Canada. *Cureus.* 2021;13(11):e19677. Doi: https://doi.org/10.7759/cureus.19677
28. Barac A, Krnjaic P, Vujnovic N, et al. The impact of the COVID-19 pandemic on resident physicians: a cross-sectional study. *Work.* 2021;69(3):751-758. Doi: https://doi. org/10.3233/WOR- 205253
29. Cravero AL, Kim NJ, Feld LD, et al. Impact of exposure to patients with COVID-19 on residents and fellows: an international survey of 1420 trainees. *Postgrad Med J.* 2021;97(1153):706-715. Doi: https://doi. org/10.1136 /postg radme dj-2020-138789
30. Thomas NK. Resident burnout. *JAMA*, 2004;292: 2880-2889.
31. Eckleberry-Hunt J, Lick D, Boura J, et al. An exploratory study of resident burnout and wellness. *Acad. Med.* 2009,84:269-277.
32. Romiti GF, Bencivenga L, Villani R, et al. The impact of COVID-19 pandemic on well-being of Italian physicians: a report from the Italian Society of Internal Medicine (SIMI) national survey. *Intern Emerg Med.* 2023;18:53-65. Advance online publication. Doi: https://doi.org/10.1007/s11739-022-03108-4
33. Zoorob D, Shah S, La Saevig D, et al. Insight into resident burnout, mental wellness, and coping mechanisms early in the COVID-19 pandemic. *PLoS ONE*. 2021;16:e0250104.
34. Mion G, Hamann P, Saleten M, et al. Psychological impact of the COVID-19 pandemic and burnout severity in French residents: A national study. *Eur J Psychiatry*. 2021;35:173-180.
35. Holmes EA, O'Connor RC, Perry VH, et al. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *Lancet Psychiat*. 2020;7(6):547-560. Doi: https://doi .org/10.1016/S2215-0366(20)30168-1
36. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psuchiatry*. 2009;54(5):302-311. Doi: https:// doi.org/10.1177/070674370905400504
37. Stamm B. The Concise ProQOL Manual: The concise manual for the Professional Quality of Life Scale, 2 nd Edition. Pocatello; 2010.
38. Palestini L, Prati G, Pietrantoni L, Cicognani E. The professional quality of life in accident and emergency work: A contribution to the Italian validation of the Professional Quality of Life Scale (ProQOL). *Psicoter Cogn e Comportamentale.* 2009;15:2.
39. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. *Br J Clin Psychol*. 2005;44(Pt2):227-239. Doi: https://doi.org/10.1348/014466505X29657
40. Bottesi G, Ghisi M, Altoè G, Conforti E, Melli G, Sica C. The Italian version of the Depression Anxiety Stress Scales-21: Factor structure and psychometric properties on community and clinical samples. *Compr Psychiatry*. 2015;60:170-181. Doi: https://doi. org/10.1016/j.comppsych.2015.04.005
41. Restauri N, Sheridan AD. Burnout and Posttraumatic Stress Disorder in the Coronavirus Disease 2019 (COVID-19) Pandemic: Intersection, Impact, and Interventions. *J Am Coll Radiol*. 2020;17(7):921-926. Doi: https://doi.org/10.1016/j.jacr.2020.05.021
42. De Kock JH, Latham HA, Leslie SJ, et al. A rapid review of the impact of COVID-19 on the mental health of healthcare workers: implications for supporting psychological well-being. *BMC Public Health*. 2021;21(1):104. Doi: https://doi.org/10.1186/s12889 -020-10070-3
43. Della Monica A, Ferrara P, Dal Mas F, Cobianchi L, Scannapieco F, Ruta F. The impact of Covid-19 healthcare emergency on the psychological well-being of health professionals: a review of literature. *Ann Ig*. 2022;34(1):27-44. Doi: https://doi.org/10.7416 /ai.2021.2445
44. Magnavita N, Tripepi G, Di Prinzio RR. Symptoms in Health Care Workers during the COVID-19 Epidemic. A Cross-Sectional Survey. *Int J Env Res Pub Health*. 2020;17(14):5218. Doi: https://doi.org/10.3390 /ijerph17145218
45. Xu J, Xu QH, Wang CM, Wang J. Psychological status of surgical staff during the COVID-19 outbreak. *Psychiatry Res*. 2020;288:112955. Doi: https://doi.org /10.1016/j.psychres.2020.112955
46. Huang Z, Zhuang D, Xiong B, Deng DX, Li H, Lai W. Occupational exposure to SARS-CoV-2 in burns treatment during the COVID-19 epidemic: Specific diagnosis and treatment protocol. *Biomed Pharmacother*. 2020;127:110176. Doi: https://doi.org/10.1016/j .biopha.2020.110176
47. Cai H, Tu B, Ma J, et al. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID 19) in Hubei, China. *Med Sci Monit*. 2020;26:e924171. Doi: https:// doi.org/10.12659/MSM.924171
48. Bozdağ F, Ergün N. Psychological Resilience of Healthcare Professionals During COVID-19 Pandemic. *Psychol Rep*. 2021,124(6):2567-2586. Doi: https://doi .org/10.1177/0033294120965477

49. Shacham M, Hamama-Raz Y, Kolerman R, Mijiritsky O, Ben-Ezra M, Mijiritsky E. COVID-19 Factors and Psychological Factors Associated with Elevated Psychological Distress among Dentists and Dental Hygienists in Israel. *Int J Env Res Pub Health*. 2020;17(8):2900. Doi: https://doi.org/10.3390/ijerph17082900
50. Pietromonaco PR, Overall NC. Implications of social isolation, separation, and loss during the COVID-19 pandemic for couples' relationships. *Current Opin Psychol*. 2022;43:189-194. Doi: https://doi.org/10.1016/j.copsyc.2021.07.014
51. Lee SJ, Ward KP, Rodriguez CM. Longitudinal Analysis of Short-term Changes in Relationship Conflict During COVID-19: A Risk and Resilience Perspective. *J Interpers Violence*. 2021;37:15-16. Advance online publication. Doi: https://doi.org/10.1177/08862605211006359
52. Sun N, Wei L, Shi S, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control*. 2020;48(6):592-8. Doi: https://doi.org/10.1016/j.ajic.2020.03.018
53. Lai J, Ma S, Wang Y, et al. Factors Associated with Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Netw Open*. 2020;3(3):e203976. Doi: https://doi.org/10.1001/jamanetworkopen.2020.3976
54. Eid RS, Gobinath AR, Galea L. Sex differences in depression: Insights from clinical and preclinical studies. *Prog Neurobiol* .2019;176:86-102. Doi: https://doi.org/10.1016/j.pneurobio.2019.01.006
55. Brera AS, Arrigoni C, Dellafiore F, et al. Burnout syndrome and its determinants among healthcare workers during the first wave of the Covid-19 outbreak in Italy: a cross-sectional study to identify sex-related differences. *Med Lav*. 2021;112(4):306-319. Published 2021 Aug 26. Doi: 10.23749/mdl.v112i4.11316
56. Di Tella M, Romeo A, Benfante A, Castelli L. Mental health of healthcare workers during the COVID-19 pandemic in Italy. *J Eval Clin Pract*. 2020;26(6):1583-1587. Doi: 10.1111/jep.13444
57. Azzolina D, Lorenzoni G, Silvestri L, Prosepe I, Berchialla P, Gregori D. Regional Differences in Mortality Rates During the COVID-19 Epidemic in Italy. *Disaster Med Public Health Prep*. 2022;16(4):1355-1361. Doi: 10.1017/dmp.2020.486
58. Buselli R, Corsi M, Veltri A, et al. Mental health of Health Care Workers (HCWs): a review of organizational interventions put in place by local institutions to cope with new psychosocial challenges resulting from COVID-19. *Psychiatry Res*. 2021;299:113847. Doi: https://doi.org/10.1016/j.psychres.2021.113847
59. Halms T, Strasser M, Kunz M, Hasan A. How to Reduce Mental Health Burden in Health Care Workers During COVID-19? – A Scoping Review of Guideline Recommendations. *Front Psychiatry*. 2022;12,770193. Doi: https://doi.org/10.3389/fpsyt.2021.770193
60. De Vera MIV, Gabari MI. Associated factors with resilience and burnout: A cross-sectional study in a teaching group in Spain. *Aula Abierta*. 2020;49,177-184.
61. Galindo-Domínguez H, Pegalajar M, Uriartec JD. Mediator and moderator effect of resilience between self-efficacy and burnout amongst social and legal sciences faculty members. *Rev Psicodidáctica*. 2020;25:127-135.
62. Soons I, Brouwers A, Tomic W. An experimental study of the psychological impact of a Mindfulness-Based Stress Reduction Program on highly sensitive persons. *Eur J Psycol*. 2010;4:148-169. Doi: 10.5964/ejop.v6i4.228
63. Albott CS, Wozniak JR, McGlinch BP, Wall MH, Gold BS, Vinogradov S. Battle Buddies: Rapid Deployment of a Psychological Resilience Intervention for Health Care Workers During the COVID-19 Pandemic. *Anesth Analg*. 2020;131(1):43-54. Doi: https://doi.org/10.1213/ANE.0000000000004912
64. Giorgi G, Lecca LI, Alessio F, et al. COVID-19-Related Mental Health Effects in the Workplace: A Narrative Review. *Int J Environ Res Public Health*. 2020;17(21):7857. Doi. https://doi.org/10.3390/ijerph17217857
65. Morina N, Weilenmann S, Dawson K, et al. RECHARGE – A Brief Psychological Intervention to Build Resilience in Health Care Workers During the COVID-19 Pandemic: Study Protocol for a Randomized Controlled Trial. 15 March 2021, PREPRINT (Version 1) available at Research Square [https://doi.org/10.21203/rs.3.rs-212942/v1] .