



## Article

# COVID-19's Impact on Medical Staff Wellbeing: Investigating Trauma and Resilience in a Longitudinal Study—Are Doctors Truly Less Vulnerable Than Nurses?

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**Abstract:** This study examines the psychological repercussions of the COVID-19 pandemic on a medical team in an Israeli general hospital. The research explores the professional quality of life, burnout symptoms, secondary traumatic stress, and mindfulness among team members across three distinct phases of the pandemic. Analysis was conducted for different subgroups based on job roles and seniority, allowing for an evaluation of the phase-specific effects on ProQOL (Professional Quality of Life) and mindfulness. Results align with established crisis trajectories: honeymoon/heroic phases, inventory, disillusionment, and recovery. As a result of the prolonged pandemic and the need to change shifts and recruit staff to deal with the affected patients, it is an accumulative study not following the same person but the same ward and the same hospital. The findings suggest a negative correlation between compassion satisfaction and burnout, as well as between mindfulness and burnout/secondary traumatic stress. Unlike most studies, healthcare workers (HCWs) were less affected than doctors in all measures. This study highlights doctors' vulnerability and underscores hospital management's key role in promoting effective support for professional quality of life. This is especially important for male doctors facing distinct well-being challenges.

**Keywords:** COVID-19; healthcare workers; medical doctors; compassion satisfaction; burnout; secondary traumatic stress; coronavirus; mental health; mindfulness



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## 1. Introduction

### 1.1. Background on Healthcare Workers (HCWs) in Israel

According to a report [1], nursing is predominantly female-dominated (89.5%), with approximately 10.5% being men. Roughly 87% of nurses possess specialized medical training, and over 60% hold first or second degrees. Around 69% of nurses work in hospitals, while about 20% work in the community. The female/male ratio among nurses is 89.5% to 10.5%, respectively. For doctors, the male/female ratio is 61% to 39%, respectively.

### 1.2. Impact of Crises on Healthcare Workers

Crises, including major public health events like pandemics, often have a profound impact on medical staff, requiring psychological adjustments. In December 2019, cases of a new coronavirus infection (COVID-19) emerged in China's Hubei Province. This virus rapidly spread worldwide, leading the World Health Organization (WHO) to declare a COVID-19 pandemic on 11 March 2020. Throughout the pandemic, healthcare workers (HCWs) experienced heightened levels of anxiety, depression, and post-traumatic stress

disorder (PTSD), as well as an increase in burnout and compassion fatigue (CF), particularly among women and nurses [2].

The psychological and physical impact has been especially significant among HCWs, who face additional stressors specific to their roles [2–6]. Notably, certain nursing domains such as critical care, emergency nursing, oncology, pediatric nursing, mental health nursing, and midwifery have reported high percentages of secondary post-traumatic stress [7]. COVID-19 has significantly affected a substantial number of HCWs working with COVID-19 patients and within hospitals at large.

HCWs contend with heightened work demands and risks to their physical and mental well-being. This is compounded by significant infection rates (25–30% among physicians and 45–55% among nurses) [2]. They encounter intense work-related stressors, including extended working hours, stringent safety protocols, a continuous need for focus, reduced social interaction, and tasks they might not have been prepared for [8]. Additionally, HCWs grapple with the potential loss of colleagues and friends, or the risk of infecting loved ones [9,10]. A rapid systematic review revealed elevated rates of mental health disorder symptoms in HCWs (PTSD: 44.9%; depression: 27.2%; anxiety: 27.7%; and insomnia: 36.1%) [11].

Psychological distress in HCWs is attributed to uncertainty about workplace safety, irritability, insomnia, demoralization, and exhaustion due to escalating case numbers [12,13]. Furthermore, burnout, inadequate personal protective equipment, heightened levels of compassion fatigue (CF), and burnout can intensify moral distress [2,6,14]. The risk of contracting the disease, coupled with the ethical quandaries of care prioritization and poor working conditions, has exposed HCWs to severe psychological stress. This stress manifests as anxiety, depression (characterized by loneliness, sleep disruptions, difficulty concentrating, reduced initiative, sadness, and feelings of rejection) [6,15], CF, and burnout [4]. Factors like a high-risk work environment, young age, and prior psychological disorders contribute to anxiety, depression, and stress among HCWs [14–18], along with a higher likelihood of experiencing secondary traumatic stress (STS) due to patient deaths [19]. Consequently, HCWs exhibit a significant prevalence of mental disorders during the COVID-19 pandemic [20].

Numerous reports in the literature emphasize that frontline professionals directly involved in diagnosing and treating COVID-19 patients are more vulnerable than those not directly engaged with these patients [3,17,19,21]. Recent studies underscore that frontline HCWs, especially nurses, experience heightened anxiety [5,18,22] and STS [19]. This can be attributed to their responsibility for COVID-19 patient care and the lack of specific treatment guidelines and adequate support [3]. Additionally, research indicates that inadequate social support heightens the risk of depression and burnout [6].

A systematic review among Western frontline healthcare professionals demonstrated varying levels of stress, anxiety, depression, sleep disturbances, and burnout across healthcare professionals in different European and US countries [23]. Frontline personnel, particularly females and those in nursing roles, exhibited more pronounced symptoms [5,18,24–26]. Factors like shorter work experience, being single, having a negative perception, residing in high-incidence disease areas, and patient rudeness exacerbated stress [27–30].

Consistently, comparative results indicated higher anxiety levels among frontline professionals [5,8,14,24–26,31–33]. Female nursing personnel working closely with COVID-19 patients showed the greatest impact, with 40% compared to 15% in other categories [4,15,25]. Nurses demonstrated poorer mental health outcomes, higher anxiety disorder rates, and elevated percentages of vicarious trauma (29.16) and burnout (29.16) [4,34,35]. Another study assessed professional quality of life and mental health outcomes among HCWs. Female subjects reported greater stress, while frontline staff exhibited higher compassion satisfaction (CS). Burnout, secondary traumatization, first-line involvement, and ICU work were positively correlated with depression and anxiety [22]. Further research identified gender, age, anxiety, depression, and a history of past trauma as risk factors for secondary traumatic stress (STS) [5,18].

Burnout (BO) signifies compromised work-related psychological health, representing a chronic strain response to prolonged work-related stress [36,37]. It involves high emotional exhaustion, depersonalization, low personal accomplishment, frustration, feelings of powerlessness, loss of work enthusiasm, psychological exhaustion, and indolence (negative attitude, behaviors, and guilt) [12,35,37–39].

An escalation in professional stress often correlates with elevated levels of burnout. Prolonged strain due to excessive workloads, insufficient equipment, limited human resources, and a lack of workplace support has shown a positive correlation with burnout, leading to psychological and/or physical distress. Burnout is particularly prevalent among healthcare workers (HCWs), notably nurses (53.3%) compared to physicians (42.5%) [12,40]. This syndrome can heighten the risk of medical errors, thus jeopardizing patient safety and compromising care quality, alongside diminishing job satisfaction [38,41]. Physicians exhibiting high burnout and fatigue levels were inclined to neglect self-protection measures, escalating infection risks. This had additional repercussions, including depression, suicidal tendencies, medical ailments [38,41], anxiety, diminished satisfaction, and compromised care quality [3]. Over half of physicians experienced burnout [37,42].

Various factors have been linked to elevated burnout levels: younger age, female gender, occupation (nurses and physicians), work location (specialized COVID-19 units) [2,37], perceived COVID-19 threat [12], marital status, salary reduction, health problems, and direct contact with infected individuals. Those exposed to personal and work-related burnout included individuals experiencing marital status changes, salary reductions, health issues, and direct interaction with infected individuals [43]. Senior medical staff exhibited lower distress, while frontline workers demonstrated higher resilience levels [13]. A high-exposure environment correlated with increased endorsement of PTSD symptoms, burnout, anxiety, and depression. Conversely, resilience showed a mitigating impact on the endorsement of PTSD symptoms.

Secondary Traumatic Stress (STS) is a known PTSD stressor, particularly among HCWs treating traumatized patients. STS encompasses compassion stress, resulting in fatigue and re-traumatization. The re-experiencing of trauma can lead to compassion fatigue (CF), hindering the ability to empathize and support patients. It can also induce moral injury due to an inability to provide necessary care (e.g., due to resource scarcity) [3] or ethical conflicts arising from difficult decisions (e.g., age-based care decisions) [2]. Female HCWs reported significantly higher scores on the STS Intrusion subscale. Those without children exhibited higher scores across all STS subscales. STS was positively correlated with time spent with patients, exposure to patient deaths, and the severity of symptoms in friends or family members with COVID-19 [19].

Compassion satisfaction (CS) embodies the positive dimension of being a healthcare worker (HCW), linked to empathy and Quality of Care (QOC). CS potentially offsets compassion fatigue (CF) risks, given that stress and negative emotions are positively correlated with CF, while positive emotions align with CS [35]. Research conducted a few months after the pandemic's onset suggested an increase in CS, particularly among nurses, attributed to heightened media coverage that led to their perceived social recognition [44]. Consistent with these findings, research during the pandemic's peak revealed high CS levels (52.80%) alongside lower CF (41.80%) and burnout (36.04%) rates compared to prior studies [45]. This shift implied that HCWs were able to find a "sense of value and meaning in the work they do, perhaps bolstered by the public's emphasis on the 'essential' or even 'heroic' nature of their roles". The study further observed that CS correlated negatively with CF and burnout, while burnout and CF correlated positively. A similar sentiment was echoed by [44], who noted that the pandemic's unique circumstances allowed nurses to rekindle their motivation to provide care and heightened the visibility and social image of their work.

Quality of Working Life (QoWL) pertains to workers' perceptions and evaluations of their jobs [46]. Especially during the pandemic, poor patient outcomes have often led to diminished employee motivation. Decisions to leave organizations have been

associated with unfavorable working conditions [30,47]. Work engagement signifies a positive, fulfilling, affective motivational state of work-related well-being characterized by vigor, dedication, and absorption. Engaged employees possess high energy levels and a strong identification with their work [48].

Ruiz-Fernández et al. revealed that factors like resilience, empathy, and self-compassion influence whether care provided by HCWs leads to CS or CF/burnout. Mean CS scores were higher among nurses, whereas CF and burnout scores were elevated among physicians [44].

Mindfulness involves consciously directing attention to the present moment, experiencing it without judgment and acceptance, with the aim of responding deliberately rather than automatically. Mindfulness has been associated with reduced stress, anxiety, depression, improved mood, self-empathy, and empathy among medical students [49]. Furthermore, Ref. [50] found components of mindfulness to be positively linked with technical skills and resource utilization during simulation tasks. Additionally, Ref. [49] reported that in a sample of medical students, mindfulness was connected with lower stress levels before task initiation and facilitated stress management during tasks. Ref. [51] supports the notion that mindfulness is valuable for preventing and managing stress and burnout, enhancing empathy and patient communication, and being effective in anxiety treatment.

## 2. Materials and Methods

Medical personnel, including medical doctors (MDs) and healthcare workers (HCWs), affiliated with the Shaare Zedek Medical Centre in Jerusalem, Israel, were invited to take part in an online survey focused on assessing their work-related quality of life. The survey was conducted over four phases (T0–3) spanning from September 2019 to July 2021. In total, 1098 responses were gathered. Given the prolonged impact of the pandemic on staff composition, shifts, and employee deployment across various departments, a consistent group composition was not maintained. Instead, the survey aimed to capture trends among different professions during various phases, rather than tracking individual changes. Incomplete ProQOL questionnaire responses were excluded from the analysis. To ensure the independence of observations, responses with matching last four digits in their ID numbers were scrutinized for demographic consistency, leading to the removal of duplicate entries. The final dataset consisted of 468 participants, distributed across the phases as follows: T0 ( $n = 295$ ), T1 ( $n = 80$ ), T2 ( $n = 51$ ), and T3 ( $n = 42$ ). This participant pool included 171 doctors and 297 healthcare workers.

### 2.1. Materials

Demographics encompassed gender, age, profession type (doctor or HCW), job type (daily or shift worker), and seniority (10+ years' experience or under 10 years' experience).

The Professional Quality of Life questionnaire (ProQOL) is a self-report measure consisting of 30 items that evaluate both the positive and negative impacts of work. Each question is rated on a 5-point Likert scale and is divided into three subscales: compassion satisfaction (CS), burnout, and Secondary Traumatic Symptoms (STS). Subscale scores fall within the following ranges: CS—0–22 (low), 23–41 (reasonable/medium), and 42 and above (high); STS—0–22 (low), 23–41 (medium), and 42 and above (high); burnout—0–22 (low), 23–41 (moderate), and 42 and above (severe).

The Mindful Attention Awareness Scale (MAAS) is a 15-item, 5-scale questionnaire designed to assess mindfulness aspects such as awareness and present-moment attention. Sample questions include statements like "I tend not to notice feelings of physical tension or discomfort until they really grab my attention" and "It seems I am 'running on automatic' without much awareness of what I'm doing." While specific norms were not provided, an average score of 4 is considered indicative of moderate mindfulness.

### 2.2. Statistical Analysis

The statistical analysis was conducted separately for each subgroup based on job and seniority to discern the effects of different phases on ProQOL and Mindfulness.

The normality of continuous variable distributions was assessed using the Shapiro–Wilk test. When deviations from normality were observed, outcomes were summarized using the median and interquartile range [IQR]. Categorical variables were presented as counts and percentages.

To elucidate differences in ProQOL measures across the four phases, an initial Kruskal–Wallis test was executed, followed by a subsequent Dunn’s post hoc test.

ProQOL and mindfulness measures were stratified into three levels, as delineated in the materials. To compare distribution within each subgroup across phases, a chi-square test was employed.

Stacked bar plots were employed for the graphical representation of ProQOL measure distribution. These plots showcase bars stacked atop each other, with the height of each bar corresponding to the percentage of its respective category.

Correlation between ProQOL and mindfulness measures was assessed using Pairwise Spearman correlations, including 95% confidence intervals.

A *p*-value less than 0.05 was deemed statistically significant for all analyses. The statistical analyses were conducted using R version 4.1.2 (R Foundation for Statistical Computing, Vienna, Austria) and IBM SPSS Statistics for Windows, Version 28.0.1.1 (released in 2021, Armonk, NY, USA: IBM Corp.).

### 3. Results

#### 3.1. Participant Characteristics

The analysis encompassed a total of 171 doctors and 297 healthcare staff.

Doctors exhibited a median age of 40 with an interquartile range (IQR) of [34–50], while other staff members had a median age of 38 with an IQR of [31–46] (*p* = 0.009). Among doctors, 40% were female, contrasting with 91% among healthcare workers (HCW) (*p* < 0.001). Refer to Table 1 for an overview of participant characteristics.

**Table 1.** Participants characteristics.

	Doctor ( <i>n</i> = 171)	HCW ( <i>n</i> = 297)	Total ( <i>n</i> = 468)	<i>p</i> -Value
Age				0.0009
Median (IQR)	40.0 (34.0, 50.0)	38.0 (31.0, 46.0)	38.0 (32.0, 48.8)	
Gender				<0.001
Male	103 (60.2%)	27 (9.1%)	130 (27.8%)	
Female	68 (39.8%)	270 (90.9%)	338 (72.2%)	
Seniority				0.7013
≤10 years	91 (53.2%)	152 (51.2%)	243 (51.9%)	
>10 years	80 (46.8%)	145 (48.8%)	225 (48.1%)	

#### 3.2. General Effects of Phases among Doctors and HCWs

##### 3.2.1. Compassion Satisfaction

Before the onset of COVID-19, approximately 50% of both doctors and HCWs reported elevated levels of compassion satisfaction (CS) (score 42+), while the remainder indicated a moderate level of CS (score 23–41). Among doctors, a notable reduction in high CS levels was observed, declining from 45.8% before COVID-19 to 26.7% during phase 3 (*p* = 0.028). Conversely, among HCWs, the prevalence of high CS remained relatively stable, fluctuating from 49.2% to 44.4% during phase 3 (*p* = 0.7616). The median CS among doctors exhibited a significant decrease from 41 [37–45] at T0 to 38 [34.5–41] (*p* = 0.0233), while the median CS among HCWs remained constant at 41 throughout all phases.

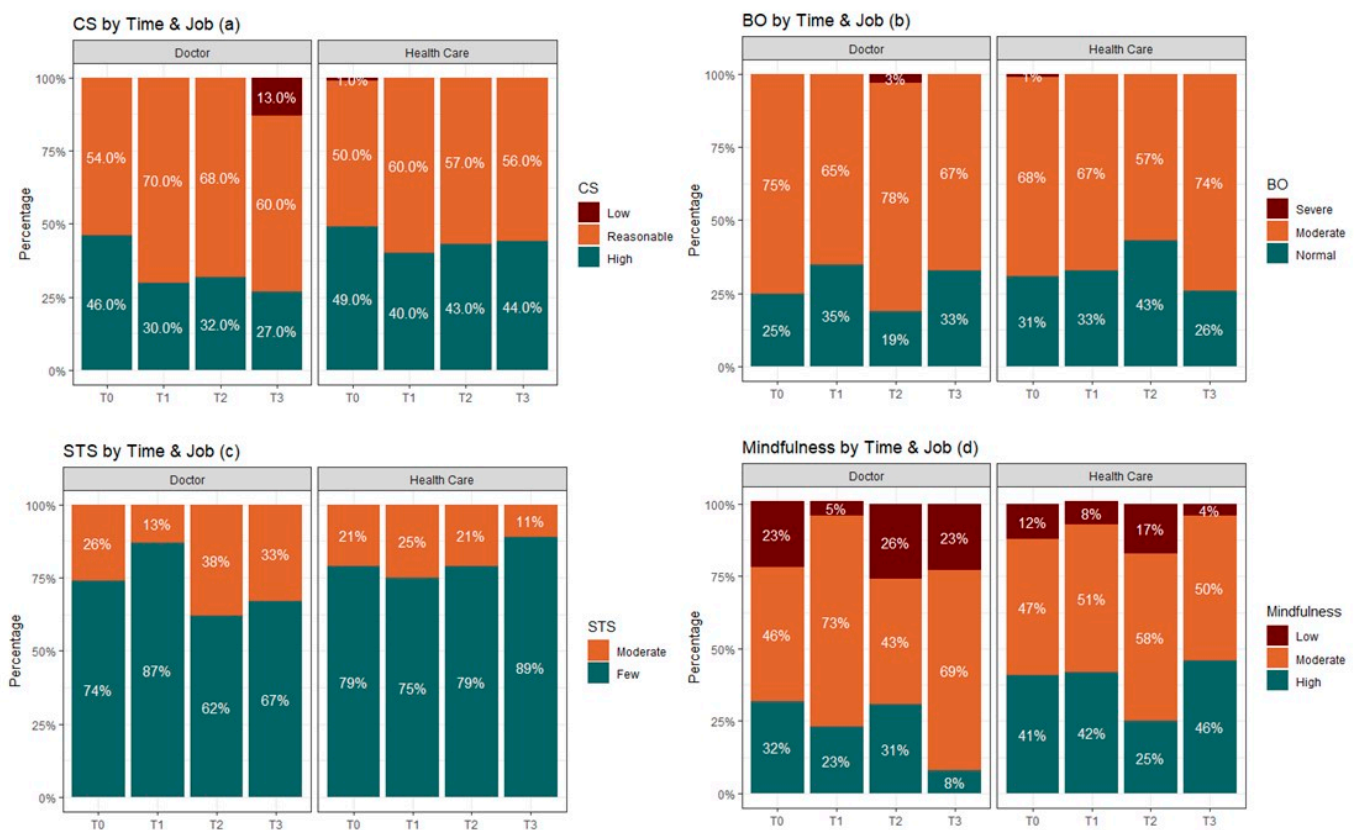
##### 3.2.2. Burnout

The phases of the pandemic did not exert a significant impact on burnout. Approximately 70% of both doctors and healthcare staff consistently reported moderate burnout levels (scores 23–41), with no discernible alteration over the course of time.



### 3.2.3. Secondary Traumatic Stress (STS) Levels

For both doctors and healthcare workers, the prevailing trend indicated low stress levels, with none reporting high stress levels. In the case of doctors, STS declined from 26% at T0 to 13% at T1, subsequently experiencing an increment in moderate stress during phase 2 (26% at T0 to 38% at T2). Among HCWs, a decrease was observed from 21% pre-COVID-19 to 11% during phase 3. Among doctors, STS witnessed another rise, reaching 38% at T2 and 33% at T3 (refer to Figure 1c).



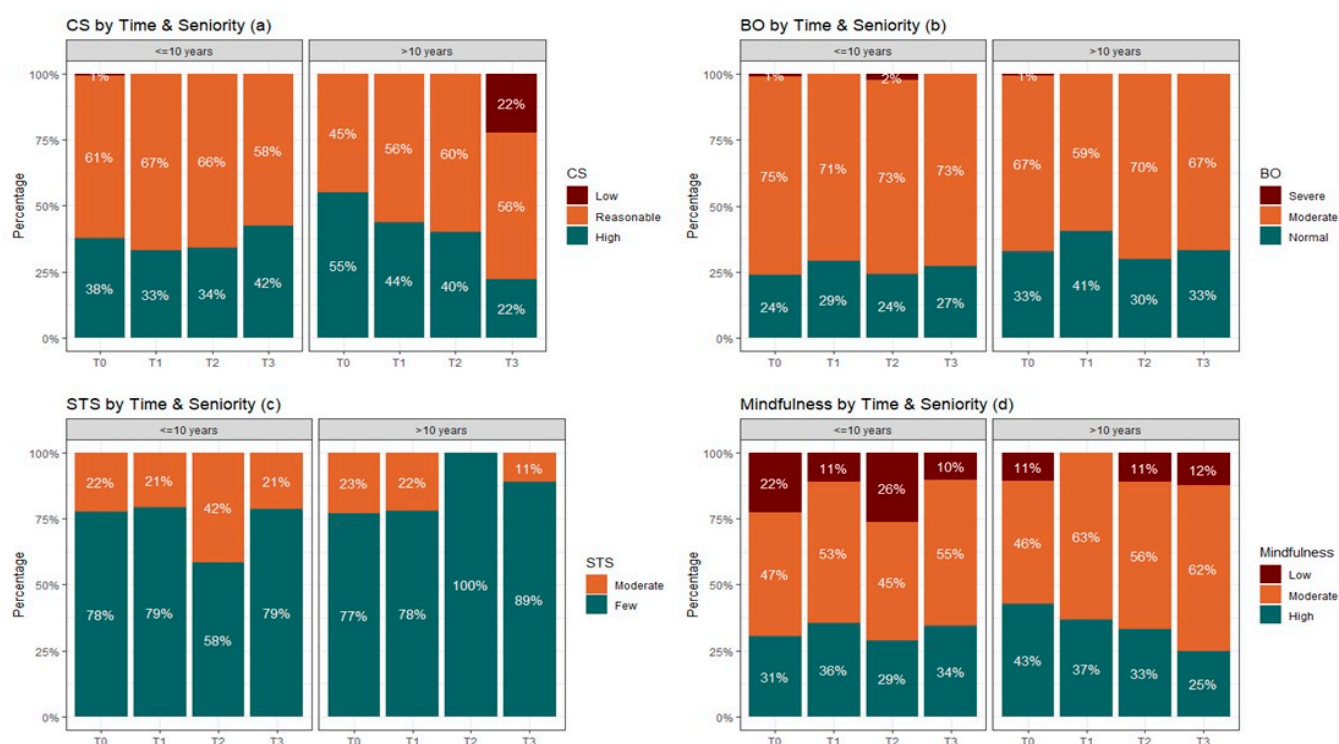
**Figure 1.** ProQOL and mindfulness distribution in four phases per job (doctors and HCWs). (a) CS, (b) burnout, (c) STS, and (d) mindfulness.

### 3.2.4. Mindfulness

At T0, 23% of doctors reported a low level of mindfulness, which notably diminished to 5% at T1. Over the passage of time, the percentage of individuals indicating high mindfulness levels (5–6) dwindled from 41% before the COVID-19 era to merely 8% during phase 3 ( $p = 0.1049$ ). Correspondingly, 41% of respondents reported high mindfulness before COVID-19, a proportion that exhibited relative consistency at 46% during phase 3 ( $p = 0.7756$ ). Upon comparison between males (largely doctors) and females (largely HCWs), a notable disparity emerged, with male mindfulness plummeting from 45% at T0 to none at T3 ( $p = 0.003$ ) (refer to Figure 1d).

Consistent correlations emerged across the various pandemic phases and between doctors and HCWs for all ProQOL measures.

Figure 2 showed the ProQOL and mindfulness distribution in four phases per seniority ( $\leq 10$  years and  $> 10$  years).



**Figure 2.** ProQOL and mindfulness distribution in four phases per seniority ( $\leq 10$  years and  $>10$  years). (a) CS, (b) burnout, (c) STS, and (d) mindfulness. The colors represent green, normal level; orange, moderate level; and dark red, extreme level.

### 3.2.5. Compassion Satisfaction (CS)

Significant strong negative correlations were observed with burnout among both doctors and HCWs ( $r = -0.544$  and  $r = -0.601$ , respectively).

Mild negative correlations were noted with Secondary Traumatic Stress (STS) for both doctors and HCWs ( $r = -0.179$  and  $r = -0.149$ , respectively).

Mild positive correlations were identified with mindfulness for both doctors and HCWs ( $r = 0.205$  and  $r = 0.280$ , respectively).

### 3.2.6. Burnout

Doctors and HCWs exhibited significant moderate positive correlations with STS ( $r = 0.475$  and  $r = 0.423$ , respectively).

Moderate negative correlations were evident with mindfulness for both doctors and HCWs ( $r = -0.418$  and  $r = -0.380$ , respectively).

### 3.2.7. Secondary Traumatic Stress (STS)

Negative and significant correlations were observed with mindfulness among doctors and HCWs ( $r = -0.529$  and  $r = -0.337$ , respectively).

Table 2 showed Spearman pairwise correlations of mindfulness and ProQOL per job and Spearman pairwise correlations of mindfulness and ProQOL per seniority.

**Table 2.** (a) Spearman pairwise correlations of mindfulness and ProQOL per job. (b) Spearman pairwise correlations of mindfulness and ProQOL per seniority.

<b>a.</b>								
	Doctors				Health Care Workers			
	r	p Value	95% CI		r	p Value	95% CI	
			Lower	Upper			Lower	Upper
CS—burnout	−0.544	<0.001	−0.644	−0.425	−0.601	<0.001	−0.671	−0.520
CS—STS	−0.179	0.019	−0.325	−0.025	−0.149	0.010	−0.262	−0.033
CS—mindfulness	0.205	0.009	0.048	0.353	0.280	<0.001	0.162	0.390
burnout—STS	0.475	<0.001	0.346	0.587	0.423	<0.001	0.322	0.515
burnout—mindfulness	−0.418	<0.001	−0.540	−0.277	−0.380	<0.001	−0.481	−0.269
STS—mindfulness	−0.529	<0.001	−0.634	−0.404	−0.337	<0.001	−0.442	−0.223
<b>b.</b>								
	Seniority							
	1 ≤ 10				2 > 10			
	r	p Value	95% CI		r	p Value	95% CI	
			Lower	Upper			Lower	Upper
CS—burnout	−0.571	<0.001	−0.652	−0.476	−0.575	<0.001	−0.659	−0.478
CS—STS	−0.235	<0.001	−0.354	−0.109	−0.052	0.437	−0.185	0.083
CS—mindfulness	0.299	<0.001	0.171	0.418	0.187	0.007	0.048	0.320
burnout—STS	0.436	<0.001	0.325	0.536	0.436	<0.001	0.320	0.539
burnout—mindfulness	−0.439	<0.001	−0.542	−0.323	−0.356	<0.001	−0.473	−0.226
STS—mindfulness	−0.413	<0.001	−0.519	−0.294	−0.413	<0.001	−0.523	−0.289

For doctors, the difference between over 10 years and under 10 years on STS showed that more doctors with less than 10 years reported more STS  $p = 0.008$ .

Figure 3 showed ProQOL and mindfulness distribution in four phases per gender difference.

The observed difference in mindfulness between males and females (in our case more among doctors than HCWs) suggests that the level of high mindfulness decreased among males compared to females ( $p = 0.003$ ).

Table 3 showed distribution of medical doctors to HCWs in four phases.

**Table 3.** Distribution of medical doctors to HCWs in four phases.

	T0	T1	T2	T3
Doctor	96 (32.5%)	23 (28.8%)	14 (27.5%)	15 (35.7%)
Health Care	199 (67.5%)	57 (71.2%)	37 (72.5%)	27 (64.3%)

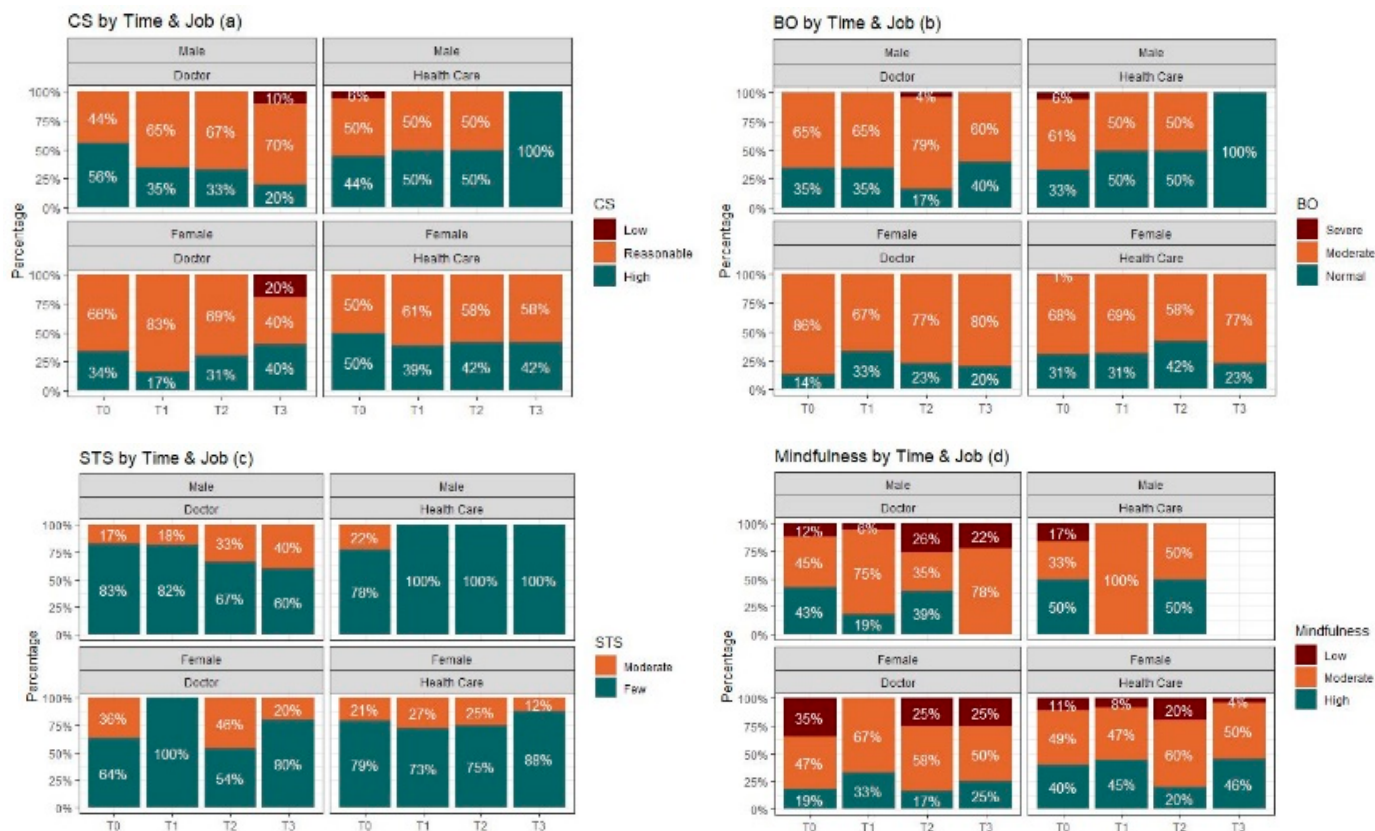
It seems that the ratio was kept almost constant throughout the study.

Figure 4 showed ProQOL and mindfulness distribution in four phases per gender difference within male vs. female doctors and male vs. female HCWs.





**Figure 3.** ProQOL and mindfulness distribution in four phases per gender difference. (a) CS, (b) burnout, (c) STS, and (d) mindfulness. The colors represent green, normal level; orange, moderate level; and dark red, extreme level.



**Figure 4.** ProQOL and mindfulness distribution in four phases per gender difference within male vs. female doctors and male vs. female HCWs, (a) CS, (b) burnout, (c) STS, and (d) mindfulness.

The observed gender-based differences suggest that male healthcare workers (HCWs) perform better than other medical team members. Male doctors' STS become worse over time, and a similar pattern is seen in burnout. Although mindfulness T-3 indicates mixed results male doctors still did not report high levels at the time.

#### 4. Discussion

The present study highlights a negative correlation between compassion satisfaction and burnout, as well as between mindfulness and burnout, which encompasses secondary traumatic stress. Notably, the impact of time on compassion satisfaction revealed a significant distinction between T0 (pre-COVID-19) and subsequent time points. Specifically, at T0, doctors reported the highest levels of compassion satisfaction, which progressively diminished in the subsequent periods. In contrast, compassion satisfaction among healthcare workers (HCWs) remained consistent.

Furthermore, the influence of time on mindfulness was also evident. Initially, doctors exhibited high levels of mindfulness at T0, but these levels decreased by T3. However, HCWs experienced a decline in mindfulness levels post-T0, followed by a return to T0 levels by T3.

In terms of doctors, a conspicuous decrease in compassion satisfaction was observed from the period before COVID-19 to the initial lockdowns and beyond. This diminished level of satisfaction persisted throughout the subsequent lockdowns. Notably, during the third measurement, occurring shortly after the commencement of vaccinations and coinciding with a significant rise in fatalities (from 2281 deceased to 3813 deceased) and an almost doubling of confirmed cases (from 297,526 to 523,931), there was a further reduction in the sense of compassion satisfaction. Furthermore, for the first time, a subgroup with low compassion satisfaction emerged. This could possibly indicate a manifestation of attrition within this subgroup.

Conversely, within the HCW group, no discernible change in compassion satisfaction levels was observed across all measurements.

The fluctuations in burnout levels persisted throughout the course of the pandemic. Simultaneously, the histograms suggest that attrition rates among doctors were notably higher compared to HCWs, particularly during the second lockdown. This could be attributed to the realization that COVID-19 is not a short-lived event, and as the number of deaths in Israel and globally increased, the awareness of the pandemic's severity grew (a phase referred to as the disillusionment stage). In Israel, the death toll surged nearly tenfold, rising from 289 deceased to 2281 deceased.

This same pattern continues with secondary traumatic stress (STS) levels, remaining consistent throughout the lockdowns. However, it became evident that among doctors, there are higher indicators of mental stress symptoms, particularly from the second lockdown onwards, in contrast to HCWs.

A similar trend is observed in mindfulness. During the third lockdown, doctors experienced a significant decline in their high levels of mindfulness (which are theoretically considered protective), plummeting from 32% of doctors reporting high mindfulness levels in a pre-COVID-19 situation to a mere 8% during the third lockdown.

Although this depiction does not attain statistical significance (please refer to the study's limitations), it suggests that doctors exhibit a more acute reaction compared to other HCWs. This is noteworthy, as most studies tend to indicate higher levels of reactions among HCWs.

Disparities in seniority become evident concerning STS, where doctors with less than 10 years of experience displayed higher STS than those with 10 years or more ( $p = 0.008$ ). However, the absence of significant differences in other measures might indicate that both senior and junior staff were unprepared and lacked awareness of COVID-19's characteristics, progression, and potential remedies.

These findings may potentially be attributed to what is termed the disillusionment phase within recognized trajectories that follow major and prolonged crises. In the immedi-

ate aftermath of a disaster, an initial phase characterized by heightened energy is dedicated to survival, rescue, and repair efforts. Altruism tends to be particularly pronounced among aid workers during this stage. However, as time progresses, the constraints of available resources become more evident, leading to feelings of fatigue and discouragement due to the immense demands required for restoration [52]. This phenomenon could be mirrored in the declining levels of mindfulness and compassion satisfaction observed over time.

Our study indicates that doctors, primarily male, exhibited more pronounced signs of fatigue across different time phases compared to nurses, who were predominantly female. This disparity reached a statistically significant level in the context of mindfulness. Specifically, the percentage of males (mainly doctors) with high mindfulness levels decreased from 45% at T0 to none. In contrast, among females (mainly HCWs), the proportion of those with high mindfulness levels was 45% at T0 and decreased to 36% by T3. This finding is innovative as other research conducted during the pandemic reported that women (largely HCWs) were reporting a greater psychological impact when compared to men [31,53,54].

Only one study has specifically mentioned that doctors exhibited a worse reaction, experiencing higher emotional exhaustion compared to nursing staff [55]. In contrast, several other studies have indicated that the majority of healthcare workers (HCWs) have faced negative impacts on their mental health during this challenging period [31,34,56]. Additionally, specific research has demonstrated that women tend to display heightened emotional sensitivity when confronted with aversive situations. Furthermore, women often exhibit moral reasoning that is directed towards others [57]. This behavior may also be influenced by societal gender norms. Yarnell et al. [58] point out that masculine social norms, emphasizing qualities like strength, emotional restraint, pragmatism, and independence, could discourage men from prioritizing self-care during times of distress. Consequently, this might lead to lower levels of self-compassion compared to qualities associated with nurturing, caring, and self-sacrifice, which align with feminine gender norms. As a result, women might be more inclined to prioritize patients' needs before their own, particularly in comparison to men. This inclination could contribute to higher levels of compassion satisfaction in women. It is worth noting that studies have demonstrated that men who adhere to masculine gender norms tend to exhibit heightened psychological distress [58].

When examining beyond professions, females showed more favorable outcomes in all measures. In general, HCWs had fewer symptoms and were better off in mindfulness and compassion satisfaction. Male HCWs were better than female HCWs in all measurements at (T3).

Male doctors initially exhibited higher mindfulness scores at the outset (T0). However, by T3, none of the male doctors retained a high mindfulness score, while 25% of their female counterparts reported elevated mindfulness scores. Regarding "low" mindfulness scores, a slight disparity in favor of male doctors is observable at 22% compared to the 25% observed among female doctors.

Male doctors reported twice the number of STS symptoms compared to female doctors. Male doctors experienced more burnout symptoms (BO) than female doctors at T3, but their scores were better than female doctors at T3. When compared to male HCWs, male HCWs had no symptoms of BO at T3.

At T3, both male and female doctors exhibited low compassion satisfaction (CS), with females having twice the low score of CS than male doctors but on high levels of CS, female doctors scored twice as male doctors.

A notable audit report from the Israel State Comptroller regarding medical activities in Israel during the COVID-19 pandemic underscored the healthcare system's shortage of manpower [59]. The report revealed that hospital wards were operating at very high occupancy rates even before the pandemic emerged. The report further highlighted that the treatment of severe COVID-19 cases faced bottlenecks due to the scarcity of medical personnel with expertise in intensive and respiratory care, as well as a lack of skilled nursing staff capable of managing patients in complex and severe conditions. In fact, general intensive care beds accounted for just 3% of all general hospital beds in Israel,

a significantly lower percentage compared to Western countries. Moreover, the number of general hospital beds per capita in Israel ranks among the lowest in OECD countries. Consequently, the extended duration of the pandemic, combined with limited knowledge and skills and inadequate hospital bed availability, exerted significant stress on both doctors and HCWs.

The latest Ministry of Health survey of burnout following COVID-19 in Israeli hospitals indicated that 42% of the doctors (mostly men) reported above 4 levels of burnout (on a 0–5 scale) whereas only 36% of nursing staff (mostly women) reported above 4 levels of burnout. Research by [60] found negative results concerning the psychological health of frontline doctors in Jordan. Only 28.2% of doctors in the study felt satisfied with the infection control policy at their institution, and only 19.8% felt safe at their workplace. More than 90% of doctors were concerned about transmitting the virus to non-infected patients or their families. This study also found that the more knowledge a doctor has about the virus, the higher their anxiety was regarding dealing with COVID-19 cases.

During normal times, distinct roles and procedures are observed between medical doctors and nursing staff. However, this demarcation became blurred during the management of COVID-19 patients. Whereas nursing staff are used to caring for and carrying out routine nursing jobs, doctors found themselves facing non-specific care tasks very similar to the nursing staff, with no heroic medicine, and a rather passive position of “wait and see”.

Events such as the COVID-19 pandemic highlight that existing support systems for healthcare workers (HCWs) enhance their emotional awareness, fostering more empathetic patient communication and greater effectiveness under stress [56]. In contrast to doctors, nurses prioritize supportive supervisors and team-oriented work settings, leading to a broader support network [61]. The absence of emotional recognition due to inadequate support can impact HCWs’ well-being, leading to disengagement, distress, and burnout, as indicated by [56]. An additional dimension pertains to the hierarchical stature of doctors within the healthcare paradigm, as evidenced by apparent differentials in workload, and the complex challenges they encounter. Nurses are often perceived as having lower status and less power compared to doctors in healthcare settings. This dynamic might lead nurses to develop a higher tolerance for ambiguity in their work. As a result, they may invest more in patient care and welfare, as reflected itself in the CS. Ref. [62] found that doctors’ heightened vulnerability in this context may stem from their roles as primary decision makers [31]. Within the observed phases of the COVID-19 pandemic, the notable deficiency in preparedness significantly influenced this particular outcome. The absence of well-defined treatment protocols and strategies for containing the virus, coupled with frequent modifications to regulations and protocols by the Ministry of Health (MOH), collectively contributed to a prevailing sense of perplexity and powerlessness. This was particularly challenging for individuals accustomed to assuming authoritative positions and being a fount of knowledge and direction within clinical settings.

#### 4.1. Limitations

The primary limitation of our study stems from the varying responses observed across the four distinct phases. This divergence can largely be attributed to the unprecedented impact of the pandemic itself. In the initial pre-COVID-19 phase, participants were relatively accessible and forthcoming due to the stability of their routines. However, as time elapsed and the pandemic unfolded, the challenges and demands faced by the hospital staff escalated significantly.

The evolving circumstances, including the escalating workload and heightened distress, played a significant role in shaping participants’ responses. The necessity to adapt to shifting schedules and to continually recruit additional staff to cope with the escalating number of affected patients had a discernible impact on our study sample. Notably, during the COVID-19 period, our study encountered reduced participation rates. This decrease can be attributed, in some instances, to the prevailing fatigue among the staff and, in others, to the overwhelming nature of their tasks. Furthermore, the situation was exacerbated

by instances where hospital staff were less responsive due to their direct involvement in patient care or were afflicted by the virus and subsequently placed in quarantine.

This variability further complicated our ability to attain conclusive results, especially with respect to achieving statistical significance. A larger sample size might have enabled us to uncover more definitive trends.

In conclusion, the current study offers valuable insights into the psychological impact of the pandemic on healthcare professionals. Still, it is crucial to acknowledge its limitations in terms of response variability and sample size.

#### 4.2. Recommendations

Emphasizing the significance of recognizing and addressing the emotional and psychological well-being of healthcare professionals during and after the pandemic is paramount. This calls for a comprehensive approach encompassing preparation, communication, leadership support, and robust mental support networks.

**Continued Monitoring and Measurement:** Sustaining the monitoring of the enduring effects of COVID-19 on healthcare professionals beyond the pandemic's decline is recommended. The transition from pandemic response to regular healthcare operations may introduce additional stress and difficulties for medical personnel.

**Preparation and Education:** Thorough preparation and education are pivotal for healthcare professionals to cope with the emotional and psychological toll of their experiences during the COVID-19 pandemic. This includes equipping them with the necessary tools and knowledge to manage the challenges they encounter.

**Clear and Accountable Leadership:** Effective leadership plays a pivotal role in assisting healthcare professionals during the transition back to normal operations. Leaders should offer clear guidance, support, and accountability throughout this period.

**Team Communication and Sharing:** Promoting open communication and the sharing of feelings, experiences, and responsibilities among healthcare teams aids individuals in managing overwhelming anxiety and prevents feelings of frustration and powerlessness.

**Recommendations from the Israeli Ministry of Health:** The Israeli Ministry of Health provides specific suggestions for supporting healthcare workers in addressing COVID-19 challenges [63]:

- **Encourage free expression:** Healthcare staff should be encouraged to express concerns if they encounter situations that could potentially harm patients.
- **Maintain inter-team communication:** Despite working in different shifts or capsules, continuous communication among healthcare teams should be prioritized.
- **Facilitate adaptation:** Support healthcare staff in adapting to the new work environment, which may involve changes in protocols and routines due to COVID-19.
- **Support from management:** Hospital management should provide support to ward managers and responsible nurses in establishing a mental support network for COVID-19 teams. This network can help them deal with difficult and abrasive situations while maintaining a balance between work and family life.
- **Flexibility:** Recognize that resilience strategies need to evolve over time. Stay updated with the latest research and adapt the training as needed.

**Novel recommendation—Resilience Training Unit:** A specialized resilience training unit within the hospital should be developed to address and mitigate issues related to compassion fatigue, compassion satisfaction, stress management, mindfulness, and self-nurturing among the hospital staff. This initiative could lead to improved staff well-being, better patient care, and enhanced overall hospital performance.

To achieve this goal, the following steps are recommended:

**Composition of the Resilience Training Unit:** The team should consist of members from various departments like Human Resources, welfare services, and mental health to ensure a holistic approach to addressing staff well-being and resilience.

**Ongoing Information and Training:** Regular information and training on compassion fatigue, compassion satisfaction, stress management, mindfulness, and self-nurturing are



crucial to equip staff with the tools and knowledge needed to manage the challenges and emotional demands of their roles effectively.

**Preventative Measure:** Proactive training and resources from the resilience training unit can prevent or reduce burnout, stress-related issues, and compassion fatigue among the hospital staff, leading to better patient care.

**Crisis Response Team:** A designated Crisis Response Team ready to intervene during major crises can offer psychological first aid, emotional support, and guidance to staff members affected by traumatic incidents.

**Advisory Role:** The resilience training unit can act as advisors to the hospital management during crises to ensure behavioral aspects and staff morale are maintained during challenging times.

**Support Sessions:** Leading support sessions after incidents or crises is essential for debriefing, emotional processing, and helping staff cope with the aftermath, contributing to faster recovery and resilience-building.

**Doctor Participation:** Engaging senior doctors and gaining their support is crucial for the initiative's success, encouraging other medical staff to participate and take the training seriously. Therefore, launching a campaign to involve senior doctors and gain their approval demonstrates the hospital's dedication to its staff's well-being, enhancing the campaign's impact via collaboration with influential figures within the medical community.

**Hospital Management Responsibility:** Direct responsibility from hospital management for the resilience training unit is vital, showing commitment to staff well-being and ensuring the team's credibility, as well as securing resources and time for training activities.

#### 4.3. Contribution to The Field

Our primary contribution centers around the identification of vulnerability among doctors, primarily male, in contrast to the predominantly female nursing staff and other health care workers as highlighted in the current study. This underscores a significant and sensitive concern regarding doctors in general and specifically male MDs who encounter challenges in seeking assistance.

Furthermore, we assert that our proposal to establish a dedicated resilience unit within the hospital addresses an essential requirement. This unit serves as a vital resource not only for managing "daily crises" but also for responding to incidents involving multiple casualties and pandemic situations.

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

**Data Availability Statement:** The consent forms the participants of this study signed stated: "The information collected from the questionnaire will be used for research purposes only, will be visible only to the research team, and will be stored in a protected site". We therefore cannot share the data but we will be happy to receive questions or request and will do our best to help.

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