

Narrative Review

The impact of the COVID-19 pandemic on burnout and mental well-being of healthcare workers at Lago di Garda hospitals, Northern Italy

L'impatto dell'emergenza sanitaria da COVID-19 sul burnout e la salute mentale degli operatori sanitari degli ospedali del Lago di Garda nel Nord Italia

**Krzysztof SZADEJKO¹, Carmelo SCARCELLA², Rita Erica FIORAVANZO³,
Livia CADEI⁴, Stefano BONOMETTI⁵, Rossella GOGLIONI^{6*}, Simonetta
BETTINAZZI⁷**

¹Istituto Superiore di Scienze dell'Educazione e della Formazione, "Giuseppe Toniolo", Institute of Educational Sciences IGT "Giuseppe Toniolo", Modena, Italy. E-mail: sciadeico@gmail.com. ORCID: <http://orcid.org/0000-0003-4773-3757>.

²Azienda Socio-Sanitaria Territoriale-ASST del Garda, Desenzano del Garda (BS), Italia. E-mail: carmelo.scarcella@libero.it. ORCID: <http://orcid.org/0000-0001-6859-0260>

³Istituto Europeo di Psicotraumatologia e Stress Management (IEP), European Institute of Psychotraumatology and Stress Management, Milano, Italy. E-mail: rita.fioravanzo@psicotraumatologia.org. ORCID: <http://orcid.org/0000-0002-7452-8858>

⁴Università Cattolica del Sacro Cuore, Brescia, Italia. E-mail: livia.cadei@unicatt.it. ORCID: <http://orcid.org/0000-0001-6335-8788>

⁵Università degli Studi dell'Insubria, Varese, Italia. E-mail: stefano.bonometti@uninsubria.it. ORCID: <https://orcid.org/0000-0003-4393-9002>

⁶ASST del Garda, Desenzano del Garda (BS), Italia. E-mail: rossella.gogliioni@asst-garda.it. ORCID: <https://orcid.org/0000-0002-5355-7545>

⁷ASST del Garda, Desenzano del Garda (BS), Italia. E-mail: simonetta.bettinazzi@asst-garda.it. ORCID: <https://orcid.org/0000-0002-6399-8539>

* Author for the correspondence

Abstract

Introduction: Healthcare professionals (HCPs) suffer from persistent psychophysical fatigue after being exposed to the coronavirus pandemic (Covid-19), which can lead to emotional distress and burnout. This study aimed to assess healthcare professional's psychophysical exhaustion, to explore the factors influencing work-related stress and to identify the protective factors in the workplace.

Methods: 1,191 HCPs (23.1% male, 76.9% female), working in hospitals of ASST Garda (Northern Italy), in the first period of full coronavirus pandemic (Covid-19), were asked to complete the self-administered questionnaire. The mixed method (QN + QL) was employed for collecting and analyzing the data.

Results: A high level of psychophysical fatigue was discovered, especially in the Covid wards. It was found that the two senior work groups with 15-19 and 20-24 years of experience, were particularly vulnerable in terms of psychophysical fatigue and mental health. From the qualitative data analysis, three core categories emerged: work, health and personal factors, which described the specific factors, both in terms of main difficulties and factors that induced the HCP's psychophysical exhaustion during the first period of the health emergency.

Conclusions: Our findings suggest that the Covid-19 pandemic has negatively affected mental health of HCPs caring for Covid-19 infected patients, leading to increased levels of stress and burnout, due to work overload and fear of contamination. There is a need to promote psychological well-being and support for healthcare professionals. Policy and sector managers should promptly organize psychological support services to deal with the problems that emerged from the investigation.

Riassunto

Introduzione: Gli operatori sanitari esposti all'epidemia da coronavirus Covid-19 soffrono di un affaticamento psicofisico persistente, che può portare ad esaurimento emotivo e a burnout. Questo studio mira ad analizzare i livelli di esaurimento psicofisico dei professionisti della salute, ad esplorare i fattori che causano lo stress lavoro correlato e ad identificare i fattori protettivi nei confronti del malessere psicologico sul posto di lavoro.

Metodi: L'indagine è stata effettuata durante l'estate di 2020, in piena pandemia Covid-19. Un gruppo di 1.191 operatori sanitari (23,1% maschi, 76,9% femmine), operanti negli ospedali di ASST Garda (porzione sudorientale della Provincia di Brescia), è stato invitato a compilare il questionario quali-quantitativo. L'analisi dei dati è stata realizzata con il metodo misto (QN + QL).

Risultati: È stato individuato un alto livello di affaticamento psicofisico, soprattutto nei reparti Covid-19. È stato riscontrato che i due gruppi di lavoro con 15-19 e 20-24 anni di esperienza, risultavano particolarmente vulnerabili in termini di fatica psicofisica e salute mentale. Dall'analisi qualitativa dei dati sono emersi tre gruppi di fattori che descrivono le principali difficoltà nei reparti ospedalieri e le cause dell'esaurimento psicofisico degli operatori sanitari durante il primo periodo dell'emergenza da Covid-19: fattore lavoro, fattore salute e fattori personali.

Conclusioni: I risultati rilevano che la pandemia da Covid-19 ha influenzato negativamente la salute mentale degli operatori sanitari in stretto contatto con i pazienti, portando ad elevati livelli di stress e stanchezza psicofisica. Le principali cause sono il sovraccarico di lavoro e la paura della contaminazione. Si segnala un'impellente necessità di sostenere gli operatori sanitari e di promuovere il loro benessere psicologico. La politica e i responsabili del settore dovrebbero organizzare tempestivamente i servizi di supporto psicologico per far fronte alle problematiche emerse dall'indagine.

Parole chiave: Covid-19; sindrome da burnout; operatori sanitari; psicologia della salute sul lavoro; stress lavoro correlato; coping; SARS-CoV-2. **Key words:** Covid-19; burnout syndrome; healthcare professionals; occupational health psychology; work-related stress; coping; SARS-CoV-2.

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INTRODUCTION

In December 2019, a novel coronavirus disease (COVID-19) emerged from Hubei province in China and quickly spread throughout the world. In response to the growing health emergency, the World Health Organization raised the global risk to the highest level of alert [1]. In contrast to the symptoms of this diseases, when manifested were clear to medical staff, less evident were the mental health affects this crisis could have provoked in the general population and more specifically among medical staff. Nevertheless, despite the fact that this pandemic may be the first of its kind in modern-day in terms of its reach and impact, previous studies during the SARS and MERS outbreaks did report high levels of stress that resulted in post-traumatic stress disorder in frontline medical staff [2], therefore confirming the psychological impact epidemics can induce. Indeed, due to the overwhelming demand placed on medical staff as a result of the developing pandemic, psychological wellbeing has become a focus for many researchers. In fact, studies on COVID-19 have argued that some nurses encounter intense psychological stress or trauma (e.g. insomnia, fear, anxiety) during an emergency response due to the environment, shortages of staff and personal protective equipment (PPE), heavy workloads and lack of knowledge and skills relevant to infection control [1] have all contributed to such mental distress.

As one study showed [3] in assessing the mental health status of Chinese people, the majority of whom were from Hubei province, certain age groups (21-40) are at greater risk of experiencing mental distress. This study revealed higher rates of anxiety, depression, hazardous and harmful alcohol use and lower mental wellbeing than the usual ratio. While it has been shown that certain age groups are at greater risk, it has duly been found that certain professions also face an increased vulnerability in terms of mental health [4]. In fact, in one study, also conducted in the Chinese province of Hubei, professions vulnerable to mental health illness were identified. The study, which focused on doctors, nurses, medical staff, students, teachers/government, economy staff, workers/farmers and 'other' workers, found that not only a considerable part of the Chinese population showed increased levels of depression and anxiety, but students and other medical staff were the most affected. As a result, the study suggested that doctors and nurses need support regarding potential anxiety disorders [4].

Furthermore, in investigating the psychological impact and coping strategies of frontline medical staff in Hunan province, adjacent to Hubei province, during the COVID-19 outbreak between January and March 2020 [2] an increased level of stress was noted. Responses to this study by medical professionals showed that a variety of aspects influenced one's stress levels, with the main factors resulting in concerns for personal safety, participants' families and patient mortality. The study also found that the safety of the participants' colleagues and lack of treatment for COVID-19 were important factors in inducing stress in all medical staff [2].

More specifically in terms of medical staff and coping strategies, one study offered nurses experiencing psychological stress (e.g. insomnia, anxiety and fear) [1] one-to-one psychological support. These psychological counselling sessions, organized by the researchers, were able to successfully provide targeted mental support to nurses. As a result, these nurses found greater motivation and became more confident when their needs were addressed [1]. Thus, underlining the need for assistance and support to medical staff during such arduous times.

Yet, despite the conspicuous significant psychological impact to be expected in the country of origin of the Covid-19 pandemic, such impacts have also been noted elsewhere in the world, as documented in a variety of studies. Data from a Canadian public opinion poll conducted in early February 2020 indicated that one-third of respondents were worried about the virus and 7% were “very concerned” about becoming infected. The fear of 2019-nCoV was likely due to its novelty and the uncertainties about how severe the outbreak might become. In addition, a lack of faith in the healthcare system was also found to be a likely source in fueling fears regarding the illness [5].

And not only in Canada were the psychological effects of the pandemic noted earlier on in its insurgence, but one study [6] was able to pinpoint the significant psychological distress experienced by the whole population in different European countries. In fact, participants from France and the United Kingdom reported experiencing severe/extremely severe depression, anxiety, and stress more often compared to those from the other countries. Once again, the looming fear of uncertainty surrounding the epidemic proved to be a source of stress for health care professionals.

This position of vulnerability in which medical staff find themselves in, in the midst of a pandemic, were even further documented with a study which focused on doctors and nurse, finding that a history of depression or anxiety was a risk factor for anxiety symptoms in doctors and nurses. Nevertheless, the study was able to indicate that positive coping strategies were negatively correlated with the total score of anxiety and depression [7]. Thus, frontline medical staff in the pandemic are undoubtedly exposed to more risk of anxiety and depression symptoms, yet through positive coping skills, they were able to improve their negative emotions [7].

As we have seen up to now, a number of studies have been able to map out a clear picture of the psychological stress induced by the pandemic and the professions most affected by it, and in adding to this stress, we should also underline the phenomenon of burnout in the medical field. In one Chinese national cross-sectional study, the severity of burnout and its associated factors among doctors and nurses in ICUs in mainland China were investigated. The study revealed that out of a total of 1122 participants, 800 doctors (71.3% of all doctors) and 881 nurses (68.3% of all nurses) were deemed to be burned out. Furthermore, the researchers found that those working in the general ICU were most likely to experience burnout. The factors associated with burnout, according to this study, included low frequency of exercise, comorbidities, working in a high-quality hospital, more years of work experience, more night shifts and fewer paid vacation days [8]. We could surmise by this data that not only are medical staff at risk for mental illness, but we could even say certain wards within hospitals are at greater risk due to the inherent stress of that particular ward.

Another study, which focused on the characteristics associated with burnout, investigated Chinese neurologists, and psychological morbidity to be common in Chinese neurologists. In addition to the findings reported above regarding burnout, this study found other factors independently associated with burnout to be lower income, more work hours per week, more nights on call per month, working in public hospitals, psychological morbidity, high levels of job stress, low levels of job satisfaction, and poor doctor-patient relationships [9]. Once again, underscoring the vulnerability of medical professionals.

Consequently, as we can see from these two previously mentioned studies, psychological distress and its resulting symptoms, as well as feelings of burnout, have clearly left medical staff during the pandemic in a precarious mental state. As has been unequivocally documented, COVID-19 poses a major challenge to the mental health of working professionals. And due to such evidence, many

studies on the matter have concluded by suggesting sufficient help be offered to all occupational groups with an emphasis on effective coping strategies [6] along with addressing the mental health crisis during this epidemic by implementing a multi-faceted approach [3].

The COVID-19 health emergency and its persistence over time have led healthcare professionals to experience severe stress linked to continuous organizational changes and the necessity to cover stressful shifts. The fear and concern of contagion, for themselves and their families, have forced HCPs into true self-isolation; the increased workload has also reduced face-to-face time with colleagues and the relationship with patients has changed radically. The manifestations of emotional distress and post-traumatic stress disorder are many and frequent. It is on this precondition that the management of ASST del Garda has decided to investigate the impact of the health emergency on psychological variables in order to analyze the psychophysical well-being of HCPs.

METHODS

Study Design

This was a mixed method (QN + QL) study design conducted to identify the factors influencing psychophysical fatigue in HCPs during the first outbreak of COVID-19 in ASST Garda in Italy. The specific objectives of the research were to analyze the levels of burnout, psychological well-being, resilience and mindfulness among HCPs and to identify the protective factors (first study). In addition, its aim was to explore factors that affected HCPs psychophysical exhaustion (second study). The research was carried out as a research-intervention with the aim of setting up training and support for healthcare professionals.

Study setting and sample

During the outbreak of COVID-19, hospitals of ASST Garda were designated for treating infected patients in the southern area of Lake Garda, located in Northern Italy. The participants were drawn from HCPs working in hospitals located in the towns of Desenzano, Lonato, Gavardo, Salò, Manerbio, Leno, South Brescia, the Central and Eastern territorial network, Garda and Vallesabbia. This study used convenience sampling which gave their consent to the survey. Data collection was carried out anonymously using an online questionnaire sent out by the management of the ASST Garda via mailing-list. The research involved 1,191 HCPs, 42% of all the staff of ASST Garda, of which 23.1% male and 76.9% female.

Study instruments

Burnout measures

Burnout was measured with the Link Burnout Questionnaire (LBQ) [10]. The LBQ consists of 24 items which analyze 4 indicators for the detection of Burnout syndrome: psychophysical exhaustion (PE), deterioration of the relationship (DR), professional inefficiency (PI), disillusion (DI). Each item was answered on a 6-point scale, ranging from 1 (never) to 6 (every day), with a high score meaning a high level of burnout. Cronbach's alpha of the scales were sequentially: $\alpha=.84$ for PE, $\alpha=.69$ for DR, $\alpha=.72$ for PI and $\alpha=.87$ for DI, indicating adequate internal consistency.

Psychological well-being measures

Psychological well-being (PWB) was measured with the General Health Questionnaire (GHQ-12) [11–16]. The 12-item version of the GHQ-12, as one factor, assesses a 'level' of mental well-being over the past few weeks using a 4-point scale (from 0 to 3). The score is used to generate a total score ranging from 0 to 36. A higher score indicates lower psychological well-being, whereas scores ≥ 14 were used as a cut-off in identifying non-psychotic mental disorders (psychological malaise) at

individual and group levels. Cronbach's alpha of the scale was .86, indicating adequate internal consistency.

Relationship between work and private life

The relationship between work and private life was measured with the Work-Family Conflict Scale (W-FCS) [17-18]. The W-FCS questionnaire is a self-report instrument that consists in 10 items on a Likert-type scale ranging from 1 (completely disagree) to 5 (completely agree). The W-FCS measures work-family conflict by considering both directions: work interference with family (W-F) and family interference with work (F-W) [19-21]. The internal consistency of the two subscales was high: $\alpha=.91$ for W-F and $\alpha=.85$ for F-W.

Resilience

Resilience was measured with the Connor-Davidson Resilience Scale (CD-RISC) [22, 23]. The CD-RISC consists of 10 items which evaluate the personal qualities that enable one to adapt the body, mind and spirit in facing adversity [24, 25]. All items carry a 5-point range of responses from 1 (not true at all) to 5 (totally true). The total score ranges from 10-50, with higher scores reflecting greater resilience. Cronbach's alpha of the scale was .87, indicating adequate internal consistency.

Work engagement

Work engagement was measured with the Utrecht Work Engagement Scale (UWES), an instrument designed by Schaufeli and Bakker [26, 27], which investigates the experience work related engagement) by means of three scales: vigor (VI), Dedication (DE), and absorption (AB). The UWES consists of 17 items. Responses to items are given on a 6-point frequency scale varying from 0 (never) to 6 (always). In our study we obtained the following internal consistency values for the three subscales: $\alpha=.87$ for VI, $\alpha=.94$ for DE and $\alpha=.73$ for AB, indicating adequate reliability.

Mindfulness

Mindfulness was measured with the Mindfulness Awareness Attention Scale (MAAS) designed by Brown and Ryan [28, 29]. For the purposes of our research, the questionnaire was administered in its short form of 7 items. A 5-point range of responses were adopted from 1 (almost always) to 5 (hardly ever). The total score ranges from 7-35, with higher scores reflecting greater mindfulness. Cronbach's alpha of the scale was .83, indicating adequate internal consistency.

Coping strategies

Coping strategies were measured with the Coping Orientation to Problems Experienced (COPE) [30, 31]. The questionnaire consists of 60 items distributed over 5 factors: (1) social-focused coping (Cope-SF) (12 items), defined by searching for social support and emotional release; (2) avoidance coping (Cope-AV) (16 items) defined by denial, drug use, behavioral and mental detachment; (3) problem-focused coping [Cope-PF] (12 item), defined by active approach and planning; (4) positive attitude (Cope-PA) (12 items), defined by acceptance, positive reinterpretation and containment; (5) transcendent orientation coping (Cope-TO) (8 items), defined by activities related to religion [31]. Subjects were asked to respond on the 4-point Likert scale from 1 (usually I don't do it) to 4 (I almost always do it) The internal consistency for the five constructs were as follows: $\alpha=.90$ for Cope-SF, $\alpha=.78$ for Cope-AV, $\alpha=.81$ for Cope-PF, $\alpha=.85$ for Cope-PA and $\alpha=.82$ for Cope-TO, indicating adequate reliability.

Qualitative open questions

To complete the survey, two open questions were added: (1) What was your biggest difficulty during the period of the health emergency? (2) What tired you the most during the period of the health emergency? These two items are part of the second study, which dealt with the qualitative approach.

Data collection

Data were collected during from August 25, 2020 to September 30, 2020, about 2 months after the first peak of the Covid emergency in Italy. The researchers sent the online questionnaire to all ASST Garda healthcare personnel via mailing list. In the introduction to the questionnaire, the purpose of the study was explained. Before answering the questionnaire, everyone was informed about the purpose and confidentiality obligations deriving from the General Data Protection Regulation for EU Member States ('GDPR' Regulation (EU) 2016/679). All participants declared informed consent. The whole process of the survey was conducted anonymously, and all socio-demographic information has been kept confidential.

Data analysis

The data analysis was carried out with both a quantitative and qualitative approach. In the first study, the statistical data were analyzed using Gnu PSPP for Windows. The participants' general characteristics were analyzed with frequencies, percentages, means, and standard deviations. Each scale reliability was assessed with Cronbach Alpha and the normal distribution of all variables was examined. Correlation was computed using Pearson's correlation test. Differences in analyzed variables, according to general characteristics, were scrutinized using independent ANOVA and LSD post hoc tests. Finally, to analyze structural relationships between measured variables and latent constructs, the Structural Equation Modeling (SEM) was carried out.

In the second study, a qualitative approach was assumed, related to the Grounded theory (GT) [32-33] or more correctly to the Grounded theory methodology (GTM) [34]. The GTM is an interpretative approach to qualitative research, which has recently been experiencing a phase of renewed interest [35]. The decision to apply this methodology was reached due to the fact that the answers to the open questions required a qualitative approach. In fact, the GTM favors the analysis process by extracting the results (theories), starting from the qualitative data, rather than from the predefined constructs, thus putting in order a large amount of information, categorizing recurring concepts (factors) and identifying the relationships between them. The answers to the open questions were analyzed with MAXQDA software for qualitative data analysis [36], according to the CAQDA (Computer Assisted Qualitative Data Analysis) approach [37]. The decision to use this software in the qualitative data processing was taken based on the need to make the researchers' work more objective, as MAXQDA allows for the systematic and rigorous management of data.

Finally, lexical analysis was performed. All the text with the answers to the open questions were scanned to find keywords (the main terms of the reasoning). After the elimination of the stop-words from the text, that is words that did not convey useful or specific information, the whole text was subjected to the analysis of occurrences (i.e. the number of times a word appeared within the text). The final result was a series of so-called "word clouds", a visual representation of keywords. The purpose of this type of analysis was to examine the language used by HCPs in reference to the topics requested in the open questions.

RESULTS

The first study

Differences among characteristics and seniority in workplace of HCPs

The groups of Healthcare Professionals, according to their characteristics and their seniority in the workplace are presented in Tables 1 and 2. Compared to the other groups, the Covid Intensive Care group and Covid Service O.U. (Operational Unit) had a higher level of deterioration in the relationship (DR), mental problems (PWB) and work-family conflicts (W-FCS) areas. The comparisons of the PWB parameters revealed that technical support services and remote working groups had significantly lower values than the other groups. There were no differences between the groups of service in terms of psychophysical exhaustion (PE), professional inefficiency (PI), disillusion (DI), resilience, vigor, mindfulness, avoidance coping (Cope-AV), coping focalized on the problem (Cope-PF), or positive attitude (Cope-PA).

Table 1. HCP group service characteristics. Means of ANOVA one-way ($n=1,191$).

Variables	Group of service								p-value ($p < .05$)
	Covid Intensive Care (N=96)	Covid Service O.U. (N=513)	Covid free Service O.U. (N=316)	Filter zone (N=91)	Technical support services (N=56)	Administrative support services (N=102)	Smart working (N=10)	F-value	
Burnout-PE	20.4	19.7	18.8	18.3	19.1	19.7	19.5	1.403	.210
Burnout-DR	17.0	16.6	15.0	10.5	16.0	16.5	15.1	3.672	.001
Burnout-PI	13.2	13.1	10.6	12.9	12.4	13.2	12.8	,661	.681
Burnout-DI	16.1	15.8	15.4	14.4	17.4	16.7	17.7	1.691	.120
PWB	16.0	15.3	14.8	15.1	12.9	13.6	12.9	2.912	.008
W-F Conflict	16.6	15.9	14.7	14.9	15.1	15.0	13.2	2.868	.009
F-W Conflict	8.6	9.0	9.0	9.0	10.8	9.2	9.6	2.151	.045
Resilience	37.7	37.9	37.7	37.6	38.1	38.2	38.8	,207	.975
Vigor	28.3	29.8	30.5	30.3	30.5	30.8	29.3	1.668	.125
Dedication	23.8	25.1	25.3	26.7	23.0	23.8	24.3	2.646	.015
Absorption	25.3	26.7	27.4	27.0	26.7	28.7	26.8	2.578	.017
Mindfulness	26.8	26.9	27.8	27.9	26.9	27.4	26.8	1.642	.132
Cope-SF	41.5	39.8	40.9	41.5	35.2	36.8	39.4	3.564	.002
Cope-AV	29.3	29.6	28.9	28.9	26.8	27.0	29.4	2.435	.024
Cope-PF	44.4	44.7	45.8	44.9	43.6	45.0	43.8	,721	.633
Cope-PA	47.1	46.8	47.6	47.5	45.0	45.3	43.2	1.355	.230
Cope-TO	19.3	19.7	19.4	18.9	18.8	19.4	15.6	,573	.752

The comparison among years of seniority in employment (Table 2) revealed that the two groups 15-19 and 20-24 years are particularly vulnerable. Indeed, they reached significantly higher mean levels in the psychophysical exhaustion (PE) and severity of a psychological malaise (PWB) variables. Additionally, their levels of vigor and dedication, the two subscales of work engagement, are significantly lower than other HCP groups. Please note that the two senior groups with 0-4 and 5-9

year experience reached the highest levels in the social-focused coping (Cope-SF), problem-focused [Cope-PF] and positive attitude (Cope-PA), compared to other groups.

Table 2. HCP’s years of seniority. Means of ANOVA one-way (n=1,191).

Variables	Years of seniority								F-value	P-value (p<.05)
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-40		
	Years (N = 176)	Years (N = 94)	Years (N = 154)	Years (N = 83)	Years (N = 183)	Years (N = 187)	Years (N = 185)	Years (N = 122)		
Burnout-PE	16.6	19.9	19.7	21.0	20.5	19.2	19.7	19.5	6.435	,000
Burnout-DR	15.3	17.2	16.1	16.5	16.3	15.8	16.6	15.3	1.954	,058
Burnout-PI	12.6	14.0	13.5	13.0	13.2	12.2	12.7	12.7	2.034	,048
Burnout-DI	12.3	16.5	16.5	17.4	16.9	16.7	16.0	15.2	8.599	,000
PWB	13.5	14.8	15.3	16.0	16.3	15.1	14.9	13.7	3.780	,000
W-F Conflict	14.2	16.6	16.6	16.9	15.6	15.4	14.8	14.7	4.556	,000
F-W Conflict	8.9	8.7	9.5	9.8	9.7	8.7	8.8	8.6	1.866	,072
Resilience	38.2	38.4	37.7	37.5	36.9	38.2	37.2	38.9	1.919	,063
Vigor	31.6	29.9	30.1	28.2	29.1	29.6	29.9	31.2	3.283	,002
Dedication	28.2	24.5	25.2	22.7	23.9	24.1	24.4	25.6	8.266	,000
Absorption	28.6	27.1	27.0	25.3	26.0	26.1	27.1	28.5	4.445	,000
Mindfulness	27.5	26.3	27.3	26.8	26.7	27.8	27.3	28.0	1.717	,101
Cope-SS	42.7	42.6	41.7	38.0	38.6	38.9	39.0	37.4	4.410	,000
Cope-AV	29.8	30.3	28.8	27.7	29.8	28.6	28.3	28.3	1.649	,118
Cope-FP	46.6	46.0	44.5	43.5	43.8	44.5	45.4	44.9	1.584	,136
Cope-PA	48.8	48.2	46.5	45.3	45.7	46.5	46.4	47.4	2.119	,039
Cope-TO	18.9	19.9	20.2	18.6	20.2	19.3	19.1	18.9	,816	,574

Correlational analysis

The correlation matrix (Table 3) shows how psychophysical exhaustion (PE) correlates significantly to all the LBQ subscales: psychological malaise (PWB), conflict W-F / F-W and avoidance strategies (Cope AV). To the contrary, it correlates negatively to resilience, vigor, dedication, absorption, mindfulness, focus problem strategies (Cope-FP), and positive attitude (Cope PA). It is also worth noting that mindfulness, which is on a discrete level (see Tables 1 and 2), despite a very difficult situation due to COVID, is negatively correlated to all variables except resilience, vigor, dedication, absorption, cope-FP, and cope-PA. Analogically to mindfulness, the same trend occurred with regard to resilience.

Table 3. Correlational matrix (n =1,191).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Burnout-PE	(.84)	,54**	,50**	,71**	,53**	,45**	,13**	-,38**	-,66**	-,67**	-,49**	-,43**	ns	,25**	-,20**	-,19**	ns
2. Burnout-DR		(.69)	,43**	,52**	,32**	,29**	,11**	-,27**	-,46**	-,51**	-,41**	-,33**	-,09**	,24**	-,20**	-,19**	ns
3. Burnout-PI			(.72)	,51**	,43**	,27**	,24**	-,39**	-,49**	-,47**	-,29**	-,47**	ns	,36**	-,17**	-,17**	,07*
4. Burnout-DI				(.87)	,43**	,37**	,17**	-,36**	-,65**	-,82**	-,57**	-,41**	-,07*	,27**	-,22**	-,20**	ns
5. PWB					(.86)	,35**	,17**	-,49**	-,49**	-,40**	-,30**	-,41**	,12**	,29**	-,13**	-,10**	ns
6. W-F Conflict						(.91)	,34**	-,19**	-,33**	-,32**	-,19**	-,26**	,11**	,18**	ns	ns	,11*
7. F-W Conflict							(.85)	-,21**	-,20**	-,15**	-,08**	-,22*	ns	,26**	-,12**	-,15**	,10**
8. Resilience								(.87)	,59**	,43**	,37**	,40**	ns	-,32**	,37**	,35**	ns
9. Vigor									(.87)	,78**	,73**	,45**	ns	-,31**	,30**	,33**	ns
10. Dedication										(.94)	,72**	,41**	,13**	-,22**	,29**	,29**	ns
11. Absorption											(.73)	,23**	,14**	-,13**	,24**	,28**	,09**
12. Mindfulness												(.83)	ns	-,41**	,18**	,16**	-,12**
13. Cope-SS													(.90)	,19**	,41**	,43**	,30**
14. Cope-AV														(.78)	ns	ns	,30**
15. Cope-FP															(.81)	,71**	,28**
16. Cope-PA																(.85)	,27**
17. Cope-TO																	(.82)

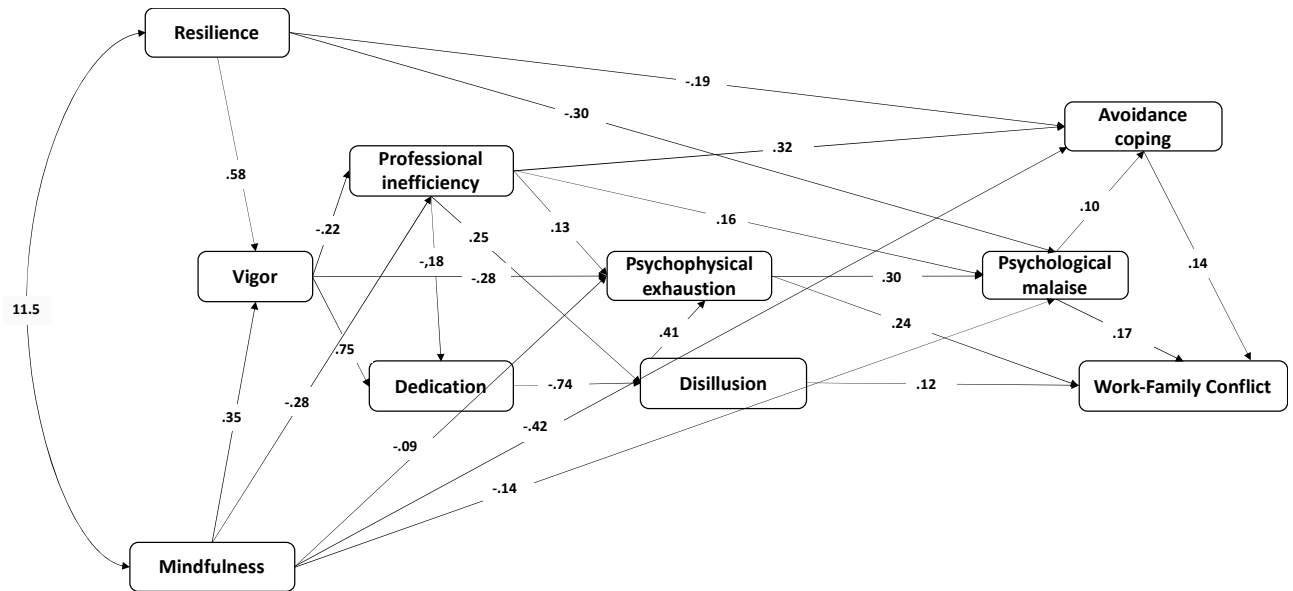
Notes: **p < .01 (2-tailed); * p < .05 (2-tailed); ns = the correlation is not significant. Cronbach’s alpha is reported in the diagonal between parentheses

Path Analysis

In order to provide information on the causal processes and to estimate the direction and intensity of the links between measured variables, the Structural Equation Modeling was carried out. The models were tested using the maximum likelihood criterion. A multi-equation approach was chosen as it is more suitable for providing a representation of real processes, even if there are simplified. Each of these equations expresses the causal link between the exogenous variables (resilience and mindfulness, *covariance* = 11.5) and the endogenous variables (vigor, professional inefficacy, dedication, disillusion, psychophysical exhaustion, psychological malaise, avoidance strategies and work-family conflict).

The model reported the following values: Chi-square = 76,7 (df = 21, p = .000); Good Fit Index (GFI) = .987; Normed Fit Index (NFI) = .987; Comparative Fit Index (CFI) = .991; Root Mean Square Error of Approximation (RMSEA) = .047. The values GFI, NFI, and CFI indicate an acceptable model when they approach 1 [38, 39]. The RMSEA coefficient is one of the most sensitive of model stability. It is generally assumed that an RMSEA value of approximately .05 or less indicates a good stability of the model in relation to the degrees of freedom [40–42]. Statisticians claim that a value of about .08 results in a reasonable approximation error, but also suggest not to assume a model with the RMSEA value greater than .10 [41]. In our model, the RMSEA coefficient is below .05 and values of the model fit coefficients are very high, therefore it can be assumed that it has reached its capability to effectively express theoretical concepts with good stability.

Figure 1. Path analysis. Structural Equation Model (SEM). Each vector indicates the direction of the influence of one variable on another and its standardized coefficient B describes the weight of this bond



The second study

As mentioned above, for analyzing two open questions, the MAXQDA software was used [43]. The qualitative database reported: 1,071 answers out of 1191 (90%) for the 1st question; 1,047 answers out of 1,191 (88%) for the 2nd question; 50-page transcript (Times New Roman, 12p, line spacing 1); 16,942 words 125 MAXQDA codes 6,662 coded segments (in which: 2,721 segments encoded in the 1st document and 3941 segments encoded in the 2nd document). Three types of coding were performed during the analysis: open coding, axial coding and selective coding. The text was coded by two coders. To establish the intercoder concordance, the Cohen's Kappa coefficient (K) was calculated, which represents the degree of accuracy and reliability of the analysis. The coefficient K reported the value K = .91, which indicates a high level of agreement between the two coders [44, 45].

Difficulties and factors that induce HCPs' psychophysical exhaustion

In the last phase of the analysis, two conceptual Maxmaps were created (Figure 2 and Figure 3). Both maps, created according to the Code Co-occurrence Model (code intersection), were integrated and systematically organized with reference to the conceptual axes that emerged empirically from the analyzed text. In the creation of the Maxmaps, the following criteria were adopted: 3 levels of codes, 25 minimum number of co-occurrences, code frequency ≥10. Line width reflects co-occurrence frequency, i.e. connecting lines between codes with many relationships appear thicker than between codes that are less common. The frequencies of each factor (code) are shown in brackets.

From the content analysis, three core categories emerged: work, health and personal factors. Each category reported the specific factors both in terms of main difficulties and factors that induced HCP's psychophysical exhaustion during the health emergency.

What was the greatest difficulty among healthcare professionals during the period of the health emergency?

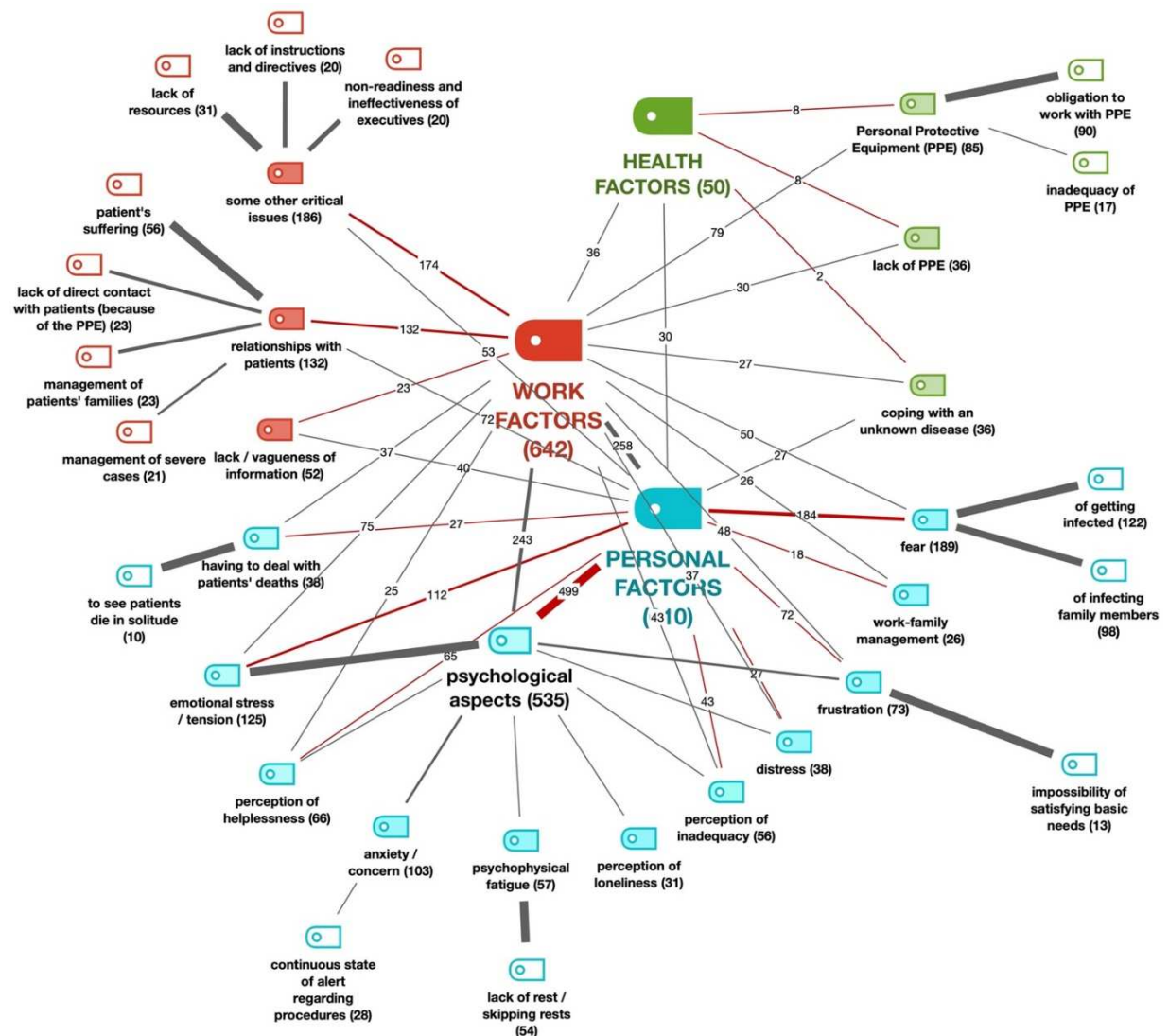
Healthcare professional's greatest difficulties among the main work factors were: the lack of well-defined information, instructions and directives, lack of resources, unpreparedness and

ineffectiveness of executives, dealing with the suffering of patients, lack of direct contact with patients because of the PPE, management of severe patients' cases and their families.

Difficulties of HCP in the health category included factors such as: obligation to work with PPE, initial lack of PPE and coping with an unknown disease.

Personal factors, related to HCP's difficulties, predominantly were linked to psychological aspects like: emotional stress and tension, fear of getting infected and infecting family members, frustration connected to the impossibility of satisfying basic needs during one's shift, anxiety and continuous state of alert regarding procedures, psychophysical fatigue as a result of the lack of rest, having to deal with patients' deaths in solitude, and a perception of helplessness, inadequacy and loneliness.

Figure 2. Maxmap: Code Co-occurrence Model. Main difficulties encountered during the Covid emergency, reported by Healthcare Professionals ($n=1071$).



A few quotes concerning the major difficulties:

- "To manage and implement the regional and company directives which change very often".
- "Initial difficulty in finding PPE".
- "Very busy shifts, a very high workload".

- "Psychological pressure relative to uncertainty".
- "Not being able to visit all patients with the same frequency as previously".
- "To assist patients in the last moments of their life".
- "Lack of complete knowledge about the treatment of the Coronavirus disease".
- "Seeing that our efforts were insufficient to save people, hence the sense of helplessness".
- "The fear of infecting family members, especially health frail relatives".
- "Continuous psychological tension and difficulty in seeing the situation improve".

What are factors that induce HCP's psychophysical exhaustion?

The second open question concerned the psychophysical exhaustion of healthcare workers. Similar to the previous question, the three following core categories also emerged: work, health and personal factors.

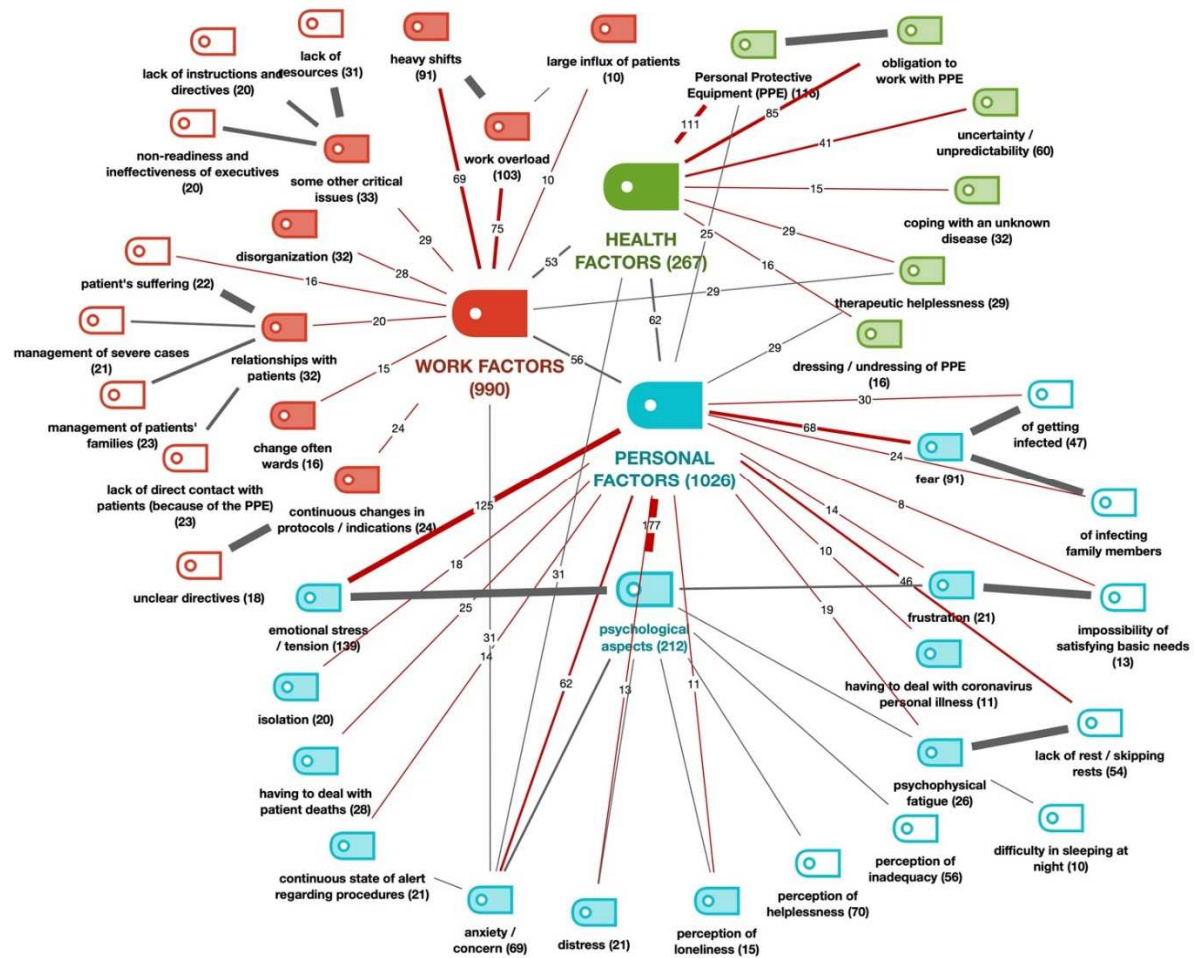
As declared by HCPs, the factors that had the greatest impact on psychophysical exhaustion among work factors were: work overload with heavy shifts and a large influx of patients, lack of resources, lack of directives, lack of readiness and ineffectiveness of executives, disorganization, relationships with patients and their families, management of severe cases, lack of direct contact with patients because of the PPE, continuous changes of protocols and wards.

Among health factors declared, the following were revealed: issues related to PPE (obligation to work with PPE and dressing/undressing PPE), uncertainty and unpredictability, coping with an unknown disease, and medical helplessness.

Personal factors were mainly related to psychological aspects such as: emotional stress and distress, fear of getting infected or infecting family members, anxiety and experiencing a continuous state of alert regarding procedures, perception of helplessness and inadequacy, having to deal with patients' deaths, psychophysical fatigue due to a lack of rest, frustration as a result of the impossibility to satisfy basic needs during one's shift. Other factors were: perception of loneliness, personal coronavirus illness and difficulty in sleeping at night.

Two of those factors proved to be co-occurring with all three core categories: anxiety (continuous state of alert regarding procedures) and medical helplessness. We can consider those factors as particularly relevant with regard to the psychophysical exhaustion faced by healthcare professionals.

Figure 3. Maxmap: Code Co-occurrence Model. Factors that induce HCP's psychophysical exhaustion ($n = 1047$).



A few quotes concerning factors that induced psychophysical exhaustion:

- "Vague organizational strategies."
- "Shifts without rest and the psychological stress from fear of contagion."
- "Working all shift long wearing PPE."
- "Continuous transfers of the ward from one floor to another and working with colleagues with whom I had never worked, and in ways different from mine in dealing with the emergency."
- "To see so many people die and to know that nothing can be done."
- "Anxiety in regards to carrying out all the procedures properly."
- "Seeing the immense suffering and feeling helpless in the face of it."
- "Fear of getting infected myself and my family."
- "Management of emotional stress and unpredictability of events."
- "Working with PPE without being able to drink, eat, or go to the bathroom for a long time."

Analysis of the lexicon of HCPs in relation to difficulties at work and factors that induce psychophysical exhaustion. The last part of the second study concerned a brief lexical analysis of the two topics covered in the open questions. Figures 4 and 5 present word clouds, which contain the

main concepts describing the major difficulties and fatigue factors expressed by HCPs. The word clouds show 10 of the most frequent words identified in the text with all the answers. The peculiarity of word clouds is that the larger word size corresponds to the higher frequency of the keyword in the text. In the context of this analysis, we can consider each keyword as an expression of a deep personal experience at the workplace.

The word cloud, created with WORDLE, reported the following 10 words: fear, work, management, lack, / to face, patients, PPE, family, see and home. The most frequent term among these words describing the major difficulties encountered during the COVID emergency was "fear". Fear in the human psyche has ancient roots. It is a primary emotion, a reaction to a specific danger. A person feels fear in the face of an identifiable threat, for a specific object that triggers it. Fear activates fight or flight responses and is therefore an effective defense mechanism for our safety. While on the other hand, we do not know where the danger comes from, we do not see it (but we know that it looms everywhere) and it cannot be identified as a specific object, a state of perennial trepidation and pervasive discomfort can be generated which can lead to anxiety. So, it seems that the fear of the coronavirus, the uncertainty of how to tackle this unknown disease, the fear of being infected and infecting family members and intense shifts managing patients in wards covered in PPE, have created the greatest difficulties.

Figure 4. What was your greatest difficulty during the period of the health emergency? Word cloud with 10 most frequent conceptual words.



The word cloud on the topic of fatigue reported the following 10 words: work, fear, stress, shift, PPE, uncertainty, lack, workload, anxiety and patients. The language used to describe the elements of fatigue revolves around the word "work". The disease, which HCPs were called to deal with, affected the working procedures and methods. The HCPs faced their work despite their own personal fear of being infected or infecting their families as well as any discomfort caused by the PPE, in addition to carrying out exhausting shifts. Adding to this, there is also the stress during shifts, the obligation to work with PPE, the workload of numerous dying patients, moral suffering, anxiety, uncertainty and frustration of not being able to do more, thus painting a clear picture of the heavy strain healthcare workers are put under due to physical and emotional pressure.

Figure 5. What tired you the most during the period of the health emergency? Word cloud with 10 most frequent conceptual words.



DISCUSSION

This research aimed to investigate the impact of the COVID-19 health emergency and its persistence over time on healthcare workers. The data analysis was faced with a dual quantitative and qualitative approach, to which a lexical analysis was added. By observing our data with Anova analysis, it emerged that the staff working in the Covid Operating Units, specifically in Intensive Care, presented higher levels of burnout, and in particular, psychophysical exhaustion as well as a deterioration of relationships. Comparing the age groups of HCPs, the highest level of exhaustion was found in the age groups between 15-19 years and 20-24 years on the job. Given their age, approximately 35-45 years old, it could be hypothesized that in addition to dealing with the Covid emergency, participants of the study may have also had specific family conditions, such as having to take care of young children or elderly parents. This could have had an impact on their stress levels and workload. At the same time, high levels of resilience and work engagement were found among those with 0-4 and 35-40 years of experience. It seems that the 'greenness' of the first years of work and in contrast, the fortitude of a longer experience, provided support in dealing with the emergency.

Of particular attention are the data relating to administrative and technical support services, which show significant levels of burnout, higher than the O.U. Covid Free care staff. The problems of patient acceptance and management seem to have impacted the technical-administrative staff significantly with regard to psychophysical exhaustion (PE) and disillusionment (DI).

As shown by the Structural Equation Modeling, the reduction of mindfulness affects the increase in the perception of professional ineffectiveness, psychophysical exhaustion, psychological malaise and the increase in avoidance strategies. The reduction of resilience decreases vigor and at the same time increases psychological malaise and avoidance strategies. Furthermore, the lowering of vigor decreases dedication, and increases the perception of ineffectiveness and psychophysical fatigue. Psychophysical exhaustion and psychological distress are the direct predictors of family-work conflicts. Therefore, promoting mindfulness, resilience and vigor among HCPs means carrying out a preventive action of great importance against disillusionment, psychophysical exhaustion and psychological malaise.

The qualitative study, based on the two open questions, made it possible to identify three areas, which include the stressors, those that have had a significant impact on difficulties and fatigue of HCPs: Work, Health and Personal factors.

Main difficulties encountered during the period of the Covid emergency, with respect to work, concerns the lack of resources and clear directives from management. Intense and long shifts, marked by the frustration of not being able to satisfy basic needs as well as the frequent change of departments, weighed heavily among HCPs. The relationship with patients, the inability to have direct contact with them due to the PPE, their suffering, seeing them dying and the laborious managing of relationships with patient's family members, were perceived as very difficult psychologically.

Among the health factors revealed, HCPs declared fatigue and a lack of personal safety in terms of having to face an unknown and dangerous disease and the obligation to work with PPE. Added to this is a perception of clinical helplessness and a regret of not being able to assist patients as they would have liked to.

The third area of personal factors was strongly saturated with codes related to psychological aspects: fear of being infected and of infecting family members, perception of loneliness, increased levels of

anxiety due to the continuous state of alert regarding the modification of procedures and protocols. It is interesting to note that psychophysical fatigue was linked both to high levels of emotional stress, as well as to a lack of rest, therefore also to physical fatigue.

CONCLUSION

As we have seen, the mixed method (QN+QL) provided a fairly complete picture of the situation experienced by the health workers of the ASST Garda during the first wave of the Covid-19 epidemic. The results underline an urgent need to plan well-targeted interventions in order to support HCPs, especially for employees in the range of 15-25 years on the job. The protective factors that should be promoted as burnout prevention are: mindfulness, resilience and empowerment. The constant monitoring of the well-being of HCPs as research-action is highly recommended.

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