

Article

Hardiness, Stress and Secondary Trauma in Italian Healthcare and Emergency Workers during the COVID-19 Pandemic

Monia Vagni, Tiziana Maiorano , Valeria Giostra and Daniela Pajardi * 

Department of Humanities, University of Urbino, 61,029 Urbino, Italy; monia.vagni@uniurb.it (M.V.); tiz.maiorano@gmail.com (T.M.); valeria.giostra@uniurb.it (V.G.)

* Correspondence: daniela.pajardi@uniurb.it; Tel.: +39-072-230-5814

Received: 11 June 2020; Accepted: 9 July 2020; Published: 11 July 2020



Abstract: Emergency situations such as the COVID-19 pandemic can lead healthcare and emergency workers to undergo severe stress reactions that increase the risk of developing secondary trauma. Hardiness is a protective factor that reduces the likelihood of negative outcomes such as secondary trauma. In this study, we analyzed the responses to physical, emotional, cognitive, organizational-relational and COVID-19 stress of 140 healthcare and 96 emergency workers. Decision-making difficulties due to high uncertainty and the fear of contracting the virus and infecting others were also considered. We aimed to detect which stressors caused secondary trauma and to assess the protective power of hardiness. Participants completed the questionnaire online measuring stress, secondary trauma and resilience. We performed a t-test, correlational analysis and hierarchical regression. The healthcare workers had higher levels of stress and arousal than the emergency workers group and those involved in the treatment of COVID-19 were exposed to a large degree of stress and were at high risk of developing secondary trauma. Commitment is associated with high levels of stress, arousal and intrusion, while control shows a protective function. Stress and hardiness result in 37% and 17% of the variance of arousal and intrusion, respectively.

Keywords: COVID-19; stress; secondary trauma; resilience; hardiness; healthcare workers

1. Introduction

1.1. Some Notes on the COVID-19 Pandemic

The coronavirus pandemic (COVID-19) is a totally new and unknown international public health emergency [1], and like the other viruses in the family of coronaviruses, it can cause a range of symptoms, from mild flu-like symptoms, such as cold, sore throat, cough and fever, to more severe ones such as pneumonia and breathing difficulties, and in some cases, death [2]. The COVID-19 emergency has significantly affected the working environment for healthcare workers and the provision of care has been emotionally difficult for them due to stress, uncertainty and stigmatization [3]. Healthcare workers and emergency workers have operated in extreme situations due to the rapid spread of COVID-19, high levels of infection, mortality in severe cases, lack of specific medicine, lack of PPE, no formal operative protocols and lockdown. Healthcare workers, but also emergency workers and paramedics, are usually exposed to traumatic events and often witness the death of patients. However, during the COVID-19 epidemic, there has been intense and long-lasting exposure to these factors, leading both health and emergency workers to develop the risk of post-traumatic stress disorder (PTSD) or secondary trauma (STS). Research has shown that healthcare workers can develop post-traumatic stress disorder (PTSD) following events such as SARS and MERS outbreaks [4–7], occasionally with a late onset after the end of the emergency [8].

1.2. Secondary Trauma in Healthcare Workers and Emergency Workers

Healthcare workers operating in emergency departments are at higher risk than workers from other departments of developing one or more symptoms of Vicarious Trauma or Secondary Traumatic Stress (STS) [9,10], a common occurrence during catastrophes [1]. Secondary trauma is defined as indirect exposure to trauma, through a firsthand account or narrative of a traumatic event, that may result in a set of symptoms and reactions similar to those found in people with posttraumatic stress disorder (PTSD) (e.g., re-experiencing, avoidance and hyperarousal). Concerning COVID-19, updated studies conducted on Chinese health personnel have already highlighted the strong impact of the epidemic on the psychological health of doctors and nurses. Some studies, which have focused on analyzing the stress of healthcare workers in dealing with COVID-19, show the presence of high levels of depression, anxiety, insomnia and distress in health workers related to the stressful experience [11–13]. Moreover, the severity of the symptoms was influenced by age, gender, role, specialization, kind of activity performed and direct exposure to patients with COVID-19.

A review of the literature [14] underlined that sociodemographic variables, such as age, gender, profession, workplace and psychological variables such as poor social support and self-efficacy, influence the stress perceived by health workers. In particular, female professionals with more than 10 years of experience and previous psychiatric pathology present more risk factors for developing the symptoms of stress, anxiety and depression [11,13]. Huang et al. [15] found, in a sample of medical staff during the COVID-19 emergency, that females showed higher levels of anxiety and PTSD than males and that the levels were higher for nurses than for doctors. Moreover, Li et al. [12] found that nurses had developed higher levels of vicarious trauma than the general population; nurses who did not work closely with COVID-19 patients were, however, at risk. They showed a more severe symptomatology, both physical and psychological, compared with their colleagues working on the frontline emergency. In Italy, a study conducted on healthcare workers [16] found that doctors and nurses developed higher levels of stress and anxiety than those in the general population, and that healthcare workers operating in the North, the area of Italy most affected, showed a more severe symptomatology. This study also confirmed that females tend to have a higher perception of the risk of infection and this increases their risk of developing anxiety and distress. In emergency work, there are also some additional risk factors, such as personality traits, that result in higher empathy towards the patient, and, therefore, greater vulnerability of the healthcare workers [10,17]. Some of these risk factors have presented themselves in a serious way during the COVID19 emergency: the unpredictability and rising infection rate [10], the repetitiveness of the exposure to trauma and suffering of patients [18,19], mortality and morbidity [18]. The mortality rate and the difficulty of finding effective treatment can be risk factors, as they lead nurses to experience feelings of helplessness as a result of not being able to save the patient [20]. The greater the intimacy with the patient and the more traumatic the incident, the greater the risk of STS occurrence [21]: the pervasiveness of COVID-19 and the cases of infection for staff are variables that contribute to the rise in this risk. In the first specific study on the risk of STS during COVID-19 conducted in China on a sample of 526 nurses (234 front-line nurses and 292 non-front-line nurses), it emerged that the level of STS in frontline nurses is affected by the level of closeness and sympathy they feel toward COVID19 patients and becomes a risk factor due to their involvement in patients' physical and psychological suffering.

1.3. Resilience and Hardiness as Protection Factors in Healthcare and Emergency Workers

Being exposed to negative events is normally associated with negative thoughts and emotions that can have negative consequences, especially on mental health [4–6]. However, studies on traumatic stress conducted in recent years in emergency healthcare have found that traumatic events may also be associated with positive changes after trauma and, therefore, may be perceived as a spur to personal growth [22]. Such positive personal changes may include self-perception, relationships with others and appreciation of life, which results from having coped with life crises. Changes in self-perception may lead workers to develop positive feelings about their character and competence.

People who manage to achieve positive changes after a traumatic experience describe an increasing sense of control and intimacy, and a greater ability to give meaning to their experiences [22,23]. The ability to cope with trauma and to achieve positive changes is strictly connected and promoted by resilience [23]. Several studies have shown that resilience is one of the factors that protect frontline emergency workers from secondary traumatization symptoms [24–28]. Furthermore, some studies show that even healthcare and emergency workers who care for COVID-19 patients are at risk of developing psychological consequences, including PTSD; those with resilience are better able to cope with the situation [4,5,18,24,25,29,30]. The essential characteristics of resilience, on a psychological level, are competence and control during a condition of stress caused by trauma (coping). To these can be added, as mentioned, recovery—that is, the progressive ability to return to the original condition, despite the severity of the trauma. Moreover, the possibility of useful learning, i.e., the ability to use the same skills for other stressful situations in the future, is increased by a strengthening of defenses and a subject's skills in dealing with difficult situations. Coping refers to cognitive and behavioral efforts to control, reduce or tolerate the internal and external demands of a stressful encounter. Coping is conceived as a process by which individuals manage to challenge the threat and demands placed upon them [31–33]. Resilience can, therefore, be understood as a process through which the individual is able to preserve him/herself from unpleasant life events, allowing for the control of stress and negative emotions. Resilience promotes perseverance and adaptation to the requirements of life, facilitates mobilization and leads a person to pursue potential remedies in difficult situations. Resilience also increases the tolerance of negative emotions and failures and plays an important role in preventing the negative consequences of negative life events [34,35]. People with a higher level of resilience are more positive and possess higher self-esteem and self-efficacy. Resilient subjects tend to experience difficulties as an opportunity to obtain new experiences, and to develop different decision-making processes [36].

Concerning healthcare workers, McKinley et al. [37] suggest that resilience may be difficult to conceptualize and that resilience levels in doctors are influenced by demographics, personality, organizational or environmental factors, social support, leisure, having overcome previous adversity and having undergone interventions to improve resilience [4]. Many studies agree in highlighting how resilience is a protective factor against the development of secondary traumatic stress and burnout among human service professionals [38] and in nurses [39–41]. Resilient healthcare workers would seem more likely to deal more effectively with stress and trauma [22,42,43] and, also, tend to have more optimism and flexibility, as well as better regulation of emotions [44]. Another reason as to why resilience is considered a protective factor is that it involves repair mechanisms from the negative effects of traumatic stress but also involves changes in personal resources—frustration can turn into opportunity [45–50]. This is also shown by the results of some studies [28,41,51], where nurses with higher levels of resilience are more able to reduce negative emotions and to learn more effective coping strategies to face job demands. These factors would play an important role in dealing with trauma and reducing negative outcomes. Furthermore, resilience appears to correlate positively with the level of positive posttraumatic change in a group of medical emergency workers [22,52] and firefighters [52]. The literature on resilience has highlighted the important role of both personality characteristics and environmental resources in promoting an adaptive response to changes [53–55]. Among the individual attributes associated with resilience, hardiness emerged as one of the traits that can preserve against the negative consequences of adverse life experiences. The construct of hardiness was originally developed by Kobasa [56]. It derives from an existential theory of personality [57,58] and has been defined as a personality trait that features three closely related tendencies: challenge, commitment and control. The term “challenge” reflects an outlook on life that enables an individual to perceive change as an opportunity for growth rather than a threat to one's sense of security or survival. Change rather than stability is seen as the normative mode of life. Individuals strong in “commitment” believe in the truth and value of who they are and what they are doing. They have a sense of meaning and purpose in work and relationships and are deeply involved rather than alienated out of fear,

uncertainty or boredom. The term “control” reflects a belief that one can influence the course of life events within reasonable limits. Hardy individuals have an internal sense of personal mastery, confronting problems with confidence in their ability to implement effective solutions, rather than feeling powerless or lacking self-confidence. Bartone [25] revealed that there was a relationship between hardiness and stress. The findings of this research revealed that hardiness was a defensive factor against stress-related diseases. Some studies have shown that health workers with higher hardiness levels enjoy better psychological well-being [59–61], and that hardiness is inversely correlated with stress in both doctors [29] and nurses [26,62–65]. Jamal [24] obtained similar results in a study conducted on a group of emergency workers. Several studies have investigated hardiness in nurses working in emergency departments or crisis units, highlighting how higher levels of hardiness are associated with higher levels of burnout [26,64–66]. Further studies in nurses have also shown that hardiness is an important predictor and has direct effects on their mental and physical health [67–69]. A study conducted on ambulance emergency workers has shown that workers with high levels of hardiness have lower levels of burnout, post-traumatic stress disorder and psychopathology in general [61]. In particular, of the three factors that make up hardiness, the Commitment scale was significantly associated with the levels of both burnout and post-traumatic stress disorder and general psychopathology. The controlling factor, on the other hand, had no significant correlation with post-traumatic disorder. Finally, the challenge factor correlated only with the components “emotional exhaustion” and “personal accomplishment” of burnout. Concerning pandemic events prior to COVID-19, it was highlighted that nursing staff from China to Liberia supporting the fight against Ebola had higher levels of resilience than the rest of the population [70].

Park et al. [71] highlighted how, in nurses employed in hospitals that treated patients with MERS-CoV, hardiness influenced mental health both directly and indirectly through stress, although the influence of direct effects was greater than that of the indirect effects. Another study relating to the healthcare workers employed during the MERS-CoV epidemic also revealed a partially mediating effect of resilience in the relationship between stress and psychosocial wellbeing [72]. Moreover, with regard to the COVID-19 pandemic, resilience, measured by the Connor-Davidson Resilience Scale (CD-RISC) in medical workers from other provinces in Wuhan fighting against COVID-19, was positively correlated with active coping and negatively correlated with depression and anxiety [23]. In other words, the resilience of medical workers in this study was negatively associated with depression and anxiety, indicating that resilience could be a protective factor. In addition, there was a positive association between resilience and positive coping—that is, medical workers who tend to adopt active coping techniques have higher resilience. Concerning resilience and age, a study [72] on 1472 healthcare workers during the peak period of the COVID-19 outbreak in China found that age was a moderator in the association between resilience and mental health in healthcare professionals, and that an increase in age (from young to middle-aged adults) attenuated the relationship between resilience and mental health. In particular, younger health workers showed a closer association between hardiness and mental health than middle-aged ones.

2. Objectives

The main objective of this study is to identify and measure the hardiness skills activated by healthcare and emergency workers to deal with stress factors related to the COVID-19 emergency that may be associated with the risk of developing vicarious or secondary trauma. In this study, a new questionnaire was used that, in agreement with the literature [1,15,73–75], included acute reactions to emotional, cognitive, physical, organizational and social relational stress factors. Moreover, reactions linked to difficulties due to ineffective decision-making and dealing with stress were also considered. Finally, healthcare workers’ fears of contracting the virus and of infecting their own families were specifically considered [1,15,74–76]. Based on the literature findings, the specific objectives were:

- (1). To examine the relationships between emergency stress, hardiness and secondary trauma in healthcare and emergency workers.

- (2). To identify significant differences concerning stress factors, hardiness and secondary trauma between a healthcare workers group and an emergency workers group.
- (3). To identify significant differences concerning stress factors, hardiness and secondary trauma between workers who worked with COVID-19 patients and workers who did not.
- (4). To analyze the predictive power of components of stress factors and components of hardiness on total stress by checking the models by age, gender, group and direct experience with COVID19 patients.

3. Materials and Methods

3.1. Participants

Participants from all Italian regions filled out the questionnaire online. The sample consisted of 236 participants, 97 males (41.1%) and 139 females (58.9%), with an average age of 43.24 (SD = 11.06; min 22/max 67). The gender variable was significant in the sample distribution ($\chi^2 = 7.48$; $p < 0.01$). The participants were divided into two groups: a "Healthcare" group consisting of 140 healthcare workers (59.3%): 64 doctors (45.7%); 55 nurses (39.3%); 11 operators (8%); and 10 psychologists (7%). The second group, called "Emergency," consisted of 96 operators (40.1%), of which 51 were ambulance workers (53%) and 45 were other operators (firefighters; police; Civil Protection) and equaled 47%. The distribution of the different professions involved in the study presented a difference in the distribution ($\chi^2 = 8.20$; $p < 0.01$). One hundred and thirty-four participants (56.8%) said they had come into direct contact with COVID-19 patients during the acute phase of the pandemic; 102 participants (equal to 43.2%) said they had never come into contact with COVID-19 patients. Whether or not they had come into contact with COVID-19 patients led to a different distribution in the sample ($\chi^2 = 4.34$; $p < 0.05$). An age difference between the two groups, since the emergency group was older ($t = -2.04$; $p < 0.05$), and a different distribution of the gender variable emerged between the Healthcare and Emergency groups, with 45 males and 52 females in the first group and 95 males and 44 females in the second ($\chi^2 = 11.41$; $p < 0.01$). In addition, 72.9% of the workers in the Healthcare group worked directly with COVID-19 patients, while only 33.3% ($\chi^2 = 36.25$; $p < 0.001$) of the Emergency workers did.

3.2. Procedure

This study used an online questionnaire that was presented for completion during the COVID19 pandemic. The questionnaire consisted of three parts: online informed consent, baseline sociodemographic information and an online battery of questionnaires, as described later. Data were collected anonymously. All procedures were approved by the institutional Ethics Committee.

3.3. Materials

In this study, questionnaires were administered to evaluate secondary trauma, emergency stress, dispositional resilience and the presence of stressful factors in each participant. We included in our battery the following questionnaires:

Secondary Traumatic Stress Scale—Italian Version (STSS-I) [77]: This is the Italian version of the Secondary Traumatic Stress Scale (STSS) [78], which is the only validated instrument to measure Secondary Trauma in Italy. The Italian version has been applied in other studies as evidence of its validity [79]. It is a 15-item self-reported questionnaire that measures indirect reactions to traumatic experience and allows for the verification of the presence and relative frequency of two symptoms of vicarious trauma, Intrusion and Arousal, corresponding to two subscales. In the Italian version the instrument consists of two scales (Arousal and Intrusion) and not three (including Avoidance) as in the original version. Some items of the original Avoidance Scale have been incorporated into the Arousal and Intrusion scales and, therefore, avoidance symptoms are also measured to some extent. In detail, Arousal items describe situations characterized by anxiety, confusion, various physical and psychological complaints and agitation. Intrusion refers to the re-experiencing of the traumatic

event—even if not directly suffered—through internal images and memories. Instructions for the STSS indicated that respondents should say how frequently an item was true for them over the past four weeks. The items are evaluated on a five-point scale (1 = never; 5 = very often) that provides scores for Intrusion (example items: “I thought about my work with victims when I did not intend to”; “Reminders of my work with clients upset me”) and Arousal (example items: “I had trouble concentrating”; “I was easily annoyed”; “I expected something bad to happen”; “I felt jumpy”). The STSS-I demonstrated good internal consistency for the two scales: Arousal ($\alpha = 0.87$) and Intrusion ($\alpha = 0.81$).

Dispositional Resilience Scale-15 Italian version (DRS-15) [80,81]: This is a self-reported questionnaire that measures Hardiness, consisting of 15 items, scored on a four-point scale ranging from 0 (not at all true) to 3 (completely true). The instrument includes positively and negatively keyed items covering the three conceptually important Hardiness components: commitment, control and challenge. The overall score ranges from 0 to 45, with higher scores indicating greater hardiness. In addition to the total score, the DRS yields scores for three subscales: Commitment, Control and Challenge. Since the Italian version has low reliability indices [80], the coefficient alpha was calculated on the answers provided by the participants of this study. The values obtained are: 0.67, 0.65, 0.70 and 0.72, respectively, for the scale commitment, control, challenge and total DRS, and the reliability levels obtained are not high, but acceptable.

Emergency Stress Questionnaire (ESQ): During emergency situations such as a pandemic, healthcare and emergency workers may be affected by several stress factors [75,76,82–86]. The healthcare and emergency workers in emergency situations may refer to physical, emotional, cognitive, decision-making, relational and organizational stress [75,76,83–86]. According to the literature, COVID-19 represents a factor of independent stress [87] and of great impact [15]. Starting with these considerations, we constructed the Emergency Stress Questionnaire consisting of 33 items assessed on a five-point Likert scale, with scores from 0 (not at all) to 4 (very much). The scales correspond to the factors identified and confirmed by factorial analysis through the analysis of the main components with an orthogonal rotation of factors (Varimax). The number of factors to be extracted was initially verified through the unit’s largest Eigenvalue criteria and, subsequently, by the Scree Test. The Emergency Stress Questionnaire is based on 6 scales: Organizational-Relational Stress, which measures stress levels related to the organizational context, the relationship between colleagues and social support (eight items); Physical Stress, which is made up of items describing symptoms of physical fatigue (five items); Inefficacy Decisional Stress, which revealed the self-effectiveness in decision-making processes (five items); Emotional Stress, which measured emotional reactions (six items); Cognitive Stress, which measured cognitive aspects of stress (four items); and COVID-19 Stress, which is made up of items describing worries related to the COVID-19 emergency (five items). The Emergency Stress Questionnaire showed good internal consistency ($\alpha = 0.93$) and also consistency for each individual scale: Organizational-Relational Stress ($\alpha = 0.71$), Physical Stress ($\alpha = 0.82$), Inefficacy Decisional Stress ($\alpha = 0.80$), Emotional Stress ($\alpha = 0.86$), Cognitive Stress ($\alpha = 0.72$) and COVID-19 Stress ($\alpha = 0.80$).

3.4. Preliminary Analysis

A first analysis was conducted by Pearson’s correlations between the variables of interest in this study ESQ, STSS-I and DRS-15. Table 1 shows the results of correlations.

Table 1. Pearson's correlation between ESQ, STSS-I and DRS-15 ($n = 236$).

	ESQ	STSS-I		DRS-15		
	Total Stress	Arousal	Intrusion	Commitment	Control	Challenge
ESQ						
Organizational-Relational Stress	0.747 ***	0.376 ***	0.198 **	−0.106 *	−0.154 **	−0.156 **
Physical Stress	0.702 ***	0.095	−0.04	−0.081	−0.196 **	−0.068
Inefficacy Decisional	0.596 ***	0.246 ***	0.205 **	0.004	−0.013	−0.054
Emotional Stress	0.756 ***	0.369 ***	0.110 *	−0.064	−0.043	0.005
Cognitive Stress	0.693 ***	0.462 ***	0.277 ***	−0.078	−0.052	−0.054
COVID Stress	0.671 ***	0.309 ***	0.113 *	−0.110 *	−0.028	−0.119 *
Total Stress	1	0.414 ***	0.142 *	−0.106 *	−0.140 *	−0.084
DRS-15						
Commitment	−0.106 *	0.023	0.156 **	1	0.479 ***	0.103 *
Control	−0.140 *	−0.136 *	0.068	0.479 ***	1	0.170 **
Challenge	−0.084	−0.071	−0.075	0.103 *	0.170 **	1
STSS-I						
Arousal	0.414 ***	1	0.479 ***	0.023	−0.136 *	−0.071
Intrusion	0.142 *	0.479 ***	1	0.156 **	0.068	−0.075

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; ESQ = Emergency Stress Questionnaire; STSS-I = Secondary Traumatic Stress Scale—Italian Version; DRS-15 = Dispositional Resilience Scale.

Preliminary comparisons were made through the Student's t-test between the Healthcare and Emergency groups in relation to the ESQ, DRS-15 and STSS-I scores. Table 2 shows the comparison between the two groups. Moreover, comparisons were made between groups according to whether they worked directly with COVID-19 patients or not. Table 3 shows the results of this analysis.

Table 2. Differences in ESQ, DRS and STSS-I between Healthcare ($n = 140$) and Emergency workers groups ($n = 96$).

	Healthcare Mean (SD)	Emergency Mean (SD)	t-Value	Cohen's d ¹
ESQ				
Organizational-Relational Stress	22.04 (4.69)	19.32 (3.61)	4.77 **	0.65
Physical Stress	10.09 (5.24)	8.07 (4.48)	3.07 *	0.41
Inefficacy Decisional	14.72 (2.47)	12.77 (2.47)	5.96 **	0.79
Emotional Stress	13.90 (3.85)	10.58 (3.49)	6.76 **	0.90
Cognitive Stress	8.65 (2.89)	6.10 (2.54)	6.98 **	0.94
COVID-19 Stress	15.18 (3.49)	12.85 (4.09)	4.68 **	0.61
Total Stress	84.54 (15.01)	69.69 (12.02)	8.60 **	1.09
DRS-15				
Commitment	9.81 (1.88)	10.49 (1.97)	−2.66 *	0.35
Control	10.39 (1.96)	10.65 (2.67)	−0.91	0.11
Challenge	7.96 (2.18)	7.92 (1.90)	0.15	0.02
STSS-I				
Arousal	26.48 (4.04)	23.69 (4.27)	5.06 **	0.67
Intrusion	15.11 (4.96)	14.56 (4.74)	0.86	0.11

* $p < 0.01$, ** $p < 0.001$; ESQ = Emergency Stress Questionnaire; DRS-15 = Dispositional Resilience Scale, STSS-I = Secondary Traumatic Stress Scale—Italian Version.; ¹ dimensions of the effect size of Cohen's d = low (0.20), medium (0.50), large (0.80); very large ($d > 1$).

Considering the Gender variable, differences in Physical Stress were recorded in the Healthcare group (Female: $M = 11.09$; $SD = 5.04$; Male: $M = 7.96$; $SD = 5.05$; $t = 3.44$; $p < 0.01$) and COVID-19 Stress (Female: $M = 15.62$; $SD = 3.28$; Male: $M = 14.24$; $SD = 3.77$; $t = 2.21$; $p < 0.05$). In the Emergency group, women showed greater Physical Stress (Female: $M = 9.41$; $SD = 4.70$; Male: $M = 6.94$; $SD = 3.99$; $t = 2.78$; $p < 0.01$) and Emotional Stress (Female: $M = 11.52$; $SD = 3.94$; Male: $M = 9.79$; $SD = 2.86$; $t = 2.49$; $p < 0.05$), while men had greater Inefficacy Decisional Stress (Male: $M = 13.37$; $SD = 2.34$; Female: $M = 12.07$; $SD = 2.46$; $t = 2.65$; $p < 0.05$). Females who worked directly with COVID-19 patients showed higher Physical Stress (Female: $M = 811.57$; $SD = 5.01$; Male: $M = 8.13$; $SD = 4.59$; $t = 4.09$; $p < 0.001$), Emotional Stress (Female: $M = 14.51$; $SD = 3.92$; Male: $M = 12.35$; $SD = 3.85$; $t = 3.20$; $p < 0.01$), and COVID-19 Stress (Female: $M = 15.91$; $SD = 3.19$; Male: $M = 14.55$; $SD = 3.66$; $t = 2.29$; $p < 0.05$).

In workers who had no direct contact with COVID-19 patients, there were no differences in the gender variable. Between males and females, there were no differences in the resilience and secondary trauma capacities. A significant difference emerged within the Healthcare group that worked with COVID-19 patients. Nurses showed higher stress scores on the COVID-19 scale than doctors ($F = 4.971$; $p < 0.01$; Bonferroni post hoc test: Nurses: $M = 16.45$; $SD = 3.01$; Doctors: $M = 14.38$; $SD = 3.12$; $t = 2074$; $p < 0.01$). Within the group of healthcare professionals who did not work directly with COVID-19 patients, there were no differences. In the Emergency group, there were no differences between workers treating COVID-19 patients and workers treating other patients.

Table 3. Differences in ESQ, DRS and STSS-I between COVID-19 Patient ($n = 134$) and No COVID-19 Patient Groups ($n = 102$).

	COVID-19 Patient Mean (SD)	No COVID-19 Patient Mean (SD)	t-Value	Cohen's d ¹
ESQ				
Organizational-Relational Stress	22.16 (4.32)	19.31 (4.18)	5.09 ***	0.67
Physical Stress	10.03 (5.10)	8.26 (4.77)	2.71 **	0.36
Inefficacy Decisional	14.74 (2.44)	12.86 (2.53)	5.75 ***	0.76
Emotional Stress	13.54 (3.46)	11.25 (3.70)	4.51 ***	0.59
Cognitive Stress	8.34 (3.01)	6.67 (2.78)	4.36 ***	0.66
COVID-19 Stress	15.30 (3.46)	12.83 (4.04)	5.04 ***	0.58
Total Stress	84.11 (14.78)	71.18 (14.25)	6.77 ***	0.89
DRS-15				
Commitment	9.87 (1.98)	10.38 (1.86)	-2.04 *	0.27
Control	10.47 (1.98)	10.53 (2.24)	-0.22	0.03
Challenge	7.89 (2.15)	8.01 (1.95)	-0.45	0.04
STSS-I				
Arousal	26.22 (4.13)	24.21 (4.39)	3.59 ***	0.47
Intrusion	15.28 (4.83)	14.37 (4.90)	1.43	0.19

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; ESQ = Emergency Stress Questionnaire; DRS-15 = Dispositional Resilience Scale, STSS-I = Secondary Traumatic Stress Scale—Italian; ¹ Dimensions of effect size of Cohen's d = low (0.20), medium (0.50), large (0.80), very large ($d > 1$).

4. Results

Multiple regression analyses were conducted to examine the predictive power of resilience scales in explaining the variance in the ESQ Total Stress score, including Age, Gender (Male vs. Female), Healthcare vs. Emergency group and COVID vs. No-COVID patient group. The model explained 34% of variance ($F = 17.091$; $p < 0.001$), and Gender (Beta = 0.160; $p < 0.01$), Healthcare vs. Emergency group (Beta = -0.338; $p < 0.001$), COVID vs. No-COVID patient group (Beta = -0.276; $p < 0.001$) and Control (Beta = -0.134; $p < 0.05$) emerged as significant predictors. Commitment, Challenge and Age did not emerge as significant predictors in the model when explaining the variance in Total Stress. Hierarchical regression models of emergency stress and resilience scales as predictors were conducted on Arousal and Intrusion levels of secondary trauma. Considering Age and Gender differences within the groups, these variables have been included in all models together with the Group variable (Healthcare vs. Emergency) and the COVID patients vs. No-COVID patients designation (see Table 4).

Table 4. Hierarchical regressions on Arousal and Intrusion ($n = 236$).

	AROUSAL		INTRUSION	
	Exp (B)	B	Exp (B)	B
Model 1				
Age	0.066	0.167 **	0.032	0.073
Gender	0.360	0.041	-1.001	-0.101
Healthcare/Emergency Group	-2.364	-0.268 ***	-0.597	-0.060
COVID Patients	-1.360	-0.155 *	0.722	-0.060
	$R^2 = 0.142$		$R^2 = 0.023$	
	$F = 9.473$ ***		$F = 1.375$ n.s.	

Table 4. Cont.

	AROUSAL		INTRUSION	
	Exp (B)	B	Exp (B)	B
Model 2				
Age	0.080	0.203 ***	0.036	0.083
Gender	0.565	0.064	−0.457	−0.046
Healthcare/Emergency Group	−0.721	−0.082	0.869	0.088
COVID Patients	−0.653	−0.075	−0.122	−0.012
ESQ				
Organizational-Relational Stress	0.176	0.180 *	0.120	0.110
Physical Stress	−0.207	−0.238 **	−0.196	−0.201 *
Inefficacy Decisional Stress	−0.042	−0.026	0.225	0.123
Emotional Stress	0.195	0.181 *	0.006	0.005
Cognitive Stress	0.452	0.315 ***	0.467	0.290 ***
COVID-19 Stress	0.063	0.056	0.011	0.009
	$R^2 = 0.339$		$R^2 = 0.142$	
	$\Delta R^2 = 0.197 ***$		$\Delta R^2 = 0.118 ***$	
	$F = 11.450 ***$		$F = 3.697 ***$	
Model 3				
Age	0.068	0.173 **	0.032	0.073
Gender	0.474	0.054	−0.625	−0.063
Healthcare/Emergency Group	−0.901	−102	0.493	0.050
COVID Patients	−0.802	−0.092	−0.246	−0.025
ESQ				
Organizational-Relational Stress	0.149	0.153 *	0.120	0.110
Physical Stress	−0.238	−0.274 ***	−0.189	−0.195 *
Inefficacy Decisional Stress	−0.068	−0.042	0.174	0.095
Emotional Stress	0.197	0.183 *	0.003	0.002
Cognitive Stress	0.467	0.325 ***	0.464	0.288 ***
COVID-19 Stress	0.094	0.085	0.020	0.016
DRS-15				
Commitment	0.404	0.180 **	0.454	0.181 *
Control	−0.411	−0.198 **	−0.026	−0.011
Challenge	−0.033	−0.016	−0.150	−0.063
	$R^2 = 0.374$		$R^2 = 0.172$	
	$\Delta R^2 = 0.035 **$		$\Delta R^2 = 0.031 *$	
	$F = 10.116 ***$		$F = 3.540 ***$	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Gender (1 = male; 2 = female); COVID Patients (1 = yes; 2 = no).

5. Discussions

The results of this study highlight how healthcare and emergency workers were exposed to numerous stressors associated with high arousal during the pandemic, as emerged from studies conducted on other epidemics [1,4–7]. Healthcare workers, however, showed higher levels of Organizational-Relational, Physical, Emotional and Cognitive stress than emergency workers. In the Italian context, in fact, healthcare workers had, in several cases, to re-organize their departments and, in the absence of clear and pre-existing procedure protocols, seem to have experienced greater decision-making uncertainty compared to emergency staff, sometimes failing to fully imagine the consequences of their intervention [1]. This exposed them to tensions in their teams, and led to uncertainty, frustration and helplessness when facing the disease and numerous deaths. The risk of being infected, as well as the risk of infecting their family members, was very serious, especially in hospital operators, where being in contact with COVID-19 patients or with contaminated environments was constant and prolonged. The scores on the COVID-19 scale of the ESQ questionnaire, which specifically measures the fear of developing the disease and spreading the virus to others, were very high for hospital operators, especially for those who were working in direct contact with COVID-19 patients. To have given aid and assistance to COVID-19 patients was a predictor of total stress, but not of secondary trauma. The predictive effect of the group and contact variables with COVID-19 patients recorded in model 1 were then absorbed by the stress scales. Other studies have found that, during an

epidemic, many healthcare workers are working on the front line in the treatment of patients and this can have repercussions for their health [71,88].

Working with COVID-19 patients, both in emergency and care phases, has led to the development of significantly higher levels of stress. There are also differences in stress factors related to the Gender variable. In particular, women tend to develop greater physical and emotional stress. An additional source of stress was the realization of the risk of contracting the virus and transmitting it to loved ones. On the contrary, men seem to have experienced a greater sense of decision-related ineffectiveness during the emergency phase. The stress related to the risk of COVID-19 infection was significantly higher in nurses than in doctors, because nurses had more constant contact with COVID-19 patients, as underlined in other studies [6,11,12,89].

Emergency workers' interventions with patients may have been carried out before a diagnosis of COVID-19, which may have limited their understanding of the situation as it related to the pandemic, but this did not preclude the development of stress reactions or secondary trauma.

The knowledge of a COVID-19 diagnosis and prolonged contact with and care of these patients by healthcare professionals may explain not only the perception of greater stress, but also the higher scores obtained on the Arousal scale, with a risk of developing symptoms of secondary trauma. Healthcare workers, unlike emergency workers, worked for days and weeks with hospitalized patients, having to cope with the impossibility, in some cases, of being able to provide them with the necessary care and perceiving a sense of helplessness in the face of numerous deaths on the ward. Furthermore, healthcare professionals, and especially nurses, also had to provide emotional support for patients who were unable to have contact with their family members. This may have led them to experience even greater emotional stress and physical exhaustion, which had an impact on Arousal levels.

In agreement with other studies, the provision of emergency intervention and care in emergency situations is associated with the risk of developing psychological illnesses, including PTSD [1,12,89]. However, high levels of secondary trauma, especially in terms of arousal, reduce the ability to control the situation, and this may lead to an increase in the perception of stress.

The results of this study show how Cognitive, Emotional and Organizational—Relational Stress have a predictive effect on Arousal. In the realm of Intrusion, however, cognitive stress seems to have the greatest impact. On the contrary, physical stress seems to have a negative effect on both Arousal and Intrusion. It is likely that individuals who tend to develop physical illnesses lack the ability to be aware of their negative emotions and thoughts, and this limits their perception of their level of stress. This phenomenon, which seems to be associated with the mechanisms of somatization, does not mean these subjects are not at risk of developing a mental disorder, but it removes awareness of their malaise from their conscience by removing images, thoughts, emotions, etc. that refer to the most negative aspects of the pandemic. The subjects may feel a lower state of arousal and their memories may be less intrusive. In this regard, it should be noted that in the Italian version both the Arousal and Intrusion scales contain items referring to Avoidance.

High stress and arousal conditions required workers to rely on skills of resilience. The literature notes that resilience has a protective role and, especially in the acute phases of an emergency, a particular role is given to hardiness [5,6,18,24,25,28]. The results presented, in accordance with other studies, reveal how Hardiness Scales are associated negatively with stress scales, particularly with Organizational-Relational, Physical and COVID stress [27,30,64–67]. They appear to have a significant effect on both Total Stress and Secondary Trauma, in accordance with what has been found in other studies [23,28,38–40].

The ability underlying the Commitment Scale, which has a positive, predictive effect on both Arousal and Intrusion, leads emergency and healthcare workers to be actively involved, capable of facing events and highly involved in reducing difficulties [25,28,42,43,80]. The trend recorded in this study by resilient and resistant operators of being very involved and committed may explain the positive association between Commitment and Arousal. The operators were involved in the study

during the acute phase of the pandemic—that is, when they were probably very absorbed and in a sort of hyper-involvement, due to the size and extent of the phenomenon.

In the acute phase of the pandemic, healthcare and emergency workers, probably due to the nature of their work and their predisposition to help others, may have made particular use of commitment resources. In fact, subjects with high commitment believe in the truth and value of who they are and what they are doing. This may have led them not to give up and to go on despite the strong sense of powerlessness and the constant witnessing of a high number of deaths. However, it would seem that healthcare and emergency workers increased or gained strength from their commitment, running the risk of a loss of strength and resources and thereby effectively increasing the risk of developing secondary trauma. According to the literature, these subjects may be at risk of developing burnout or mental illnesses in the long term [38–41].

The results of this study show that Commitment has a negative correlation with the Organizational-Relational Stress Scales, COVID-19 and Total Stress. Commitment, however, precisely because it leads operators to involvement, commitment and acting from a sense of justice and duty, has a predictive effect on secondary trauma. It is a positive association, in line with other studies that have found a positive association of the commitment scale with PTSD and other psychic pathologies, and at the same time, is inversely related to stress [25,61,71,80]. The Italian version of the intrusion ladder is made up of five items, two of which refer to Avoidance. A subsequent investigation might allow for the separation of Intrusion items from Avoidance items in order to verify how Commitment behaves with respect to the two types of symptoms.

According to Alexander and Klein [61], in the present study the Control Scale of Hardiness is negatively associated with PTSD. The scale of Hardiness Control assumes negative predictiveness with respect to both Stress and Arousal; this is more pronounced in the Healthcare group that assisted COVID-19 patients. The Control Scale detects how personal beliefs and actions can influence events. The Control Scale, therefore, seems to assume a protective role with respect to Total Stress and Arousal.

Since in the Italian version the Arousal and Intrusion scales also contain items that detect Avoidance, this may explain the negative effect of Control on the Arousal scale, since Control refers to the ability to regulate negative emotions. The effectiveness of Control in managing emotions has been found in other studies conducted on doctors and nurses [28,41,51].

In agreement with other studies, the presence of trauma related to stress reactions does not exclude the presence of positive responses. Studies on traumatic stress conducted on emergency and healthcare workers indicate how stressful events can be associated with positive changes in terms of self-perception, relationships with others and appreciating the results obtained. Resilience could, indeed, be a source of personal growth [22,23].

The Challenge scale of hardiness is able to consider a traumatic event as a stimulus to development. In the present study, the average Challenge scores are lower than for the other scales and in the lower average range overall [80]. Challenge does not assume predictive significance for stress or secondary trauma.

It is likely that in the acute emergency phase of the pandemic, operators were in difficulty and (over)committed. Coping with emergencies and with their immediate reactions may have left them no time or opportunity to consider their traumatic experiences or to attribute a different meaning to events characterized by high numbers of daily deaths.

However, the effect of Challenge might be observed at a later stage when the more traumatic aspects might have faded from memory and the operators have the time to reflect further on their experiences. Age shows a positive predictive effect on Arousal, if considered in association with other predictors such as resilience and stress factors, in explaining the symptoms of secondary trauma. These results seem to corroborate Hou et al. [73]: the mental health of middle-aged operators depends less on resilience and more on other factors, such as feelings of self-fulfillment and personal growth. The above results concern the reactions of the operators detected in the acute phase of the pandemic. It would be interesting to follow up and examine how hardiness resources act on secondary

trauma—for example, leading workers to activate other resources, such as those of Challenge, to protect against overcommitment.

The results of our study are in line with what has been highlighted by De Brier et al. [90], according to whom the mental health of healthcare professionals during epidemics requires a preservative approach. The authors suggest that a safe and efficient work environment should promote a personal sense of control that can maximize healthcare workers' resilience during a global health crisis such as the COVID-19 pandemic.

The results of this study highlight a relevant effect of stress on secondary trauma, while the components of hardiness have low correlations and low incidence. During the first phase of reaction to the pandemic, it is likely that hardiness skills are not able to constitute a highly effective protective factor or do not manifest owing to the seriousness of the situation. It is also necessary to consider that the present study is limited by the number of participants in relation to the low reliability/stability of the commitment and control scales that could have affected the final results. An extension of the sample or a follow-up retest would be of merit.

In emergency situations, such as the COVID-19 pandemic, it is also necessary to provide psychological support, training and supervision to healthcare professionals, and to help them reflect on how to react emotionally and psychologically to a catastrophic event [91]. Furthermore, healthcare organizations should provide healthcare professionals with information on how to manage stress, reduce burnout and increase resilience during a crisis of this magnitude [92]. In addition, resilience can be acquired through mental health training, which can improve an individual's sense of self-confidence and self-efficacy [93] and also, according to Buselli et al. [94], there is a need to encourage healthcare workers to empower their emotional and cognitive skills.

One limit of the research is the reliance on self-reporting tools as in the trend of international literature, even if they do not have control scales and allow for the detection of any response bias such as, for example, social desirability. The data collected in this study refer to the responses of the healthcare and emergency workers in the initial emergency. As part of a longitudinal study, a greater association of stress with coping and hardiness strategies is expected in phase two of the pandemic. Furthermore, in order to stabilize the symptomatic manifestations, the intrusive aspects of the trauma are likely to be greater. Over time, it is assumed that acute stress reactions subside the symptomatic remission, in which resilience and capacity to cope have proven effective or, on the contrary, a real structuring of secondary trauma and/or of burnout. Following these hypotheses, the authors are implementing a longitudinal research design by inserting new variables such as resilience, burnout and trauma related coping self-efficacy.

Author Contributions: Conceptualization, M.V., T.M., V.G., D.P.; methodology, M.V., T.M., V.G.; formal analysis M.V., T.M.; investigation M.V., T.M., V.G., D.P.; data curation, M.V., T.M.; writing—original draft preparation, T.M., V.G., M.V., D.P.; writing—review and editing, M.V., T.M., V.G., D.P.; visualization, T.M., V.G.; project administration, M.V., T.M., D.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: We would like to thank all the participants involved for the contribution they made to this study during this time of emergency.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Ornell, F.; Halpern, S.C.; Kessler, F.H.P.; Narvaez, J.C. The impact of the COVID-19 pandemic on the mental health of healthcare professionals. *Cad. Saúde Pública* **2020**, *36*, e00063520. [[CrossRef](#)] [[PubMed](#)]
2. Cirrincione, L.; Plescia, F.; Ledda, C.; Rapisarda, V.; Martorana, D.; Moldovan, R.E.; Theodoridou, K.; Cannizzaro, E. COVID-19 Pandemic: Prevention and Protection Measures to Be Adopted at the Workplace. *Sustainability* **2020**, *12*, 3603. [[CrossRef](#)]
3. Ramaci, T.; Barattucci, M.; Ledda, C.; Rapisarda, V. Social Stigma during COVID-19 and its impact on HCWs outcomes. *Sustainability* **2020**, *12*, 3834. [[CrossRef](#)]

4. Louise Duncan, D. What the COVID-19 pandemic tells us about the need to develop resilience in the nursing workforce. *Nurs. Manag.* **2020**, *27*, 22–27. [[CrossRef](#)]
5. Tam, D.K.P.; Lee, S.; Lee, S.S. Impact of SARS on avian influenza preparedness in healthcare workers. *Infection* **2007**, *35*, 320–325. [[CrossRef](#)] [[PubMed](#)]
6. Shih, F.J.; Turale, S.; Lin, Y.S.; Gau, M.L.; Kao, C.C.; Yang, C.Y.; Liao, Y.C. Surviving a life-threatening crisis: Taiwan’s nurse leaders’ reflections and difficulties fighting the SARS epidemic. *J. Clin. Nurs.* **2009**, *18*, 3391–3400. [[CrossRef](#)] [[PubMed](#)]
7. Kim, H.J.; Park, H.R. Factors affecting post-traumatic stress of general hospital nurses after the epidemic of Middle East respiratory syndrome infection. *J. Korean Clin. Nurs. Res.* **2017**, *23*, 179–188.
8. Lee, S.M.; Kang, W.S.; Cho, A.R.; Kim, T.; Park, J.K. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. *Compr. Psychiatry* **2018**, *87*, 123–127. [[CrossRef](#)]
9. Morrison, L.; Joy, P. Secondary traumatic stress in the emergency department. *J. Adv. Nurs.* **2016**, *72*, 2894–2906. [[CrossRef](#)]
10. Ratrout, H.; Hamdan-Mansour, A. Factors associated with secondary traumatic stress among emergency nurses: An integrative review. *Open J. Nurs.* **2017**, *7*, 1209–1226. [[CrossRef](#)]
11. Lai, J.; Ma, S.; Wang, Y.; Cai, Z.; Hu, J.; Wei, N.; Wu, J.; Du, H.; Chen, T.; Li, R.; et al. Factors associated with mental health outcomes among healthcare workers exposed to coronavirus disease 2019. *JAMA Netw. Open* **2020**, *3*, e203976. [[CrossRef](#)] [[PubMed](#)]
12. Li, Z.; Ge, J.; Yang, M.; Feng, J.; Qiao, M.; Jiang, R.; Bi, J.; Zhan, G.; Xu, X.; Wang, L.; et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. *Brain Behav. Immun.* **2020**; In Press.
13. Zhu, Z.; Xu, S.; Wang, H.; Liu, Z.; Wu, J.; Li, G.; Miao, J.; Zhang, C.; Yang, Y.; Sun, W.; et al. COVID-19 in Wuhan: Immediate psychological impact on 5062 health workers. *MedRxiv* **2020**. [[CrossRef](#)]
14. Beck, C. Secondary traumatic stress in nurses: A systematic review. *Arch. Psychiatr. Nurs.* **2011**, *25*, 1–10. [[CrossRef](#)] [[PubMed](#)]
15. Huang, J.Z.; Han, M.F.; Luo, T.D.; Ren, A.K.; Zhou, X.P. Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. *J. Ind. Hyg. Occup. Dis.* **2020**, *38*, E001.
16. Simone, L.; Gnagnarella, C. Differences between health workers and general population in risk perception, behaviors, and psychological distress related to COVID-19 spread in Italy. *PsyArXiv* **2020**. Available online: <https://psyarxiv.com/84d2c/> (accessed on 11 May 2020).
17. Eley, D.; Eley, R.; Bertello, M.; Rogers-Clark, C. Why did I become a nurse? Personality traits and reasons for entering nursing. *J. Adv. Nurs.* **2012**, *68*, 1546–1555. [[CrossRef](#)] [[PubMed](#)]
18. Adriaenssens, J.; de Gucht, V.; Maes, S. The impact of traumatic events on emergency room nurses: Findings from a questionnaire survey. *Int. J. Nurs. Stud.* **2012**, *49*, 1411–1422. [[CrossRef](#)]
19. García-Izquierdo, M.; Ríos-Risquez, M.I. The relationship between psychosocial job stress and burnout in emergency departments: An exploratory study. *Nurs. Outlook* **2012**, *60*, 322–329. [[CrossRef](#)]
20. Missouridou, E. Secondary posttraumatic stress and nurses’ emotional responses to patient’s trauma. *J. Trauma Nurs.* **2017**, *24*, 110–115. [[CrossRef](#)]
21. Luftman, K.; Aydelotte, J.; Rix, K.; Ali, S.; Houck, K.; Coopwood, T.B.; Teixeira, P.; Eastman, A.; Eastridge, B.; Brown, C.V.; et al. PTSD in those who care for the injured. *Injury* **2017**, *48*, 293–296. [[CrossRef](#)]
22. Ogińska-Bulik, N.; Kobylarczyk, M. Relation between resiliency and post-traumatic growth in a group of paramedics: The mediating role of coping strategies. *Int. J. Occup. Med. Environ. Health* **2015**, *28*, 707–719. [[CrossRef](#)] [[PubMed](#)]
23. Lin, J.; Ren, Y.; Gan, H.; Chen, Y.; Huang, Y.; You, X. Factors Influencing Resilience of Medical Workers from Other Provinces to Wuhan Fighting Against 2019 Novel Coronavirus Pneumonia, PREPRINT (Version 1). *Res. Sq.* **2020**. Available online: <https://europepmc.org/article/ppr/ppr122749> (accessed on 18 May 2020).
24. Jamal, Y. Coping Strategies as a Mediator of Hardiness and Stress among Rescue Workers. *Stud. Ethno-Med.* **2017**, *11*, 201–208. [[CrossRef](#)]
25. Bartone, P.T. Social and organizational influences on psychological hardiness: How leaders can increase stress resilience. *Secur. Inform.* **2012**, *1*, 21. [[CrossRef](#)]
26. Park, M.K. Relationship among hardiness, social support and burnout of nurses working in emergency department. *J. Korea Converg. Soc.* **2017**, *8*, 397–405.

27. Greinacher, A.; Nikendei, A.; Kottke, R.; Wiesbeck, J.; Herzog, W.; Nikendei, C. Secondary Traumatization, Psychological Stress, and Resilience in Psychosocial Emergency Care Personnel. *Int. J. Environ. Res. Public Health* **2019**, *16*, 3213. [[CrossRef](#)] [[PubMed](#)]
28. Ogińska-Bulik, N.; Michalska, P. Psychological Resilience and Secondary Traumatic Stress in Nurses Working With Terminally Ill Patients—The Mediating Role of Job Burnout. *Psychol. Serv.* **2020**. Advance online publication.
29. Jamal, Y.; Niloferfarooqi, Y. Professional life stress and coping strategies used by house-job doctors. *Stud. Ethno-Med.* **2016**, *10*, 132–139. [[CrossRef](#)]
30. Mealer, M.; Jones, J.; Moss, M. A qualitative study of resilience and posttraumatic stress disorder in United States ICU nurses. *Intensive Care Med.* **2012**, *38*, 1445–1451. [[CrossRef](#)]
31. Lazarus, R.S.; Folkman, S. *Stress, Appraisal, and Coping*; Springer: New York, NY, USA, 1984.
32. Tedeschi, R.G.; Calhoun, L.G. Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychol. Inq.* **2012**, *15*, 1–8. [[CrossRef](#)]
33. Prati, G.; Pietrantonio, L. Optimism, social support and coping strategies contributing to posttraumatic growth: A meta-analysis. *J. Loss Trauma* **2009**, *14*, 364–388. [[CrossRef](#)]
34. Connor, K.M. Assessment of resilience in the aftermath trauma. *J. Clin. Psychiatry* **2006**, *67*, 46–49. [[PubMed](#)]
35. Levine, S.Z.; Laufer, A.; Stein, E.; Hamma-Raz, Y.; Solomon, Z. Examining the relationship between resilience and posttraumatic growth. *J. Trauma. Stress* **2009**, *22*, 282–286. [[CrossRef](#)] [[PubMed](#)]
36. Semmer, N. Personality, stress and coping. In *Handbook of Personality and Health*; Vollrath, M., Ed.; Wiley: Chichester, UK, 2006; pp. 73–113.
37. McKinley, N.; Karayiannis, P.N.; Convie, L.; Clarke, M.; Kirk, S.J.; Campbell, W. Resilience in medical doctors: A systematic review. *Postgrad. Med.* **2019**, *95*, 140–147. [[CrossRef](#)] [[PubMed](#)]
38. Harker, R.; Pidgeon, A.M.; Klaassen, F.; King, S. Exploring resilience and mindfulness as preventative factors for psychological distress burnout and secondary traumatic stress among human service professionals. *Work* **2016**, *54*, 631–637. [[CrossRef](#)]
39. Back, A.L.; Steinhäuser, K.E.; Kamal, A.H.; Jackson, V.A. Building Resilience for Palliative Care Clinicians: An Approach to Burnout Prevention Based on Individual Skills and Workplace Factors. *J. Pain Symptom Manag.* **2016**, *52*, 284–291. [[CrossRef](#)]
40. Tseng, H.M.; Shih, W.M.; Shen, Y.C.; Ho, L.H.; Wu, C.F. Work Stress, Resilience, and Professional Quality of Life Among Nurses Caring for Mass Burn Casualty Patients After Formosa Color Dust Explosion. *J. Burn Care Res.* **2018**, *39*, 798–804. [[CrossRef](#)]
41. Yu, F.; Raphael, D.; Mackay, L.; Smith, M.; King, A. Personal and work-related factors associated with nurse resilience: A systematic review. *Int. J. Nurs. Stud.* **2019**, *93*, 129–140. [[CrossRef](#)]
42. Brown, S. The impact of resiliency on nurse burnout: An integrative literature review. *Med. Surg. Nurs.* **2018**, *27*, 349–378.
43. McCain, R.S.; McKinley, N.; Dempster, M.; Campbell, W.J.; Kirk, S.J. A study of the relationship between resilience, burnout and coping strategies in doctors. *Postgrad. Med.* **2017**, *94*, 43–47. [[CrossRef](#)]
44. New, A.S.; Fan, J.; Murrugh, J.W.; Liu, X.; Liebman, R.E.; Guise, K.G.; Tang, C.Y.; Charney, D.S. A functional magnetic resonance imaging study of deliberate emotion regulation in resilience and posttraumatic stress disorder. *Biol. Psychiatry* **2009**, *66*, 656–664. [[CrossRef](#)] [[PubMed](#)]
45. Siebert, A. *The Resiliency Advantage*; Berrett-Koehler: San Francisco, CA, USA, 2005.
46. Castelletti, P. La metafora della resilienza: Dalla psicologia clinica alla psicologia dell'assistenza umanitaria e della cooperazione. *Nuove Tend. Della Psicol.* **2006**, *4*, 211–233.
47. Masten, A.S. Resilience in developing systems: Progress and Promise as the fourth wave rises. *Dev. Psychopathol.* **2007**, *19*, 921–930. [[CrossRef](#)] [[PubMed](#)]
48. Masten, A.S.; Wright, M.O.D. Resiliency over the lifespan: Developmental perspectives on resistance, recovery, and transformations. In *Handbook of Adult Resilience*; Reich, J.V., Zautra, A.J., Hall, J.S., Eds.; Guilford Press: New York, NY, USA, 2009; pp. 213–237.
49. Gonzales, L. *Surviving Survival: The Art and Science of Resilience*; Norton: New York, NY, USA, 2012.
50. Robertson, D. *Build. Your Resilience*; Hodder: London, UK, 2012.
51. Foster, K.; Roche, M.; Delgado, C.; Cuzzillo, C.; Giandinoto, J.A.; Furness, T. Resilience and mental health nursing: An integrative review of international literature. *Int. J. Ment. Health Nurs.* **2019**, *28*, 71–85. [[CrossRef](#)]

52. Ogińska-Bulik, N.; Kobylarczyk, M. Association between resiliency and posttraumatic growth in firefighters: The role of stress appraisal. *Int. J. Occup. Saf. Ergon.* **2016**, *22*, 40–48. [[CrossRef](#)]
53. Bonanno, G.A. Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *Am. Psychol.* **2004**, *59*, 20–28. [[CrossRef](#)]
54. Masten, A.S. Ordinary magic: Resilience processes in development. *Am. Psychol.* **2001**, *56*, 227–238. [[CrossRef](#)]
55. Luthar, S.S.; Brown, P.J. Maximizing resilience through diverse levels of inquiry: Prevailing paradigms, possibilities, and priorities for the future. *Dev. Psychopathol.* **2007**, *19*, 931–955. [[CrossRef](#)]
56. Kobasa, S. Stressful life events, personality, and health: An inquiry into hardiness. *J. Personal. Soc. Psychol.* **1979**, *37*, 1–11. [[CrossRef](#)]
57. Kobasa, S.C.; Maddi, S.R. Existential personality theory. In *Current Personality Theories*; Corsini, R.J., Ed.; F.E. Peacock: Peacock, IL, USA, 1977.
58. Kobasa, S.C.; Maddi, S.R.; Zola, M.A. Type-A and hardiness. *J. Behav. Med.* **1983**, *6*, 41–51. [[CrossRef](#)]
59. Gito, M.; Ihara, H.; Ogata, H. The relationship of resilience, hardiness, depression and burnout among Japanese psychiatric hospital nurses. *J. Nurs. Educ. Pract.* **2013**, *3*, 12–18. [[CrossRef](#)]
60. Woo, M.H.; Suh, K.H. The influence of job stress and hardiness on physical and mental health among nursing home employees. *Korean J. Health Psychol.* **2008**, *13*, 91–109.
61. Alexander, D.A.; Klein, S. Ambulance personnel and critical incidents: Impact of accident and emergency work on mental health and emotional well-being. *Br. J. Psychiatry* **2001**, *178*, 76–81. [[CrossRef](#)] [[PubMed](#)]
62. McCalister, K.T.; Dolbier, C.L.; Webster, J.A.; Mallon, M.W.; Steinhardt, M.A. Hardiness and support at work as predictors of work stress and job satisfaction. *Am. J. Health Promot.* **2006**, *20*, 183–191. [[CrossRef](#)] [[PubMed](#)]
63. Soderstrom, M.; Dolbier, C.; Leiferman, J.; Steinhardt, M. The relationship of hardiness, coping strategies, and perceived stress to symptoms of illness. *J. Behav. Med.* **2000**, *23*, 311–328. [[CrossRef](#)]
64. Cho, H.N.; Kim, S.J. Relationship of job stress, hardiness, and burnout among emergency room nurses. *Korean. J. Occup. Health Nurs.* **2014**, *24*, 11–19. [[CrossRef](#)]
65. Henderson, J. The Effect of Hardiness Education on Hardiness and Burnout on Registered Nurses. *Nurs. Econ.* **2015**, *33*, 204–209.
66. Whitmer, M.; Hurst, S.; Prins, M. Intergenerational views of hardiness in critical care nurses. *Dimens. Crit. Care Nurs.* **2009**, *28*, 214–220. [[CrossRef](#)]
67. Harrison, M.; Loiselle, C.G.; Duquette, A.; Semenic, S.E. Hardiness, work support and psychological distress among nursing assistant and registered nurses in Quebec. *J. Adv. Nurs.* **2002**, *28*, 584–591. [[CrossRef](#)]
68. Hsieh, C.; Hsieh, H.; Chen, P.; Hsiao, Y.; Lee, S. The relationship between hardiness coping strategies and burnout in psychiatric nurses. *J. Nurs.* **2004**, *51*, 24–33.
69. Lambert, V.A.; Lambert, C.E.; Petrini, M.; Mei, X.; Zhang, Y.J. Workplace and personal factors associated with physical and mental health in hospital nurses in China. *Nurs. Health Sci.* **2007**, *9*, 120–126. [[CrossRef](#)] [[PubMed](#)]
70. Xu, Z.S.; Zhang, L.; Li, M.; Ren, H.; Song, C.P. Resilience of Nursing Staff from Medical Contingent of PLA to Liberia and Its Influence Factors. *J. Nurs.* **2017**, *24*, 23–26.
71. Park, J.S.; Lee, E.H.; Park, N.R.; Choi, Y.H. Mental health of nurses working at a government-designated hospital during a MERS-CoV outbreak: A cross-sectional study. *Arch. Psychiatr. Nurs.* **2018**, *32*, 2–6. [[CrossRef](#)] [[PubMed](#)]
72. Kwon, H.M.; Kim, T.H.; Choi, M.R.; Kim, B.J.; Kim, H.W.; Song, O.S.; Eun, H.J. The Effects of MERS (Middle East Respiratory Syndrome) Event on the Psychosocial Wellbeing of Healthcare Workers and the Public with the Mediating Effect of Resilience. *Korean J. Psychosom. Med.* **2017**, *25*, 111.
73. Hou, T.; Zhang, T.; Cai, W.; Song, X.; Chen, A.; Deng, G.; Ni, C. Social support and mental health among health care workers during Coronavirus Disease 2019 outbreak: A moderated mediation model. *PLoS ONE* **2020**, *15*, e0233831. [[CrossRef](#)] [[PubMed](#)]
74. Favretto, G. *Le Forme del Mobbing*; Raffaello Cortina: Milano, Italy, 2005.
75. Walton, M.; Murray, E.; Christian, M.D. Mental healthcare for medical staff and affiliated healthcare workers during the COVID-19 pandemic. *Eur. Heart J. Acute Cardiovasc. Care* **2020**, *9*, 241–247. [[CrossRef](#)]

76. Du, J.; Dong, L.; Wang, T.; Yuan, C.; Fu, R.; Zhang, L.; Liu, B.; Zhang, M.; Yin, Y.; Qin, J.; et al. Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. *Gen. Hosp. Psychiatry* **2020**, in press. [CrossRef]
77. Setti, I.; Argentero, P. Vicarious trauma: A contribution to the Italian adaptation of the Secondary Traumatic Stress Scale in a sample of ambulance operators. *Appl. Psychon. Bull.* **2012**, *264*, 58–64.
78. Bride, B.E.; Robinson, M.M.; Yegidis, B.; Figley, C.R. Development and Validation of the Secondary Traumatic Stress Scale. *Res. Soc. Work Pract.* **2004**, *14*, 27–35. [CrossRef]
79. Calogero, I.; Ferracane, G.; Lombardo, C.E.M.; Isgrò, R.; Micieli, S.; Cervellione, B. Risk factors and protection in teachers. *Int. J. Dev. Educ. Psychol. INFAD Rev. Psicol.* **2019**, *2*, 187–196. [CrossRef]
80. Picardi, A.; Bartone, P.T.; Querci, R.; Bitetti, D.; Tarsitani, L.; Roselli, V.; Maraone, A.; Fabi, E.; De Michele, F.; Gaviano, I.; et al. Development and validation of the Italian version of the 15-item dispositional resilience scale. *Riv. Psichiatr.* **2012**, *47*, 231–237. [PubMed]
81. Bartone, P.T. Test-retest reliability of the Dispositional Resilience Scale-15, a brief hardiness scale. *Psychol. Rep.* **2007**, *101*, 943–944. [CrossRef] [PubMed]
82. Del Missier, F.; Bonini, N.; Rumiati, R. *Psicologia del Giudizio e Della Decisione*; Il Mulino: Bologna, Italy, 2008.
83. Sbattella, F. *Manuale di Psicologia Dell'emergenza*; Franco Angeli: Milano, Italy, 2009.
84. Argentero, P.; Setti, I. Engagement and vicarious traumatization in rescue workers. *Int. Arch. Occup. Environ. Health* **2011**, *84*, 67–75. [CrossRef] [PubMed]
85. Fraccaroli, F.; Balducci, C. *Stress e Rischi Psicosociali Nelle Organizzazioni*; Il Mulino: Bologna, Italy, 2012.
86. Bellelli, G.; Di Schiena, R. *Emozioni e Decisioni. Come la Psicologia Spiega il Conflitto tra Ragione e Sentiment*; Il Mulino: Bologna, Italy, 2012.
87. Spoorthy, M.S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic: A review. *Asian J. Psychiatry* **2020**, *51*, 102119. [CrossRef]
88. Khee, K.S.; Lee, L.B.; Chai, O.T.; Loong, C.K.; Ming, C.W.; Kheng, T.H. The psychological impact of SARS on health care providers. *Crit. Care Shock* **2004**, *7*, 99–106.
89. Cabello, I.R.; Echavez, J.F.M.; Serrano-Ripoll, M.J.; Fraile-Navarro, D.; de Roque, M.A.F.; Moreno, G.P.; Castro, A.; Ruiz-Pérez, I.; Rd, R.Z.C.; Goncalves-Bradley, D. Impact of viral epidemic outbreaks on mental health of healthcare workers: A rapid systematic review. *MedRxiv* **2020**. Available online: <https://www.medrxiv.org/content/10.1101/2020.04.02.20048892v1.full.pdf> (accessed on 28 May 2020).
90. De Brier, N.; Stroobants, S.; Vandekerckhove, P.; De Buck, E. Factors affecting mental health of health care workers during coronavirus disease outbreaks: A rapid systematic review. *PsyArXiv* **2020**. Available online: <https://psyarxiv.com/w9uuxs> (accessed on 28 May 2020). [CrossRef]
91. Maldonato, N.M.; Bottone, M.; Chiodi, A.; Continisio, G.I.; De Falco, R.; Duval, M.; Muzii, B.; Siani, G.; Valerio, P.; Vitelli, R.; et al. Mental Health First Aid Service in an Italian University Public Hospital during the Coronavirus Disease 2019 Outbreak. *Sustainability* **2020**, *12*, 4244. [CrossRef]
92. Dewey, C.; Hingle, S.; Goelz, E.; Linzer, M. Supporting clinicians during the COVID-19 pandemic. *Ann. Intern. Med.* **2020**, *172*, 752–753. [CrossRef]
93. Chan, A.O.; Chan, Y.H.; Kee, J.P. Exposure to crises and resiliency of health care workers in Singapore. *Occup. Med.* **2013**, *63*, 141–144. [CrossRef]
94. Buselli, R.; Baldanzi, S.; Corsi, M.; Chiumiento, M.; Del Lupo, E.; Carmassi, C.; Dell'Osso, L.; Cristaudo, A. Psychological Care of Health Workers during the COVID-19 Outbreak in Italy: Preliminary Report of an Occupational Health Department (AOUP) Responsible for Monitoring Hospital Staff Condition. *Sustainability* **2020**, *12*, 5039. [CrossRef]

